Complementarity between generic organizational configuration and functional capabilities in the explanation of performance:

A fuzzy set analysis of the Thai non-life insurance industry

by

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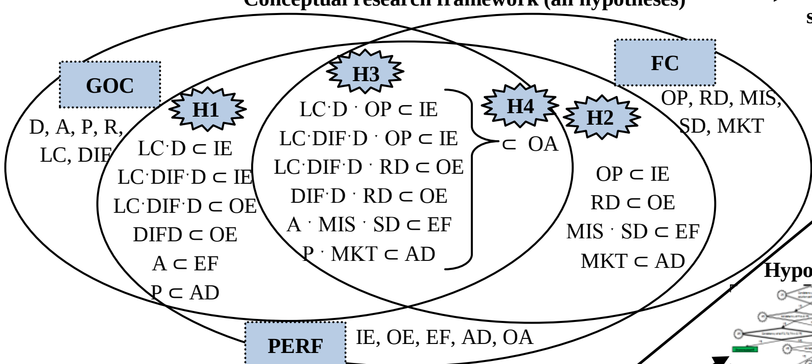
Quick Access List of Definitions, Abbreviations, Visualised Framework and Report Table Legend

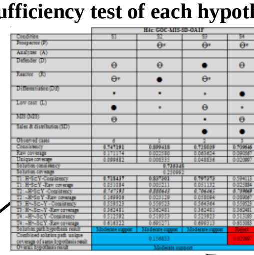
The next page is intended to be a loose page glossary to which readers may refer throughout this thesis.

Construct	Definition	Calibration 3 anchor points		
		0	0.5	1
GOC: Generic Organizational Configurations (Miles & Snow, 1978; Porter, 1980) Sets of firms (or business units) sharing a commonly occurring cluster of important organizational characteristics (e.g. strategies, goals, structures and processes) that reinforce each other to collectively serve a unifying thematic focus, which in turn defines "ideal types"				
D: Defender	Business units that have a narrow product-market focus to secure a stable market niche			
*In this dissertation, I hypothesize that D could be mixed with LC or DIF or both into **LCD**: Low-Cost Defender, **DIFD**: Differentiated Defender, or **BCD**: Best-Cost Defender, respectively.				
A: Analyzer	Business units that operate in 2 types of product-market domains, one that is relatively stable and the other in flux	3	4.5	7
P: Prospector	Business units that continually search for new market opportunities			
R: Reactor	Business units that respond to the challenges of the adaptive cycle in uneven and transient ways			
LC: Low-Cost Leadership	Business units that provide comparable products at lower cost than their competitors	Q1	Q2	Q3
DIF: Differentiation	Business units that tailor their products or services to fulfil a unique customer need, allowing organizations to charge a premium price to capture market share			
FC: Functional Capability (Day, 1994; DeSarbo et al., 2005) Complex bundles of skills and accumulated knowledge related to a particular type of day-to-day operational activity, especially the principal functional area of the firm within line and staff activities, that enable firms to coordinate activities and make use of their assets (or resources) to create economic value and sustain competitive advantage				
OP: Operations	Capability that integrates logistics systems, controls costs, manages financial and human resources, forecasts revenues, and manages marketing planning			
RD: Product design and R&D	Capability that pertains to production process efficiency, cost reduction, greater consistency in delivery, and greater competitiveness			
MIS: Management information system	Capability that helps an organization create technical and market knowledge and facilitates intra-organizational communication flow	Q1	Q2	Q3
SD: Sales & Distribution	Capability that relates to focused market sensing and linking outside the organization			
MKT: Marketing	Capability that integrates many marketing activities			
Perf: Performance Dimension (Walker & Ruekert, 1987; Grant, 2010): "f" after the acronym for each performance measurement (e.g. ad1f) means financial data for such measurement (ad1), otherwise surveyed data.				
IE: Input Efficiency	Cost reduction advantage: **IE**: Expense ratio (equivalent to overhead cost ratio)	Q1	Q2	Q3
OE: Output Efficiency	Revenue expansion advantage: **OE1**: Loss ratio (equivalent to gross profit margin), **OE2**: Investment Yield	Q1	Q2	Q3
EF: Effectiveness	Success of a business' products and programmes in relation to those of its competitors in the market: **EF1**: Net written premium growth (equivalent to sales growth), **EF2**: Relative market shares	Q1	Q2	Q3
AD: Adaptability	Success in responding to changing conditions and opportunities in the environment: **AD1**: Number of new products offered to the market within the past year, **AD2**: Percentage of net written premiums (equivalent to sales) of new products offered to the market within the past year	Q1	Q2	Q3
OA: Overall Performance Proxy	Increase in long-run profits with a view to maximizing the value of the firm: **OA1**: Combined ratio (equivalent to ROS), **OA2**: ROE	Q1	Q2	Q3

Conceptual research framework (all hypotheses)



Summary table fsQCA sufficiency test of each hypothesis



Legend: ● = Core causal condition present ϴ = Core causal condition absent

Core conditions are those that are part of both parsimonious and intermediate solutions.

• = Peripheral causal condition present ө = Peripheral causal condition absent

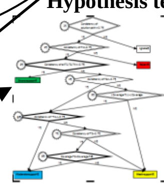
Peripheral conditions are those that only appear in the intermediate solution.

* =Trivial (low relevance) necessary condition Blank spaces = "don't care" condition

Bold number = above 0.7 consistency threshold level

Italic Bold number = above 0.7 consistency level and only used for T2, T3 and T4.

Hypothesis testing criteria



- = Reject
- = Weak support
- = Support
- =Strong support

fuzzy set Qualitative Comparative Analysis (fsQCA) Parameter (Ragin, 1987; Schneider & Wagemann, 2012).

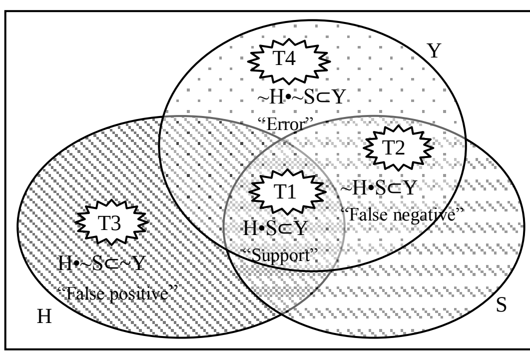
Consistency (quite similar to *confidence level* in quantitative analysis)

- Indicates to what degree the empirical data are in line with a postulated subset relation
- Expresses the percentage of cases' set membership scores in 2 sets that is in line with the statement that 1 of the 2 sets is a subset (for sufficiency test) of the other.
- $= \Sigma \min(x,y) / \Sigma \min(x)$ (x = causal condition, y = outcome) (min=0, max=1)

Coverage (quite similar to *explanatory power* in quantitative analysis)

- Assesses the relation in size between the condition set and the outcome set
- Expresses how much of the outcome is covered by the sufficient condition
- $= \Sigma \min(x,y) / \Sigma \min(y)$ (x = causal condition, y = outcome) (min=0, max=1)
- **Raw coverage**: Percentage of all cases' set membership in the outcome covered by a single sufficient path of an equifinal solution term (quite similar to r^2 concept)
- **Unique coverage**: Percentage of all cases' set membership in the outcome uniquely covered by a single sufficient path of an equifinal solution term (quite similar to *partial regression coefficient* concept)
- **Solution coverage**: Percentage of all cases' set membership in the outcome covered by the solution term (all solution paths).

Hypothesis testing for each solution path



Set relationship symbolic term

⊂ = subset relationship, reflecting sufficient condition

⊃ = superset relationship, reflecting necessary condition

~ = negation of the following condition.

+ = "or"= union operation in set relationship, denoting the set containing all the elements that are in either or both of the concerned sets.

• = "and"= intercept operation in set relationship, denoting the set containing all the elements that are in both of the concerned sets.

INUS condition = an insufficient but non-redundant part of a condition which is itself unnecessary but sufficient for the result

ACKNOWLEDGEMENTS

This thesis would have been impossible without the help, encouragement and support of a number of people. I sincerely thank all of them. First of all, I would like to express my deepest gratitude to my supervisor, Professor Michael Mol, who has supervised the research from its inception and has provided invaluable support, guidance and advice. He has always believed in my potential as a researcher. Professor Andy Lockett has offered supervision and his support has also been very much appreciated. My special thanks go to all the research participants who agreed to give their time and share their views and experiences, without whom the research would not have been completed. My heartfelt gratitude goes to my beloved parents, Pravitra and Soontara for their unconditional support, love and faith in me. This thesis is at least as much theirs as mine.

DECLARATION

I declare that this thesis is the result of my own individual research. I have followed the Guide to Examinations for Higher Degrees by Research, established by the Graduate School at the University of Warwick. I confirm that the thesis has not been submitted elsewhere for a degree at another university or professional qualification.

Sirus Pussayanavin

EXECUTIVE SUMMARY

Configuration is a classification system used to define sets of homogeneous organizations, the main objective of which is to increase the level of explained variance of key attributes across organizations (Dess, Newport & Rasheed, 1993). The impact of configuration on performance has attracted substantial support, resulting in its widespread use in research and teaching to categorize and understand organizations in diverse industries. However, over the last two decades many researchers have challenged the configuration-performance relationship (Ketchen et al., 1997; Short, Payne & Ketchen, 2008). For example, Barney and Hoskisson (1990: 187) have criticized its lack of theoretical and empirical rigour, recommending that research should focus not on configuration but on the performance implications of firm-specific characteristics. However, the resource-based view/capability theory which they recommend also lacks convincing empirical evidence (Newbert, 2007). Clearly, there remain areas for improvement regarding our understanding of the exact nature of performance generation, especially: 1) appropriate performance proxies for different types of configuration and capability (Walker & Ruekert, 1987); 2) potential complementarity between these two research streams to explain performance (Dess et al., 1995; Short, Payne & Ketchen, 2008); and 3) the notion of equifinality, which is a state in which the same outcome is achieved from different paths (Doty, Glick & Huber, 1993; Gresov & Drazin, 1997).

In this thesis, I propose that consistency between a business unit's generic organizational configuration (GOC) and a firm's functional capability (FC) provides a better explanation of corresponding performance dimension across business units than either factor on its own. I investigate five types of GOC based on a combination of Miles and Snow's (1978) and Porter's (1980) typologies, which I map onto four different FCs (DeSarbo et al., 2005) and four different intermediate outcomes. Traditionally, quantitative analysis better matches GOC and qualitative analysis is more suitable for FC (Hoskisson et al., 1999). Instead, I employ fuzzy set qualitative comparative analysis (fsQCA) (Ragin, 1987, 2000), a formal

analysis of qualitative evidence and small to medium-N situations using Boolean algebra to study causal complexity focusing on necessary and/or sufficient conditions for a desired outcome. This allows me 1) to explore exactly which combinations of GOC and FC provide sufficient conditions to achieve high levels of related performance dimensions; and 2) to examine equifinality (Fiss, 2007; Ragin, 2008). Based on causal asymmetry, this set theoretic approach is more appropriate to describe social science relationships than correlational tests that assume causal symmetry, the only causal assumption of methodologies available for previous researches (Ragin, 1987, 2000; Fiss, 2011). Therefore, the adoption of this new technique could also solve the methodological gap in this literature that partly leads to equivocal results in prior researches, which in turn mistakenly support falisification attempts for both GOC and FC theories, because these perceived inconsistency in former researches could actually be a normal situation of asymmetrical relationship (equifinality), a true nature of social science relationships. Moreover, fsQCA fits well with small to medium-sized sample that limits the use of traditional quantitative analysis. The context for this study is the Thai non-life insurance industry in 2011, focusing on a single industry in order to avoid the performance variation caused by differing industry conditions in multi-industry research (Conant, Mokwa and Varadarajan, 1990) which might affect the impact of GOC and FC, and to accord with the timing of the hypothesized cause-effect relationship, as well as to represent a novel setting – a service industry in an emerging market.

The findings suggest that scholars should consider organizational configuration and capabilities in a more nuanced manner and should assume compatibility between GOC and FC. This shifts the focus from negating and replacing the former with the latter to searching for an appropriate combination of the two, because finding a compatible combination may be more important for generating high performance than either factor individually. This research contributes to academic and practical knowledge of the configuration-performance relationship, enhances explanations of performance and mitigates the equivocal results of previous research studies, as well as supporting the equifinality notion. The results also suggest that these two well-established and parallel research streams are compatible, thereby bridging the gap between them. Furthermore, it suggests that future research should take a more holistic view regarding the creation of competitive advantage through both external (market power of GOC) and internal (efficiency of FC) causal factors. Finally, it will help managers to select a GOC compatible with their FC and to match this combination with an appropriate performance goal.

1 INTRODUCTION

Every business unit in an industry is constantly seeking to out-compete others by building its competitive advantage in order to achieve superior performance. There are two schools of thought on how to achieve this goal: positioning the business unit to best match the chosen market and take advantage of market power (Bain, 1956); or building capacity to enhance the productivity of the firm's resources in order to be more effective and efficient than others (Penrose, 1959). The long debate over which of these is more important has triggered the need for this thesis.

This chapter provides an overview of this thesis. Firstly, it will provide a background to organizational configuration, including attempts to negate this main research construct. It will then reveal both theoretical and methodological gap in this field which this thesis aims to address, followed by a statement of the research objectives and potential contributions of this study. Finally, it will propose some research questions, and conclude by outlining the structure of this thesis.

1.1 Background

Configuration is a classification system used to define sets of homogeneous organizations, the main objective of which is to increase the level of explained variance of key attributes across organizations (Ulrich & McKelvey, 1990; Dess, Newport & Rasheed, 1993). It aims to achieve brevity while presenting a rich description of organizations (Mintzberg, 1973; 1978; Miller & Friesen, 1977, 1984; Hambrick, 1983b). In essence, a configuration contains two elements: 1) a scheme to describe firms according to their strategically important constructs; and 2) a theoretical proposition regarding the performance outcome of these strategic designs (Campbell-Hunt, 2000; Short, Payne & Ketchen, 2008).

The typologies of Miles and Snow (1978) and Porter (1980) are the two dominant configurations, widely used in research and teaching to categorize and understand organizations in diverse industries according to their adaptability and sources of competitive advantage. Miles and Snow (1978) assert that a firm bases its adaptive strategy on its perception of its environment. Since different types of firm view their environments differently, they use different adaptive strategies, which in turn allow some firms to be more adaptive or more sensitive to their environments than others, leading to different performance outcomes. Each environmental situation favours a particular strategy. A less adaptive strategy (e.g. Defender) will be beneficial in a slowly changing environment, while a more adaptive strategy (e.g. Prospector) will be more advantageous in a volatile environment. For example, Apple has capitalized on the convergence of digital consumer electronics and computers by offering the iPod and iTunes Music Store (Grant, 2010). Porter (1980) argues that a firm achieves higher profits than competitors by supplying either an identical product at a cheaper cost or a differentiated product for which customers are willing to pay extra beyond the additional cost of differentiation. For instance, Southwest Airlines pursues a cost leadership strategy, using a single type of plane and flexible, non-union employees to provide their customers with a point-to-point, no-frills airline service at a competitive price, while Body Shop uses a differentiation strategy, offering a cosmetics and toiletries brand that values environmental and social responsibility (Grant, 2010).

The widespread use of configurations prompts a need to test their effects (Dess, Newport & Rasheed, 1993). The configuration-performance relationship has been challenged by many researchers over the last two decades (Ketchen et al., 1997; Campbell-Hunt, 2000; Short, Payne & Ketchen, 2008). Hatten and Hatten (1987: 329) claim that a strategic group (one type of configuration) is no more than "an analytical convenience". McGee and Thomas (1986) and Thomas and Venkatraman (1988) propose that empirical evidence of relationships between configuration and performance appears to be equivocal. Bacharach (1989) also argues that typologies are not supported by theories of causation and contingency. In addition, owing to a lack of theoretical and empirical rigour, which has led to two fundamental assertions being left untested ("strategic groups exist" and "the firm's performance depends upon strategic group membership"), Barney and Hoskisson (1990: 187) recommend that strategic group (configuration) research should be abandoned in favour of refocusing on the performance implications of firm-specific characteristics (resource-based view (RBV)/capability theory, Wernerfelt, 1984). Such criticism has created "swings of a pendulum" in strategic management theory and research (Hoskisson et al., 1999), with two key implications: theoretical and methodological implications, both of which suggest potential determinants of the current configuration-performance puzzle.

Firstly, it has shifted the theoretical focus of the source of performance from a business unit's external position (configuration) to a firm's internal characteristics (capability), highlighting the unconvincing empirical evidence of the former paradigm. These attempts to negate the value of configuration have raised concerns among its supporters, resulting in a number of research studies over the past fifteen years seeking to validate the existence of a configuration-performance relationship (e.g. Ketchen et al., 1997; Nair & Kotha, 2001; Leask & Parker, 2007; Short et al., 2007). However, although the latter paradigm, that of RBV/capability theory, has been in the ascendency, empirical evidence for a link between resource and performance is also equivocal (Newbert, 2007). This finding supports Hoskisson et al.'s (1999: 444) proposal that "[B]ecause the nature of strategy problems cannot easily be framed within a fixed paradigm, strategic management is necessarily a multi-paradigmatic discipline, requiring varied theoretical perspectives and methodologies". Evidently, there remain areas for improvement regarding our understanding of the exact nature of performance generation, especially 1) appropriate performance proxies for different types of configuration and capability (Walker & Ruekert, 1987), and 2) potential complementarity or a circumstance in which "doing more of one thing increases the returns to doing more of another" (Milgrom & Robert, 1995: 181) between these two research streams to explain performance (Dess et al., 1995; Short, Payne & Ketchen, 2008), particularly I anticipate that consistency between configuration (the posture of a business unit) and capability (the routine of a firm) in terms of similar practices will result in better performance than pursuing incompatible alternatives, as well as 3) the notion of equifinality, which is a state in which the same outcome is achieved from different paths (Doty, Glick & Huber, 1993; Gresov & Drazin, 1997). These are the key research theoretical gaps which this thesis aims to fill. Note that the latter two are based on causal complexity (conjunctural causation) and asymmetric relationship assumption (Fiss, 2007). Therefore, the methodology used to test them must share the same assumption.

Secondly, as a result of this theoretical shift, the dominant method for conducting strategic management research has also changed from positivistic, deductive, large-scale statistical analyses seeking to validate “scientific” hypotheses based on models abstracted from the structure-conduct-performance (S-C-P) paradigm of industrial organization economics (Bain, 1956), which is rooted in configuration, to normative, inductive, in-depth case-based studies of single firms or industries reintroduced by RBV, which is rooted in capability. However, Hoskisson et al. (1999) suggest that the apparent “dominance” of particular methodological tools does not mean that these tools are applicable to all research questions; rather, the research question and context of each study should dictate the choice of appropriate research methods. Hence, they expect that the future direction of strategic management research will be multi-paradigmatic, requiring varied theoretical perspectives (e.g. a balance between internal and external explanations of complex relationships) and methodologies (e.g. an integration of both methodologies or even a development of a new technique to overcome limitations in examining strategic management) in order to help explain firm performance. Evidently, both current dominant methods available to prior researches (i.e. quantitative and qualitative approach) are unable to properly test this research theoretical gap (i.e. complementarity, equifinality), resulting in equivocal evidences (inconsistencies) in previous researches, which in turn mistakenly supports attempts to falsify both research streams. A quantitative analysis (correlation-based approach) is inappropriate owing to the mismatch between the additive and symmetrical relationship assumption of this methodology and the core argument of this research regarding complementarity and equifinality, which are based on causal complexity (conjunctural causation) and an asymmetric relationship assumption (Fiss, 2007), a true nature of social science relationships (Ragin, 1987, 2000; Fiss, 2011). Therefore, the challenges regarding the equivocality of configuration and capability in prior researches could be counterargued that these are mistakenly based on the notion of causal symmetry whereas the actual nature of this social science relationship is asymmetrical. The existence of equifinality, if found in this research, would offers an alternative explanation for equivocal results, which in turn lends support to the validity of the relationship of both configuration and capability to performance. Likewise, qualitative methods cannot empirically test equifinality and cannot take a holistic view of the organizations, nor are they able to identify all combinations of interconnected attributes related to high performance from all possible combinations. These are the key research methodological gaps which this thesis also aims to fill.

Building on these two implications, I take a post-positivist stance in this thesis, specifically that of Lakatos (1968), modifying the peripheral assumptions (Lakatos's protective belt), to examine the interrelationship between a business unit's external position (organizational configuration) and a firm's internal characteristics (functional capabilities) to establish whether bringing together these two major areas of scholarship may better explain differences in performance. The logic is that a business unit must be able to align its market position with its firm's internal functional strength, and only when it does so will it be able to outperform others. In other words, these two causal factors must complement each other to achieve high performance. By improving the match between the predictions of "the research programme" and the results of observation, my thesis will contribute to what Lakatos calls "a progressive research programme".

Likewise, rather than using either quantitative analysis, which better matches GOC, or qualitative analysis, which is more suitable for FC (Hoskisson et al., 1999) as other previous researches do, I apply fuzzy set qualitative comparative analysis (fsQCA) (Ragin, 1987, 2000), which is the formal analysis of qualitative evidence and small to medium-N situations using Boolean algebra to study causal complexity focusing on necessary and/or sufficient conditions for a desired outcome. The reason to adopt this new experimental technique developed from other research streams is that its two main underlying assumptions allow me to truly examine complementarity and equifinality (Fiss, 2007; Ragin, 2008), the two main arguments of this thesis: First, based on the assumption that "patterns of attributes will exhibit different features and lead to different outcomes depending on how they are arranged" (Fiss, 2007: 1181), this technique is designed to distinguish the more relevant causal factors from the less relevant ones and therefore allows me to examine exactly which combinations of GOC and FC provide sufficient conditions to achieve high levels of related performance dimensions. This in turn solves quantitative method limitation that cannot explain how each variable is relevant to the outcome as well as solves qualitative method limitation that cannot identify all combinations of interconnected attributes related to high performance from all possible combinations. Second, based on causal asymmetry, fsQCA is more appropriate to describe social science relationships than correlational tests that assume causal symmetry (Ragin, 1987, 2000; Fiss, 2011). Therefore, the adoption of this new technique, instead of any other techniques available to and used by previous researches (i.e. quantitative and qualitative analysis), could solve the methodological gap in this literature that partly leads to equivocal results in prior researches. Moreover, fsQCA fits well with small to medium-sized sample size that limits the use of traditional quantitative analysis.

With regard to empirical data, I test my hypotheses on the Thai non-life insurance industry in 2011. As a single-industry study, this avoids the performance variation of multi-industry research caused by differing industry conditions (Conant, Mokwa & Varadarajan, 1990), which might affect the impact of the two causal conditions being investigated. Also, as a cross-sectional study, it matches well with the timing of the hypothesized concurrent cause-effect relationship, and represents a novel setting in this literature – a service industry in an emerging market.

In summary, by implication I argue that performance differences can best be explained by examining complementarity between GOC and FC. Therefore, the contribution of this thesis lies in bringing these two areas together and employing fsQCA, which fits the research question and the context better than a traditional methodology such as quantitative analysis.

1.2 Research objectives and potential contributions

In response to the aforementioned criticism of the lack of theoretical and empirical rigour, especially by Barney and Hoskisson (1990), I aim to conduct a holistic empirical analysis of all possible consistent combinations of GOC and FC and performance dimensions to provide theoretical and empirical support for the configuration-performance relationship.

Specifically, in terms of the theoretical issue, rather than arguing whether GOC or FC better explains performance, I propose that *neither is a universally better causal factor. Rather, both are essential, and thus it is better to consider them jointly because each offers a different perspective to explain performance*. GOC (Miles & Snow, 1978; Porter, 1980) draws on an external perspective (market power) while FC (DeSarbo et al., 2005) takes an internal perspective (efficiency). Therefore, I hypothesize that there is complementarity or a circumstance in which "doing more of one thing increases the returns to doing more of another" (Milgrom & Robert, 1995: 181) between GOC and FC and anticipate that, as a result of a reciprocal and mutually reinforcing effect, consistency between GOC and FC in terms of similar practices will provide a better explanation of performance than the pursuit of incompatible alternatives. According to complementarity theory, this situation called "supermodularity" stems from similarity or practices "of the same kind" (Milgrom & Robert, 1995). For example, the performance of a business unit pursuing a low-cost strategy is expected to be better if it belongs to a firm that has a strong operations capability rather than a strong marketing capability. With the flexibility to adapt to a new and more cost-efficient operations system, such a business unit may reduce its costs further and maintain its cost leadership status, which will be reflected in better performance. On the other hand, strength in the marketing function will not help reduce its costs; rather, it will actually require the business unit to spend more on marketing campaigns, which in turn will increase the overall cost and go against its configurational objectives (although this may impact positively on differentiation). This mismatch between GOC and FC will be reflected in unfavourable performance. By using fsQCA, a new research method based on causal asymmetry assumption, instead of any other techniques available to and used by previous researches (i.e. quantitative and qualitative analysis), this thesis could demonstrate the existence of complementarity, which would help mitigate criticisms of the theoretical weakness of configuration-related research and support its progress by improving its predictive ability and bridging the gap between these two well-established research streams. It is also expected that equifinality exists in this research context. This is a state in which the same outcome is achieved from different paths (Doty, Glick & Huber, 1993; Gresov & Drazin, 1997), when different GOCs or FCs or a combination of the two lead to the same levels of performance, and when different combinations of GOC and FC as well as different performance dimensions lead to the same level of overall performance proxy. As an implicit assumption of configuration, the existence of equifinality will not only mitigate the equivocal results of previous research, but will also strengthen the configuration notion.

With regard to empirical concerns, I build on the ideas that performance dimensions cannot all be achieved simultaneously because doing well on one dimension usually entails trade-offs with performance on another (Donaldson, 1984) and that business units should perform well on the performance dimensions most relevant to the type of strategy they are implementing (Walker & Ruekert, 1987; Dye, 2004; Van der Stede, Chow & Lin, 2006). I seek to prove that *different configuration typologies have different appropriate performance measurements*. Thus, the equivocal empirical results of previous research may be solved by tailoring performance dimensions to particular organizational configurations.

In addition, by providing a better understanding of past management actions, this research will enable managers to predict the likely consequences of decisions and competitive actions. This research may also help develop a clearer understanding of the impact of various GOCs and FCs on different performance dimensions. A better understanding of these relationships will result in improved strategy formation and implementation, especially in adjusting strategies and organizational resources to match changing environments and achieve performance goals.

1.3 Research questions

In order to address the aforementioned research objectives, the main research question is: *how do GOC and FC, either alone or in combination, affect different performance dimensions*? This is made up of four sub-questions as follows:

1. *Will the relationship between GOC (a business unit's common, strategically important constructs) and performance become less equivocal if researchers consider performance measures commensurate with different GOC typologies, rather than judging the GOC-performance relationship on only one performance measure for all GOC typologies*? The objective of this sub-question, which is addressed by H1, is to respond to the equivocal empirical evidence of previous investigations.
2. *How do a firm's FCs (firm-specific characteristics) relate to performance through measurements commensurate with each FC, especially compared with the corresponding GOC, to explain the same performance dimension*? The objective of this sub-question, which is addressed by H2, is to test whether firm-specific characteristics provide a better explanation than GOC, as suggested by Barney & Hoskisson (1990).
3. *To what extent do FCs complement the relationship between GOC and performance in different measurements, and does this combination provide a better explanation of the performance outcome than considering either construct in isolation*? The objective of this sub-question, which is addressed by H3, is to test whether there is complementarity between GOC and FC. The answer to this question may bridge the gap between these two concepts, rather than endorsing a single position in this long and controversial debate.

4. *Can more than one proposed combination of GOC and FC, as well as their corresponding performance dimensions, lead to an equally high overall performance outcome*? The objective of this sub-question, which is addressed by H4, is to test whether equifinality exists in the relationship: 1) between proposed combinations of GOC and FC and overall performance proxy; and 2) between performance dimensions (as intermediate outcomes) and overall performance proxy (as a final outcome). The answer to this question may support the configuration literature both by providing empirical evidence of equifinality, an implicit assumption that has largely been ignored in previous configuration research, and by providing a potential explanation for the equivocal empirical evidence of previous investigations.

1.4 Thesis structure

This thesis is organized into ten further chapters as follows.

Chapter Two discusses current knowledge, research gaps and development opportunities for organizational configuration and functional capabilities and their impacts on performance. These are each approached in the same manner, beginning with an introductory definition, then explaining the research focus and summarizing the existing literature, and finally developing proposed hypotheses for the relationship between each research construct and performance (H1, H2).

In Chapter Three, I argue in favour of complementarity and equifinality. The former provides a better explanation of performance than any current theory previously mentioned (H3) and the latter reveals the true nature of the relationship between all research constructs and performance (H4), which in turn supports the configuration literature. This chapter follows the same format as the previous one, comprising a definition, the research focus, the existing literature and proposed hypotheses.

In Chapter Four, I develop detailed sub-hypotheses for each main hypothesis formulated in the two previous chapters to explain all four performance dimensions and the overall performance proxy. In this regard, all GOC typologies (H1), FC types (H2), and their proposed compatible combinations (H3, H4) are hypothesized against relevant performance dimensions and overall performance proxies. All the research hypotheses are then summarized and presented in a visual format.

In Chapter Five, I justify post-positivism as the adopted research paradigm for this dissertation and discuss its implications with regard to both the hypotheses and the choice of methodology. I then give reasons for adopting fsQCA as the research technique and describe the technique in detail.

In Chapter Six, I introduce the research setting, which is the Thai non-life insurance industry, and offer reasons for its selection. I then describe its characteristics and provide a summary of an exploratory study that broadly supports the research hypotheses.

In Chapter Seven, I justify the operationalization of all research constructs used to test these research hypotheses, describing the measurement approach, the unit of analysis, and the calibration criteria required by fsQCA, which is the technique adopted in this research. I then discuss about sampling techniques and descriptive statistics of the collected data.

In Chapter Eight, I refer readers first to an in-depth example given in Appendix 13.4 of the fsQCA analytical process, including a justification of the rules and conditions used in the analysis and an explanation of the hypothesis testing procedure, because fsQCA is a relatively new technique and these procedures are applied to all tests in this research. Next, I explain the notation of the findings table introduced by Ragin and Fiss (2008) before reporting the findings from the first two main hypotheses. These are presented in a summary table with a brief interpretation and possible explanations for any deviations from the hypotheses, testing the relationship of each separate research construct (GOC in H1 and FC in H2) with different performance dimensions. This translates into four sub-hypotheses for each test, each of which is triangulated against both survey and financial performance data.

Finally, post-hoc analysis of each of the two main hypotheses is conducted to identify patterns and further implications.

In Chapter Nine, following the same format as the previous chapter, I report the findings from the last two main hypotheses, testing the relationship of both research constructs (GOC and FC) with different performance dimensions. This translates into four sub-hypotheses for each to test for complementarity (H3) and with an overall performance proxy to test equifinality between them (H4). Each is triangulated against both survey and financial performance data. Finally, post-hoc analysis of each of the two main hypotheses is conducted to identify patterns and further implications.

Chapter Ten comprises further discussion of the implications for both current (GOC and FC) and proposed theory (complementarity and equifinality), a generalization of the implications for practice in the insurance industry (both insurer and regulator) and in other industries, and a discussion of the limitations of this research regarding the dataset and technical issues.

In Chapter Eleven, I summarize this study by addressing each research question with the findings of each hypothesis and their theoretical implications.

2 CONFIGURATIONS, CAPABILITIES AND PERFORMANCE

In this chapter, I will identify a research gap in the literature of organizational configuration and of capabilities, arguing that taking into account only one of these is insufficient to cover all factors that affect performance.

I will begin by reviewing the relevant literature on organizational configuration (a multi-domain business unit classification framework which helps to describe and predict performance consequences), focusing on its implications for performance. This will include definitions (page 14), subcategory, research focus and supporting reasons (page 17). This review will aim to show that, while this concept is supported by some extant research studies, it has been challenged by others; and that, despite adjustments in response to the challenges, which to a certain extent prove that the configuration-performance relationship still holds, there is room to develop the level of performance predictability further because organizational configuration covers only a review of opportunities and threats in the environment (external appraisal) under the SWOT analysis model.

Building on the previous sections, an argument for the performance implications of GOC (H1) will be made (page 33) in order to show the direct effect of this research construct. Although this hypothesis has been tested in previous research studies, it is still required as a benchmark for the next step in this research, as well as to compare the results of this research methodology (fsQCA) with those of previous research.

I will then propose the inclusion of FCs, the principal functional areas of a firm that provide a source of competitive advantage, as another research construct which, when considered together, may improve our understanding of the performance implications, because FC considers the strengths and weaknesses of an organization (internal appraisal) under the SWOT analysis model, the two parts not covered by GOC. This section proceeds with a definition (page 43), the research focus and supporting reasons (page 46) and a review of the existing literature (page 51). This review aims to show that the capability-performance relationship is inconclusive and that both capability and configuration memberships are of equal importance in explaining performance differences between firms. This, and the fact that they are coexist and not mutually exclusive, support the main argument of this research that it is possible to enhance the level of performance explanation by simultaneously taking into account both factors (complementarity) and their unique characteristics (equifinality). These two main research arguments will be discussed in detail in the next chapter.

Building on the previous sections, an argument for the performance implications of FC (H2) will be made (page 55) in order to show the direct effect of this proposed research construct. Although, like H1, this hypothesis has been examined before, it is required as a benchmark for the next step of this research.

2.1 Organizational configuration

2.1.1 Definition

Many authors have offered their own definitions of organizational configuration. Those by key contributors include:

> A configuration represents a number of specific and separate attributes which are meaningful collectively rather than individually (Rosenberg, 1968).
>
> Organizational configurations can be defined as commonly occurring clusters of attributes of organizational strategies, structures, and processes (Ketchen, Thomas & Snow, 1993: 1278)
>
> ... any multidimensional constellation of conceptually distinct characteristics that commonly occur together (Meyer, Tsui & Hinings, 1993:1175)
>
> Configuration can be defined as the degree to which an organization's elements are orchestrated and connected by a single theme. Such themes can be found within or across categories. ... Two important properties contributing to the

degree of configuration are thematic focus and a close alignment of elements that serve that focus and reinforce each other (Miller, 1996: 509).

> Organizational configurations are defined as groups of firms sharing a common profile of organizational characteristics (Ketchen et al., 1997: 224).

> Configurations may be defined as constellations of organizational elements that are pulled together by a unifying theme … The first constellation is called the core, it consists of the mission, the means (the fundamental abilities and resources required to accomplish the mission) and the market … The second constellation includes the systems, processes, and structures that support the core … In a well-configured organization, there is harmony within and between the two constellations that creates the synergies required to make a company uniquely effective. In short, building a configuration is about two things: (1) making choices about what a company does and how it will do it, and (2) ensuring that the things a company does reinforce each other… (Miller & Whitney, 1999:5-6).

> Organizational configurations are sets of firms that are similar in terms of important characteristics (Short, Payne & Ketchen, 2008: 1053).

> ‘configuring’ school … is how the different dimensions of an organization cluster together under particular conditions, to define ‘states’, ‘models’, or ‘ideal types’ (Mintzberg, Ahlstrand & Lampel, 2009: 318).

These appear to have much in common, especially three main points: 1) that organizational configurations are sets of firms that are similar in terms of important characteristics; 2) that these characteristics commonly occur together as clusters because they are meaningful collectively rather than individually; and 3) that these characteristics reinforce each other to support a single theme that defines “ideal types”.

Hence, in order to incorporate all of these into a comprehensive description, I propose a summary definition of organizational configuration as ***sets of firms (or business units) sharing commonly occurring clusters of important organizational characteristics (e.g. strategies, goals, structures and processes) that reinforce each other collectively to serve a unifying thematic focus, which in turn defines "ideal types".***

Unlike other classification schemes such as *typology*, a theoretical conceptual classification scheme, and *taxonomy*, an empirically derived classification scheme, which represent only a single domain or one aspect of organizations, organizational configuration encapsulates a "relationship among elements representing multiple domains" (Dess, Newport & Rasheed, 1993: 776). Since organizational configurations are "composed of tight constellations of mutually supportive elements" (Miller, 1986: 236) and connected by a single theme (Miller, 1996), the presence of a certain element can be used reliably to predict the remaining elements (Miller & Mintzberg, 1984). Thus, "organizations are best understood as clusters of interconnected structures and practices, rather than as modular or loosely coupled entities whose components can be understood in isolation" (Fiss, 2007: 1180).

By organizing a variety of data into a manageable number of common, predictively-useful (meaningful) types, organizational configuration allows researchers to explain and predict the success and failure of a firm under particular circumstances (Short, Payne & Ketchen, 2008). Organizational configuration seeks to address the three main goals of organizational research: description, explanation and prediction (see Kerlinger, 1986): it describes organizations by identifying groups of firms that resemble each other on important dimensions; it offers a fundamental explanation for organizational success and failure; and it endeavours to provide an accurate prediction of which sets of firms will be successful under a particular set of circumstances (Short, Payne & Ketchen, 2008). Thus, this notion has played a significant role in management research. For instance, Miles and Snow's (1978) typology has been cited more than 1,800 times, and Porter's (1980) generic strategies have also played a major role in management research as well as in practice (both consulting and strategizing).

2.1.2 Research Focus

In their major review of the organizational configuration literature, Short, Payne and Ketchen (2008: 1056) treat organizational configuration as a "cover term" that provides "a conceptual 'umbrella' under which various types of configuration can be examined". They classify organizational configuration into four groups on two dimensions:

1) *Basis for identifying organizational configuration*: the criterion for firm categorization is either the competitive strategies used by such firms, or other organizational features of interest to the researcher;

2) *Applicability of organizational configuration*: application of the classification is either context-specific or generalizable.

This is shown in Figure 2-1.

		Basis for identifying organizational configurations	
		Competitive Strategy	Other Organizational Features
Applicability of organizational configurations	Context-specific	**Strategic Groups**	**Archetypes**
	Generalizable	**Generic Strategies**	**Organizational Forms**

Figure 2-1: Organizational configuration classification

Adapted from Short, Payne & Ketchen (2008: 1057)

Each item is defined as follows:

1. *Strategic groups* are context-specific configurations identified on the basis of a competitive strategy such as market positioning or competitive scope.
2. *Archetypes* are context-specific configurations derived from an array of organizational features, such as strategy, structure, process and size, rather than competitive strategies, depending on the researcher's interest.

3. *Generic strategies* are configurations identified on the basis of competitive strategy and can be applied to a variety of contexts. An example of this group is Porter's (1980) generic strategy (including overall cost leadership, differentiation and focus).
4. *Organizational forms* are configurations identified from an array of organizational features, depending on the researcher's interest, and can be applied to a variety of contexts. An example of this group is Miles and Snow's (1978) typology (including prospector, analyzer, defender and reactor).

For a full summary of research in each of these four categories between 1993 and 2007, see Short, Payne & Ketchen (2008).

Short, Payne & Ketchen (2008) assert that since the first two (strategic groups and archetypes) are context-specific and assume that "sector specific was taken as a given" (Greenwood & Hinings, 1993: 1060), they are useful for those interested in multi-dimensional configurations in a particular context rather than in a broader sense, while the latter two (generic strategies and organizational forms), which represent a "broader level" (Porter, 1980: 34), may be used successfully in a variety of industries, thus providing the benefit of generalizability to both academic and practitioner alike. In this regard, Herbert and Deresky (1987: 136) also support the usefulness of generic strategies to "highlight the essential features of separate, situation-specific strategies, capturing their major commonalities in such ways that they facilitate understanding broad strategic patterns" (academic's benefit) and to "provide guidance at the corporate level, for portfolio strategic alternatives and directions, and serve as a basis for allocating resources among diverse subsidiaries and business units in complex organizations" and "at the business level, such categorization reduces the myriad variables that demand managerial 'art' to a manageable set of factors with high commonality". They also suggest that a model of the situation and broad guidelines for action can be derived from general patterns of managerial strategic behaviour under each generic strategy, which in turn helps to improve control and coordination towards common goals (practitioner's benefit).

In accordance with Short, Payne and Ketchen's (2008: 1058) claim regarding the generalizability of the latter two organizational configuration types, that they "offer[s] significant potential for building conceptual bridges between theories", as well as Herbert and Deresky's (1987) suggestion regarding their usefulness to both academic and practitioner, I will focus only on generic strategies and organizational forms, particularly Miles and Snow's (1978) and Porter's (1980) generic strategy typology because these are among the most widely-accepted typologies used by both academics and practitioners (Short, Payne & Ketchen, 2008). Furthermore, although many attempts have been made to develop these two typologies, their original versions remain the most widely-cited and tested (Wright et al., 1990; Eng, 1994). In this regard, I will refer to generic strategies and organizational forms collectively as *generic organizational configuration* (GOC).

With regard to GOC typologies, I adopt Walker and Ruekert's (1987) integrated typologies, which combine Miles and Snow's (1978) defender and Porter's (1980) overall cost leadership and differentiation into *low-cost defender* (LCD) and *differentiated defender* (DIFD). The underlying rationale is that, in order to protect its current market, a defender must decide on a competitive strategy (to compete on either cost or differentiation) while a prospector has relatively little need to consider how it will compete in the new product markets it develops because it often faces little or no competition until those markets become established. I concur with the arguments of Phillips, Chang and Buzzell (1983), Karnani (1984), Murray (1988), Hill (1988), Cappel et al. (1994) and Oskarsson and Sjoberg (1994) that conditions in favour of cost-leadership (e.g. transaction cost reduction based on vertical integration, process innovation and scale effect) are independent of conditions that favour differentiation (e.g. consumer preference, product innovation, and quality differentiation through a firm's advance in a complex value system). For instance, Baden-Fuller and Stopford (1992) cite the example of Benetton, which has resolved a "dilemma of opposites" by producing higher fashion at low cost and on a large scale, and Gilbert and Strebel (1988), in their discussion of "outpacing" strategy, point to Toyota, which entered the market as a low-cost manufacturer and then differentiated itself to capture more market share. Consequently, I also include *best-cost defender* (BCD), a firm that successfully pursues both low cost and differentiation at the same time, in the research scope in order to capture this real-life evidence (e.g. Miller, 1988; Dess, Lumpkin and Covin, 1997), although the original organizational configuration concept (Porter, 1980) suggests this to be unlikely (stuck in the middle).

As well as adding best-cost defender (BCD) to Walker and Ruekert’s (1987) typologies, I also include *analyzer,* an intermediate type between Miles and Snow’s (1978) defender and prospector. However, I will not hypothesize around the *reactor,* a type that lacks an effective response to changes in the organizational environment (ad hoc response), because the inclusion of analyzer provides an explanation for how a business unit balances the two polar opposites suggested by Miles and Snow (1978), creates a viable business model and enjoys high performance. Including the reactor type would add little to our understanding of the configuration-performance relationship. This point is supported by many empirical studies, which have confirmed that the three viable strategies determined by Miles and Snow (1978) (prospectors, defenders and analyzers) are equally likely to perform well, given that they respond to the challenges of organizational adaptation in a consistent fashion (Miles & Snow, 1978; Snow & Hrebiniak, 1980; Hrebiniak & Joyce, 1985; Smith, Guthrie and Chen, 1986, 1989; Conant, Mokwa & Varadarajan, 1990). Reactors, however, respond uncertainly or inappropriately and are generally linked with poor performance. As I concur with Walker and Ruekert (1987) that the kinds of organizational structures, processes and programmes suitable for the successful implementation of each strategy described earlier are unlikely to vary much, no matter how broad or narrow the market domain in which the strategy is applied, I will not take into account Porter’s (1980) focus strategy in this model. A summary of GOC typologies used in this research is shown in Figure 2-2.

		Intensity of Product/Market Development (Miles-Snow Dimension)		
		High		*Low*
Basis of Competitive Advantage (Porter Dimension)	*Cost Leadership*	**Prospectors**	**Analyzers**	**Low-Cost Defenders***
				Best-Cost Defenders
	Differentiation			**Differentiated Defenders***

*building on Walker & Ruekert (1987)

Figure 2-2**: Summary of GOC typologies used in this research**

2.1.3 Existing literature

The organizational configuration-performance relationship originates from *contingency theory* (see Meyer, Tsui & Hinings, 1993), which views the success of firms as their ability to adapt their structures, such as organic or bureaucratic, over time to fit changing contingencies, such as task uncertainty, task independence and size (Donaldson, 2001). The fundamental assumption of contingency theory is that a certain organizational type is most appropriate for a particular environmental condition (one best way).

Grounded in structural contingency theory (see Meyer, Tsui & Hinings, 1993), the configuration notion begins with Weber's (1947) claim that each of the three types of authority in society (traditional, rational/legal and charismatic) has an appropriate administrative structure (Ketchen, Thomas & Snow, 1993) and his prediction that the evolution and prosperity of these types depend on certain societal conditions. Similarly, Burns and Stalker (1961) argue that each of two organizational structures (mechanistic and organic) prospers in particular types of environment: the mechanistic prospers in a stable environment while the organic prospers in a dynamic environment. This logic is repeated in the works of Woodward (1958), Lawrence and Lorsch (1967b) and Galbraith (1973), supporting the central argument of structural contingency theory that the success of organizational types (organizational configurations) is a function of their appropriateness to environmental conditions.

Subsequent development of this research stream involved the identification of organizational configurations that are equally successful in multiple environments (e.g. Miles & Snow, 1978; Miller & Friesen, 1978). As a second-order type of contingency theory, organizational configuration proposes a transition from the situational context of contingency theory to the equifinality concept. Organizational configuration posits that there are a few distinct, but equally successful, types of firm within a particular contingency. The underlying assumption of organizational configuration is that

> Organizational phenomena can be understood by identifying distinct, internally consistent sets of firms and their relationships to their environments and performance outcomes over time rather than by seeking to uncover one universal set of relationships that hold across all organizations (Miller, 1986; Ketchen, Thomas & Snow, 1993: 1278; Ketchen et al., 1997: 224).

The notion that these configurations are not universally effective has been supported by many empirical research studies. For instance, Snow and Hrebiniak (1980) found that analyzers, defenders and prospectors outperformed reactors in three of four examined industries, while reactors performed best in the fourth industry, which was highly regulated. Since then, most configurational research has adopted the argument that some organizational types will fit a given environment better than others, and that each environment may contain several well-aligned configurations and several poorly-aligned configurations. This perspective does not argue that there is only one successful configuration type for a given environment.

These two arguments are supported by many studies. For instance, Segev, Raveh and Farjoun (1999) found that the highest-ranking business school programmes did not belong to the same group but rather were leaders in different groups. Another good example is the finding of McNamara, Deephouse and Luce (2003) that there are larger performance differences within than between strategic groups of banks. This organizational phenomenon is defined as equifinality, which is the state of achieving a particular outcome (e.g. high levels of performance) through various paths (Doty, Glick & Huber, 1993; Gresov & Drazin, 1997). However, the notion of equifinality for configurational research, especially the types of equifinality that exist in different contexts, has rarely been dealt with explicitly in this research stream (Payne, 2006). This probably dues to the lack of research method adopting a causal asymmetry assumption that fits better with the nature of social science, particularly equifinality notion, during the time of prior researches (methodological gap), which in turn hinders researchers from solving this puzzle up until recently. This methodological gap will be discussed in detail in Section 5.2 of Chapter 5 (page107). Table 2-1 summarizes previous research supporting both contingency theory (the root of configuration) and organizational configuration and equifinality.

Table 2-1: Summary of previous empirical works on the organizational configuration-performance relationship

Researchers	Finding	Supporting Theory
Weber (1947)	Evolution and prosperity of each of the three types of authority in society (traditional, rational/legal, and charismatic) depend on certain societal conditions.	Contingency theory
Burns & Stalker, 1961; Woodward, 1958; Lawrence & Lorsch, 1967b; Galbraith, 1973	While mechanistic organizational structures prosper in a stable environment, organic organizational structures prosper in a dynamic environment.	
Miles & Snow 1978; Miller & Friesen, 1978, Snow & Hrebiniak, 1980	Organizational configurations are equally successful in multiple environments. 1) some organizational types will fit a given environment better than others 2) each environment may contain several well-aligned configurations and several poorly-aligned configurations	Organizational configurations & equifinality
Segev, Raveh and Farjoun (1999)	The highest-ranking business school programmes did not belong to the same group but rather were leaders in different groups.	
McNamara, Deephouse & Luce (2003)	There are larger performance differences within than between strategic groups of banks.	

The current research is an effort explicitly to test the existence of equifinality, arguing that there is more than one equally successful combination of GOC and FC in the market. (Equifinality will be discussed in more detail in the next chapter.)

The equifinality concept lends support to firms' ability to make *strategic choices* (Child, 1972). In other words, there is more than one possible and viable choice (not just one best way) for the strategic management team of an organization regarding the environments in which the organization wants to compete (corporate-level strategies) and how they will compete in those environments (business-level strategies). These strategic choices may either diminish or enhance the ability of the organization to adapt to its environment (industry/market), depending on whether such choices fit with its environmental requirements, as well as the internal consistency of organizational attributes (fit between strategy, structure and process) in order to compete in the chosen environment.

In addition, along with Hrebriniak and Joyce's (1985) concept of "choice of situation", Porter (1991) has recently proposed an advanced and modified view, which departs markedly from traditional industrial organization (IO) theory (Bain, 1968; Caves, 1972), that market environment is partly exogenous and partly subject to influence by the firm's actions. Strategic choices therefore influence business performance outcomes (Child, 1972; Hambrick & Mason, 1984; Pfeffer & Salancik, 1978; Herbert & Deresky, 1987).

This strategic choice-making ability (Child, 1972) removes the determinism of contingency and gives rise to an explanation of firms' different levels of performance, particularly sustained superior performance which is a major strategic management research stream (Rumelt, Schendel & Teece, 1994). The leading hypothesis of this research stream is that sustained superior performance stems from sustainable competitive advantage (Barney, 2011; Grant, 2010). For instance, Roberts (1999) finds significant empirical support for this hypothesis in that a pharmaceutical firm's innovative propensity (one example of sustainable competitive advantage) played a key role in creating persistently abnormal profit outcomes

(ROA). This research result supports the theory that a high innovative propensity leads to a chain of temporary monopolistic positions at the product level, which in turn aggregate into the firm's persistent profitability. It is evident that superior performance does not occur in a random manner; rather, it is a result of sustainable competitive advantage.

Based on Porter's (1980, 1985, 1990, 1991) competitive strategy framework, organizational configuration research assumes 1) that firms are identical (firm homogeneity) in terms of strategically relevant resources (Scherer, 1980; Porter, 1981; Rumelt, 1984); and 2) that resource heterogeneity will be very short-lived because of the high mobility of the resources, since resources can be bought and sold in factor markets (Hirshleifer, 1980; Barney, 1986a). Organizational configuration research, therefore, adopts an "*outside-in*" perspective regarding market structure and its central role in explaining a firm's performance, whilst also recognizing the role of the firm's activities, which collectively create its position (relative to other firms within the same industry), in influencing the firm's performance. In this concept, a firm is viewed as "a bundle of strategic activities aiming at adapting to industry environment by seeking an attractive position in the market arena" (Spanos & Lioukas, 2001: 907).

According to Porter (1991), given a constant industry structure, a successful firm may develop an attractive relative position either by achieving a lower cost base than its competitors or by differentiating its products and/or services and asking for a premium price exceeding the additional cost. These two fundamental types of competitive advantage – low cost and differentiation – may be achieved through a consistent array of activities, which in turn, together with the chosen scope of operations, define the notion of generic strategy. The relative influence of competitive forces encountered by the firm in its chosen position is therefore a crucial factor for the sustainability of the firm's rent (McGahan & Porter, 1997). In this competitive strategy framework, strategic choice therefore results from an understanding of industry structure and its effects, and the potential consequences of each possible response of the firm to such an external environment. This managerial strategic choice then translates into the firm's required resources, which may be built either as a result of accumulation by performing strategies (activities) over time, or by acquiring them from the environment, or both (Porter, 1991). Thus, in this framework, strategy logically precedes resources because the successful implementation of a strategy requires an appropriate set of resources and capabilities (Porter, 1980). Since resources are attached to strategy but not vice versa, their values are not in and of themselves. Rather, resource values depend on how well they support the strategic choice pursued, which in turn also depend on how well the strategic choice fits the industry structure (Spanos & Lioukas, 2001).

Industry structure and firm activities (market positioning) are two interrelated determinants of firm performance because industry structure can be at least partly manipulated by firm activities (Porter, 1991; Grant, 2010). Each contributes to firm performance in a different but cooperative way. While industry structure influences the sustainability of the firm's performance, the positioning created by the firm's activities affects its ability to establish a competitive advantage over its rivals (Porter, 1991). Together, they place the firm in an attractive position, which in turn allows the firm to exercise market power (Teece, 1984; Teece, Pisano & Shuen, 1997) and, hence, gain monopoly rent either from its ability to defend itself against competitive forces (defensive effect or direct effect) – a passive strategic posture in which the firm takes industry forces as given and tries to lessen the industry's negative effects (thread) by finding a protected position – or from its ability to influence competitive forces in its favour (offensive effect or indirect effect) – a more aggressive strategic stance in which the firm actively engages in conscious attempts to adjust the balance and underlying causes of industry forces and is, hence, sometimes called a pure monopoly-type effect owing to its active market power execution (Porter, 1980, 1985, 1991).

Many researchers have since carried out empirical examinations of configuration-performance relationships. The study of organizational configuration, therefore, plays an important role in both organization theory and strategic research (e.g. Miller & Friesen, 1978, 1984; Mintzberg, 1979, 1980; Dess & Davis, 1984; Hambrick, 1984; Miller, 1986; Doty & Glick, 1994; Bensaou & Venkatraman, 1995; Ketchen et al., 1997; Fiss, 2007).

Like other areas of organizational science, configurational research has been continually challenged as it has developed, facing a series of critiques in the late 1980s and early 1990s (Ketchen et al., 1997; Campbell-Hunt, 2000; Short, Payne & Ketchen, 2008). However, the previously-mentioned classification of organizational configuration into four types (only two of which are selected as the focus of this research) was proposed only recently by Short, Payne & Ketchen (2008). Therefore, few challenges to this research stream have acknowledged the difference between these four types; rather, each has been taken to be representative of the whole concept. Consequently, any convincing logic negating the validity of any type of configuration has been used to challenge the notion of organizational configuration in general. In this regard, strategic groups are the most frequently-challenged topic. Hatten and Hatten (1987: 329) argue that strategic groups (one type of configuration) are only "an analytical convenience". McGee and Thomas (1986) and Thomas and Venkatraman (1988: 548) claim that the findings are equivocal, constituting overall "weak evidence of performance variations across groups". Bacharach (1989) also argues that typologies cannot provide theoretical support for causation and contingency. In addition, because of a lack of theoretical and empirical rigour, which has left two fundamental assertions untested ("strategic groups exist" and "the firm's performance depends upon strategic group membership") because the empirical result is based on a suspect technique (cluster analysis), Barney and Hoskisson (1990) suggest abandoning configurational research to refocus on the performance implications of firm-specific characteristics. These challenges identify the limitations of configurational research and also cast doubt on the worth of such research (Short, Payne & Ketchen, 2008). This theoretical tension also affects managerial concerns in practice, such as determining whether market manoeuvring (if a manager believes in the organizational configuration approach) or capabilities building (if a manager believes in the FC approach) is the more appropriate investment decision.

Over the last two decades, many scholars have conducted research, albeit less frequently in recent years, to tackle the aforementioned challenges on multiple grounds. In response to previous qualitative reviews (e.g. McGee & Thomas, 1986; Thomas & Venkatraman, 1988), which used a "voting" perspective (Hunter, Schmidt & Jackson, 1982) and concluded that the configuration-performance relationship was equivocal because almost as many studies produced null results as positive results, Hunter & Schmidt (1990) proved that taking into account only studies that either support or do not support a relationship often leads to wrong conclusions. Rather, Hunter, Schmidt and Jackson, (1982) and Hunter & Schmidt (1990) argue that an accurate estimation of the strength of a relationship across the studies in a literature can be achieved through a meta-analytic aggregation of effect sizes. Therefore, meta-analysis is required before the configurational perspective should be abandoned. There are two additional debated issues in this regard: 1) the adequacy of the variables selected to identify configurations (Ketchen, Thomas & Snow, 1993; McKelvey, 1982); and 2) the appropriate unit of analysis (industry, technology, market or nation) (Bacharach, 1989). Different criteria produce substantial differences in the empirical results (Dess, Newport & Rasheed, 1993), thus making it more difficult to make a qualitative assessment of configuration-performance links. In response to the call for meta-analysis, as well as to take the two aforementioned criteria into account, Ketchen et al. (1997) conducted a meta-analysis on the configuration-performance relationship, focusing on potential moderators of that relationship drawn from 33 primary research studies published between January 1972 and January 1995 in the *Academy of Management Journal*, the annual *Academy of Management Proceedings*, *Administrative Science Quarterly*, *Management Science*, and *Strategic Management Journal*, containing 40 independent samples of organizations. They found that "27.6 percent of the utility available from prediction of performance differences across firms is predicted by configuration membership" (Ketchen et al., 1997: 233).[1] This removed the equivocality of previous qualitative reviews surrounding the ability of configuration to predict performance, which had been unable to account for sampling error

[1] About 8% (from 0.276^2) of performance variance can be explained by configurational membership.

across studies (Hunter, Schmidt & Jackson, 1982). In addition to this main argument, they also investigated characteristics that moderate this relationship and found that: 1) the size of performance variance is equally explained by research using empirically-based, inductively-derived and theory-based deductively-derived configurations, with an overall effect of 27.3% and 27.8% respectively; 2) broadly-defined organizational configuration studies demonstrate larger effect sizes than narrowly-defined configuration studies, with an overall effect of 35.6% and 16.9% respectively; 3) predictions for a single industry will yield stronger effect sizes than for multiple industries, with an overall effect of 32.7% and 25.1% respectively; and 4) studies focusing on longitudinal studies have larger effect sizes than cross-sectional studies, with an overall effect of 34.9% and 26.0% respectively (Ketchen et al., 1997). It is worth noting that eight of the 33 research samples in this meta-analysis used Miles and Snow’s (1978) typology (Snow & Hrebiniak, 1980; Hambrick, 1983a; Namiki, 1989; Smith, Guthrie & Chen, 1989; Conant, Mokwa & Varadarajan, 1990) or Porter’s (1980) typology (Dess & Davis, 1984; Obaidat, 1987; West, 1988) as the basis for configuration, which are also used for GOC in the present study. Thus, it is even more logical to argue that the results of this meta-analysis support the argument of this research.

In response to the criticisms of Hatten and Hatten (1987), McGee and Thomas (1986) and Thomas and Venkatraman (1988), over the past two decades the research has largely confirmed that configurations are related to performance. Hence, explaining performance is still a popular objective of configurational studies. Performance measurement in configurational research comes in many forms: accounting data (e.g. return on assets, return on sales), realized market share (e.g. Lawless & Anderson, 1996), patenting rate (e.g. Maurer & Ebers, 2006), price cost margin (e.g. Spanos, Zaralis & Lioukas, 2004) and various subjective measures (e.g. Slater & Olson, 2000).

Next, in response to Bacharach’s (1989) criticism of typologies’ inability to provide theoretical support for causation and contingency, Doty and Glick (1994) argued that typologies may be powerful tools for theory building because they develop rich constructs, depict interesting relationships between the constructs, and are falsifiable.

Furthermore, in response to Barney and Hoskisson's (1990) concern about the existence of strategic groups, Dranove, Peteraf and Shanley (1998) used Bresnahan's (1989) general model of pricing to argue that, apart from firm and industry effects, strategic group membership does influence firm-level performance because each strategic group may produce a differentiated product, with homogeneity within groups, which in turn supports the existence of strategic groups. In addition, Rouse and Daellenbach (1999), among others, call for research that isolates sources of sustained competitive advantage between firm- and group-level effects. This suggests that scholars are beginning to accept that organizational configuration exists and should be taken into account (Short, Payne & Ketchen, 2008). As part of an effort to respond to this call, Nair and Kotha (2001) and Nair and Filer (2003) segregated the firm- and environmental-level effects from the analysis to verify a link between strategic group membership and firm performance in the Japanese steel industry. Another contribution of these research studies is that they directly addressed the concern that strategic group effects are a function of cluster analysis, rather than a defensible and tangible strategic phenomenon, by purposely selecting the Japanese steel industry in which a strategic group naturally occurred (integrated mills versus minimills). Short et al. (2007) further isolated strategic group effects on firm performance by using systems theory in a multi-industry analysis and found that group membership consistently explains significant variance in firm performance and that the effect of strategic group membership is stronger than that of industry membership. Leask and Parker (2007) also found substantial strategic group effects on performance in the UK pharmaceutical industry across time, which helped validate previous research in the US pharmaceutical industry. A summary of challenges to the existence of configuration-performance relationships and subsequent counter arguments is shown in Table 2-2.

Table 2-2: Challenges to configuration-performance relationships and subsequent counter arguments

Falsification attempts		Counter argument	
Researchers	**Argument**	**Researchers**	**Counter-argument**
1st argument			
Hatten & Hatten, 1987: 329	Strategic groups are "an analytical convenience".	Hunter, Schmidt & Jackson, 1982; Hunter & Schmidt, 1990	Accounting for studies supporting a relationship leads to wrong conclusions; rather, meta-analysis is required.
McGee & Thomas, 1986; Thomas & Venkatraman, 1988: 548	"Weak evidence of performance variations across groups"	Ketchen, Thomas & Snow, 1993; McKelvey, 1982	The adequacy of variables selected to identify configurations
		Bacharach, 1989	The appropriate unit of analysis
		Dess, Newport & Rasheed, 1993	Difficult to make qualitative assessment of configuration-performance links since different criteria yield different results
		Ketchen et al. 1997: 233	A meta-analysis found that "27.6 percent of the utility available from prediction of performance differences across firms is predicted by configuration membership"
2nd argument			
Bacharach, 1989	Typologies cannot provide theoretical support for causation and contingency.	Doty & Glick, 1994	Typologies may be powerful tools for theory building because they develop rich constructs, depict interesting relationships between constructs, and are falsifiable.
3rd argument			
Barney & Hoskisson, 1990	Strategic groups lack theoretical and empirical rigour – empirical results are based on a suspect technique (cluster analysis)	Dranove, Peteraf & Shanley, 1998	Apart from firm and industry effects, strategic group membership did influence firm-level performance because each strategic group could produce a differentiated product, with homogeneity within groups.
		Rouse & Daellenbach, 1999	Call for research that isolates sources of sustained competitive advantage between firm- and group-level effects
		Nair & Kotha, 2001; Nair & Filer, 2003	Verify the link between strategic group membership and firm performance by segregating firm- and environmental-level effects
		Short et al., 2007	By using systems theory in a multi-industry analysis, they isolated strategic group effects on firm performance and found that group membership consistently explains significant variance in firm performance and its effects are stronger than that of industry membership.
		Leask & Parker, 2007	There are substantial strategic group effects on performance across time

Since 1993, research has more firmly established the notion of strategic groups, both through richer conceptual argument and by using a variety of empirical techniques to measure strategic groups, either in combination with or instead of cluster analysis (Short, Payne & Ketchen, 2008), strengthening organizational configuration as a whole. However, since around the same time, resource-based theory (Wernerfelt, 1984; Barney, 1991a, 1991b), which provides an alternative view to organizational research to describe, explain and predict by examining firm-specific characteristics, has also evolved from a nascent, upstart perspective to one of the most prominent and powerful theories to explain performance (Newbert, 2007). Wernerfelt's (1984) and Barney's (1991a, 1991b) resource-based theory articles have been cited over 1,200 and 2,000 times respectively (Newbert, 2007).

While the underlying assumption of both theories is that sustained superior performance has specifiable causes tied to the concept of competitive advantage (Powell, 2001), there are still debates between them about the source of competitive advantage (Powell, 2001; Spanos & Lioukas, 2001). Caves and Porter (1977) and Porter (1980) argue for a limited number of organizational configuration typologies to protect market position in any given industry as the source of competitive advantage, which in turn yields superior performance in the form of monopoly rents (Bain, 1968; Scherer, 1980), whereas Lippman and Rumelt (1982) and Wernerfelt (1984) propose that idiosyncratic firm-specific resources and (functional) capabilities generate superior performance in the form of Ricardian (or efficiency) rents (Ricardo, 1817; Demsetz, 1973). (More detail will be provided in Section 2.2.)

Although there is a theoretical tension between these two research streams, they are not mutually exclusive (Williamson, 1991; Teece, Pisano & Shuen, 1997), providing an opportunity to enhance organizational understanding by combining these two concepts, which in turn offers researchers "the possibility of identifying strategies-in-practice that may demonstrate features of either school without unduly biasing data collection under the presumption of seeking to confirm or deny the tenets of either" (Parnell & Hershey, 2005). The potential to extend our organizational understanding by combining organizational configuration and resource-based theory are reflected in the main objective and contribution of the current research, which proposes FC as another factor to explain and predict the organizational configuration-performance relationship. In another effort to address previous challenges to the notion of an organizational configuration-performance relationship in terms of empirical results, this research also suggests 1) using performance dimension measurements that may be more suitable for particular types of business unit-level configuration and 2) adopting a causal asymmetry assumption that fits better with the nature of social science, which has not been used in previous studies due to the unavailability of proper research method during the time of prior researches (methodological gap). This methodological gap will be discussed in detail in Section 5.2 of Chapter 5 (page107). Therefore, these proposed adjustments may partly solve the equivocal results of previous researches.

2.1.4 Relationship between GOC and performance (H1)

In order to establish a benchmark for the next step of this research (to compare the explanatory power of each research construct alone and combined), in this section I will argue for the existence of a relationship between GOC and performance (H1) by linking the strategic choice approach (Child, 1972), emphasizing Miles and Snow's (1978) "*adaptive cycle*" and Porter's (1980) "*generic competitive strategy*" (the two chosen research focuses), with its implications for market power, especially the generation of *monopoly rent* (Bain, 1968; Scherer, 1980), to a business unit's chosen attractive positions (Caves & Porter, 1977; Porter, 1980), each of which will be described in turn.

Strategic choices (Child, 1972) reflect how business units adapt to and compete in their chosen environments. Miles and Snow (1978) argue that organizational adaptation may be conceptualized as a cycle of adjustment continuously and simultaneously to solve three intricately interwoven major adaptive problems: entrepreneurial (domain definition), engineering (technology) and administrative (structure-process and innovation). The conformity of the combination of solutions to these three major adaptive problems constitutes the strategy-structure relationship; that is, the organization's chosen technology, structure and process reflect previous decisions about the product-market domain and this paves the way for future development. Different strategic decisions by various business units create attractive positions within an industry (Spanos & Lioukas, 2001), resulting in the creation of various sources of market power, which are reflected in different performance dimensions. Each of the three major adaptive problems will be discussed in turn.

Adaptation to the *entrepreneurial problem* involves the development of a concrete definition of an organizational domain: a specific product or service for a target market or market segment. Managers' acceptance of a particular product-market domain is indicated by their decision to commit resources to achieve objectives relevant to the chosen domain (Miles & Snow, 1978). This is in line with Porter's (1985) claim that discretionary policy choices have the greatest impact on cost or uniqueness, depending on which generic strategy is chosen (low cost leadership or differentiation). Such policy choices include: product configuration, performance and features offered; mix and variety of products offered; level of services provided (e.g. credit, delivery, repair); delivery time; buyer served (e.g. small versus large); channels employed (e.g. fewer, more efficient dealers versus many small ones); intensity of an adopted activity (e.g. rate of advertising spending and technology development activities); content of activity (e.g. information provided in order processing); process technology chosen in performing the activity (e.g. precision of machine tools, computerization of order processing independent of scale, timing); specifications of raw materials or other purchased inputs used (e.g. quality of raw materials affects processing yield); procedures governing the actions of personnel in an activity (e.g. service procedures, nature of sales calls, frequency of inspection or sampling); skill and experience level of personnel employed in an activity and training provided; wages paid and amenities provided to employees, relative to prevailing norms; other human resource policies, including hiring, training and employee motivation; information employed to control an activity; and procedures for scheduling production, maintenance, the sales force and other activities (Porter, 1985: 81, 124).

In line with the configuration concept, especially the notion of systemic fit (Drazin & Van de Ven, 1985) which is a multivariate interaction between organizational traits affecting performance, all policy choices should be consistent with the central theme. Otherwise, the main generic strategic objective, which is the business unit's desired position within its product-market domain, will not be achieved because attempting to pursue different types of generic strategies implies different requirements for success (Porter, 1980). For instance, the pursuit of economies of scale (e.g. tight control system, minimization of overheads and dedication to learning curve), which strengthens a low-cost leadership strategy, may have a negative impact on innovation and adaptability, which in turn is counterproductive to pursuing a differentiation strategy (Porter, 1985). Likewise, while shared programmes and facilities support the centralized decision making of those pursuing a low-cost leadership strategy, they suppress the specialization and responsiveness of those pursuing a differentiation strategy (Woo, 1984).

Therefore, except in the case of a special type of GOC – best-cost defender (BCD) – business units must usually make a trade-off between the pros and cons of each competitive strategy. For example, since the target customers of business units pursuing a low-cost leadership strategy are those seeking cost savings rather than brand image or highly innovative products, these business units do not need to spend on R&D and advertising in order to offer no-frills products or services. In other words, since the key concern of low-cost defenders (LCD) is to achieve operating efficiency, they make a strategic choice to trade off adaptability and innovation against efficiency. They may be willing to share programmes and facilities to gain economies of scale at the expense of a low responsiveness rate and adaptability. Thus, their level of success will be reflected in their input efficiency (the ability to reduce costs) rather than their output efficiency (the ability to demand a high price premium).

However, although the entrepreneurial problem is the most salient adaptive problem, solving this alone will not ensure effective adjustment (Miles & Snow, 1978). The business unit must also solve the engineering and administrative problems to guarantee achievement of its desired position within its product-market domain.

Solving the *engineering problem* involves the establishment of a support system for the entrepreneurial problem at the operations management level (Miles & Snow, 1978).

Managers are required to select an appropriate technology (input-transformation-output process) to produce and distribute the chosen products and services and to form new information, communication and control linkages to ensure the appropriate application of technology.

Porter (1985: 81) also supports this argument, claiming that although a business unit's discretionary policies may reflect a low-cost leadership strategy, GOCs always play an independent role in the cost of value activities and "they also frequently affect or are affected by other cost drivers". For instance, a standardized, no-frills product reflecting a low-cost defender theme dictates basic machinery for mass production. The high initial investment in the chosen process technology must then be amortized through large business volume to achieve economies of scale, otherwise the product price will be too high relative to features attractive to customers. Only when economies of scale drive down the cost per unit will the low-price policy of low-cost defenders be reinforced. In other words, while desired product characteristics reflecting the business unit's discretionary policies dictate the choice of process technology, such choices also inevitably affect other scales (cost and uniqueness drivers) in order for the business unit to be viable, which in turn also affect the business unit's discretionary policies. Just as cost drivers are important structural factors in the success of a low-cost leadership strategy, so too are uniqueness drivers in the accomplishment of a differentiation strategy.

Both cost and uniqueness drivers lie in the same structural factors, such as economies and diseconomies of scale, learning and spillovers, links within the value chain and vertical links with the value chains of supplier and channels, interrelationships, and integration (Porter, 1985; Grant, 2010). However, they influence the business unit's costs and uniqueness in different ways. Their relative importance varies between industries, between firms or business units within an industry, and between different activities within a firm or business unit (Grant, 2010). Furthermore, they should be examined in combination rather than individually in order to consider their interactions with and impact on each other (either reinforcing or counteracting), because no single driver succeeds unless other activities are coordinated. For example, economy of scale cannot be achieved if other activities fail to provide the inputs necessary to operate smoothly on a large scale (Porter, 1985). Again, consistency between these structural factors, working toward a single chosen configuration, will result in a clear business unit position, which in turn will allow it to exercise its market power as well as protecting itself from market forces.

Solving the *administration problem* involves the creation of a structure and process that aims to reduce uncertainty by rationalizing and stabilizing the organizational system developed during the entrepreneurial and engineering phases (Miles & Snow, 1978). For instance, measurement of organizational performance against the previous year and a reward system that favours production (e.g. defect rate, lead time) and finance (e.g. operating cost) supports the main objective of low-cost defenders to cut costs, while measurement of organizational performance against important competitors and a reward system that favours marketing encourages the main objective of prospectors to continuously develop new markets. Moreover, it makes much sense for analyzers to appraise performance based on effectiveness (the ability to maintain or increase sales growth and market share) because this reflects analyzers' main goals both to defend their current markets (as defenders) and to explore new markets (as prospectors). Clearly, the way in which a business unit controls its organization and motivates its staff should support its main objective, strengthening the proposal of the current research to use different performance dimensions to reflect a variety of main objectives for each GOC.

If a business unit has a consistent set of solutions for the three major adaptive problems mentioned earlier, working toward a single theme (possessing a clear typology of GOC), it will achieve its desired position relative to other business units within its chosen environment (Caves & Porter, 1977; Porter, 1980), which in turn will allow it to exercise market power in its own way (Teece, 1984; Teece, Pisano & Shuen, 1997) and gain monopoly rent (Bain, 1968; Scherer, 1980). Such monopoly rent may arise either from a *defensive effect*, which is a business unit's ability to defend itself against competitive forces, or from an *offensive effect*, which is its ability to influence competitive forces in its favour (Porter, 1980, 1985, 1991).

Porter (1980) posits that having a low-cost position protects a business unit against five competitive forces within its industry. Firstly, it defends the business unit against rivalry from competitors because it can still earn profits after its competitors have exhausted their returns. Secondly, it allows the business unit to cope with powerful buyers because it can exercise its bargaining power to drive down the price to that of the next most cost-efficient competitor. Moreover, if the business unit has large production volumes, buyers may depend on just a few service providers, reducing their willingness to threaten a service provider (Pfeffer & Salancik, 1978). Thirdly, it offers more flexibility to deal with increases in input costs by powerful suppliers. Fourthly, economies of scale and cost advantages tend to pose considerable entry barriers to newcomers. Finally, the cost leader tends to be in a better position compared to its competitors to guard against potential substitutes. In summary, under highly competitive pressures, less cost-efficient competitors will suffer before the more cost-efficient business unit.

Likewise, differentiation (e.g. design or brand image, technology, features, customer service, dealer network) is also a viable strategy for earning above-average returns in an industry, as this allows business units to deal with five competitive forces (Porter, 1980). Firstly, customers' brand loyalty helps reduce price sensitivity and permits the business unit to increase its margins, avoiding the need for a low-cost position and thus protecting it from competitive rivalry. Secondly, customers' brand loyalty also deters newcomers from threatening the business unit's uniqueness, hence raising entry barriers. Thirdly, the higher margins derived from differentiation offer greater flexibility to deal with powerful suppliers. Fourthly, buyers' lack of comparable alternatives and lower price sensitivity mitigate their bargaining power. Finally, customers' brand loyalty usually places business units in a more favourable position than their competitors with regard to substitutes. In brief, under highly competitive pressures, less unique competitors (with low customer loyalty) will suffer before more unique business units (with high customer loyalty). Customer loyalty created through differentiation allows a business unit to demand a high margin, sell more at a given price, and maintain its revenue during cyclical or seasonal downturns. Porter (1985: 120) calls these benefits collectively the “price premium”.

Essentially, different sources of market power result in different types of superior performance from monopoly rent, as will be described in more detail later when discussing the sub-hypotheses according to the various proposed typologies. This is in line with Grandori and Furnari’s (2008) argument that the different themes of each organizational configuration typology infuse different principles of behaviour and investment, resulting in varying suitability to achieve different types of outcomes. Therefore, they suggest that the type of performance parameter sought should be relevant to the organization’s choice of elements.

Consequently, in arguing for the performance implications of market power, especially monopoly rent, created by different typologies of GOC and adopting the argument regarding the suitability of a variety of performance measures for different types of configuration (e.g. Mintzberg, 1979; Walker & Ruekert, 1987; Dye, 2004; Van der Stede, Chow & Lin, 2006; Grandori & Furnari, 2008), with some additions and adjustments to cover the scope of this research, the following main hypothesis is proposed:

> H1: Having a high intensity level of at least one particular typology of proposed GOC is a sufficient condition for a business unit to achieve a high level of performance dimension corresponding with that typology.

To test this hypothesis, four sub-hypotheses are developed in Section 4 of Chapter 4 (page 75) to examine what typology of GOC is sufficient to generate each of four types of proposed performance dimension. The supporting reasons for each sub-hypothesis will be structured by introducing the objective of each GOC, ie. Miles & Snow’s (1978) adaptive decisions and/or Porter's (1980) generic competitive strategy, which is reflected in its particular characteristics and behaviours, which in turn results in a high level of a related performance dimension.

2.2 Functional capabilities

Functional capabilities (FC) are proposed as another potential causal factor in order partially to adopt the suggestions of those who have challenged the validity of organizational configuration (particularly Barney & Hoskisson, 1990) and focus on the performance implications of firm-specific characteristics without neglecting organizational configuration completely. Rather, both concepts will be taken into account simultaneously and it will be suggested that complementarity between them provides a better explanation of performance than considering only a single notion at a time because each provides different perspectives on the source of competitive advantage, increasing the likelihood of complimentarity rather than substitution.

At the broadest level, there are two schools of thought regarding sources of competitive advantage, answering the question "why do some firms persistently outperform others?", each of which is represented by constructs in the current research as follows:

1. *Market power explanation*, which focuses on the impact of product market power on a firm's ability to raise prices above a competitive level (Porter, 1979, 1981). This explanation is rooted in the *structure-conduct-performance* (S-C-P) paradigm of industrial organization economics (Bain, 1956) in that, if the industry structure (e.g. number of competitors, product heterogeneity, and entry and exit costs) and the particular firm's conduct or actions (e.g. price taking, product differentiation, tacit collusion, and exploiting market power) restrict the entry of newcomers into the industry by raising various barriers, then that firm will achieve above normal performance, while firms that cannot take advantage of market power will achieve only normal or below normal performance. This concept is built on a review of opportunities and threats in the

environment (external appraisal) under the SWOT analysis model. It is reflected in the GOC of this research in that its proponents, with an "*outside-in*" view, focus firstly on analyzing the external or industry environment and then positioning business units by developing unique strategies as well as related surrounding contexts (combination of technology, structure and process), collectively called configurations, to best match the chosen market. Hence, Mintzberg, Ahlstrand and Lampel (2009) refer to it as the "*positioning school*" or "*configuration school*". This in turn generates monopoly rent, resulting in above average performance and sustainable competitive advantage.

2. *Efficiency explanation*, which focuses on the impact of disparity between firms' ability to respond to customer needs, as some firms are more effective and efficient than others (Demsetz, 1973), resulting in superior performance (Rumelt, 1984). This explanation is rooted in neoclassical price theory (Foss & Knudsen, 2003) in that it is more costly for less efficient firms to mimic more efficient firms, perpetuating differences in their performance levels. Likewise, this notion is developed in a review of organizational strengths and weaknesses (internal appraisal) under the SWOT analysis model. This paradigm, especially distinctive competencies (Learned et al., 1969; Hrebiniak & Snow, 1982; Hitt & Ireland, 1985a, 1985b, 1986), Ricardo's (1817) analysis of land rents, the work of Penrose (1959) and the antitrust implications of economics (Scherer, 1980), triggered the first, fundamental publications of resource-based theory: Wernerfelt's (1984) resource-based view, Rumelt's (1984) strategic theory of the firm, Barney (1986a) and Dierickx and Cool (1989). These four papers were followed by many ongoing efforts to extend and refine this theory (e.g. Barney, 1986b, 1988, 1991b; Conner, 1991; Castanias & Helfat, 1991; Rumelt, 1991; Hansen & Wernerfelt, 1989; Peteraf, 1993; Mahoney, 1993; Grant, 1996b). This included an attempt to develop typologies of these tangible and intangible assets in order to suggest that different types of factors of production may have different effects for firms (Barney & Clark, 2007). These assets were first called simply "*resources*" (Wernerfelt, 1984; Barney, 1991b) with no more detailed categories. When Prahalad and Hamel (1990), building on

Selznick (1957), developed their core competencies concept of a diversified firm, they added the term "*competence*" to this research stream. Stalk, Evans and Shulman (1992), arguing that competencies and capabilities are different, added the term "*capabilities*". *Functional capabilities*, another construct used in this research, are simply the firm's capabilities categorized according to a particular type of day-to-day operational activity. Moreover, as resource-based theory continues to develop, other parallel research streams have emerged to explain the same phenomenon from different perspectives.[2] (For a detailed literature review of resource-based theory development, see Barney & Clark, 2007.) Although it is helpful to understand the full range of a firm's factors of production, Barney and Clark (2007: 249) argue that "the essential predictions of resource-based theory did not change with the introduction of these [resource] typologies". In other words, whether the firm's factors of production are called resources, capabilities, competencies or whatever, the theoretical prediction will be exactly the same in that these factors of production are likely to be a source of sustained competitive advantage only if they enable the firm to implement a strategy that increases customers' willingness to pay and/or reduces its costs. At the same time, such factors of production must be path dependent, causally ambiguous or socially complex. This research stream is at the root of FC, another construct used in this research, advocates of which, taking an "*inside-out*" view, primarily emphasize the characteristics of internal resources and capabilities within firms derived from collective and learning processes. Hence, Mintzberg, Ahlstrand and Lampel (2009) call this the "*cultural school*" or "*learning school*". This, in turn, creates efficiency rent, resulting in above average performance and sustainable competitive advantage.

[2] Teece, Pisano & Shuen (1997) focus on the ability of firms to develop new capabilities, proposing the term "*dynamic capabilities*". Many scholars (e.g. Grant, 1996a; Liebeskind, 1996; Spender & Grant, 1996) have developed a "*knowledge-based theory*", arguing that knowledge is the most important resource controlled by firms. Other research fields have sought independently to determine the source of competitive advantage. The two most important are the theory of invisible assets (Itami, 1987) and competence-based theories of corporate diversification (e.g. Prahalad & Bettis, 1986; Prahalad & Hamel 1990).

2.2.1 Definition

Capabilities can be traced back to Penrose (1959), who focused on the implications of resource manipulation as well as resource possession for firm performance. In this regard, Penrose proposed that firms should be considered as an administrative framework that coordinates a bundle of productive resources. Hence, a firm's growth is limited by the productive opportunity of the bundle of productive resources which it controls and its administrative framework which coordinates and makes use of these resources. This work, consequently, broadens the definition of productive resources affecting competitiveness, from land (e.g. Ricardo, 1817) to managerial teams, the top management group and entrepreneurial skills. Moreover, even within a group of firms with the same productive resources according to the extended definition, a firm may have additional sources of heterogeneity, such as its administrative framework (Penrose, 1959). Likewise, evolutionary economics refers to the organization's capacity as "the repertoires of organization members ... associated with the possession of particular collections of resources, including the ability to utilize those resources productively" (Nelson & Winter, 1982: 103). Building on Day (1990: 38), who defines strategic capabilities as "complex bundles of skills and accumulated knowledge that enable firms [or SBUs] to coordinate activities and make use of their assets", DeSarbo et al. (2005: 49) arrive at a more conclusive definition by adding the main objective of strategic capabilities, which is "to create economic value and sustain competitive advantage". Not only are capabilities the "firm's capacities to deploy a combination of resources for a desired end result" (Helfat & Lieberman, 2002: 725), they are also the routines of a firm, as well as the managerial activities that constantly adjust these routines to improve the firm's effectiveness (Amit & Schoemaker, 1993; Collis, 1994; Grant, 2010).

This concept is supported by many scholars in this literature, albeit using different analogies and terms. For example, in line with Day's (1994: 38) argument that "capabilities are the glue that brings these assets together and enables them to be deployed advantageously", Amit and Schoemaker's (1993) differentiation between resources and capabilities as "factors of production" and "intermediate goods" is broadly analogous to Miller and Shamsie's (1996) distinction between "discrete" and "systemic" resources, Brumagin's (1994) distinction between "elementary" and "higher-level" resources, and Black and Boal's (1994) distinction between "traits" and "configurations". Similarly, *core competencies* are often used interchangeably with capabilities (Hamel & Prahalad, 1992; Day, 1994) because they are capabilities that make a significant contribution to ultimate customer value or to the efficient delivery of such value and provide a basis for entering new markets (Prahalad & Hamel, 1990). Therefore, in practice, they are most often applied in the context of a firm's corporate diversification strategy (Barney & Clark, 2007).

A capability is firm-specific because it is deeply embedded in the firm and its routine processes (Nelson & Winter, 1982; Grant, 2010), while resources – a firm's available fundamental productive, financial, physical (Williamson, 1975), individual (Becker, 1964) and organizational capital (Tomer, 1987) attributes – is much less specific to the firm (Makadok, 2001). This makes the results of the proposed construct (FC) of this research more beneficial for practitioners in creating more sustainable competitive advantage in their firms because it is more difficult for their competitors to imitate capabilities than resources. Unlike resources, capabilities cannot be given a monetary value and are too deeply embedded in organizational routines and practices to be traded or imitated (Dierkx & Cool, 1989). It is not easy to transfer capability from one firm to another without transferring ownership of the firm or a self-contained sub-unit of that firm (Teece, Pisano & Shuen, 1997; Makadok, 2001). If a firm is dissolved, its capabilities will vanish while its resources can be transferred to the new owner. For instance, a licence to sell non-life insurance products will be passed on from the acquired to the acquiring firm, whereas its product development skills will disappear or be significantly reduced.

In other words, the resource-based view emphasizes sources of competitive advantage through the evolution of the organization as a result of interaction with the resources utilized[3] (Gagliardi, 1992; Taylor, 2002; Rafaeli & Vilnai-Yavetz, 2004) that cannot easily be duplicated by competing firms; these resources are analagous to entry barriers (Wernerfelt, 1984, 1995; Barney, 1991a; Nelson, 1991; Peteraf, 1993; Conner & Prahalad, 1996). In contrast, the capabilities approach focuses on their development through a strategic learning process to continuously discover which bundle of resources delivers sustainable competitive advantage (Mintzberg, Ahlstrand & Lampel, 2009).

Makadok (2001: 387) also highlights differences between rent-creation mechanisms and suggests complementary and substitute effects between *resource-picking*, in which "Managers gather information and analysis to outsmart the resource market in picking resources", and *capability-building*, in which "Managers design and construct organizational systems to enhance the productivity of whatever resources the firm acquires".

Functional capabilities are "discrete processes within a particular area or department in a firm ... associated with the day-to-day operational activities of the firm that are directed toward the production of products and services" (Fortune & Mitchell, 2012: 798-99). As "capabilities and organizational processes are closely entwined because it is the capability that enables the activities in a business process to be carried out" (Day, 1994), FCs are rooted in the functional areas of the firm (Amit & Shoesmaker, 1993), especially in line and staff activities (Teece, Pisano & Shuen, 1997). They incorporate operational activities (Zollo & Winter, 2002) such as production, R&D, distribution, and marketing (Collis, 1994; Verona, 1999) and are related to "the ability to do specific things" (Hall, 1993: 610), especially day-to-day firm activities (Henderson & Cockburn, 1994).

Previous researchers' definitions of FCs have much in common. Basically, they add two specific characteristics to the definition of capability: 1) such capabilities are associated with day-to-day operational activities; and 2) such capabilities are rooted in the functional areas

[3] Meaning that the potential of resources to create competitive advantage lies in 1) opportunities to economize on their use (using fewer resources to create the same level of output, referred to as input efficiency, or using the same level of resources to produce greater output, referred to as output efficiency) and 2) possibilities to employ them more profitably, i.e. redeploying current resources to a more profit generating business (Grant, 2010).

of the firm, especially within line and staff activities. Thus, in order to encompass the general consensus on and key characteristics of FCs, I combine DeSarbo et al.'s (2005: 49) definition of capability (see page 43) with these two common characteristics (Amit & Shoesmaker, 1993; Day, 1994; Henderson & Cockburn, 1994; Teece, Pisano & Shuen, 1997; Zollo & Winter, 2002; Fortune & Mitchell, 2012) to produce a definition of FCs for the purposes of this dissertation as ***complex bundles of skills and accumulated knowledge related to a particular type of day-to-day operational activities, especially the principal functional area of the firm within line and staff activities, that enable firms to coordinate activities and make use of their assets (or resources) to create economic value and sustain competitive advantage.***

As with the resource-based view, FCs are also subject to path dependence (Arthur, 1989) in that they evolve or develop over time. Their potential to create competitive advantage, therefore, lies in the lack of substitutes and the difficulty for other firms to imitate the way in which they orchestrate their resources, because FCs generally evolve in a firm-specific context (Barney, 1991a). Empirical evidence supports the contribution of FC to sustained advantage (Yeoh & Roth, 1999), performance (Lee, Lee & Pennings, 2001), entrepreneurial wealth (Deeds, 2001), and IPOs (Deeds, Decarolis & Coombs, 1997). The cross-sectional, largely static focus of FC is suitable for testing the research hypotheses of this study because the required data on assumed causes (GOC and FC) and assumed consequences (performance) must be concurrent rather than occurring over a long period of time, as they may vary vastly over such a period, resulting in difficulty in interpreting the research results.

2.2.2 Research Focus

FC is selected as another research construct to represent firm-specific characteristics, in accordance with the suggestions of those who have challenged the validity of organizational configuration (Barney & Hoskisson, 1990) to focus more on the performance implications of firm-specific characteristics. However, this research aims to examine their performance implications when combined with GOC, investigating complementarity between them. I agree with Barney and Clark's argument that

> the ability of other firms to imitate a particular firm's strategies does not depend on the attributes of those strategies, per se, but rather on the attributes of the resources and capabilities that enable that firm to create and implement its strategies in the first place. In other words, just as resources only have the potential to create value through their impact on a firm's strategies, so too strategies only have the potential to be costly to imitate because of the nature of the resources that enabled a firm to choose and implement its strategies (2007: 226).

However, I also believe that inconsistency between strategies (GOC) and capabilities (FC) will also stifle competitive advantage since, even if a firm implements its planned strategies, it cannot make best use of its controlled capabilities. At worst, mistakenly chosen strategies may go against the strength of a firm's capabilities. For example, it may be worse for a firm with a strong R&D capability to pursue a cost leadership strategy because the more it invests in product design, the higher its costs will be, which in turn will severely affect its low-cost strategy. Thus, I propose that, rather than neglecting GOC completely, it should be taken into account along with consideration of FC in terms of consistency between them. This addition will provide a more comprehensive view in answer to the competitive advantage question.

In order to gain a clear understanding of the complementarity between GOC and capabilities and explain performance variance, it is useful to examine the firm's activities (capabilities that correspond to each activity or FC) in more detail, rather than focusing on broadly defined activities (capabilities that involve cross-functional and cross-divisional integration or dynamic capabilities) because it will be possible to identify from the research results which type of capability is consistent with a particular type of GOC. Dynamic capabilities, by definition, are more likely to link to all GOCs,[4] whereas a particular type of FC appears to support only a specific type of proposed GOC typology.[5] Hence, FCs are suitable in this regard.

Furthermore, examining FCs (rather than other factors of production) allows researchers to observe potential consistency between firm-specific characteristics and configuration, as well as their implications for performance (the main argument of this research) in the same way as Mintzberg's (1979) claim that different key parts of the organizational structure (comprising operating core, technostructure, support staff, middle line, strategic apex, and ideology) of a particular type of effective organization (which implies superior performance) uniquely take dominant roles that are consistent with their firm's design parameters (Mintzberg's (1979) "configuration hypothesis") and contingency factors (Mintzberg's (1979) "congruence hypothesis").

This is because each type of FC fits better with different key parts of Mintzberg's (1979) organizational structure model, since they are rooted in functional areas of the firm (Amit & Shoesmaker, 1993), especially within line and staff activities (Teece, Pisano & Shuen, 1997), while it is difficult to assign other factors of production (resources, dynamic capability and knowledge) to only one key part of the organizational structure.[6] In addition, owing to these different characteristics, it is easier and less contentious to measure FCs that relate to particular day-to-day organizational activities than other factors of production that involve cross-functional and cross-departmental activities.

Consequently, FC is used as a categorization scheme in this research. In this regard, according to Day (1994), although it is impossible to list all possible FCs because every business develops its own pattern of FCs depending on its competitive market, past

[4] For example, it is difficult to indicate which dynamic capabilities support only prospectors because the dynamic capabilities that enhance prospectors tend to have a similar effect on other GOCs.
[5] For example, operational capability logically supports low-cost defenders, but barely assists, or even hinders, differentiated defenders.
[6] They often match with many key parts of the organizational structure, making it difficult to identify both internal and external consistency.

commitments and anticipated requirements,[7] certain types of FC can be recognized in all businesses according to their core processes for creating economic value.[8]

Day (1994: 41), therefore, suggests sorting FCs into three categories along a continuum of the orientation and focus of the defining processes: 1) *inside-out functional capabilities*, which are "deployed from the inside out and activated by market requirements, competitive challenges, and external opportunities" (e.g. financial management, cost control, technology development, integrated logistics, manufacturing and other transformation activities, human resource management, and environment health and safety); 2) *outside-in functional capabilities*, which focus almost exclusively outside the organization, aiming to "connect the processes that define the other organizational capabilities to the external environment and enable the business to compete by anticipating market requirements ahead of competitors and creating durable relationships with customers, channel members, and suppliers" (e.g. market sensing, customer linking, channel bonding and technology monitoring); and 3) *spanning functional capabilities*, which "are needed to integrate the inside-out and outside-in capabilities" (e.g. customer order fulfillment, pricing, purchasing, customer service delivery, new product/service development and strategy development). In line with Daft and Weick's (1984) notion of organizational intrusiveness, Day (1994: 42) proposes that which FC should be emphasized depends heavily on how business units choose to compete. They may either "actively search the environment for answers" (market-driven organizations) or passively "accept whatever information the environment gives them, do not engage in trial and error learning, and interpret the environment within accepted terms" (internally oriented organizations).

Building on Day (1994), DeSarbo et al. (2005) investigate five major strategic capabilities: management, technological, information technology, market-linking and marketing

[7] This is probably why until recently no FC has been explored other than marketing capability (Conant, Mokwa & Varadarajan, 1990; DeSarbo et al., 2005; Song, Di Benedetto & Nason, 2007), which is the most common among firms.
[8] The ability to "make a disproportionate contribution to the provision of superior customer value – as defined from the customer's perspective – or ... to deliver value to customers in an appreciably more cost-effective way" (Day, 1994: 39).

capabilities. These are also in line with Song, Di Benedetto and Nason’s (2007) four FCs – technology, information technology, market-linking and marketing capabilities – and are closely comparable with Grant’s (2010) functional classification of organizational capabilities, especially for service businesses whose operational and corporate functional activities are very similar to manufacturing businesses’ management activities.

In view of this high level of unanimity, I have adopted five FCs from DeSarbo et al.’s (2005) major strategic capabilities and Grant’s (2010) functional classification of organizational capabilities. These closely match each other, except for one FC (even though a different term seems to be used for manufacturing business, this FC is appropriate for service businesses, which are the focus of this research dataset). These two groups of capabilities share the same definition and are different only in their label. I have decided to refer to these FCs using Grant’s (2010) label to better suit the research dataset owing to the previously-mentioned inconsistency in the term. The matching names used by DeSarbo et al. (2005) are provided in parentheses. The details are as follows:

1. *Operational and corporate functional capabilities* (or management capabilities) are capabilities that integrate logistics systems, control costs, forecast revenues, and manage financial and human resources and marketing planning (DeSarbo et al., 2005). These capabilities enable the firm to control costs by pursuing corporate functions (e.g. financial control, management development, strategic innovation and multidivisional coordination) and improving operational functions (e.g. efficiency in volume manufacturing, continuous improvements in operations, and flexibility and speed of response). As previously mentioned, this definition is more appropriate to service businesses (the focus of this research) than manufacturing businesses because service businesses do not transform raw materials into products, but rather a range of corporate functions are directed toward the provision of services to customers.
2. *Product design and R&D capabilities* (or technological capabilities) are capabilities that pertain to technology and new product development, the production process, predicting

technological changes, and quality control skills (Day, 1994; DeSarbo et al., 2005; Song, Di Benedetto & Nason, 2007). These capabilities allow a firm to differentiate its offering through better product design and increased production efficiency.

3. *Management information system capabilities* (or information technology capabilities) are capabilities that help a firm to create technology and market knowledge and facilitate inter- and intra-organizational communication flow (DeSarbo et al., 2005; Song, Di Benedetto & Nason, 2007). These capabilities allow a firm effectively and integratively to disseminate market information across all pertinent functional areas to direct the new product development process as well as to support managerial decision making.
4. *Sales and distribution capabilities* (or market-linking capabilities) are capabilities that relate to focused market sensing, customer linking and channel bonding outside the organization (Day, 1994; DeSarbo et al., 2005; Song, Di Benedetto & Nason, 2007). These capabilities allow a firm most effectively to respond quickly to changes in customer needs (e.g. effective sales promotion and execution, efficiency and speed of order processing, speed of distribution and customer service) and to make use of its technological strengths (derived from management information system capabilities).
5. *Marketing capabilities* (DeSarbo et al., 2005 use the same label.) are capabilities that integrate many marketing activities, such as segmenting and targeting the market, pricing, advertising, and monitoring both customers' and competitors' current situations (Day, 1994; DeSarbo et al., 2005; Song, Di Benedetto & Nason, 2007). These capabilities permit a firm to take advantage of its market sensing and technological strengths (derived from management information system capabilities) to implement effective marketing programmes (e.g. brand management, building a reputation for quality and responsiveness to market trends).

2.2.3 Existing literature

FC research is rooted in evolutionary economics (Nelson & Winter, 1982) and the resource-based view (Penrose, 1959; Wernerfelt, 1984; Rumelt, 1984; Barney, 1986a). They focus primarily on the relationship between an individual firm's internal characteristics (as opposed to those of an industry) and firm performance. Unlike organizational configuration research, they assume that firms may be heterogeneous in term of the strategically relevant resources and capabilities on which they base their strategies, and that these strategically relevant resources and capabilities may not be perfectly mobile across firms (Barney, 1991a) because resources and capabilities are tied semi-permanently to the firm (Maijoor & Witteloostuijn, 1996).

These assumptions in turn imply that, although managers may still make decisions regarding available strategic choices, their alternatives may be constrained by their firm's accumulated resources and capabilities (Barney, 1991a). Strategic choice is therefore a result of careful evaluation of the firm's available resources and capabilities (the strengths and weaknesses of SWOT analysis). In other words, a firm's unique resources and capabilities define its strategy (Rumelt, 1984). Since, in this framework, resources drive strategy choice rather than vice versa, their values are in and of themselves.

FC research, therefore, adopts an "*inside-out*" perspective regarding idiosyncratic firm attributes (resources and capabilities) and their central role in explaining a firm's performance. In this concept, a firm is viewed as a bundle of unique resources and capabilities. The rent generation capacity of the firm's resources and capabilities greatly determines its ability to establish and sustain a profitable market position (Conner, 1991). In other words, a firm's profitability, through pursuing either differentiation or a low-cost position in the marketplace, stems from acquiring and deploying valuable idiosyncratic assets, rather than from Porter's (1991) industry structure or from Bain's (1968) industrial organization (Conner, 1991).

The fundamental logic is that sustainability of superior performance depends primarily on the cost of the resources necessary to implement the strategy pursued. The underlying assumption is that strategic factor markets (Barney, 1986a) are imperfectly competitive owing to different expectations, information asymmetries and luck regarding the future value of such strategic resources. This is because, if strategic factor markets are perfectly competitive, the cost to any firm of acquiring the same resources would equal the future economic value that such resources would generate by implementing a strategy, which in turn would make it impossible for any firm to sustain its competitive advantage (Barney, 1986a). Dierickx and Cool (1989) push this notion further by proposing that sustainable rent cannot stem from purchasable assets, but rather from assets internally built and accumulated through the firm's operations process, which are neither imitable nor substitutable. Clearly, a firm's inability to change its accumulated resources over time (Carrol, 1993) and barriers to imitation (Rumelt, 1991) cause firm heterogeneity. The firm's unique assets thus provide inherently differentiated levels of "efficiency" in that some are superior to others, which in turn create Ricardian rents (Teece, Pisano & Shuen, 1997).

This efficiency rent can be classified into two interrelated dimensions (Spanos & Lioukas, 2001): firstly, the direct (pure efficiency) effect of the efficient implementation of the pursued strategy (Collis, 1994); and secondly, the indirect effect of the firm's ability to comprehend and develop its strategy (dynamic capabilities) (Teece, Pisano & Shuen, 1997). This rent (superior performance) will be sustainable if, and only if, the resources utilized to conceive and implement the strategy are valuable, rare, inimitable and nonsubstitutable (Barney, 1991a).

Barney and Arikan (2001) and Newbert (2007) provide the two most prominent assessments of the strategic resource-performance relationship of the substantial body of resource-based theory (RBT) research.[9] Both agree that strategic resources matter, albeit to different degrees (Crook et al., 2008). While Barney and Arikan (2001: 121) provide only a qualitative assessment of the literature without any statistical calculations, asserting that "overall, results are consistent with resource-based expectations", Newbert (2007: 121) concludes that

[9] For a list of strategic resource-performance relationship research between 1991 and 2007, see Crook et al. (2008).

RBT "has received only modest support overall" as a result of his calculation of the percentage of significance tests supporting the hypothesis that strategic resources have an effect on performance without taking into consideration statistical artifacts (e.g. sampling error) and without estimating the extent to which strategic resources influence performance. Both the technical limitations of previous research and the inconsistent results regarding the level of performance prediction have raised concerns among researchers and practitioners alike about the benefit of this theory. Godfrey and Hill (1995: 530) argue that whether RBT will "stand or fall" depends heavily on the accuracy of its performance prediction compared with reality.

To address these limitations and to offer a more accurate assessment of the relationship, as demanded by Godfrey and Hill (1995), Crook et al. (2008) have conducted a meta-analysis of the strategic resources-performance relationship with a focus on potential moderators of that relationship from 125 studies, over half of which appear in either the *Strategic Management Journal* (42 studies) or the *Academy of Management Journal* (28 studies), published between 1991 and 2007, which cover 29,561 organizations.

They find that "22 percent of the utility available from predicting performance differences across organizations is provided by strategic resources" (Crook et al. 2008: 1150). In other words, assuming that there are two firms of concern, one of which has a one standard deviation advantage in its strategic resources over the other, Crook et al.'s (2008) results suggest that, on average, the former firm's performance would exceed the latter's by 0.22 of a standard deviation. This does not mean that accumulating additional strategic resources will automatically improve outcomes directly and without any ceiling. Rather, their results suggest that significant performance may result from possessing more strategic resources than competitors.

This strong support for a link between strategic resources and performance leads to the conclusion that RBT research is "managerially relevant and worthy of researchers' attention" (Crook et al., 2008: 1151). Furthermore, Crook et al. (2008) also investigate characteristics that moderate this relationship and find that: 1) resource measures that meet the criteria of RBT (value, rarity, inimitability and nonsubstitutability) are more strongly related to performance than measures that do not meet these criteria, with an overall effect of 26% and 12% respectively; and 2) there is no significant difference between manufacturing and service firms, diversified and undiversified firms, and large and small firms, which implies that the relationship between strategic resources and performance is strong and relatively constant across a wide variety of contexts.

Interestingly, there is no significant difference between the overall best case effect of strategic resource on performance of Crook et al.'s (2008) meta-analysis (29%) and Ketchen et al.'s (1997) meta-analysis (28%), implying that strategic resources and configuration are of equal importance in explaining performance differences between firms. Therefore, Crook et al. (2008) call for future inquiry into how competing sources (strategic resources and organizational configurations) interact, which is the main goal of the current research. Simultaneously, this research addresses Priem and Butler's (2001) call for further development of RBT to investigate conditions under which different resources and capabilities are and are not valuable by examining complementarity between GOC and FC. Complementarity and equifinality (a unique characteristic in achieving competitive advantage) will be discussed in the next chapter. Note that although there are many calls for future investigation regarding complementarity between GOC and FC, the lack of proper research method in terms of the underlying assumptions hinders researchers from solving this puzzle up until recently. This methodological gap will be discussed in detail in Section 5.2 of Chapter 5 (page107).

2.2.4 Relationship between FC and performance (H2)

I will take into account Barney and Hoskisson's (1990) recommendation to focus on the performance implications of firm-specific characteristics by examining the effect of a firm's FC on a business unit's performance relative to the particular type of FC, in order to better understand this relationship and to be able to compare the explanatory power of the two research constructs (business unit's GOC and firm's FC) against the same types of performance measurement, which in turn may support the main hypothesis of this research regarding complementarity (H3), as discussed in the next chapter.

Unlike the previous hypothesis (H1), which bases its explanation of a business unit's superior performance on market power, from its strategic choices to its position within the industry, this hypothesis (H2) explains the difference between firms' performance through the lens of internal strengths and weaknesses in terms of efficiency (disparity between firms' ability to respond to customer needs), using two abstract concepts of RBT (Wernerfelt, 1984; Rumelt, 1984; Barney, 1986a; Dierickx & Cool, 1989): definition and assumptions of resources and capabilities.

Firstly, a firm's resources are defined as "all assets, capabilities, competencies, organizational processes, firm attributes, information, knowledge, and so forth, that are controlled by a firm and that enable the firm to conceive of and implement strategies designed to improve its efficiency and effectiveness" (Barney, 2011: 121). Secondly, RBT makes two main assumptions. The first is a firm's *resource heterogeneity*, perceiving the firm as a bundle of productive resources and assuming that different firms possess different bundles of these resources (Penrose, 1959). The second is *resource immobility*, presuming that some resources are either very costly to imitate or are inelastic in supply.

By combining the definition and all assumptions of resources and capabilities, RBT supporters argue that if the resources that a firm possesses allow it to exploit opportunities and neutralize threats, are possessed by only a small number of competing firms and are either very costly to imitate or inelastic in supply, then such resources may be a strength and therefore a potential source of competitive advantage, resulting in superior performance (Ricardian rent) (Ricardo, 1817; Selznick, 1957).

To make these abstract concepts more amenable to the analysis of a firm's strengths and weaknesses, Barney (1991a) has developed a VRIN (valuable, rare, inimitable and nonsubstitutable) framework based on these abstract concepts. This VRIN framework comprises a series of four questions to be asked about the business activities in which a firm engages (including questions of value, rarity, imitability and substitutability). The answers to these questions determine whether the firm's resources and capabilities are strengths or weaknesses and the level of competitiveness they create, as well as the level of sustainability they generate. Each of these will be discussed in turn for FC as a whole. In Section 4.2 of Chapter 4 (page 87), I will then discuss each proposed FC under each sub-hypothesis, especially their implications for different types of performance dimension.

The question of value: The firm's FCs will be strengths (valuable) if, and only if, they enable the firm to exploit environmental opportunities and/or neutralize environmental threats, which from an economic perspective means either reducing the firm's net costs or increasing its price premium ("how much a firm's customers are willing to pay compared to what would have been the case if this firm did not possess those resources" (Barney, 2011: 126)) or, in a special case (BCD), both. Therefore, the FCs of different firms may be valuable in different ways depending on the extent to which they link internal attributes (strengths and weaknesses) and external attributes (opportunities and threats) as well as their economic value implications. To take Ferrari and Ford as an example, although competing within the same industry, Ferrari exploits its resources and capabilities in response to demand for very expensive cars, while Ford exploits its resources and capabilities in response to demand for practical, reliable, low-cost cars. This fact supports the proposal of this research to use different performance dimensions corresponding with different types of FC objectives.

The question of rarity: Valuable but common FCs can only be sources of competitive parity, but valuable and rare FCs may be sources of at least temporary competitive advantage. Thus, to investigate the sustainability of competitive advantage, rarity must be taken into consideration. In this regard, Barney (2011: 127) suggests a clear guideline to determine the rarity of a particular valuable resource or capability: “as long as the number of firms that possess a particular valuable resource or capability is less than the number of firms needed to generate perfect competition dynamics in an industry, that resource or capability can be considered rare and a potential source of competitive advantage”.

The questions of imitability and substitutability: Valuable and rare FCs may be sources of at least temporary competitive advantage. However, they may be sources of sustained competitive advantage if, and only if, they are imperfectly imitable (Lippman & Rumelt, 1982; Barney, 1986a, 1986b), meaning that “firms that do not possess them face a cost disadvantage in obtaining them compared to firms that already possess them” (Barney (2011: 128). There are two forms of imitation: direct duplication and substitution. The relative cost of each directly parallels the situation facing a firm with less fertile land competing with a firm with more fertile land and the role of substitutes (e.g. fertilizer) in the analysis of Ricardian rents (Ricardo, 1817).

Costly direct duplications, which suggest inelastic supply of the FC in question, and costly substitutes allow firms that already possess these FCs to gain sustained competitive advantage by earning an economic (Ricardian, or efficiency) rent. The cost disadvantages of imitating these FCs arise from three possible sources:

1) *Unique historical conditions*: The low-cost acquisition or development of the FC of a particular firm may depend on unique historical conditions such as *path dependence*, a situation in which subsequent events in the evolution of a process depend heavily on earlier events (Arthur, 1989); therefore, these FCs have important *time-compression diseconomies* (Dierickx & Cool, 1989).
2) *Causal ambiguity*: Imitating firms may not understand the relationship between the FCs of a particular firm and their competitive advantage because these FCs are taken for granted and the managers are unaware of them (Itami (1987) calls these *invisible assets*) or the managers are unable to evaluate which FCs, alone or in combination, actually

generate competitive advantage (Barney, 2011) or whether a combination of a large number of these FCs create competitive advantage (the *interconnectedness of asset stocks* and *asset mass efficiencies* (Dierickx & Cool, 1989)).

3) *Social complexity*: FCs may be socially complex phenomena, and it may be beyond the firm's ability systematically to manage and influence them (Porras & Berg, 1978; Porter, 1980; Klein & Leffler, 1981; Barney, 1986b; Hambrick, 1987).

Essentially, the economic value implications of different FCs, which depend on their links with the environment, result in different types of superior performance from their Ricardian rent. I will describe this in more detail in Section 4.2 (page 87) when discussing the sub-hypotheses according to different proposed FCs.

Consequently, by arguing for the performance implications of efficiency, especially Ricardian rent, created by different FCs and adopting an argument regarding the suitability or relevance of a variety of performance measures for different types of FC, which also allows these research results to be compared with those of the GOC (H1), the following main hypothesis is proposed:

> H2: Being part of a firm that has a high intensity level of at least one particular type of proposed FC is a sufficient condition for a business unit to achieve a high level of performance dimension corresponding with that type of FC.

To test this hypothesis, four sub-hypotheses are developed to determine what type of proposed FC is sufficient to generate each of four types of proposed performance dimension.

2.3 Chapter summary

In this chapter, I have identified gaps in the GOC and FC literatures, arguing that taking into account only one of them is insufficient to cover all factors that affect performance. I have proposed that considering them together, especially based on a causal asymmetry assumption that fits better with the nature of social science, which has not been used in previous studies due to the unavailability of proper research method during the time of prior researches (methodological gap), may improve our understanding of their performance implications (complementarity) as well as their unique characteristics (equifinality) because they coexist and are not mutually exclusive in covering different areas of the SWOT analysis model (external and internal factors). These two main research contributions will be discussed in detail in the next chapter and the methodological gap will be discussed in detail in Chapter 5

3 COMPLIMENTARITY, EQUIFINALITY AND PERFORMANCE

In this chapter, I will review the key literature on complementarity between GOC and FC, focusing on its implications for performance. I will explain its definition, research focus, my main intentions regarding this issue, and the theoretical logic of previous research which collectively supports a complementary effect of GOC and FC on performance (page 61). Building on the previous sections, an argument for the performance implications of complementarity between GOC and FC (H3) will be made (page 65).

I will then argue for equifinality between matching combinations of GOC and FC, explaining its definition, research focus, my main intentions regarding this issue, and the theoretical logic of its performance implications (page 70). Building on the preceding sections, an argument for the performance implications of equifinality between matching combinations of GOC and FC (H4) will be made (page 71).

Having clearly described the four research hypotheses, in the next chapter I will then discuss the development of a model, covering details of the sub-hypotheses of each of the four main hypotheses.

3.1 Complementarity

3.1.1 Research Focus

Complementarity is a circumstance in which "doing more of one thing increases the returns to doing more of another" (Milgrom & Robert, 1995: 181). Setting the complementarity notion in this research context, I anticipate that consistency between GOC (the posture of a business unit) and FC (the routine of a firm) will result in better performance than pursuing incompatible alternatives, a situation known as "supermodularity" in complementarity theory (Milgrom & Robert, 1995).

My principal aim is not to try to resolve the underlying theoretical tension between the two perspectives, since I am conscious that they are drawn from two different theoretical traditions. Rather, I hope to improve the explanation of performance by simultaneously incorporating the impact of both industry- and firm-specific factors on firm performance, in order to test whether consistency between them better predicts a higher performance outcome than each individually. In effect, I will attempt to extend the relevant empirical literature (e.g. Schmalensee, 1985; Hansen & Wernerfelt, 1989; Rumelt, 1991; McGahan & Porter, 1997; Mauri & Michaels, 1998; Spanos & Lioukas, 2001) by proposing a composite framework in which these two distinct but complementary perspectives are explicitly modelled and concurrently tested to find compatible combinations. This is my main contribution.

3.1.2 Existing literature

Although Milgrom and Roberts (1995) do not explicitly theorize that complementarity stems from similarity, practices "of the same kind" are considered in their examples to be complementary (Grandori & Furnari, 2008). Consequently, the dominant hypothesis of organizational economics in this field follows this assumption that complementarity stems from similarity. For example, Williamson (2004) suggests that the less varied the practices in a particular system, the better. Building on this notion, I aim to identify similarities between each typology of GOC and each type of FC, which in turn should lead to complementarity and generate higher levels of performance.

Although it appears that complementarity between GOC and FC in explaining firm performance has only recently been recognized (Conner, 1991; Mahoney & Pandian, 1992; Amit & Schoemaker, 1993; Peteraf, 1993; Henderson & Cockburn, 1994), in fact Wernerfelt (1984) suggested that a competitive advantage framework (the root of GOC) and a resource-based view (the root of FC) are two sides of the same coin. Likewise, Hamel & Prahalad (1986) have argued that to be successful (to achieve sustained competitive advantage), a company must reconcile its purpose, which is comparable with the ideal type of organizational configuration, with its means, which are comparable with the resources and FCs underlying its current position, through strategic intent (a corporate challenge to achieve a desired future position).

Similarly, Cool and Schendel (1988: 209) have argued that “[i]f a firm’s current actions [strategies] are incongruent with its accumulated ‘stock’ of assets [resources and skills or competences], then it is likely to be less effective than other firms pursuing a similar strategy but with a good ‘fit’ between current strategic investments and accumulated assets”. Barney (1992) and Barney and Griffin (1992) also argue that value is created not only through internal fit between the resources and capabilities within a firm and its pursued strategy, but also by external fit between the firm’s strategy and its competitive environment.

In addition, Barney and Zajac (1994) claim that, unless the content of the firm’s strategy and competitive environment are taken into account, strategy implementation (resources and capabilities) cannot be clearly understood. Similarly, Short et al. (2007) assert that to better understand why some firms outperform others, strategic group level, which is an important component of the organizational system, must be added to resource-based logic. In the same manner, Sirmon, Hitt and Ireland (2007) propose that contingency theory (the root of GOC) should be integrated with resource-based theory (the root of FC) and organizational learning theory to explain resource management processes, because value created by resource management is at least partly contingent on a firm’s external environment. In other words, varying degrees of uncertainty and favourability in the environment affect the potential value of a firm’s resources and capabilities (Sirmon, Hitt & Ireland, 2007).

Perhaps the most logically convincing argument in this regard is that of Spanos and Lioukas (2001), who argue for compatibility between these two theoretical models and for a composite framework for three reasons.

Firstly, by considering their difference in terms of the nature of the rent created by a firm (monopoly rent for IO theory and efficiency rent for RBV), these two approaches are complementary in providing multi-dimensional explanations for firm performance because they offer a balanced view (both internal and external antecedents) of sources of competitive advantage. In other words, it could be argued that a competitive advantage framework (GOC) and a resource-based view (FC) jointly constitute the SWOT framework (Spanos & Lioukas, 2001).

While the focus of the competitive advantage framework on industry analysis to understand the industry's impact on business unit performance provides the "opportunities and threats" dimensions, the resource-based view, which emphasizes a specific firm's attempts to develop and combine resources and capabilities, constitutes the "strengths and weaknesses" dimensions (Foss, 1996). In other words, whereas the GOC framework closely monitors industry structure to ensure that a firm's controlled resources enable it to maintain competitive advantage (gain monopoly rent) because environmental changes "may change the significance of resources to the firm" (Penrose, 1959: 79), the FC framework focuses on developing and combining resources to gain efficiency (Ricardian) rent. Since these two approaches cover different domains of SWOT analysis (Barney, 1991a; Foss, 1997b), each of which generate different types of value, i.e. monopoly rent vs. efficiency rent (Barney & Griffin, 1992; Barney, 1992; Sirmon, Hitt & Ireland, 2007), they coexist and are complementary in providing a multi-dimensional explanation of firm performance (Spanos & Lioukas, 2001).

Secondly, taking into account their shared belief that sustained above-normal returns are possible and can be achieved by an attractive strategic position (Conner, 1991), each perspective attempts to explain the same phenomenon (sustainable competitive advantage) from different points of view, as mentioned previously.

Thirdly, taking into consideration the similarity of the unit of analysis, both also focus on the individual firm as a critical unit of analysis (despite their dissimilar perspectives on what is more important as a source of competitive advantage).

Therefore, in summary, despite the differences between GOC and FC in underlying assumptions and presupposed sources of sustainable competitive advantage, "both can co-exist and shape actual firm behavior" (Spanos & Lioukas, 2001: 911).

In addition to Spanos and Lioukas (2001), a number of previous research studies have supported complementarity between these two theoretical models and the composite framework. For example, Williamson (1991) and Teece, Pisano and Shuen (1997) argue that the effects of each are not mutually exclusive. Mauri and Michaels (1998) also propose that sustainable competitive advantage may result from the effects of both, which may also be complementary. Furthermore, Spanos and Lioukas' (2001) empirical test results support Henderson and Mitchell's (1997) argument for considering both industry- and firm-level effects on performance and suggest that "where industry forces influence market performance *and* profitability, firm assets act upon accomplishments in the market arena (i.e., market performance) and via the latter, to profitability" (Spanos & Lioukas, 2001: 908). In other words, "industry and firm effects are not only both potentially significant, but instead, they *need* to complement each other given that they affect distinct but strongly linked dimensions of performance" (Spanos & Lioukas, 2001: 922). Note that although there are many calls for future investigation regarding complementarity between GOC and FC, the lack of proper research method in terms of the underlying causal relationship assumptions hinders researchers from solving this puzzle up until recently. This methodological gap will be discussed in detail in Section 5.2 of Chapter 5 (page107).

3.1.3 Complementarity of GOC and FC (H3)

In response to Barney and Hoskisson's (1990) criticism regarding the lack of theoretical rigour of configuration and their suggestion that firm-specific characteristics should be examined instead, to help justify the equivocal empirical results of the organizational configuration-performance relationship of previous research, and to extend a number of previous research studies that support complementarity between contingency theory and RBT (e.g. Schmalensee, 1985; Hansen & Wernerfelt, 1989; Rumelt, 1991; McGahan &

Porter, 1997; Mauri & Michaels, 1998; Spanos & Lioukas, 2001), as well as to respond to previous research calling for a composite framework, I propose further theoretical support for complementarity between GOC and FC and suggest that, to better explain differences in business units' performance, these two research streams should be taken into consideration in combination rather than separately. In this regard, since inconsistency between them is possible,[10] for many reasons I anticipate that consistency between GOC and FC will enable better performance than pursuing incompatible alternatives.

Firstly, the notion of complementarity between GOC and FC in explaining firm performance has been proposed and supported for almost three decades, sometimes inexplicitly (e.g. Wernerfelt, 1984; Cool & Schendel, 1988; Hamel & Prahalad, 1986, Conner, 1991; Mahoney & Pandian, 1992; Amit & Schoemaker, 1993; Peteraf, 1993; Henderson & Cockburn, 1994; Foss, 1996; Mauri & Michaels, 1998; Spanos & Lioukas, 2001; Short et al., 2007). It has been argued that if a business unit's current strategy and purpose (posture), which is equivalent to the ideal type of GOC selected to match the environment, are incongruent with its accumulated controlled assets or its means (firm's routine), which are equivalent to its resources and FC, then it is likely to be less effective than other business units pursuing a similar strategy but with a better fit between current strategies and accumulated FCs (e.g. Cool & Schendel, 1988; Hamel & Prahalad, 1986). This is because value is created not only by internal fit between resources and capabilities within a firm and its pursued strategy (efficiency rent), but also by external fit between the firm's strategy and its competitive environment (monopoly rent) (Barney & Griffin, 1992; Barney, 1992; Sirmon, Hitt & Ireland, 2007). In this regard, Sirmon, Hitt & Ireland (2007) also suggest that varying degrees of uncertainty and favourability in the environment affect the potential value of a firm's resources and capabilities.

[10] Because FC, a firm-level routine (how well each functional area of the firm is operated), transcends GOC, a business unit-level positioning (in what position in the industry the business unit intends to be).

Miles and Snow (1978) clearly argue, in their proposed solutions to the administrative problems under the adaptive cycle framework, that different organizational typologies should have different dominant coalitions[11] that are responsible for different functional activities within the firm because this administrative solution must be entirely consistent with the solutions to the entrepreneurial and engineering problems. In other words, the FC of the firm, which represents a solution to an administrative problem (in this case its dominant coalitions), should be coherent with its GOC, which represents a solution to the entrepreneurial and engineering problems. Obviously, only a matching combination of GOC (the business unit's posture) and FC (the firm's routine) will have shared objectives, which is also reflected in their having the same performance goals.

If a business unit's posture and a firm's routine do not support each other, there will be conflicts of interest between them; strengthening one will be detrimental to the other. For example, a business unit pursuing a low-cost strategy (LC) can expect better performance if it belongs to a firm with a strong operations capability (OP) because both LC and OP focus on cost reduction through enhancement of operational efficiency. Thus, they share the same goal of increasing input efficiency (IE). The integration of functional activities across the firm, which reflects LC, also supports the routinization of procedures and standardization of components, which represent OP. Collectively, both work in harmony towards the goal of cost control (IE). Pursuing one goal will support the success of another. In contrast, strength in the marketing function (MKT) will not help reduce costs; rather it will actually require the firm to spend more on marketing activities (e.g. promotion, advertisement), which in turn will increase the overall cost and go against the low-cost strategic objectives of the business unit.

In addition, only a consistent combination of GOC and FC will support the development of both. For instance, a firm's strong marketing capability (MKT) will help support its business

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[11] A dominant coalition is defined as a group of individuals whose influence on the organization is greatest. Dominant coalition members are those that make crucial strategic decisions and determine how resources will be allocated (Miles & Snow, 1978).

unit in pursuing a prospector typology because the firm's close relationship with customers is important for a quick response to the market. Moreover, a firm's MKT strength will allow its business unit to capitalize on the firm's well-known brand to offer its product in the new market domain. For example, customers' high brand loyalty to Apple has made it easier to launch iPhones and iPads following its success with the iPod. Recognizing such benefits, the prospector will also reciprocally subsidize its marketing capabilities to stay ahead of its competitors.

Secondly, if it is true, as claimed by a number of previous research studies, that industry and firm effects (competitive advantage framework and resource-based view) are real and co-exist (Mauri & Michaels, 1998; Spanos & Lioukas, 2001), are not mutually exclusive (Williamson, 1991; Teece, Pisano & Shuen, 1997), and are compatible (Mauri & Michaels, 1998), then exclusive reliance on only one effect may be inappropriate.

Agreement on this argument within the current literature can be observed in the call for a complete dismissal of one or other perspective on these same grounds. For instance, while Porter (1991) points out that the RBV framework may overlook the fact that changes in technology, competitor behaviour or buyer needs may enhance or eliminate the competitive value of resources, supporters of RBV argue that Porter's framework misleads managers into focusing on industry-level characteristics and encourages them to try to manipulate industry structure, although their firms cannot uniquely benefit from the changes potentially brought about (McWilliams and Smart, 1993). Both views are persuasive, and the best way to truly understand this phenomenon is to take both perspectives into account.

In term of the constructs of this research, possessing only a GOC (business unit posture) without a supporting FC (firm routine) or vice versa should lead to inferior performance because they have reciprocal and mutually reinforcing effects (a business unit posture requires a corresponding firm routine as much as a firm routine requires a matching business unit posture). For instance, if a business unit make a strategic choice to be a differentiated defender (DIFD) but the firm to which it belongs does not have strong product design and R&D capabilities (RD), it will be very difficult, if not impossible, for the business unit to achieve its desired posture because RD are the main function supporting this business strategy.[12] Another example illustrating a reciprocal effect is that if a business unit in a firm with a strong management information system capability (MIS) does not have a clear strategic orientation (being a reactor with an ambiguous strategy), it will underperform owing to its underutilized strength.

Consequently, in arguing for the performance implications of consistency between GOC and FC and adopting an argument regarding the suitability or relevance of a variety of performance measures for different combinations of GOC and FC, the following main hypothesis is proposed:

> H3: Being part of a firm that has a high intensity level of at least one type of proposed FC and having a high intensity level of a particular typology of proposed GOC that is compatible with its firm's FC is a sufficient combination of conditions for a business unit to achieve a high level of performance dimension corresponding with that combination.

To test this hypothesis, in Section 4.3 of Chapter 4 (page 93) four sub-hypotheses are developed to determine what combination of proposed type of FC and proposed typology of GOC is sufficient to generate each of four types of proposed performance dimension.

Moreover, building on Milgrom & Robert's (1995: 181) complementarity definition (i.e. a circumstance in which "doing more of one thing increases the returns to doing more of another"), I can reconfirm my argument that complementarity exists if the explanation powers of a proposed combination of GOC and FC under each sub-hypothesis better explain the variation in corresponding performance than considering either GOC or FC under such sub-hypothesis alone. This comparison could be done after a sub-hypothesis has been tested.

[12] According to the RBV concept, RD are "valuable" for the success of a business unit pursuing a DIFD position.

3.2 Equifinality

In addition to the proposed empirical test for complementarity mentioned earlier, in order to support the validity of the configuration-performance relationship still further, I will also argue for the existence of equifinality, an implicit assumption of both Miles and Snow's (1978) and Porter's (1980) typologies (Marlin, Ketchen & Lamont, 2007).

Equifinality in organization theory refers to the circumstance that organizational performance can be achieved through multiple different organizational structures or strategies, even though the contingent factors faced by organizations may be the same; that is, the equifinal state can be reached independent of the initial condition (Tushman & Nadler, 1978; Scott, 1981; Van de Ven & Drazin, 1985; Hrebiniak & Joyce, 1985; Nadler & Tushman, 1988; Pennings, 1992; Galunic & Eisenhardt, 1994; Gresov & Drazin, 1997). Gresov and Drazin (1997) propose that equifinality occurs when different structures yield the same (or equivalent) functions and that performance is a consequence of organizational design, which is derived from managers' ability to make strategic choices according to their perceived environmental situation and their firm's resource flexibility.

They also argue that configurational equifinality is a situation in which an organization faces multiple, conflicting sets of functional demands and has many structural alternatives available to satisfy those demands. Thus, the organization faces a trade-off between structures and functions. The key success factor is internal consistency and coherence of organizational structure choices. Since an organization cannot satisfy different functional demands along a continuum between a pair of structural choices, its performance depends on proximity to feasible ideal patterns (Doty, Glick & Huber, 1993). This condition appears to be consistent with Porter's (1980) contention that commitment to at least one of three generic strategies (overall cost leadership, differentiation and focus) will result in higher performance than failure to develop a generic strategy, when a firm becomes stuck in the middle. Likewise, it conforms to Miles and Snow's (1978) assertion that the three viable strategy types (prospectors, defenders and analyzers) are equally likely to perform well as they respond to the challenges of organizational adaptation in a consistent fashion. Conversely, reactors, which respond uncertainly or inappropriately to environmental functional demands, are generally linked with poor performance. Note, however, that there are only a handful of empirical researches regarding equifinality in organizational configuration (Doty, Glick & Huber, 1993; Gresov & Drazin, 1997) because of the lack of proper research method that allows a holistic examination of all possible combinations to test this notion up until recently. This methodological gap will be discussed in detail in Section 5.2 of Chapter 5 (page107).

Since equifinality is a condition that supports the configuration concept, proving the existence of equifinality of the different typologies studied will bolster the validity of configuration; if equifinality exists, then an implicit assumption of configuration is empirically supported. In other words, the claim of equivocality in prior researches is essentially a normal characteristic of equifinality and these assertions, therefore, cannot falsify the configuration-performance relationship. Hence, I seek to provide evidence of equifinality by arguing that diverse organizational configuration typologies chosen from a firm's range of available structural options perform equally well in terms of the overall performance proxy.

3.2.1 Equifinality of GOC and FC (H4)

Building on the complementarity hypothesis (H3), which proposes that various consistent combinations of GOC and FC are anticipated to be sufficient conditions for their relevant performance dimensions, I also argue that the success of each consistent combination in each performance dimension is comparable in terms of the overall performance proxy. In other words, complementarity exhibits equifinality. For example, while differentiated defenders with RD may be able to charge a higher margin (gaining output efficiency) for their well-designed or innovative products, they cannot sell them in large numbers because of their comparatively high price and the fact that they must maintain their unique status; hence, they cannot gain economies of scale and tend to have low input efficiency.

On the other hand, despite the lower margin, low-cost defenders, using their OP, may still enjoy a larger sales volume and benefit from lower operating costs (input efficiency) owing to scale and scope economies as well as the learning curve provided by their rigorous operations process.

Alternatively, by aiming both to lower operational costs and provide a differentiated product commanding a high price, best cost defenders, deploying both OP and RD, may face the problem of balancing these two objectives, for example difficulty in designing an organizational structure both to support creativity in their product design (decentralized) and to routinize processes to control costs (centralized), and thus may be unable to outperform the advantageous performance measures (input and output efficiency) of the previous two typologies. However, they may still outperform them in their disadvantageous performance measures, resulting in performance parity between them.

Prospectors will gain first mover advantage by using their MKT and striving for excellence in adaptability (AD) to tap new market opportunities quickly and flexibly via their close customer connections. However, the benefits may fade sooner than expected owing to the entry of followers – copycats who save on the expense of researching the market, introducing a new product and educating a new market by exploiting the first mover's activities.

Again, in business units that operate in both existing and new markets by using their close market monitoring, quick management decision-making, and strong sales and distribution (SD) functions to respond quickly and flexibly to continuous change in the market, analyzers, with their MIS and SD capabilities, may gain high sales growth and market share (effectiveness) while still facing the problem of balancing objectives, hence achieving low input and output efficiency.

Each typology appears to offer both competitive advantages and limitations. The various typologies may be viable business models and may be equally successful in the same environment. I propose that no single typology outperforms the others in general (except the reactor which, as mentioned earlier, is not addressed in this research), given that all respond to the challenges of organizational adaptation in a consistent fashion. In other words, these typologies are expected to achieve a similar overall performance proxy (OA). In effect, this shows the existence of equifinality.

The reason for using an OA in examining equifinality is that different performance dimensions cannot be directly compared because they span different units. Moreover, a number of empirical studies in this research stream (e.g. Schoeffler, Buzzell & Heany, 1974; Buzzell, Gale & Sultan, 1975; Rumelt & Wensley, 1981; Phillips, Chang & Buzzell, 1983; Prescott, Kohli & Venkatraman, 1986) support the use of OAs since they show a positive and often significant effect of market performance on profitability.[13]

Consequently, by arguing for the implications of the OA arising from consistency between GOC and FC, the following main hypothesis is proposed:

> H4: Being part of a firm that has a high intensity level of at least one type of proposed FC and having a high intensity level of a particular typology of proposed GOC that is compatible with its firm's FC is a sufficient combination of conditions for a business unit to achieve a high level of overall performance proxy.

To test this hypothesis, in Section 4.4 of Chapter 4 (page 99) four sub-hypotheses are developed to investigate what combination of proposed type of FC and proposed typology of GOC is sufficient to generate a high OA. I hope to observe similar combinations to those of H3, supporting the hypothesis that each matching combination performs equally well in terms of OA as a result of complimentarity.

[13] Market performance in this case refers to sales growth and market share, which is the proposed effectiveness measure in this research. Profitability refers to the proposed OA in this research.

In addition, one assumption of the equifinality hypothesis (business units perform equally well through different strategic paths) is that business units' accomplishments in relevant performance dimensions are components of OA. In other words, each performance dimension and OA are intermediate and final outcomes, respectively, of complementarity between GOC and FC. Consequently, this assumption leads to another way to test for equifinality in this research (sub-hypothesis H4e), which will be discussed in more detail in Section 4.4 of Chapter 4 (page 99).

3.3 Chapter summary

In this chapter, I have reviewed the relevant literature arguing for the performance implications of complementarity between GOC and FC and equifinality between matching combinations. Building on a clear description of the four main research hypotheses in the current and previous chapters, in the next chapter I will then argue for a more specific relationship of each performance dimension under each main hypothesis, resulting in four sub-hypotheses for each.

4 MODEL DEVELOPMENT

In this chapter, I will propose sub-hypotheses of the four main hypotheses argued previously to cover all four performance dimensions and the overall performance proxy, resulting in a more specific understanding of each main hypothesis. For all four performance dimensions, I will argue for sub-hypotheses of H1 discussing different typologies of proposed GOC (page 75), sub-hypotheses of H2 discussing different types of proposed FC (page 87), and sub-hypotheses of H3 discussing different combinations of proposed GOC and FC (page 93). For the overall performance proxy, I will argue for sub-hypotheses of H4, discussing different combinations of proposed GOC and FC (page 99). Finally, a visual format of the proposed conceptual framework (page 103) will be provided.

4.1 GOC and performance (H1)

In this section, I will argue for each sub-hypothesis of H1 (relationship between GOC and performance) to understand this proposed relationship more specifically, referring to Miles and Snow's (1978) solutions to their three major problems (entrepreneurial, engineering and administrative) in the adaptive cycle as well as Porter's (1980) competitive strategies of different typologies in terms of their specific characteristics and consequences for related performance dimensions.

4.1.1 Relationship between LCD, BCD and IE (H1a)

Miles and Snow (1978: 48) posit that, in terms of the entrepreneurial problem, some business units, referred to as defenders, decide to respond to their environment by attempting to "seal off a portion of the total market to create a stable set of products and customers". In doing so, they tend to have a narrow and stable product market domain. Their success depends on their ability aggressively to maintain their prominence within their chosen domain, which in turn results in a tendency to ignore developments outside their domain (some product development is possible, but closely related to current products and services), and cautious and incremental growth primarily from penetrating deeper into their current markets.

In order to protect their current markets, some defenders make policy choices after deliberate trade-offs between cost and differentiation to seek a cost leader position (LCD and BCD). In line with solutions to Miles and Snow's (1978) engineering and administrative problems, Porter (1985: 81) proposes that such decisions result in a variety of discretionary policies that greatly affect the cost of value activities.

These groups of defenders tend to provide no-frills (simple, standardized) products at a cheaper price than their competitors. Lines of related products are limited, and their services are kept to a minimum, consistent with their standard products, to save operations costs. Likewise, speed of delivery tends to be slow because their customers favour low price and do not expect fast delivery. They also try to keep marketing and R&D expenses low because these expenses will not be beneficial to their no-frills products. They tend to design their human resource policies to be in line with their cost leadership initiative, such as standard qualifications (no need for creativity or R&D skills), resulting in lower wage rates, the provision of only necessary training, and using cost reduction targets as work incentives.

Perhaps the most important and obvious characteristic of these groups of defenders is their aim to serve large customers. They tend to select a process technology that supports large scale (single core technology), rather than an independent technology specific to the production of a particular product, and continuously improve such technology to gain and maintain economies of scale, helping to reduce their cost per unit owing to:

1) The ability to amortize fixed costs over a greater production volume. For example, because the BIC Corporation has the lion's share of the disposable pen industry, a small per unit cost saving creates enormous results, enabling it continuously to purchase the best available equipment (in terms of cost savings) and fully amortize

such costs within only four to five months, while others are unable to reduce their costs in this manner (Christensen, Berg & Salter, 1980).

2) Unique technical input-output relationships, especially activities in a process manufacturing industry (e.g. chemical, oil refining, etc.) that favour large production size in terms of cost reduction in which, up to a certain level, increases in output (capacity) require less than proportionate increases in input, the “two-thirds rule” of engineering (Moore, 1959; Lau & Tamura, 1972; Scherer, 1980).

3) A higher level of employee specialization in both manufacturing tasks and management functions because greater division of labour is allowed in mass production by breaking down the production process into narrow and separate tasks. In essence, scale economy arises when “proportionate increases in the amounts of inputs employed in a production process result in lower unit cost” (Grant, 2010: 232).

This closely matches the proposed IE definition of this research (the ability to reduce costs to produce any given level of outcome) in that, in producing more products or services, a business unit will require a less than proportional increase in its infrastructure or overhead to support an activity as it grows. The higher the economies of scale, the higher the IE (shown in lower expense ratios in this research context). However, if a business unit grows too large (beyond the optimal size), diseconomies of scale may increase costs owing to physical limits to efficient size (Scherer, 1980; Perrow, 1984), managerial diseconomy/complexity (McAfee & McMillan, 1996), lower worker motivation (Hackman & Oldham, 1980) and high transportation costs as a result of long distances between market, supplier and the business unit’s facilities.

There is another cost advantage of aiming to serve large customers over a period of time. As the cumulative volume of production grows, business units may improve their cost advantage by learning-by-doing through repetition, both at the individual level through developments in skills and problem solving and at the organizational level through the improvement and refinement of organizational routines, e.g. improved work methods, layout changes, improved scheduling, product design modifications that facilitate manufacturing, increased asset utilization, tailoring raw materials to the process, etc. (Argote, Beckman & Epple, 1990; Zollo & Winter, 2002). For example, during World War II, the time taken to build a B-24 Liberator bomber was reduced from 40,000 labour hours in 1943 to only 8,000 labour hours in 1945 (Rapping, 1965).

It should be noted that, unlike scale economy that can be achieved at any given point in time simply by reaching a certain production level during that period, a learning curve occurs over time when "the cost of accomplishing a business function falls as a function of the cumulative number of times a firm has engaged in that function" (Barney, 2011: 159), which arises from many factors such as improving worker efficiency, introducing more efficient machines, investing in modification of activities or merely increasing calendar time. Therefore, cumulative firm volume, a popular measure of learning rate owing to its simplicity, is suitable only for a particular activity and cannot be applied universally (Porter,1985). This fact supports the proposal to use IE in this research, which is the final result and main objective of the learning curve (cost saving benefit), as an appropriate proxy for a business unit striving to move down a learning curve. Hence, the more the business unit can move its production process down the learning curve, the higher its IE. However, just as scale economies are limited at a certain level of production, learning may spill over to competitors through suppliers, consultants, ex-employees and reverse engineering of products; thus, the spillover rate also determines whether learning creates a sustainable cost advantage for a particular business unit, in the case of proprietary learning, or merely reduces costs for the whole industry, in the case of high spillover rate (Porter, 1985).

Finally, owing to interactions between value activities and their impacts on each other, their total cost must be determined by examining all related activities in combination, rather than investigating each activity separately. Consequently, a business unit attempting to achieve cost advantage tends to seek opportunities for cost reduction through two mechanisms, coordination and joint optimization (Porter, 1985), of two types of linkages:

1) *Linkages within the value chain* of the business unit, between direct and indirect activities (e.g. machining and maintenance), quality assurance and other activities (e.g. inspection and after-sales service), activities that must be coordinated (e.g. inbound logistics and operations), and activities that are alternative ways of achieving the result (e.g. advertising and direct sales)

2) *Vertical linkages* with the value chains of suppliers (e.g. supplier's product design characteristics, quality assurance procedures) and the value chains of channels (e.g. channel's location, material handling technology).

Moreover, *interrelationships* with other business units within a firm also affect a business unit's costs. Sharing a value activity with sister business units will yield significant cost improvements. For instance, Hamermesh and White (1984) find that, among business units pursuing low-cost strategies, those that share some key functions (e.g. sales, marketing, manufacturing, R&D) with other units gain an ROI twice as high as those that are entirely self-contained. A business unit can reduce its costs even further by engaging in *vertical integration* to avoid market costs (e.g. procurement, transaction costs), avoid the high bargaining power of suppliers and customers, and achieve economies in joint operations. However, this decision must be made carefully because it may sometimes raise costs since the business unit's in-house activity may not be as efficient as that of its supplier. Vertical integration also creates inflexibility, which raises exit barriers. By taking actions in a jointly optimized fashion, a business unit can resolve trade-offs between value activities both inside and outside its operations as well as within its firm, resulting in significant decreases in its costs, which will be reflected in higher IE.

By pursuing cost controlling activities, such as standardizing components and processes, routinizing procedures, and integrating functional activities across firms (Walker & Ruekert, 1987), low-cost defenders and best-cost defenders may reduce their inputs (costs) compared with those of their competitors through scale and scope economies and the learning curve. These cost cutting activities, in effect, assist them in rearranging their inputs to achieve the lowest input-to-output ratio in their industries. In other words, cost-cutting activities allow them to reposition themselves as the most cost-efficient business unit or the cost-leader business unit in their industry. In the dataset of this research (non-life insurance product lines), this is reflected in a lower *expense ratio*. The expense ratio is equivalent to the overhead cost ratio and provides a comparison of operating expenses resulting from normal, day-to-day business operations, which are not directly related to the gross profit margin of products or services, and total income. Therefore, the lower the expense ratio, the higher the IE.

In effect, successfully coordinating and jointly optimizing discretionary policies and having cost drivers that reinforce each other and jointly support a single theme to achieve a cost leadership position, a key characteristic of LCD or BCD, are ways to accomplish a high level of IE, which is displayed in a lower expense ratio in this research context. As such, the following sub-hypothesis is put forward:

> H1a: Having a high intensity level of either low-cost defender (LCD) or best cost defender (BCD) is a sufficient condition for a business unit to achieve a high level of input efficiency (IE).

4.1.2 Relationship between DIFD, BCD and OE (H1b)

Although sharing the solutions of the entrepreneurial problem (Miles & Snow, 1978) mentioned earlier, some defenders make their policy choices after deliberate trade-offs between cost and differentiation to seek a differentiated position to protect their current markets (DIFD and BCD). In line with solutions to Miles and Snow's (1978) engineering and administrative problems, Porter (1985: 124-125) proposes that such a decision results in a variety of discretionary policies that greatly affect uniqueness.

These groups of defenders tend to provide differentiated or unique products (e.g. unique features or high performance) or services (e.g. credit, delivery time, scheduling, information provided in order processing, maintenance, repair) that are valuable to potential customers, which allow them to command a premium price, to sell more of their product at a given price, or to gain equivalent benefits (e.g. greater buyer loyalty during cyclical or seasonal downturns).

Building on Miller's (1986) suggestion that there are two distinct types of differentiation – innovative and marketing – these groups of defenders tend to perform detailed analyses of their target customers' needs by determining customers' ranked purchasing criteria for both *use criteria*[14] and *signal criteria*[15] to decide which purchasing criteria they wish to respond to better than their competitors. Although they normally respond to both types of purchasing criteria simultaneously, they must still choose from a number of possibilities within each type of criteria. To response to use criteria, they tend to conduct rigorous research and development, creatively design products, select an advanced technology to perform an activity (e.g. high precision machine tools, computerized order processing), use high-quality inputs, and provide detailed procedures governing employees' actions (e.g. service procedure, nature of sales call, frequency of inspection or sampling), as well as offering comprehensive information used to control an activity (e.g. temperature, pressure and variables used to control a chemical reaction) to ensure quality.

In addition, they tend to design their human resource policies to be in line with their differentiated initiative, such as high levels of skill, especially creativity and R&D skills, and experience which result in higher wage rates, a high intensity of training, and using profitability targets as work incentives. To respond to signal criteria, they tend to pursue extensive advertising, image management and intensive marketing. Altogether, they are able

[14] "purchasing criteria that stem from the way in which a supplier affects actual buyer value through lowering buyer cost or raising buyer performance" (Porter, 1985: 142), e.g. product qualities, applications engineering support.
[15] "purchasing criteria that stem from signals of value, or means used by the buyers to infer or judge what a supplier's actual value is" (Porter, 1985: 142), e.g. advertising, reputation.

to shape a buyer's perception of product or service quality, function and design. Since it is impossible and uneconomical to respond to all purchasing criteria, these defenders will aim to satisfy their customers better than their competitors only in value activities (value chains) that create the most valuable differentiation for the buyers relative to their cost of differentiation, maximizing their margin. This objective closely matches the proposed output efficiency (OE) definition of this research, which is the ability to raise profit margins (or charge a price premium).

In pursuing a differentiation strategy, differentiated defenders and best-cost defenders can demand higher margins for their differentiated products or services (in terms of either innovation or marketing, or both, according to customer perceptions) that more than offset the greater expenses involved in maintaining their differentiated positions. These higher price premiums (outputs) compared with those of their competitors assist them in rearranging their outputs to achieve the maximum output-to-input ratio within their industries. In other words, higher price premiums allow them to reposition themselves toward being the most unique or most differentiated business unit in their industry.

In this research dataset, this is reflected in a lower *loss ratio*. The loss ratio is equivalent to a complement of the gross profit margin ratio (disregarding investment activities) of products or services commanded by a business unit, and total income. Therefore, the lower the loss ratio, the higher the OE.

Investment is another main source of revenue in this research dataset. A non-life insurance product line also invests some of its premium earned to generate revenues to support potential claims in the future, which in turn helps to reduce the loss ratio or raise the profit margin. Therefore, the same argument regarding OE also applies to the *investment yield* to capture the profitability (or ability to generate earnings) of the investment activity. Thus, the higher the investment yield, the higher the OE.

In effect, successfully coordinating and jointly optimizing discretionary policies and having uniqueness drivers that reinforce each other and jointly support a single theme to achieve a differentiated position, a key characteristic of DIFD or BCD, is a means to accomplish a high level of OE, which is displayed in a lower loss ratio and higher investment yield in this research context. As such, the following sub-hypothesis is put forward:

> H1b: Having a high intensity level of either differentiated defender (DIFD) or best-cost defender (BCD) is a sufficient condition for a business unit to achieve a high level of output efficiency (OE).

4.1.3 Relationship between A and EF (H1c)

Miles and Snow (1978: 79) describe the adaptive decision for the entrepreneurial problem made by an analyzer as "to locate and exploit new product and market opportunities while simultaneously maintaining a firm base of traditional products and customers".

With hybrid product-market domains, operating in both a relatively stable domain like that of a defender and a changing domain like that of a prospector, an analyzer aims to minimize risk and maximize profit opportunities by blending the entrepreneurial solutions of both defender and prospector. In the stable portion of its domain, like defenders, operating efficiency is its key concern, which is reflected in risk averseness and efficiency drivers, while in the changing portion of its domain, like prospectors, entrepreneurial spirit and new product introductions are the main focus. Whereas the stable component is reasonably well protected through its policy choice regarding its positioning (the same logic as the two previously-mentioned hypotheses), the changing component requires extra treatment. An analyzer must closely monitor market change, especially its competitors, for new ideas and then rapidly adopt the most promising ones without engaging in extensive research and development. The analyzer's successful imitation of prospectors' initiatives comes from its extensive marketing surveillance mechanisms. In other words, whereas a prospector is a creator, an analyzer is an avid follower. Consequently, an analyzer's growth pattern is a mixture of both the defender's market penetration and the prospector's product and market development.

In terms of a solution to Miles and Snow's (1978) engineering and administrative problems, an analyzer must separate its production activities into a *dual technology core* to achieve equilibrium between conflicting demands for technological stability (formalized structures and routinized processes to achieve cost efficiency like that of defender) and for technological flexibility (large group of applications engineers who are rotated between teams charged with the task of rapidly adapting new products like those of prospectors). These two components are "welded together by an influential applied research group" (Miles & Snow,1978: 73) because this group allows the analyzer to develop new products that match the organization's technological capacities without incurring extensive research and development expenses like those of the prospector. Because of this dual technology core, the analyzer achieves only a moderate degree of technical efficiency. This fact supports the proposal of this research to use effectiveness (EF) – the success of a business' products and programmes (e.g. sales growth and change in market share) – which reflects the growth pattern of the analyzer and also reveals the implications of its dual technology core for efficiency. This special characteristic also affects the performance appraisal used for analyzers. In stable sub-units efficiency is used, especially measured against cost budgets, whereas in adaptive sub-units effectiveness is utilized, especially measured against market penetration and profit projections.

Although an analyzer pursues mixed and rather inconsistent strategies, it still has a clear goal of effectiveness, which is the success of its market performance, reflecting the external accomplishments of its business' products and programmes (e.g. sales growth and market share). This objective represents success in balancing resources to operate in both types of market setting. If it can both maintain its current stable market and respond to a relatively volatile new market, its sales growth and market share will continuously increase, thereby achieving a high level of effectiveness. However, in doing so, it may not achieve high IE and

OE or a high percentage of sales accounted for by newly introduced products (a proxy for adaptability in this research) compared with its counterparts who pursue defender and prospector strategies. Therefore, the following sub-hypothesis is proposed:

> H1c: Having a high intensity level of analyzer (A) is a sufficient condition for a business unit to achieve a high level of effectiveness (EF).

4.1.4 Relationship between P and AD (H1d)

Miles and Snow (1978: 66) describe the adaptive decision for the entrepreneurial problem made by prospectors (P) as “to locate and exploit new product market opportunities.” Thus, a prospector usually has a broad and continuously developing domain (e.g. continuously transforming a mix of products and markets). To find new potential opportunities, a prospector must monitor a wide range of environmental conditions, trends and events, which are not limited to its current domain; therefore, a prospector tends to create change in its industry. The primary source of its growth is its ability to locate new markets and develop new products. Because of horizontal expansion into related products and markets, a prospector may grow in spurts.

In terms of a solution to Miles and Snow’s (1978: 66) engineering and administrative problems, a prospector must “avoid long-term commitments to a single type of technological process”. This is because, in order to continually search for new market opportunities, a prospector cannot establish stable technologies and organization structures; rather, it must be adaptable by maintaining flexibility in technological and administrative components. A substantial part of its technological core is often engaged in the production of prototype products and its production process is developed into multiple self-contained technologies for its different products. Technologies are less formalized and more embedded in the minds of the organization’s personnel. Planning is based on incremental adjustments derived from experimental feedback.

In order to protect its technological flexibility, a prospector employs a variety of skilled individuals who can exercise judgment in selecting which skills to apply in a given situation. Managers tend to have decision-making autonomy because they are closer to both customers and competitors (Walker & Ruekert, 1987). This allows them to free themselves from restrictions and to make decisions with little consultation and few participants. Consequently, the business unit can respond quickly to changing opportunities or threats in its environment (see Lawrence & Lorsch 1967a; Thompson 1969; Mintzberg 1979). In other words, the technology of the prospector is "embedded in people, not in routine or mechanical operations" (Miles & Snow, 1978: 59). A prospector usually defines its performance in term of results and tends to compare past and recent performance with that of similar organizations (important competitors) because its organization system is undergoing relatively continuous change, which makes comparison of levels of efficiency over time difficult and only partially meaningful.

For a prospector to achieve its goals, these characteristics must be realized and their success will be reflected in the number of successful new products introduced in relation to those of competitors and the percentage of sales accounted for by products introduced within the last year, which this research measures collectively as adaptability (AD). Nonetheless, by having multiple self-contained technologies, rather than a single core technology as in defenders, as well as having a people-intensive approach that maximizes flexibility while minimizing standardization, a prospector will show lower operating efficiency, in both IE and OE, compared with LCD, BCD and DIFD. This is because, at any given point in time, a prospector may be both underutilizing and misutilizing a substantial proportion of its resources, and its learning curve associated with a particular project may be lengthy due to the complex and uncertain nature of many tasks in which it is engaged (Miles & Snow, 1978).

Moreover, since prospectors' entrepreneurial spirit will encourage the risk-taking necessary to spur growth, with less concern for profitability at least in the short run, efficiency (e.g.

ROS and ROI) and effectiveness (e.g. sales growth and change in market share) may be lower. For example, a prospector may favour maintaining its reputation as an innovator in product and market development rather than achieving high profitability. In addition, there is an inevitable failure rate associated with sustained product and market development activity and competitors usually adopt only promising ideas at a lower R&D and market introduction cost; a prospector, therefore, "may find it difficult to attain consistently the profitability levels of the more efficient defenders" (Miles & Snow, 1978: 56). Thus, IE, OE and EF are not appropriate measurements for prospectors because they do not represent this typology's key concerns.

In effect, the specific characteristics of a prospector that reinforce each other and jointly support a single theme to constantly search for new market opportunities and often test emerging environmental trends is a major means of accomplishing a high level of AD, which in this research context is displayed in the number of new non-life insurance products introduced in relation to those of competitors within the past year and the percentage of net written premiums (equivalent to sales), after reinsurance costs, accounted for by new non-life insurance products introduced to market within the past year. Hence the following sub-hypothesis is put forward:

> H1d: Having a high intensity level of prospector (P) is a sufficient condition for a business unit to achieve a high level of adaptability (AD).

4.2 FC and performance (H2)

In this section, I will argue for each sub-hypothesis of H2 (FC and performance relationship) to understand this proposed relationship more specifically by discussing each FC's value implication using the VRIN framework (Barney, 1991a). These are reflected in its particular characteristics and behaviours, which in turn result in a high level of a related performance dimension.

4.2.1 *Relationship between OP and IE (H2a)*

Operations capability (OP) lies mainly in process engineering, production, distribution (logistics system), and financial management and control. This is quite straightforward for a manufacturing firm. However, for a service firm with no manufacturing activities but rather with a range of corporate functions and activities responsible for providing its services to customers, OP lies in a range of corporate functions and activities, such as financial management (e.g. budgeting, profitability, and revenues forecasting), cost control, multidivisional coordination, the marketing planning process, and human resources management (DeSarbo et al., 2005).

Business units that belong to firms with strong OP will benefit from their firm's continuously improved operations processes (e.g. controlling costs, standardizing components and processes, routinizing procedures, and integrating functional activities across the firm). By continuously searching for more efficiency in volume manufacturing as well as providing service to customers, these business units may reduce their inputs (costs) through economies of scale and scope compared with those of their competitors. Moreover, their costs are also reduced by the learning curve, such as routinization (including back office), reducing error, fast responses and increased productivity.

Thus, in terms of economic value implications, firms' OP assists business units in managing their required inputs to achieve the minimum required input-to-output ratio within their industries. In other words, OP allows them to reposition themselves as the most cost-efficient firm. This is reflected in higher IE, which is displayed in a lower expense ratio in this research context, as described previously for H1a. Firms' OP facilitates business units in achieving scale and scope economies as well as flattening the learning curve over time, which is in turn reflected in cost reductions.[16]

[16] However, as discussed earlier, the levels of competitiveness and sustainability generated by each firm's operations capability (OP) depend on its rarity, imitability and substitutability.

In effect, being part of a firm with successful and continuously improving operations processes (e.g. controlling costs, standardizing components and processes, routinizing procedures, and integrating functional activities across firm), which are a main characteristic of strong OP, is a major means of accomplishing a high level of IE, which in this research context is displayed in a low expense ratio. As such, the following sub-hypothesis is put forward:

> H2a: Being part of a firm that has a high intensity level of operations capability (OP) is a sufficient condition for a business unit to achieve a high level of input efficiency (IE).

4.2.2 Relationship between RD and OE (H2b)

Product design and R&D capability (RD) pertains to technology and new product development, production process, predicting technological changes, product facilities, and quality control skills (Day, 1994; DeSarbo et al., 2005). This is quite straightforward for both manufacturing firms and service firms.

Business units that belong to firms with strong RD will benefit from their firms' continuous improvements in design capability in order to respond to changing customer demand over time. Moreover, they tend to proliferate in research and to develop new products with a fast cycle time, which in turn allows them to maintain their profitability by continuously differentiating themselves from competitors in terms of customer perceptions of products or service quality, function and design.

Thus, in term of economic value implications, firms' RD allows business units to differentiate their products and services, permitting them to demand higher prices for their products or services that more than offset the greater expenses involved in maintaining their differentiated positions. The resulting higher price premiums (outputs) compared with those of their competitors assist them in managing their outputs to achieve the maximum possible output-to-input ratio within their industries. In other words, RD allows them to reposition themselves toward being the highest margin (revenue efficient) firm.[17] This is reflected in higher OE and the ability to demand higher margins, which is displayed in a lower loss ratio and higher investment yield in this research context, as described previously for H1b.

In this research dataset, RD lies in the insurance product design and actuary departments, which are responsible for designing new insurance policies and calculating appropriate insurance premiums to ensure the business unit's profitability. These functions help differentiate insurance products by offering more tailor-made policies with price premiums and also help business units to manage their risk better (e.g. more accurate forecasts, which mean better financial budgeting). Moreover, these functions can be classified as rare, inimitable and nonsubstitutable because there are only a handful of actuaries in the Thai insurance industry, all of whom are very highly paid to ensure their loyalty to the firm. Therefore, RD in this dataset appears to create sustainable competitive advantage.

In effect, being a part of a firm that has a successful and continuously improving design capability in order to respond to changing customer demands over time (e.g. improving product or service quality, function, variety and design, as well as proliferation rate), a key characteristic of strong RD, is a major means of accomplishing a high level of OE, which is displayed in a low loss ratio and high investment yield in this research context. As such, the following sub-hypothesis is put forward:

> H2b: Being part of a firm that has a high intensity level of product design and R&D capability (RD) is a sufficient condition for a business unit to achieve a high level of output efficiency (OE).

4.2.3 Relationship between MIS, SD and EF (H2c)

Management information system capability (MIS) and sales and distribution capability (SD) work in close cooperation to achieve the single goal of better response to market change. MIS helps a firm to create technology and market knowledge and facilitates inter- and intra-

[17] However, as discussed earlier, the levels of competitiveness and sustainability generated by each firm's RD depend on its rarity, imitability, and substitutability.

organizational communication flow (DeSarbo et al., 2005). It allows a firm to disseminate market information effectively across all pertinent functional areas to direct the new product development process. SD relates to focused market sensing, customer linking and channel bonding outside the organization in order to create durable relationships with both buyers and wholesalers as well as retailers (Day, 1994; DeSarbo et al., 2005). These capabilities allow a firm to respond quickly to changing customer needs and to make use of its technological strengths (from MIS) most effectively.

Business units that belong to firms with strong MIS and SD will benefit from their firm's comprehensive, integrated MIS network that links market information, inter- and intra-organizational communication, and managerial decision making, as well as benefitting from their firm's effective sales promotion, efficiency and speed of order processing and distribution in order to respond more flexibly and more rapidly to the changing environment over time.

Thus, in terms of economic value implications, firms' MIS and SD allow business units to closely monitor market change in terms of customer demand, competitor strategies, environmental requirements and regulations, and then report through their information system, which in turn leads to thorough and rapid managerial decision making. In order to respond to such managerial decisions, their continuously enhanced sales and distribution system will enable them to offer effective sales promotion and to expedite their order processing and distribution.

Moreover, with closer and more frequent communication, SD also helps create trust in distribution channels, resulting in more loyalty to these business units. In summary, since each synchronizes its activity with that of the other, these capabilities in combination will allow business units both to maintain their current market and to tap into emerging markets. Thus, their success is expected to be reflected in an effectiveness measurement (EF), which is success in its market performance (e.g. sales growth and market share).

In effect, being a part of a firm with a successful and continuously improving management information system to report the market situation integratively, accurately and in a timely fashion at relatively low cost, to support both inter- and intra-unit communication as well as managerial decisions, and also with a successful and continuously improving sales and distribution function to follow managerial decisions quickly in terms of effective sales promotion and distribution, which are the main characteristics of strong MIS and SD, is a major means of accomplishing a high level of EF, which is displayed in high sales growth and high market share in this research context. As such, the following sub-hypothesis is put forward:

> H2c: Being part of a firm that has a high intensity level of both management information system capability (MIS) and sales & distribution capability (SD) is a sufficient condition for a business unit to achieve a high level of effectiveness (EF).

4.2.4 Relationship between MKT and AD (H2d)

Marketing capability (MKT) integrates many marketing activities, such as segmentation and target marketing, pricing, advertising and monitoring both customers' and competitors' current situations (Day, 1994; DeSarbo et al., 2005) to implement effective marketing programmes.

Business units that belong to firms with strong MKT will benefit from their firm continuously improving its rigorous brand management, constantly promoting its reputation for quality and quickly responding to market trends. Business units can capitalize on their firm's well-established brand equity when introducing a new product to market because customers tend to trust and have a high loyalty to the firm's brand. For example, Apple was able to capture latent demand for the iPad by capitalizing on its strong brand and previous products (e.g. iPod, iPhone) with lower costs of introduction compared with its competitors.

Thus, in terms of economic value implications, firms' MKT will facilitate business units' ability to adapt to new market opportunities. This is because many marketing programmes will work together with mutual objectives to achieve a target position, which will enhance the robustness of customer perceptions (confidence) toward the firm and its products and services, and increase customers' loyalty, resulting in their strong willingness to try newly-introduced products from the same brand. This, in turn, is reflected in high AD.

In effect, being part of a firm with successful and continuously improving marketing activities that reinforce each other and jointly support strong brand equity, a key characteristic of strong MKT, is a major means of accomplishing a high level of AD, which in this research context is displayed in the number of new non-life insurance products introduced in relation to those of competitors within the past year and the percentage of net written premiums, after reinsurance costs, accounted for by new non-life insurance products introduced to market within the past year. As such, the following sub-hypothesis is put forward:

> H2d: Being part of a firm that has a high intensity level of marketing capability (MKT) is a sufficient condition for a business unit to achieve a high level of adaptability (AD).

4.3 Complementarity and performance (H3)

In this section, I will argue for each sub-hypothesis of H3 (complementarity between GOC and FC on performance) to understand this proposed relationship more specifically, referring to Miles and Snow's (1978) claim for different solutions to administrative problems as well as Porter's (1980) common organizational requirements for different GOC typologies, which, if consistency between them is achieved, will result in a high level of a related performance dimension. Note also that after these sub-hypotheses have been tested (post-hoc analysis), I can reconfirm my argument that complementarity exists based on Milgrom & Robert's (1995: 181) complementarity definition (i.e. a circumstance in which "doing more of one thing increases the returns to doing more of another") if the explanation powers of a proposed combination of GOC and FC under each sub-hypothesis better explain the variation in corresponding performance than considering either GOC or FC under such sub-hypothesis alone.

4.3.1 Complementarity between LCD, BCD and OP on IE (H3a)

In serving the defender's focus on a stable market and a heavy emphasis on technological efficiency (doing things right) rather than effectiveness (doing the right things), the controller or production manager responsible for a business unit's financial and operations functions plays a very influential role in a defender unit, while marketing and R&D rank much lower because the financial and operations functions strengthen the defender's main focus (scope of target market and performance objective) which is most critical to the business unit's success (Miles & Snow, 1978). This is because it is not necessary for a defender to possess a great deal of expertise in externally-oriented areas such as marketing.

In other words, it is more advantageous for a defender to know its strengths and capacities (improve efficiency – "we can do what we do better than anybody") than to know about trends and developments in its industry (market adaptability). However, since there are at least two strategic choices (or three for a special case that can successfully pursue both strategies simultaneously) for a defender to compete in its chosen market, either by providing low-cost products or services, or by providing differentiated products or services that can be charged at a premium price, or both, the dominant coalition of defenders can be specified still further according to the chosen strategy.

In term of required skills and resources, as well as organizational requirements for different generic strategies, Porter (1980: 40) argues that a business unit pursuing a low-cost strategy should have process engineering skills, products designed for ease of manufacture, a low-cost distribution system, tight cost control, frequent and detailed control reports, and incentives based on meeting strict quantitative targets, all of which are characteristics of good operations capabilities that share the same goal of achieving operating efficiencies (e.g. economies of scale and learning, improved organizational routines, specialization development, capacity utilization, organizational slack reduction, and input cost reduction). Having a compatible combination of GOC (low-cost strategy) and FC (operations capabilities) allows a business unit to enjoy complementarity between them, leading to a mutually reinforcing effect.

Combining the two arguments above, a business unit that pursues either an LCD or BCD strategy and is part of a firm with strong OP will achieve its cost reduction objective, proxied by IE in this research, better than competitors that have only one of these components and another incompatible component, because such competitors cannot benefit from complementarity between GOC and FC. Consequently, the following sub-hypothesis is proposed:

> H3a: Having a high intensity level of either low-cost defender (LCD) or best cost defender (BCD) is a sufficient condition for a business unit that is part of a firm with a high intensity level of operations capability (OP) to achieve a high level of input efficiency (IE).

4.3.2 Complementarity between DIFD, BCD and RD on OE (H3b)

Building on the argument of the previous section that a business unit pursuing a defender strategy can decide how to compete in its stable market and that a defender's dominant coalition (the highest influential function for the success of the firm) can be specified even more closely from the chosen strategy, in this section I will argue for a dominant coalition (representing a particular FC) of defender that chooses to compete on product or service differentiation to create customer loyalty, which in turn allows a business unit to raise its price premium.

In terms of required skills and resources, as well as organizational requirements for different generic strategies, Porter (1980: 41) argues that business units pursuing a differentiation strategy should have a creative flair in product engineering, a strong capability in basic research, a corporate reputation for quality or technological leadership, strong coordination between functions in R&D and product development, subjective measurement and incentives rather than quantitative measures, and amenities to attract highly skilled labour, scientists or creative people, all of which are characteristics of good RD and share the same goal of demanding a high margin for their products or services exceeding the expenses incurred in maintaining their differentiated positions. Having a compatible combination of GOC (differentiation strategy) and FC (RD) allows a business unit to enjoy complementarity between them.

This argument does not go entirely against Miles and Snow's (1978) suggestion that, in general, financial and operations functions rank higher than research and development for a business unit pursuing a defender strategy because Porter (1980) also emphasizes that pursuing differentiation does not mean completely ignoring cost concerns. Rather, differentiated defenders and best-cost defenders still need to ensure that they either spend less on differentiation than they recover in the price premium or successfully exploit ways of reducing the cost of differentiation by understanding their cost drivers. In other words, cost reduction is still a core concern of DIFD and BCD, albeit not the only priority as for LCD. OP does not wield as much power as RD, but it is nevertheless present because part of the organization's profitability is still based on the ability of the production unit to operate efficiently. The priority of DIFDs and BCDs is to maintain their profitability (or OE) by continuously differentiating themselves from competitors by offering superior products or services, rather than competing only on price by searching for IE. Hence, functions that are central to differential advantage (e.g. product design and R&D) are significant functional competencies and tend to remain separate and attract significant resources and authority in order to preserve flexibility and maintain quality (Walker & Ruekert, 1987). Since DIFDs and BCDs focus more on increasing price premiums, their OE better reflects their strategic performance target; hence, it is a more appropriate performance dimension for these GOC typologies.

Consequently, business units that pursue either DIFD or BCD strategies and are within a firm with strong RD will achieve their profitability objectives, proxied by OE in this research, better than their competitors which have only one of these components and another incompatible component, because such competitors cannot benefit from complementarity between GOC and FC. Consequently, the following sub-hypothesis is proposed:

> H3b: Having a high intensity level of either differentiated defender (DIFD) or best cost defender (BCD) is a sufficient condition for a business unit that is part of a firm with a high intensity level of product design and R&D capability (RD) to achieve a high level of output efficiency (OE).

4.3.3 Complementarity between A, MIS and SD on EF (H3c)

Miles and Snow (1978) suggest that an analyzer's dominant coalition emphasizes marketing, applied research and production, which reflect parts of both the prospector's and defender's dominant coalition, because an analyzer combines the market scope of both defender (current market domain) and prospector (new market domain). Building on this, I propose a specific function that is more essential to the analyzer than to other GOCs, which may make both an academic and a practical contribution.

Operating in both new and existing product-market domains, an analyzer must closely monitor market change and, at the same time, try to maintain its current market position. To respond to the former functional demand to serve new markets, an analyzer needs MIS to develop a comprehensive and integrated MIS network that links to managerial decision making. Since an analyzer is likely to imitate a successful prospector, strength in MIS is best suited both to identifying those newly-developed products and markets which are likely to be profitable, and to supporting fast and accurate communication within the firm for quick responses. With regard to the latter functional demand to serve the current market, SD is needed to generate effective sales promotion activities, advertising and a strategy of product availability (e.g. timing and location), as well as efficiency and speed of order processing and distribution. This capability also supports new product or market introduction because right decision making using accurate and timely data cannot result in success unless sales and distribution support the decision. Together, these two FCs will help the analyzer to operate more flexibly in balancing the monitoring of its new markets and the maintenance of its existing market position. This, in turn, will be reflected in its EF (e.g. sales growth and market share).

In pursuing both strategies, which appear to have a trade-off or conflicting relationship (Freeman & Hannan, 1984), an analyzer is unlikely to perform well in either AD criteria (e.g. the number of successful new products introduced in relation to those of competitors and the percentage of sales accounted for by products introduced within the last year) or efficiency criteria (IE and OE). In other words, the conflicting goals and higher cost of running two parallel technical systems prevent the organization from being 100% efficient or 100% adaptable. Thus, to be a viable organization, analyzers' management information system and sales and distribution are two crucial departments that balance both new and existing markets.

Consequently, a business unit pursuing an analyzer strategy which is within a firm with strong MIS and SD will achieve its EF objective better than competitors that have only one of these components and other incompatible components, because such competitors cannot benefit from complementarity between GOC and FC. Consequently, the following sub-hypothesis is proposed:

> H3c: Having a high intensity level of analyzer (A) is a sufficient condition for a business unit that is part of a firm with a high intensity level of both management information system capability (MIS) and sales & distribution capability (SD) to achieve a high level of effectiveness (EF).

4.3.4 Complementarity between P and MKT on AD (H3d)

In order continually to seek new market opportunities, a prospector (P) must be flexible when facing rapidly-changing markets. Therefore, to better penetrate new and constantly developing markets, marketing capability (MKT), an FC that is closest to the customer, which facilitates both the identification of newly-developed products and markets and the utilization of its strong brand (customer loyalty) to support new products or new market expansion, must be enhanced as the dominant coalition of a prospector (Miles & Snow, 1978) in terms of competency and resource allocation (Hambrick, 1983b).

Clearly, strength in marketing activities (e.g. rigorous brand management, advertising, promotion) is essential to respond to market trends quickly, which in turn contributes to the sustainable competitive advantage of the prospector. The success of MKT will be shown in the prospector's AD but not in its efficiency criteria (IE and OE) because of the higher costs of being a market pioneer, especially market research expenses, the cost of introducing new products and educating new markets, and market testing costs (with possible failure rates).

Consequently, a business unit pursuing a prospector strategy that is within a firm with strong MKT will achieve its AD objective better than competitors that have only one of these components and another incompatible component, because such competitors cannot benefit from complementarity between GOC and FC. Consequently, the following sub-hypothesis is proposed:

> H3d: Having a high intensity level of prospector (P) is a sufficient condition for a business unit that is part of a firm with a high intensity level of marketing capability (MKT) to achieve a high level of adaptability (AD).

4.4 Equifinality and performance (H4)

In this section, I will only list each sub-hypothesis of H4 (equifinality on overall performance proxy) as a result of different proposed consistent combinations of GOC and FC (H4a-H4d) because the argument of each proposed consistent combination has been previously argued in each sub-hypothesis of H3 and will therefore not be repeated here. However, readers should refer to each sub-hypothesis of H3 as required. The last sub-hypothesis (H4e) regarding equifinality as the final outcome of each intermediate performance dimension will then be discussed.

4.4.1 Equifinality from a combination of LCD, BCD and OP on OA (H4a)

In arguing that a business unit pursuing either an LCD or BCD strategy within a firm with strong OP will achieve its overall performance proxy (OA) better than competitors that have only one of these components and another incompatible component, because such competitors cannot benefit from a complementarity between GOC and FC, the following main hypothesis is proposed:

> H4a: Having a high intensity level of either low-cost defender (LCD) or best-cost defender (BCD) is a sufficient condition for a business unit that is part of a firm with a high intensity level of operations capability (OP) to achieve a high level of overall performance proxy (OA).

4.4.2 Equifinality from a combination of DIFD, BCD and RD on OA (H4b)

In arguing that a business unit pursuing either a DIFD or a BCD strategy within a firm with strong RD will achieve its OA better than competitors that have only one of these components and another incompatible component, because such competitors cannot benefit from complementarity between GOC and FC, the following sub-hypothesis is proposed:

> H4b: Having a high intensity level of either differentiated defender (DIFD) or best-cost defender (BCD) is a sufficient condition for a business unit that is part of a firm with a high intensity level of product design and R&D capability (RD) to achieve a high level of overall performance proxy (OA).

4.4.3 Equifinality from a combination of A, MIS and SD on OA (H4c)

In arguing that a business unit pursuing an analyzer (A) strategy within a firm with strength in both MIS and SD will achieve its OA better than competitors that have only one of these components and other incompatible component, because such competitors cannot benefit from complementarity between GOC and FC, the following sub-hypothesis is proposed:

> H4c: Having a high intensity level of analyzer (A) is a sufficient condition for a business unit that is part of a firm with a high intensity level of both management information system capability (MIS) and sales & distribution capability (SD) to achieve high level of overall performance proxy (OA).

4.4.4 Equifinality from a combination of P and MKT on OA (H4d)

In arguing that a business unit pursuing a prospector (P) strategy within a firm with strong MKT will achieve its OA better than competitors that have only one of these components and another incompatible component, because such competitors cannot benefit from complementarity between GOC and FC, the following sub-hypothesis is proposed:

> H4d: Having a high intensity level of prospector (P) is a sufficient condition for a business unit that is part of a firm with a high intensity level of marketing capability (MKT) to achieve high level of overall performance proxy (OA).

4.4.5 Equifinality of each intermediate performance dimension (H4e)

The four previous sub-hypotheses on equifinality as a result of different consistent combinations of GOC and FC (H4a-H4d) are based on the assumption that success on each particular intermediate performance dimension leads to the same final outcome, which is displayed by the OA. Hence, to further support the equifinality argument, it is necessary to test this assumption as well.

By arguing for parity between the success of a variety of performance measurements relevant to different consistent combinations of GOC and FC in terms of OA, the following hypothesis is proposed:

> H4e: Achieving a high level on at least one type of performance dimension is a sufficient condition for a business unit to achieve a high level of overall performance proxy (OA).

It should be noted that, unlike the four previous hypotheses, this sub-hypothesis (H4e) has no further sub-hypotheses because all high levels of performance dimensions are assumed (and will be tested by all sub-hypotheses of H3) to be a result of consistent combinations of the proposed type of FC and the proposed typology of GOC.

4.5 Proposed conceptual framework

According to the research hypotheses mentioned in previous sections, the conceptual framework is as follows (also provided in a looseleaf glossary):

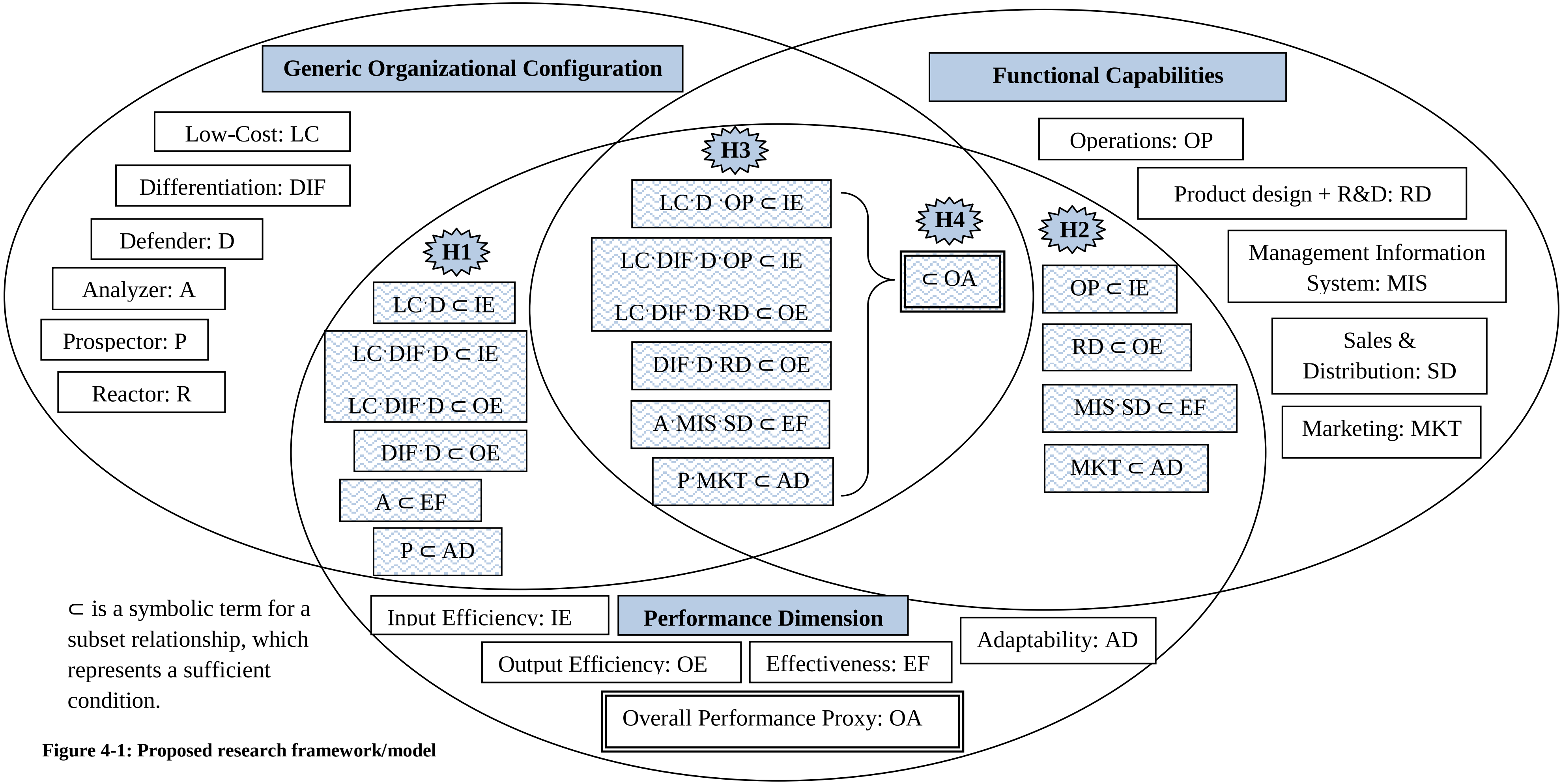

Figure 4-1: Proposed research framework/model

5 METHODOLOGY

In this chapter, the research paradigm, which affects both the proposed theories and the choice of methodology, will be discussed. This will be followed by a detailed discussion of the research methodology – fuzzy set qualitative comparative analysis (fsQCA).

5.1 Research paradigm

This section discusses the rationale for the post-positivist assumption of this thesis by mapping this concept with a history of the organizational configuration research stream. I will then describe the implications of this school of thought for my research methodology.

In order to justify and adopt either positivism, which views knowledge as objective and demands that researchers take an observer role and pursue a natural science method, or anti-positivism, which perceives knowledge as subjective and requires researchers to take an involved role with their subjects and to reject the ways of natural science, I examine how they fit with the history of my research stream development.

Dess, Newport and Rasheed (1993: 783) suggest that "[R]esearch on configuration is primarily inductive in nature – a process of observation and description". Short, Payne and Ketchen (2008) also assert that the uniqueness of configurational research is in pursuing three goals (see Kerlinger, 1986): 1) describing organizations by identifying the similarity of important dimensions; 2) explaining organizational success and failure by arguing about fit within any given circumstance; and 3) predicting which sets of firms will be successful in a particular context. In other words, organizational configuration researchers believe that events are determined by antecedents (*determinism*). These causal relationships can be understood from and verified by the empirical evidence (*empiricism*). The knowledge from observation can then be generalized to the world at large (*generality*). Clearly, with these scientific assumptions, this research stream appears to be consistent with positivism.

However, like other social sciences, the validity of configurational research has been challenged many times as it has progressed. Collectively, not only do these challenges identify the limitations of configurational research, they also cast doubt on the worth of conducting such research (Short, Payne & Ketchen, 2008). Obviously, the idea that on refutation one can demand the rejection or elimination of a theory reflects Popper's (1963) naïve falsification (Kuhn, 1970), which Lakatos (1970) calls Popper_1.

Having realised the limitations of Popper_1, specifically the problematic mono-theoretical deductive structure underlying the conflation of refutation and rejection, many scholars conducted research in response to the aforementioned falsification attempts. Rather than surrendering the basic theory – Lakatos' (1970) hard core – these scholars modified auxiliary hypotheses – Lakatos' (1970) protective belt – reflecting the progressive research programme, which is consistent with Popper_2, commented on by Lakatos (1970).

Furthermore, as of now, there is no clear sign of a potential paradigm shift (Kuhn, 1970) in configurational research.[18] These falsification attempts and anomalies are merely challenging, puzzle-solving activities of either a theoretical (assumptions development) or an experimental (experimental technique improvement) nature. Such anomalies are not regarded as serious conditions to undermine confidence in the paradigm suggested by Chalmer (1999). Although some strike at the foundation of the paradigm, they have not been able persistently to resist attempts by members of the paradigm community to remove them. These anomalies are not particularly important with respect to pressing social needs. More importantly, they do not create a period of "pronounced professional insecurity", a criterion proposed by Kuhn (1970).

In addition to recognizing critical theory, critical realism and the social constructivism concept, I am also aware of Feyerabend's (1975) criticism of Lakatos's (1970) assumption that all areas of study must share the basic characteristics of physics. Feyerabend (1975)

[18] Apparently, although the resource-based view/capability theory, the other school of thought, has been in the ascendency, its empirical evidence regarding the link between resource and performance is also equivocal (Newbert, 2007).

argues that methodologies and standards for judging physics may not be suitable in other areas. Unlike physics, studies of people and societies cannot proceed by isolating an individual mechanism without affecting the subject under investigation. In other words, a change in theory may bring about a change in the system being studied. Nevertheless, this literature still shows no good examples to support the argument regarding this criticism. Although the "swings of the pendulum" of theory and research in strategic management (Hoskisson et al., 1999) have two main implications for the theoretical focus of source of performance[19] and the dominant method for conducting strategic management research,[20] they have no effect on the organizational configuration-performance relationship, the phenomenon being studied.

The post-positivist concept that best fits with this thesis appears to be that of Lakatos (1970) because it conforms to the real situation in this research stream. His suggestion, regarding the way to deflect the arrow of modus tollens away from the hard core (negative heuristic) towards hypotheses in the protective belt (positive heuristic), has inspired me to propose complementarity between GOC and FC to explain performance, the main argument of this dissertation, because it maintains the GOC-performance relationship (hard core) and modifies the auxiliary hypotheses (protective belt) by suggesting a corresponding FC as another causal condition that will improve the explanatory power of a particular typology of GOC for performance.

Likewise, in terms of methodology, rather than accepting previous falsification attempts about the overall "weak evidence of performance variations across groups" (Thomas & Venkatraman, 1988: 548), which is the hard core of the GOC-performance relationship, I answer Dess, Newport and Rasheed's (1993) call for a research design that permits a causality inference to be applied in this literature by using fsQCA as the research

[19] A shift in the theoretical focus of source of performance from a business unit's external position (configuration) to a firm's internal characteristics (capability).

[20] A change in the dominant method for conducting strategic management research from deductive, large-scale statistical analyses based on industrial organization economics (Bain, 1956), the root of configuration, to inductive, in-depth case-based studies of single firms or industries reintroduced by RBV, the root of capability.

methodology rather than continuing to use a quantitative approach like most previous research, which may help improve the match between the research programme's predictions and observation and experiment without relinquishing the hard core of the GOC-performance relationship. A supporting reason for switching from a conventional correlational approach to a set theoretic approach will be covered in detail in the next section.

5.2 Technique: fsQCA (fuzzy set qualitative comparative analysis)

In this section, I will argue for the benefit of a set theoretic approach over a conventional correlational approach in terms of its greater suitability to the objective of this research. Next, I will discuss both conceptual and brief analytical procedures regarding fsQCA, a proposed analytical technique grounded in set theory, since this methodology is relatively new to the strategic management field.

Complementarity and equifinality, the two main arguments of this research, share the same underlying assumption as the set theoretic approach that "patterns of attributes will exhibit different features and lead to different outcomes depending on how they are arranged" (Fiss, 2007: 1181). In other words, contextuality, which is how attributes within a case of concern are arranged (as present or absent conditions) and interacted, rather than the net effect of all attributes (as isolated items), determines the outcome. Complementarity exists when there is a match between causal factors, which leads to a higher level of outcome. By the same token, equifinality takes place when there are at least two different paths (combination of causal factors) that result in the same level of outcome. However, although the discussion of organizational configuration stresses causal asymmetry, synergistic effects and equifinality, previous research studies have been conducted mainly using an econometric method, which relies on causal symmetry, additive effects and an assumption of unifinality (Fiss, 2007) because of the lack of the alternative technique supporting causal asymmetry, synergistic effects and equifinality assumption.

This assumption mismatch resulting from methodological gap makes it impossible to capture, not to mention test, complementarity and equifinality, potentially leading to equivocal results in prior researches. For instance, regression analysis is based on the independent contribution of a particular variable while everything else stays the same, usually called a *ceteris paribus* assumption (Kogut, 2010). By focusing on the net effect of a variable without taking into account the meaning of the presence or absence of other variables, regression analysis cannot identify in which situations a particular variable has more (or less) influence on the outcome. In other words, correlation-based analysis cannot both detect complementarity (Fiss, 2007) and consider equifinality (Van de Ven & Drazin, 1985).

The interaction effect, and two- and three-way interactions in particular, has been utilized in organizational configuration studies to circumvent the limitations of regression analysis (e.g. Baker & Cullen, 1993; Dess et al., 1997; Miller, 1988). Nonetheless, three-way interaction is by and large the current boundary of interpretation (see Drazin & Van de Ven, 1985; Dess et al., 1997; Ganzach, 1998). Furthermore, the assumption that its estimated nonlinear relationship applies to all cases under examination stands in direct opposition to the equifinality assumption (Gresov & Drazin, 1997; Fiss, 2007).

Another attempt to overcome the limitations of regression analysis in organizational configuration studies is the use of cluster analysis (e.g. Hambrick, 1983a; Dess & Davis, 1984; Cool & Schendel, 1987; Fiegenbaum & Thomas, 1990; Ketchen, Thomas & Snow, 1993; Bensaou & Venkatraman, 1995; Ferguson et al., 2000; Moores & Yuen, 2001; Desarbo et al., 2005; Lim et al., 2006). Although cluster analysis can identify and group similar cases according to their characteristics, which then allows the use of ANOVA or MANOVA to test whether there is a difference in performance between these groups, it treats each combination of characteristics as a “black box”, since only differences between groups of variables can be identified (Whittington et al., 1999). This method cannot explain how each of these variables is relevant to the outcome. In fact, it cannot even tell whether a particular variable shown in the identified group is really a part of the cause. Therefore, one of the weaknesses of this technique is that it is possible that cluster analysis may classify two cases with many similar variables in the same group, whereas in fact these variables are irrelevant to the outcome (Fiss, 2007). In addition, cluster analysis relies on the researcher's judgment regarding the choice of sample and variables, scaling of variables, stopping rule, similarity measure and clustering method (Ketchen & Shook, 1996; Ragin, 2000). Consequently, cluster analysis is not suitable for studying organizational configuration (Barney & Hoskisson, 1990; Wiggins & Ruefli, 1995).

Apart from the inductive approach (cluster analysis), a deductive approach which has also been employed to study organizational configuration is deviation score (e.g. Drazin & Van de Ven, 1985; Delery & Doty, 1996). Again, although this method is theoretically more convincing than cluster analysis because it allows hypothesis testing regarding the relationship between the level of performance and the level of the profile's fit (deviation score), which is calculated from the difference between a theoretically-defined ideal type and the empirical profile of the organization in the dataset, deviation score is still prone to the same criticism as cluster analysis, which is its inability to identify which misfitting profile actually results in low performance (Fiss, 2007). In other words, although deviation score is an improvement on cluster analysis (because of its ability to identify the aspect of misfit of the organization), it still cannot distinguish the more relevant causal factors from the less relevant ones. Thus, the "black box" concern remains unsolved: only a limited peek into the box is achieved (Fiss, 2007). Furthermore, this approach is also based on the researcher's judgment regarding the ideal profile. Hence, the reliability of deviation score is questionable owing to the debatable level of reliability of its original value (Gupta & Govindarajan, 1993).

Previously-used methods to study organizational configuration have gradually been improved, but the key problem remains because the fundamental assumptions of these methodologies have not yet taken the premise of causal complexity into consideration. With a completely symmetrical view, they test equally for a connection between the absence of the cause and the absence of the effect. In other words, they assume that the explanations for both negative and positive outcomes are based on the same mechanisms and conditions, which is not true for the nature of social science causal relationship. Obviously, the reasons causing low performance are not necessarily the reverse of those causing high performance. Similarly, the explanations for extremely high performance can be vastly different from those that result in moderately high performance levels. Consequently, conventional quantitative analysis, especially correlation, is blind to causal asymmetry assumption of set theoretic relationships (Ragin, 2008), resulting in previous inconsistent findings.

Therefore, understanding of complementarity and equifinality cannot be developed further without using a new empirical methodology that takes the concept of causal complexity (set theoretic relationships) into account. This set-theoretic approach is uniquely suitable for analyzing the impact of complementarity between a business unit’s GOC and a firm’s FC on the business unit’s performance because it is based on the set relationship understanding of how causes combine to bring about outcomes, and because it can handle significant levels of causal complexity (Ragin, 2000, 2008; Fiss, 2007).

Furthermore, in contrast to regression analysis, nonparametric, set methods make sample representativeness less of a concern because they do not assume that data are drawn from a given probability distribution. In addition, as part of QCA procedure, which will be explained later, the calibration of sets to measure research constructs reduces sample dependence. This is because set membership is defined relative to substantive knowledge rather than the sample mean, thereby further reducing the importance of sample representativeness (Fiss, 2007, 2011). In summary, these points suggest that a set-theoretic approach will allow for the analysis of small to medium-sized situations, in which the number of cases is too large for traditional qualitative analysis and too small for many conventional statistical analyses, for example between 10 and 50 cases (e.g. Ragin, 1994, 2000; Lacey, 2001). However, it should be noted that, although QCA was initially considered to be a small-N approach, more recent works have extended QCA to large-N settings unproblematically (e.g. Greckhamer et al., 2008; Ragin & Fiss, 2008).

In summary, one of the main reasons for the prior configuration researches' puzzle (equivocal results) is the methodological gap, particularly the mismatch between the underlying assumption of causal relationship of methodologies available for the previous studies and actual social phenomena. Hence, I propose using a set-theoretic approach – fuzzy set qualitative comparative analysis, or fsQCA – to test the hypotheses of this research.

fsQCA (Ragin, 1987, 2000) is a formal analysis of qualitative evidence to study causal complexity, focusing on what conditions are necessary and/or sufficient for an outcome of interest using Boolean algebra (a set-theoretic method). The fundamental idea of this method is that cases are best understood as combinations of attributes resembling overall types and that a comparison of cases may allow a researcher to strip away attributes that are unrelated to the outcome in question (Fiss, 2011). fsQCA's logic is rooted in the "method of difference" and the "method of agreement" (Mill, 2002), in which one compares instances of the cause and outcome to understand patterns of causation. Unlike previous methods, fsQCA focuses on set-subset relationships to examine causal patterns. For example, to understand which combination of FCs leads to high overall performance, the fsQCA researcher first considers members of the set of "high-overall performing" organizations and then distinguishes the combinations of attributes (FCs) associated with the relevant outcome (high overall performance) using Boolean algebra that allows logical reduction of various complex causal conditions into a reduced set of combinations that lead to the outcome.

In order to gain a clear understanding of the mechanism of the set-theoretic approach, it is better to compare it with the quantitative approach. Therefore, the basic steps of the quantitative approach will be summarized for the purposes of comparison, then the main differences between these approaches will be discussed. After that, the procedure for fsQCA will be explained.

The conventional template for the quantitative approach starts by identifying the phenomenon under consideration (dependent variable) believed to vary across cases and/or over time. Then, a literature review of relevant theories and studies must be conducted to list the most important causes (independent variables). The quantitative researcher should develop measurements for both the dependent variable and independent variables and identify a given population that has variation in both variables. Depending on the selected dataset, control variables may be required to include independent variables. After specifying the hypotheses and/or models, multivariate analysis is conducted on the selected variables to estimate the "net effect" of each independent variable based on its intercorrelation with other independent variables and its correlation with the dependent variable.[21] In the final stage, re-specification of the analysis, the most important independent variables are identified. Some independent variables that have weak effects on the dependent variable or are weakly justified by theory may be dropped. The researcher can then report a theory that explains the greatest variation in the dependent variable (Ragin, 2008).

The set-theoretic approach, on the other hand, assumes that "relationships among different variables are often best understood in terms of set membership" (Fiss, 2007: 1183). This fundamental notion has three implications as follows.

First, it *uses calibrated sets, instead of measured variables*. Rather than using a variable that captures a degree of variation across observations relative to each other based on indicators of sample-specific statistics (e.g. company A has greater operations capability than company B or than average), a set is employed to be more case-oriented because it requires membership criteria based on external, substantive standards, and thus has classificatory consequences (Ragin, 2008). A set is not just a nominal-scale variable with values of 0 (non-

[21] The greater an independent variable's correlation with the dependent variable and the lower its correlation with other competing independent variables, the greater its net effects.

membership) and 1 (full membership), also known as a crisp set. Cases may vary in the degree to which they satisfy membership criteria, which is the primary idea of fuzzy sets (Ragin, 1987, 2000). In fuzzy sets, between 0 (non-membership) and 1 (full membership) represent varying degrees of membership in the set. In other words, a fuzzy set allows partial membership of the set. 0.5 is the crossover point between “more in” and “more out”. As mentioned previously, the assignment of set membership scores (a process called “calibration” in fsQCA) follows directly from the external standard definition of the set.

Crisp set	0 fully out					1 fully in
Fuzzy set (6 values)	0 fully out	0.2 mostly but not fully out	0.4 more or less out	0.6 more or less in	0.8 mostly but not fully in	1 fully in
Fuzzy set (continuous)	0 fully out	0<Xi<0.5 more out than in	0.5 (crossover) neither in nor out		0.5<Xi<1 more in than out	1 fully in

Figure 5-1: Crisp set versus fuzzy set

Adapted from Ragin (2008)

Accordingly, the processed data consist of set membership scores, which reflect membership of cases in sets. For instance, in the previous example, rather than only measuring the score of company A and comparing it with other companies’ scores or even a mean score, the researcher must also specify the score according to external, agreed standards that would qualify a company for full membership in the set of high operations capability (membership score = 1) and specify the score that would completely exclude it from this set (membership score = 0), meaning it is not in a set of high operations capability (OP).

It should also be noted that the set of firms that are out of a set of high OP is not the same as a set of low OP. It is possible to be a company that is not in a set of high OP but still not in a set of low OP. This is because the criteria for these two sets are not necessarily the reverse of each other. In addition to the benefit of calibration to differentiate between “different kinds of case” as mentioned earlier, the researcher can also calibrate a fuzzy set to “differentiate between different kinds of causal connections” (Ragin, 2008). For example, is it a firm with high OP that is linked to avoiding input inefficiency (formally: $OP \subset \sim IE$) or is it not a firm with low OP (formally: $\sim OP \subset \sim IE$)? These two notions, again, are not mirror images, for there are plenty of companies that are not high OP but still not in a group of firms that have input inefficiency. Unlike the conventional research method with the assumption of symmetry, a fuzzy set can easily address these kinds of competing arguments simply by assigning different calibration schemes to the same indicator.

Obviously, a fuzzy set allows the researcher to achieve "fidelity to verbal formulations" by calibrating a membership score that is directly commensurate with theoretical constructs (Ragin, 2008), while variables in the traditional quantitative approach will be taken for granted without calibration. Aiming to explain cross-case and/or variation over time in the dependent variable, conventional quantitative researchers calculate total pools of variation in the dependent variable by adding up the effects of all observed independent variables, but they may still not know which cases (combinations of causal conditions) actually exhibit the outcome that inspired them in the first place (Ragin, 2008).

Assuming that company A achieves the criterion for the set of high OP (let us say, 0.7, which is a membership score greater than 0.5, the crossover point or the most ambiguous point), and hence it is more "in" than "out" in this set, company A is then classified as a firm with high OP. In formal mathematical terms, let A be a company A and OP a set of firms with high operation capability. The previous statement can be restated as A is a member of set OP or A is a subset of OP or formally: $A \subset OP$. Figure 5-2 shows an example histogram displaying the difference between a set of high operations capability and a set of low operations capability, as well as example company A.

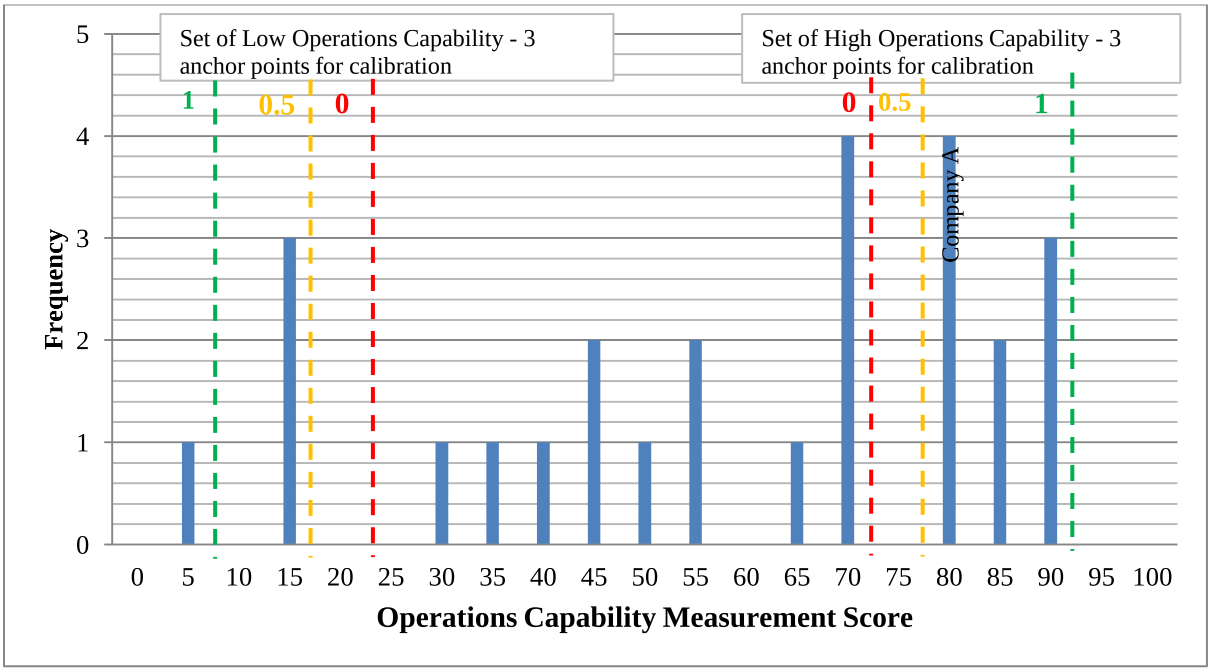

Figure 5-2: Histogram showing difference between high and low operations capabilities

Secondly, *relationships between social phenomena are perceived and can be modeled in terms of set relations*. This is best explained by example. Let *OP* be a set of firms with high operations capability and *OA* be a set of firms with high overall performance. Thus, the statement that firms with high operations capability exhibit high overall performance (all firms with high operations capability are high overall performance firms) may be restated as that such firms form a subset of high overall performance firms (formally: $OP \subset OA$). This statement can also be mathematically paraphrased as that a set of high overall performance firms is a superset of high operations capability firms (formally: $OA \supset OP$).

Thirdly, *the result emphasizes causal complexity*. In social phenomena, the overlap between two sets need not be absolute. For instance, from the previous example, consider *MKT*, a set of firms with high marketing capability. This characteristic may also lead to high overall performance, thus making firms that do exceptionally well in their marketing activities another subset of high overall performance firms (formally: $MKT \subset OA$). Yet there may, in fact, be little overlap between the two subsets *OP* and *MKT*; one can easily imagine a situation in which a cost reduction-led production system and a high level of advertisement expense may inhibit or preclude each other, thus making both *OP* and *MKT* non-overlapping subsets of *OA*. This may be expressed in the following logical statement:

$$OP + MKT \longrightarrow OA \qquad (1)$$

where "+" denotes the logical operator *or*, which represents the union of two sets, while "⟶" denotes the logical implication operator, as in "*OP* or *MKT* implies *OA*". Both *OP* and *MKT* therefore present two different but viable ways of achieving high overall performance.

Consider a somewhat more contingent statement: firms that exhibit an efficient production system (*OP*) will be high overall performing if they do not conduct much R&D ($\sim RD$), i.e. if they are not in a set of high product design and R&D capability. In logical terms, this statement may be expressed as follows:

$$OP \cdot\sim RD \longrightarrow OA \qquad (2)$$

where "·" denotes the logical operator *and*, which represents the intersection of two sets, while "∼"denotes the logical *not*, which represents non-membership of the referred set (complement set). In effect, statement 2 shows a contingency hypothesis in set theory. To better understand the possible complexity of the causal relationship in social phenomena, specifically a concept of contextuality, which suggests that an outcome is determined by how attributes are arranged (case-oriented), rather than the net effect of all attributes as isolated items (variable-oriented), let us introduce another contingency statement: firms with high marketing capability (*MKT*) will be high overall performing if they also exhibit a high level of product design and R&D capability (RD). Combining this statement with statement 2 from above results in the following statement:

$$OP \cdot\sim RD + MKT \cdot RD \longrightarrow OA \qquad (3)$$

The Boolean statement above thus summarizes two contingency statements (or hypotheses or causal recipes) about the relationship between organizational FC and a firm's overall performance. The fact that all of the ingredients in one of these two causal recipes must be present for the outcome to occur demonstrates that this view pays attention to how conditions combine in each case, and thus is much more case-oriented than the net effects understanding of causation, which is variable-oriented (Ragin, 2008). These social phenomena can be viewed in terms of set-subset relationships, which are better interpreted in terms of necessity and sufficiency (Ragin, 1987). These two notions allow researchers to generalize from a limited set of cases to larger populations.

On the one hand, a necessary condition indicates that an outcome can be achieved only if the attribute in question is present. It should be noted that the researcher need not consider the attribute in question for cases in which the outcome has not been achieved, because whether the attribute in question is present or absent in such cases does not violate the statement of necessity. The implication for the set-theoretic approach regarding necessity is that membership of cases in the causal attribute under consideration must be more than or equal to the membership of cases in the outcome of interest. Essentially, a set of the causal conditions must be a superset of the outcome. In other words, a set of the outcome must be a subset of the causal conditions (Ragin, 1987, 2000).

On the other hand, a sufficient condition suggests that an outcome will always be obtained if the attribute in question is present. It should be noted that the researcher need not consider achievement of the outcome for cases in which the attribute in question is not present, because whether the outcome of interest is present or absent in such cases does not violate the statement of sufficiency. The implication for the set-theoretic approach regarding sufficiency is that membership of cases in the outcome of interest must be more than or equal to the membership of cases in the concerned causal attribute. Essentially, the set of the outcome must be a superset of the causal conditions. In other words, the set of the causal conditions must be a subset of the outcome (Ragin, 1987, 2000).

Necessary and sufficient conditions for fuzzy sets can be presented in visual format by plotting the membership scores of cases in an XY matrix, which has a membership score of causal conditions as the horizontal axis and a membership score of the outcome as the vertical axis. (It may also be a combination of conditions depending on the researcher's focus of concern.) As mentioned above, cases are not allowed to show in the upper left area above the diagonal line in order to achieve a necessary condition because this area represents cases for which the causal attributes concerned are more than or equal to their membership in the outcome of interest. Conversely, cases are not allowed to show in the lower right area below the diagonal line in order to attain a sufficient condition as this area represents cases for which membership in the outcome of interest concerned is more than or equal to their causal attributes.

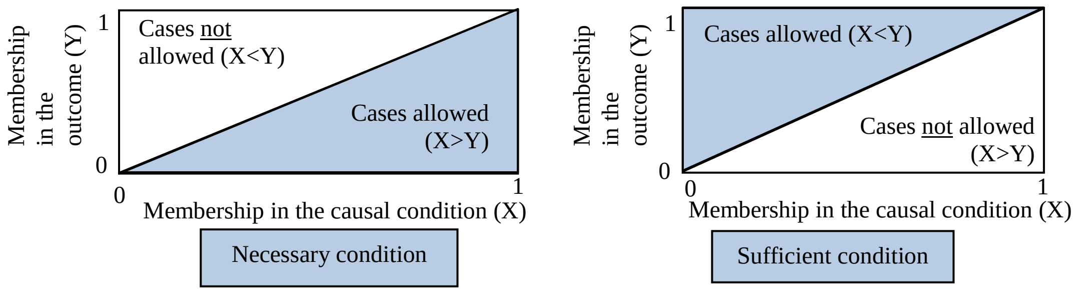

Figure 5-3: XY plot of necessary & sufficient conditions

Adapted from Schneider & Wagemann (2012)

Note that unlike correlation-based research that relies on causal symmetry, which argues for both necessary and sufficient conditions simultaneously, the set-theoretic approach only claims either a necessary condition or a sufficient condition at a time for a particular causal relationship owing to the presumption of causal asymmetry. In other words, a supported result for a sufficient test for a particular causal condition does not mean that other causal conditions cannot exist as other sufficient solution paths outcome, supporting the equifinality notion. Although perfectly consistent with the set-theoretic method, such a data pattern would result in weak or no correlation between causal condition and outcome of concern in correlation-based research. Therefore, methodology-wise, set-theoretic approach holds considerable promise for resolving previous inconsistent findings.

Moreover, unlike conventional methods that use given populations, the set-theoretic approach carefully constructs the population of candidates for the outcome of concern, embracing both positive and relevant negative cases, for example cases where the outcome might have occurred but did not (Ragin, 2008). In doing this, the set-theoretic approach protects itself against the false findings made unintentionally by conventional methods. The conventional scheme of using large given populations, which may contain a large number of irrelevant cases (cases that are not true candidates for the outcome), and relying on correlational methods increases the chance of false findings because correlations are strengthened when there are many cases lacking both the hypothesized cause and the effect (Ragin, 2008).

Statement 3 shows that there are at least two combinations of attributes that allow a firm to attain high overall performance. Thus, it can be interpreted that neither of the combinations ($OP \cdot\sim RD,\ MKT \cdot RD$) is necessary for the outcome of interest (OA). However, either of the combinations is sufficient. It should be noted that this interpretation applies only to combinations of attributes, not to individual attributes ($OP, MKT, RD, \sim RD$). In fact, none is either necessary or sufficient, in that no attribute is present in all combinations and no attribute can by itself produce the outcome. However, each is an INUS condition (Mackie, 1974), which is a single condition that is insufficient to produce the outcome on its own but is a necessary part of a conjunction, which in turn is unnecessary itself but sufficient to produce the outcome. Note also that product design and R&D capability (RD) even have opposite causal effects depending on the context provided by the combination with other attributes, thus supporting the causally complex nature of social phenomena.

With three attributes combined to create the outcome, but with none by itself necessary or sufficient, statement 3 displays a good example of the causal complexity of social phenomena, comprising many concepts that cannot be addressed by a correlational approach such as causal asymmetry (necessary and sufficient condition), INUS conditions, complementarity (conjunctural causal condition) and equifinality (two different viable combinations of a firm's FC). While correlation forces symmetry on asymmetric theoretical claims, set-theoretic analysis offers an analytical system that is faithful to verbal theory, which is largely set-theoretic in nature (Ragin, 2008), thus making it the most appropriate methodology for this research as it truly reflects its main arguments.

By applying set theoretic notion into this research context, four groups of proposed hypotheses aiming to address the four aforementioned sub-questions can be written in set theory symbolic form as follows:

1. **Relationship between GOC and performance:**

   I expect that a particular type of GOC is a sufficient condition for a business unit to achieve a specific (relevant) performance dimension.

   H1: LCD + BCD + DIFD + A + P ⊂ IE + OE + EF + AD

      H1a: LCD + BCD ⊂ IE

      H1b: DIFD + BCD ⊂ OE

      H1c: A ⊂ EF

      H1d: P ⊂ AD

2. **Relationship between FC and performance:**

   I anticipate that a particular type of FC is a sufficient condition for a business unit to achieve a specific (relevant) performance dimension.

   H2: OP + RD + MIS + SD + MKT ⊂ IE + OE + EF + AD

      H2a: OP ⊂ IE

      H2b: RD ⊂ OE

      H2c: MIS · SD ⊂ EF

      H2d: MKT ⊂ AD

3. **Complementarity between GOC and FC on performance:**

I argue that compatibility between a particular typology of GOC and a specific type of FC is a sufficient condition for a business unit to achieve a specific (relevant) performance dimension.

H3: LCD·OP + BCD·OP+ BCD·RD + DIFD·RD + A·MIS·SD + P·MKT ⊂ IE + OE + EF + AD

H3a: LCD·OP + BCD·OP ⊂ IE

H3b: BCD·RD + DIFD·RD ⊂ OE

H3c: A·MIS·SD ⊂ EF

H3d: P·MKT ⊂ AD

4. Equifinality

Equifinality as a result of different consistent combinations of GOC and FC on performance:

I suggest that compatibility between a particular typology of GOC and a specific type of FC is a sufficient condition for a business unit to achieve OA.

H4: LCD·OP + BCD·OP+ BCD·RD + DIFD·RD + A·MIS·SD + P·MKT ⊂ OA

H4a: LCD·OP + BCD·OP ⊂ OA

H4b: BCD·RD + DIFD·RD ⊂ OA

H4c: A·MIS·SD ⊂ OA

H4d: P·MKT ⊂ OA

Equifinality as the final outcome of each intermediate performance dimension:

I suggest that success on each particular performance dimension from different consistent combinations of GOC and FC is a sufficient condition for a business unit to achieve OA.

H4e: IE + OE + EF + AD $\subset$ OA

The fsQCA procedure comprises three steps: constructing property space, analyzing by Boolean logic, and interpreting and evaluating the research result. (A flowchart of this procedure is shown in Figure 5-4.) The details are as follows.

Constructing property space: fsQCA does not limit types of input data source. It may be derived from either primary data (e.g. survey or interview) or secondary data (e.g. financial reports, results of other research or economic indices). Once data have been obtained, both dependent and independent variables will be calibrated using Ragin's (1987, 2000) direct method, as mentioned earlier, to transform the raw scores of relative variables into more meaningful set measures. Specifying full membership, full non-membership, and a crossover point of maximum ambiguity (three thresholds) regarding membership in a set of interest in accordance with external standards allows the researcher to rescale an interval variable using the crossover point as an anchor from which deviation scores are calculated, taking the values of full membership and full non-membership as the upper and lower bounds. Then these deviation scores are transformed into the metric of log odds, which is centred around 0 and has no upper or lower bound (Ragin, 2008). Thus, the rescaled measures range from 0 to 1, and the converted scores are tied to three theoretically-led thresholds. Note that, because the laws governing the intersection of fuzzy sets make cases with scores of exactly 0.5 difficult to analyze, Ragin (2008) recommends avoiding the use of a precise 0.5 membership score for causal conditions.

Using these set measures to construct a truth table, which is a data matrix with 2^k rows where k is the number of attributes (causal conditions) in the analysis, each row of this table is associated with a particular combination of attributes (representing each corner of the fuzzy set vector space), and therefore the whole table displays all possible combinations. Each empirical case is sorted into the row of the truth table that matches its values on these attributes. Although each case has a degree of membership in any given corner of this property space, it may have strong membership in only one corner. Strong membership is determined by assigning 1 to fuzzy membership values greater than 0.5, and 0 to those less than 0.5.

Therefore, each combination (row) will later be treated as a different kind of case (a specific set of circumstances or property space or ideal type). Each row may also be interpreted as one statement of sufficiency (Schneider & Wagemann, 2012) because, unlike a necessity statement, a sufficiency statement truly reflects the concept of causal complexity (Ragin, 2000), which is a situation in which "two or more different combinations of attributes can be sufficient for the same outcome and that a specific attribute may have different and even opposite causal effects depending on the context provided by the configuration with other attributes" (Greckhamer et al., 2008: 715).

At this point, the researcher can directly examine the kinds of cases that exist in a given set of data (descriptive analysis, which involves examining the distribution of cases across the constructed property space). Empirically, some rows may contain many cases, others may have just a few, and others may cover no cases at all if no empirical case of such a combination of attributes is associated with a given row. A row with missing data is called a *logical remainder row*, which shows the logically possible combination of attributes of a case, which, however, does not reveal itself empirically. This situation represents the concept of *limited diversity* (Ragin, 1987, 2000), a situation in which not all theoretically possible configurations exist in empirical reality because "the potential variety is limited by the attributes' tendency to fall into coherent patterns" (Mintzberg, 1980; Miller, 1986; Meyer, Tsui & Hinings, 1993: 1176). Unlike the conventional quantitative approach, fsQCA has a transparent measure to handle limited diversity in the analysis and interpretation phase, which will be discussed later.

After sorting the cases into rows of the truth table, the researcher must prepare the truth table further before the analysis phase by reducing the number of rows by two conditions, which directly links to the robustness of the result: 1) the minimum number of cases required for a solution to be taken into account in the analysis; and 2) the minimum consistency level of a solution. "*Consistency*" is the extent to which empirical cases correspond with the set-theoretic relationships expressed in a solution (either necessity or sufficiency statements). When using fsQCA, consistency can be calculated by dividing the number of cases that exhibit a given combination of attributes as well as the outcome by the number of cases that exhibit the same combination of attributes but do not exhibit the outcome.

The main reason for this activity is to allow for the randomness (e.g. contradictory cases, which are different cases with the same causal profile but with a different set of outcomes) and error of a stochastic world (Fiss, 2007). Doing this allows the researcher to employ the probabilistic concept of "*quasi sufficiency*" (Ragin, 2000, 2005; Braumoeller & Goertz, 2000; Greckhamer et al., 2008: 715), in which sufficiency is considered based on certain benchmarks (significance level). This benchmark proportion can be adjusted depending on the nature of the data and the strength of the statement tested (Fiss, 2007). For instance, quasi sufficiency that is "usually" sufficient means that it significantly passes a benchmark of 0.65, suggesting that 65 per cent of cases with a specific combination must exhibit the outcome for the combination to pass the significance test (Ragin, 2000: 109). As these decisions are transparent, this method enables the reader easily to evaluate its robustness.

Analyzing property space by Boolean logic: To examine whether attributes of cases are necessary and/or sufficient to achieve the outcome of interest, fsQCA uses Boolean logic to determine commonalities between the combinations of attributes that lead to the outcome and to generate a logical statement (like the statements in the previous example) that describe these commonalities, hence allowing for the logical reduction of statements by using the Quine-McCluskey algorithm to simplify set-theoretic statements.

In brief, this algorithm first determines the number of logically possible groupings of all causal conditions.[22] This number can be calculated by the formula 3^k-1, where k is the number of attributes. The probabilistic sufficiency tests of each of the 3^k-1 possible combinations of causal conditions are then assessed based on a priori benchmark of sufficiency set by the researcher. Finally, the algorithm applies the containment rule to minimize the Boolean equation of all those combinations of conditions that pass the test of sufficiency. The containment rule uses Boolean logic to simplify the Boolean equation by investigating whether any of the groupings of conditions that pass the sufficiency test is contained within other groupings and is thus logically redundant and can be joined.

This analytical process can be performed using software packages such as fsQCA 2.5 (Drass & Ragin, 1999; Ragin, Drass & Davey, 2006), Tosmana, Stata or R (with the QCA3 or QCAGUI package). fsQCA 2.5 is the software package chosen for this research since it performs more fsQCA-specific calculations than others.

To demonstrate how this algorithm works, consider again statement 3, which has three attributes and one outcome. In this case, the number of logically possible groupings of all causal conditions is 26 (3^3-1). Its corresponding truth table with eight rows (2^3) is shown in Table 5-1. The shaded cells in this table highlight cells that match statement 3, which are combinations of conditions that show the presence of the outcome based on a priori benchmark of sufficiency set by the researcher. Note that some cells in the outcome column show a question mark, indicating a limited diversity situation, for which there is no empirical instance in that combination (Ragin, 1987, 2000).

[22] Logically possible groupings comprise all single causal factors (including their negation), all causal combinations including two attributes, and so on to combinations including all attributes.

Table 5-1: Truth table for hypothetical combination of FC

Adapted from Fiss (2007)

	Functional Capability			Outcome
Combination Number	**OP** **High in Operations Capability**	**MKT** **High in Marketing Capability**	**RD** **High in R&D Capability**	**OA** **High in Overall Performance**
1	Yes	Yes	Yes	Yes
2	Yes	Yes	No	Yes
3	Yes	No	Yes	No
4	No	Yes	Yes	Yes
5	Yes	No	No	Yes
6	No	Yes	No	No
7	No	No	Yes	?
8	No	No	No	?

To find out whether any of the three conditions (OP, MKT, RD) is necessary to cause the outcome (OA), the researcher must examine whether the condition is always present in all cases in which the outcome is achieved. Obviously, this is not the case here. However, the truth table shows that there are four different combinations of the three individual organizational characteristics sufficient to cause the outcome. These combinations are listed below:

Combination Number 1: $OP \cdot MKT \cdot RD \rightarrow OA$

Combination Number 2: $OP \cdot MKT \cdot\sim RD \rightarrow OA$

Combination Number 4: $\sim OP \cdot MKT \cdot RD \rightarrow OA$

Combination Number 5: $OP \cdot\sim MKT \cdot\sim RD \rightarrow OA$

While these combinations are all sufficient to cause high overall performance, based on a priori benchmark of sufficiency set by the researcher,[23] the four combinations may be simplified even further because some combinations are logically redundant. For example, firms with high operations capability (OP) that are not high in R&D capability ($\sim RD$) may or may not have a high marketing capability (MKT or $\sim MKT$). Either way, the combination of OP and $\sim RD$ will still be sufficient to cause the outcome. As a result, the four combinations may be logically reduced and simplified using the Quine-McCluskey algorithm and simplifying assumptions (see Ragin, 1987, 2000). In Boolean algebra, this proceeds as follows for Combinations 2 and 5:

$$OP \cdot MKT \cdot\sim RD + OP \cdot\sim MKT \cdot\sim RD \rightarrow OA$$

$$OP \cdot\sim RD(MKT + \sim MKT) \rightarrow OA$$

$$OP \cdot\sim RD \rightarrow OA$$

Similarly, Combinations 1 and 4 can also be simplified:

$$OP \cdot MKT \cdot RD + \sim OP \cdot MKT \cdot RD \rightarrow OA$$

$$MKT \cdot RD(OP + \sim OP) \rightarrow OA$$

$$MKT \cdot RD \rightarrow OA$$

Finally, combining the results of both simplifications leads to the following:

$$OP \cdot\sim RD + MKT \cdot RD \longrightarrow OA \qquad (4)$$

Using distributive operations, the researcher has thus arrived at a statement that, by itself, contains both logical combinations involving OP and $\sim RD$ (Combinations 2 and 5) that may lead to the outcome in question. The same distributive operations may, of course, be applied to the other two logical combinations involving MKT and RD (Combinations 1 and

[23] The benchmark for "usual" sufficiency is 0.65.

4) that are also sufficient to produce high overall performance. The result is again a simple statement that contains all combinations that may cause the outcome. In a more complex situation, other fuzzy set operations may also be utilized (Commutativity $\{A + B \cong B + A\}$, Associativity $\{A + (B + C) \cong (A + B) + C\}$, Distributivity $\{A \cdot (B + C) \cong (A \cdot B) + (A \cdot C)\}$, Idempotency $\{A \cdot A \cong A\}$, Identity $\{A \cdot \emptyset \cong \emptyset\}$, Involution $\{\sim (\sim A) \cong A\}$, and De Morgan's Laws $\{\sim (A \cdot B) \cong (\sim A + \sim B)\ ;\ \sim (A + B) \cong (\sim A \cdot \sim B)\}$). An in-depth explanation of these algorithms will not be provided because it is beyond the scope of this thesis and these algorithms can be performed by the software package mentioned earlier. (For a more detailed explanation, see Ragin, 2000.)

Interpreting and evaluating the research results: As mentioned earlier, fsQCA has a transparent measure to cope with limited diversity through the use of truth table algorithms, which is based on a counterfactual analysis of causal conditions. Counterfactual analysis is pertinent to fsQCA because even a few elements in a combination quickly lead to an exponentially large number of truth table rows, which is more likely to result in very few or no empirical cases of any particular combination, a problem of limited diversity (Ragin, 2008). Therefore, a fundamental step to cope with this problem is that researchers have to consider a limiting ratio of explanatory cases to characteristics. Below this ratio, there is an unacceptably high likelihood of incorrectly finding "meaning", when there is really just random variation. The ratios vary according to the number of characteristics in the model. With three or four characteristics, a ratio greater than 3:1 is preferred; with five or six characteristics, the ratio should be greater than 4:1. A study of 50 cases should ideally include no more than seven characteristics in the explanatory model (Marx, 2010).

However, even with such precautionary, limited diversity normally still exists. Therefore, another standard measure to deal with this problem is the truth table algorithm that provides two more solutions (parsimonious and intermediate solutions) based on "easy" and "difficult" counterfactuals (Ragin, 2008) in addition to reporting only a *conservative solution* that is derived from available cases in reality (neither "easy" nor "difficult" counterfactuals are included), which in turn leads to a relatively more complex solution than the other two solutions proposed (hence, it is also called a *complex solution*) and, thus, usually provides little insight into the causal combination (Fiss, 2011). These two proposed solutions offer a transparent research assumption regarding limited diversity, which is open to discussion regarding their justification.

"*Easy*" counterfactuals refer to situations in which a redundant causal condition is added to a set of causal conditions that are not observed in reality that by themselves, in terms of theoretical or substantive knowledge, already lead to the outcome in question. For instance, assume that there is evidence that the combination of conditions $A \cdot B \cdot\sim C$ leads to the presence of the outcome, but there is no evidence as to whether the combination $A \cdot B \cdot C$ would also lead to the outcome, and theoretical or substantive knowledge links the presence (not the absence) of C to the outcome. In such a situation, an easy counterfactual analysis indicates that both $A \cdot B \cdot\sim C$ and $A \cdot B \cdot C$ will lead to the outcome, and the expression can then be reduced to $A \cdot B$, because whether C is absent or present has no effect on the outcome.

In contrast, "*difficult*" counterfactuals refer to situations in which a condition is removed from a set of causal conditions leading to an outcome on the assumption that this condition is redundant. For example, assume that there is evidence that combination $A \cdot B \cdot C$ leads to the outcome, but there is no evidence as to whether combination $A \cdot B \cdot\sim C$ also does so. This case is, of course, the inverse of the above situation. It is more difficult to determine whether C is in fact a redundant condition that can be dropped, thus simplifying the solution to only $A \cdot B$, because theoretical or substantive knowledge links the presence, not the absence, of C to the outcome, and lacks an empirical instance of $A \cdot B \cdot\sim C$.

Having identified "easy" and "difficult" counterfactuals, a *parsimonious solution* can be established by including all simplifying assumptions regardless of whether they are based on easy or difficult counterfactuals, while an *intermediate solution* can be generated by including simplifying assumptions based only on easy counterfactuals. Fiss (2011: 403) also suggests the application of parsimonious and intermediate solutions to identify "core" and "peripheral" causal conditions, proposing that "*core conditions* are those that are part of both parsimonious and intermediate solutions, and *peripheral conditions* are those that are eliminated in the parsimonious solution and thus only appear in the intermediate solution". In effect, coreness is defined by the strength of the evidence relative to the outcome, not the connectedness to other causal conditions. Table 5-2 summarizes the usage of different types of counterfactuals to derive different types of solutions as well as the implication of conditions' strength based on whether they are displayed in both types of solutions or in just parsimonious ones.

Table 5-2: Counterfactuals used to derive a solution and its implication towards conditions' strength

Solution type	Type of counterfactuals used to derive a solution		Identifying conditions's strength	
	Easy counterfactual	Difficult counterfactual	Core condition	Peripheral condition
Parsimonious solution	Utilize	Utilize	Exhibit	Exhibit
Intermediate solution	Utilize	X	Exhibit	X

In interpreting the fsQCA results, both contexuality of solution paths and parameters must be considered together because while how causal conditions are arranged within each solution path provides us insides about the relationship among them, parameters of fit for fsQCA suggest how reliable and relevant those solution paths are. Consequently, to gain a clear understanding of conventional steps in the interpretation of fsQCA results (e.g. Crilly, 2011; Fiss, 2011; Greckhamer, 2011), it is better to firstly introduce the parameters of fit concept because these information allow researchers to discard unreliable solution paths before paying more attention to the contexuality of the residual.

Consistency and coverage are used as parameters of fit for fsQCA.[24] As mentioned earlier, by dividing the number of cases that exhibit a given combination of attributes as well as the outcome by the number of cases that exhibit the same combination of attributes but do not exhibit the outcome, *consistency* reveals how closely a subset relationship is approximated

[24] An explanatory summary is also provided in the looseleaf glossary.

by providing the degree to which cases sharing a given causal condition agree in displaying an outcome.[25] In other words, consistency answers the question of the extent to which a statement of sufficiency derived from Boolean logic is consistent with the empirical evidence. Hence, cases with strong membership in a combination are the most relevant when considering consistency. In order to be able to infer the existence of a subset relationship, consistency should be as close to 1 as possible. Consistency = 1 means that all cases sharing a condition also share the outcome. Ragin (2006, 2008) recommends setting a consistency benchmark of 0.90 for necessary and sufficient conditions.

Once an acceptable level of consistency has been achieved, coverage should then be evaluated. *Coverage* estimates a result's empirical importance in achieving the outcome by dividing the number of cases that exhibit a given combination of attributes as well as the outcome by the number of cases that exhibit the outcome no matter what combination of attributes is present.[26] In other words, coverage answers the question of the extent to which the outcome is covered or explained by the statement of sufficiency derived from Boolean logic. Again, the higher the coverage score (as close to 1 as possible), the more important that condition is in creating the outcome. Since single cases are usually explained by more than one expression or causal path (Greckhamer, 2011), making it difficult to assess each causal path's importance in creating the outcome relative to its counterparts, three types of coverage scores are used to overcome this possible overlap concern. *Raw coverage* is the overall coverage of a combination that may overlap with other combinations. *Unique coverage* is the coverage uniquely due to a combination. Hence, the difference between raw and unique coverage is due to overlap of cases between combinations. Raw and unique coverage provide assessments of their relative empirical importance when several combinations are sufficient for an outcome. *Solution coverage* is the combined coverage of all combinations leading to the outcome.

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[25] Consistency is quite similar to confidence level in quantitative analysis.
[26] Coverage is quite similar to explanatory power in quantitative analysis.

Conventional steps in understanding a contexuality of solution paths of fsQCA results (e.g. Crilly, 2011; Fiss, 2011; Greckhamer, 2011) start with discarding unreliable solution paths using a particular consistency threshold (e.g. 0.65 is used for “usually” sufficiency.). Then the residual solution paths will be grouped by their combination of core conditions. Those that share the same combination of core conditions (in term of their presence and absence) will be categorized into the same group. The difference between these unique groups displays *first-order equifinality* (different across-group) that equally achieve a particular outcome, while the difference within a particular group (a deviation exists only in combination of peripheral conditions.) portrays *second-order equifinality* (different within-group) (Fiss, 2011).

By applying these notion into this research context, both types of equifinality provide evidences supporting this research argument that the prior researches’ unifinality assumption in the relationship between GOC or FC or their combination and corresponding performance (i.e. one best way) is wrong, rather there are many possible ways leading to the same level of outcome depending on the contexuality or the arrangement of attributes of each case.

In other words, they prove causal complexity and causal asymmetry assumption in the concerned relationship, which in turn resolving previous inconsistent findings, at different levels. The presence of first-order equifinality suggests a trade-off (substitution) in a broader sense, which is across different groups based on their unique combination of core conditions, to achieve a same level of desired outcome while the presence of second-order equifinality suggests a trade-off (substitution) in a narrow sense, which is between different combinations of peripheral conditions within a group that shares the same combination of core conditions, to also achieve a same level of desired outcome. Therefore, different constellations of peripheral conditions surrounding core conditions in the same analysis provide a finer-grained understanding of which conditions are substitutes for each other (other peripheral conditions) under second-order (within-group) equifinality. Apart from finding potential substitution relationship mentioned above, a careful consideration of a contexuality of solution paths of fsQCA results may also suggest a potential "true" complementarity between two attributes present as core conditions within the same solution path because both are required with the same level of importance. Moreover, existence of an empirically *dominant combination*, which is a solution path that has the highest unique coverage within a particular analysis, provide insights into understanding which solution path is the most relevant to generate a concerned outcome.

Although fsQCA solves many previous limitations of conventional correlational approach, it still has an unsolved limitation. Like regression and other standard statistical methods, fsQCA identifies associations, not causality. In a typical analysis, fsQCA reveals combinations of attributes associated with an outcome; it is up to the researcher, however, to hypothesize any possible causal mechanisms. It is here that the justification for a set theoretical interpretation of the hypotheses should be justified. The researcher can then array the possible causal conditions in hypothetical chains and claim that it is necessary to conduct separate analyses for each intermediate outcome. fsQCA can also be modified to include temporality in the analysis by explicitly including attributes that include time patterns, such as "X preceded Y," in the analysis (Caren & Panofsky, 2005; Ragin & Strand, 2008).

With regard to a robustness test for fsQCA, Epstein et al. (2008) suggest replicating the analysis with a reduced consistency threshold and comparing the new solution (parsimonious, intermediate and conservative solutions) and its consistency and coverage (raw, unique and solution coverage scores) with those of the previous analysis. For the robust solution, it is expected that the combinations will be similar among a variety of consistency thresholds but the consistency and coverage may be reduced when applying a lower consistency threshold (Schneider & Wagemann, 2012).

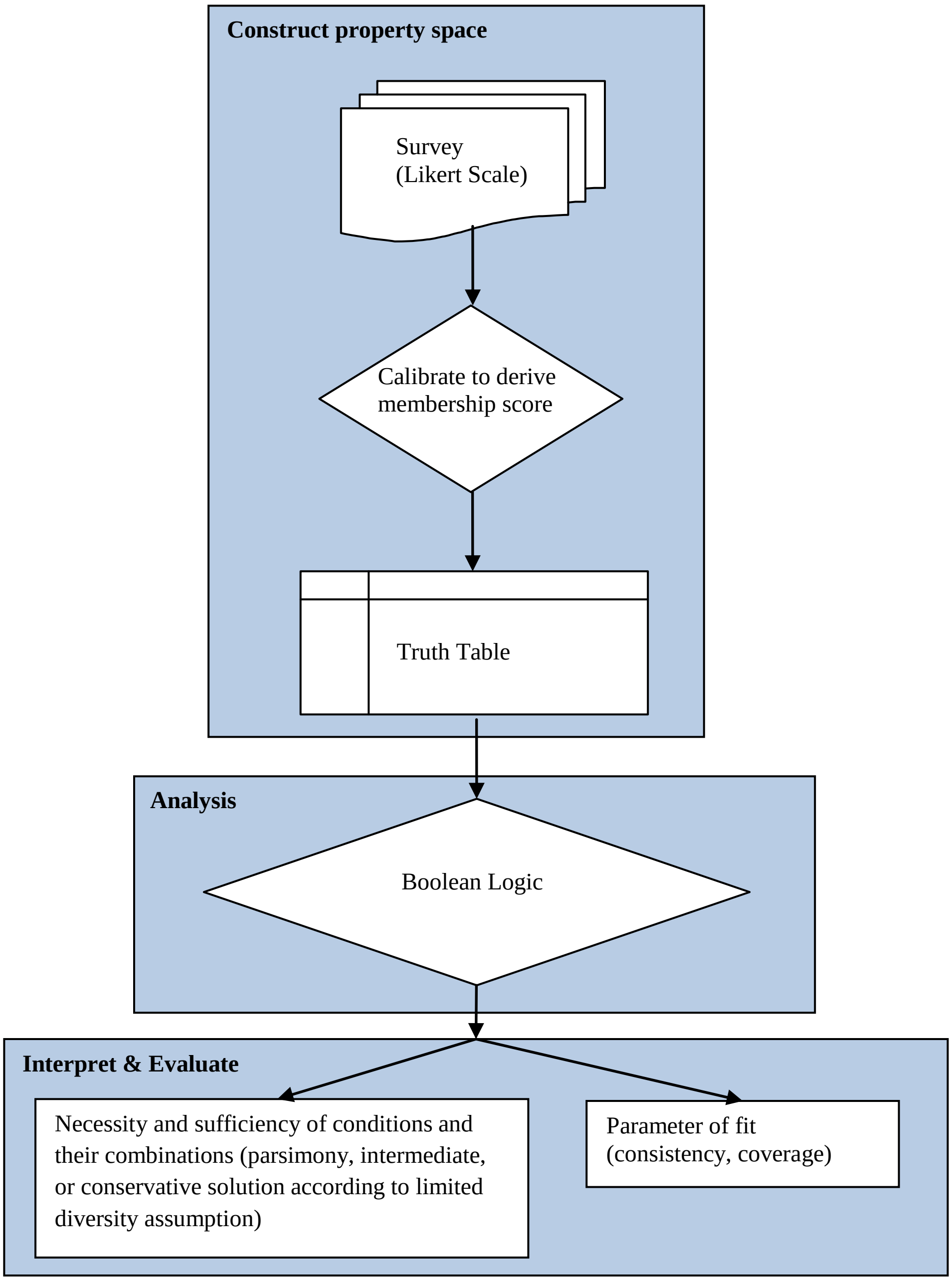

Figure 5-4: Flowchart of fsQCA procedures

5.3 Chapter summary

In this chapter, I have discussed the research paradigm adopted for this thesis, which shapes this study both theoretically and methodologically. Then, a rationale for utilizing fsQCA, rather than a conventional correlational approach, including its methodological procedure, has been provided in detail because it is quite a novel concept in this literature.

6 DATA

In this chapter, I will introduce and justify the Thai non-life insurance industry as the setting for this research. I will then describe specific characteristics of this sample and present the brief results of an exploratory study that broadly support the research hypotheses.

A single industry study is used to facilitate the identification of the relative GOCs competing in the industry and to avoid variation caused by differing industry conditions, such as regulation, industry-specific preferences regarding liquidity of assets owned, price and quantity of inputs and outputs (Dess et al., 1990). The sample used in this study is drawn from the population of Thai non-life insurers. The data sources for the development of this research are questionnaire responses, interviews, regulatory annual statements filed by insurers with the Office of Insurance Commission (OIC), and a database of the Stock Exchange of Thailand.

The Thai non-life insurance industry in 2011 has been selected as the context for the study for several reasons. Firstly, it has a *high level of control over market and environmental differences*. Using a single industry as a dataset helps avoid the problem of market and environmental differences between datasets that is characteristic of multi-industry research (Conant, Mokwa & Varadarajan, 1990). Otherwise, the effect of interrelationships between research constructs may be distorted simply by differences in industry life cycles or environmental factors, such as political, economical, technological, (physical/geographic) environmental and legal. Moreover, examining a single industry is in line with previous research that has investigated the potential of resources and capabilities to create economic value by enabling firms to create and implement strategies (e.g. Henderson & Cockburn, 1994; Ray, Barney & Muhanna, 2004) because it enables researchers to clearly identify industry-specific resources and capabilities and to build industry-specific measures of these resources and capabilities (Barney & Clark, 2007), as well as to build industry-specific measures of a firm's economic performance, resulting in a more accurate investigation.

The second reason is *the appropriateness of a one-year study period*. Since this research requires data on assumed causes (GOC and FC) and assumed consequences (a business unit's performance) to test hypotheses, these data must be concurrent. Using historical data to estimate a firm's current performance in this study would require another questionable research assumption that the firm had never changed its business unit's GOC and its FC choices. Nowadays, the insurance industry is fluctuating rapidly owing to the global financial crisis, which requires a more rigorous regulation framework (International Association of Insurance Supervisors, 2009). Hence, performing this analysis over many years in an unstable economy may lead to timing bias.

Another factor is the suitability of the timing of the research to the sample group's situation. In agreeing with Marlin, Ketchen and Lamont's (2007) argument that the fact that some previous research outcomes show a low performance relationship may be due to change in the environmental functional demands of a business, a condition which Gresov and Drazin (1997) recommend should be taken into consideration when examining the strategy-performance relationship, this research will take into account the current environmental functional demands of the sample group when interpreting the results. The Thai non-life insurance industry in 2011 was in a preparation period for the new capital adequacy requirements of an incoming, more stringent regulator (a new solvency regime) in 2011 and a requirement for stock exchange listing in 2015, which are major changes in the market landscape and require many adjustments by the insurers (Office of Insurance Commission, 2009). In addition, in 2011 a severe flood and its aftermath also heavily affected the plans and strategies of many insurance businesses.

These circumstances offer opportunities to observe changes in structure (e.g. asset allocation, risk diversification) and strategy (e.g. strategic reorientation), as well as potential mergers and acquisitions or business alliance activity during this period to circumvent strict insurance regulations and catastrophes. For example, the increasing capital requirement will raise the industry's operational costs. Hence, those employing a cost leadership strategy will be significantly affected and may need to readjust their strategic orientation. Essentially, this situation will create conditions for changes in market functional demands and market volatility for insurers to compete using a variety of strategic choices (GOC and FC) as well as providing empirical data to test equifinality. For instance, while some successful insurers may enhance their cost efficiency, others may also improve their viability by increasing their range of innovative, competitive products. Therefore, this research environment promises reliable and comprehensive results.

The third reason for selecting the Thai non-life insurance industry is *the representativeness of the literature's untapped dataset*. Unlike most previous configuration-performance relationship studies, which have focused mainly on manufacturing firms in developed countries and only a handful of service industries, especially the insurance industry (Fiegenbaum, Thomas & Ming-Je, 2001; Fiegenbaum & Thomas, 1990, 1993, 1995), this dataset represents a service industry in an emerging market. This research will enrich the research field's applicability in terms of industry type and level of economic development.

The fourth reason is *the availability of data to support assessment of the research construct*, particularly the assessment of GOC and FC, as well as the sample size requirements of fsQCA (Fiss, 2007). One of many critical obstacles that deter researchers from conducting research in an emerging market is the size of the dataset. Hence, this research carefully selects an industry in an emerging market with a relatively large number of players and, at the same time, with a reliable data source. While the total of 68 non-life insurers in this industry appears to be quite small by international research standards, considering the total of 580 listed companies in the Stock Exchange of Thailand, this industry is relatively large in this emerging market. Furthermore, taking into account only highly-regulated industries (e.g. stricter reporting requirements from various professional bodies such as auditors and actuaries to ensure information quality), the non-life insurance industry is the largest in terms of the number of players. A database maintained by the Office of Insurance Commission (OIC) generally reports all companies in the industry (no size bias, including both publicly-listed and privately-owned insurers). Moreover, this industry may be sub-categorized into four comparable business units, according to four non-life insurance product lines identified by the OIC (comprising fire, marine and transportation, automobile, and miscellaneous), which will quadruple the number of datasets. The greater the number of datasets, the greater the opportunity for the researcher to observe different GOCs and FCs.

The final reason is *the generalizability of GOC and FC in the insurance industry to other industries*. Although utilizing only a single industry makes it quite difficult to generalize this research at the level of specific strategy and capability studies beyond the specific industry contexts within which it is carried out, the results of this research, along with other previous research studies of a single industry, are quite general from a broader perspective (Barney & Clark, 2007) because they will at least provide an example of an industry that displays complementarity between GOC and FC, which has the potential to generate the performance dimension of concern. Moreover, the research approach used in this study is designed to be applicable to other industry settings. As a result, the findings and methods utilized by this study are intended to provide a basis for further research. Over time, as more of these studies are completed, our ability to specify the combination of causal conditions between GOC and FC that can be used to create economic value will be enhanced.

Next, I will describe the specific characteristics of the chosen sample, first by providing a basic overview of the non-life insurance business in general, then by drilling down to describe the market characteristics of the Thai non-life insurance sector. The former supports the complementarity argument of this research, while the latter helps justify the choice of methodology (fsQCA) and target sample.

6.1 Non-life insurance business

Non-life insurance, also known as property and liability (casualty) or general insurance, is a method of sharing the risk of property loss among a group of insured. These individuals trade their uncertainty (of high or no loss) for the certainty of paying a small premium for insurance against possible loss. Conceptually, in general, insurance is a "bad bet" for the insured, meaning that the premium paid by the insured is higher than the expected property loss without insurance. The difference between these two is the underwriting (or sales) expense (e.g. commission) and other transaction costs plus the profits of insurance firms (Joskow, 1973: 377). In other words, the insurance premium is equal to the expected loss plus selling expenses plus operating costs plus risk adjusted profits, which is one of insurers' two main sources of net income.

Apart from pooling the risk among the insured (law of large numbers), the insurance mechanism keeps the premium low through the "levered investment trust" aspect of the insurance company (Joskow, 1973: 412). A time lag for the insurer between receiving a prepaid premium from its clients (often called unearned premium reserves) and paying back to compensate for underwritten loss in a future period specified in the insurance contract allows an insurer to invest such capital[27] in securities (both stocks and bonds). This portfolio is used to support its insurance operations. Investment appears to be a non-detachable activity for insurance companies. It represents another main source of insurers' net income.

Unlike manufacturing firms, an insurer can increase its underwriting capacity faster and can even improve its underwriting performance, particularly in spreading risk (e.g. catastrophe protection), by purchasing reinsurance, which is a contract arrangement under which one insurer, known as the ceding company, buys insurance from another insurer, called the reinsurer (Webb, 1974; Doherty & Korkie, 1980; Fiegenbaum & Thomas, 1990).

Non-life insurance is marketed in two basic ways:

1) *Agency system*: Independent retailers or agents represent a number of insurers and sell insurance for these companies to the public. For their efforts, the agents receive a commission, usually a fixed percentage of the premium written (shown as selling expenses in insurance premiums).

[27] The insurance company also obtains capital from an initial sale of its stock.

2) *Direct writing system*: Insurance companies sell insurance directly either through their own salesforce or through other media (e.g. mail, telephone, internet). This system arises because of the high sales costs of the agency system (Joskow, 1973).

In line with the value chain of life insurance companies suggested by Marlborough Stirling (2001), Taylor et al. (2002), and Dommisse and Oosthuizen (2004), the non-life insurance value chain can be formed by combining the two main income-generating activities mentioned earlier with other essential activities that support the delivery of the insurance product to the market, as shown in Figure 6-1.

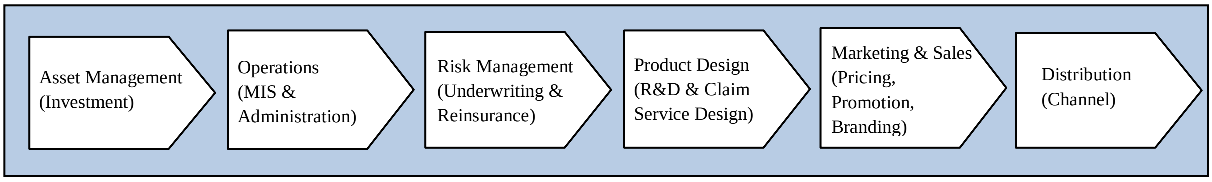

Figure 6-1: Non-life insurance value chain model

Adapted from Marlborough Stirling (2001), Taylor et al. (2002) and Dommisse & Oosthuizen (2004)

Asset management involves the selection and management of investment assets purchased by cash inflows generated from the sale of stock and insurance products. Operations entail the infrastructure, management information system and administration processes needed to deliver and orchestrate the other services in the chain (e.g. customer interaction, processing of policy record). Risk management is closely intertwined with the insurance product as the actuary determines premium rates (e.g. underwriting, statutory actuary role) and suggests the use of reinsurance to diversify the firm’s risk portfolio. Its products and related services (e.g. claims service) are designed by the next unit. Marketing and sales focuses on positioning its product and service to be suitable for its target market using a combination of the marketing mix. Distribution concentrates on distributing a product that meets the target client’s needs, especially in term of convenience (e.g. market reach and location) and associated cost.

The value chain provides a better understanding of the link between FC and configuration which, when combined, lead to business success. This non-life insurance business value chain shows how a non-life insurance business creates value for its customer by identifying a sequential chain of more specialized value-creation activities, which integrate to form a wider FC (firm's processes and routines), which in turn supports the business unit's strategic choice of posture (or configuration), as proposed in the research hypotheses. Asset management, operations and risk management activities shown across the value chain can be grouped into operations capability because all take part in the overall operations of the insurance company. Improving the efficiency of these activities will significantly reduce the overall costs of the firm and support a low-cost defender strategic choice.

On the same grounds, product design and R&D contribute to a differentiated defender strategy by permitting the insurer to charge a higher margin for innovative or more tailor-made non-life insurance products. MIS and sales and distribution, which occur across the value chain, play major roles in an analyzer strategy. MIS supports well-informed decision making by providing an on-time and accurate market database. Most importantly, only a strong sales and distribution function will enable the insurer to respond in a timely fashion, leading to market adaptability advantage. Finally, marketing activities help the firm to maintain a prospector strategy by allowing it to capitalize on its strong brand to market new products and gain a prospector's first mover advantage. Clearly, to be viable and competitive, a non-life insurer may pursue a variety of strategic choices, depending on its key functional area.

6.2 Thai non-life insurance industry

The Thai non-life insurance sector had total assets of USD 4,534 million in 2009, an increase of 8.34% from USD 4,185 million in 2008 and of 14.11% from USD 3,973 million in 2007 (Office of Insurance Commission, 2009, 2010).

Another way to measure the absolute size of the industry is its total revenue. According to Swiss Re (2008, 2009, 2010), in the same year (2009), with annual direct (also called gross) premiums (including a small amount of reinsurance premiums) of USD 4,248 million, the Thai non-life insurance market ranked 36th globally (out of a total of 88 countries in the study), ninth in Asia (out of a total of 26 countries in the study) and second in ASEAN (out of a total of eight countries in the study) in terms of premium volume (absolute size). This shows a slight drop of about 1.7% in direct premiums from 2008 (USD 4,321 million), probably owing to political instability during that period, but exhibits a large improvement of about 12.9% in direct premiums from 2007 (USD 3,764 million).

The Thai non-life insurance sector still appears to offer tremendous opportunities to excel in terms of volume by increasing insurance density and insurance penetration.[28] Although prospects for long-term growth remain good, this will undoubtedly depend on the country's political stability.

Although the non-life insurance sector is a form of market organization in which there are many operators (71 firms comprising 66 domestic firms, five of which pursue only health insurance, and five foreign branches), nine firms make up over half the market size. The top twenty competitors cover about three quarters of the market size and the rest comprise 51 smaller companies, as shown in Table 6-1. Interestingly, this trend is on the rise: the top ten firms covered about 54.77% of market size in 2009, 52.76% in 2008, 51.33% in 2007 and 52.11% in 2006.

[28] In terms of insurance density, the Thai non-life insurance market has a direct premium per capita of USD 62.7, which ranks 67th globally, 16th in Asia and 3rd in ASEAN. This is a small decrease on 2008 (USD 64.9) but a considerable increase on 2007 (USD 58.9). In terms of insurance penetration, with its direct premium at 1.6% of GDP, the Thai non-life insurance market ranks 51st globally, 9th in Asia and 3rd in ASEAN. Again, this displays a slight upward trend on 2007 (1.5%) with no change on 2008 (1.6%).

Table 6-1: Market share of direct premiums of non-life insurance business (all product lines) in 2009

Data from Office of Insurance Commission

Rank	Companies	Direct Premiums (1,000 bahts)	Market share (%)	Cumulative market share (%)
1	VIRIYAH INSURANCE	17,478,709	15.89	15.89
2	DHIPAYA INSURANCE	8,822,489	8.02	23.91
3	BANGKOK INSURANCE	7,830,627	7.12	31.03
4	SYNMUNKONG INSURANCE	5,020,406	4.56	35.59
5	MUANG THAI INSURANCE PUBLIC	4,211,161	3.83	39.42
6	THE SAFETY INSURANCE	3,935,733	3.58	43
7	LMG INSURANCE	3,731,250	3.39	46.39
8	TOKIO MARINE SRI MUANG INSURANCE	3,365,181	3.06	49.45
9	ACE INA OVERSEAS*	2,953,358	2.68	52.13
10	THANACHART INSURANCE	2,909,608	2.64	54.77
11	SIAM COMMERCIAL SAMAGGI	2,784,046	2.53	57.3
12	MITSUI SUMITOMO INSURANCE*	2,770,725	2.52	59.82
13	DEVES INSURANCE	2,505,487	2.28	62.1
14	NEW HAMPSHIRE INSURANCE*	2,342,372	2.13	64.23
15	MSIG INSURANCE	2,084,946	1.9	66.13
16	THE SOUTHEAST INSURANCE	2,019,311	1.84	67.97
17	MITTARE INSURANCE	2,011,543	1.83	69.8
18	ALLIANZ C.P GENERAL INSURANCE	1,841,395	1.67	71.47
19	NAVAKIJ INSURANCE	1,838,072	1.67	73.14
20	THAIVIVAT INSURANCE	1,798,998	1.64	74.78
21-71	Other 51 firms	27,743,130	25.22	100
	Total Market	110,004,479	100	

* foreign branches (the rest have domestic firm status)

Another measure of market concentration also supports this rising trend. The Thai non-life insurance sector had a Herfindahl-Hirschman Index of 5.15% in 2009, 4.78% in 2008, 4.65% in 2007 and 4.70% in 2006. This increase in the Herfindahl-Hirschman index indicates a decrease in competition and an increase in the market power of market leaders. In other words, the higher the Herfindahl-Hirschman Index, the higher the market concentration.

Moreover, considering the income gap by calculating the ratio between the direct premium of the ten biggest firms and that of the twenty smallest firms, the big firms were about 30.26 times larger in direct premium size in 2009. This disparity is also on a rising trend.

Market structure can also be illustrated by breaking down the market share by non-life insurance product line[29] for the whole industry, as shown in Figure 6-2 and Figure 6-3. Automobile insurance has dominated the market since 1996, with an average market share for this 14-year period of 62.50%, followed by miscellaneous, fire, and marine and transportation with 14-year average market shares of 22.74%, 11.03% and 3.73% respectively.

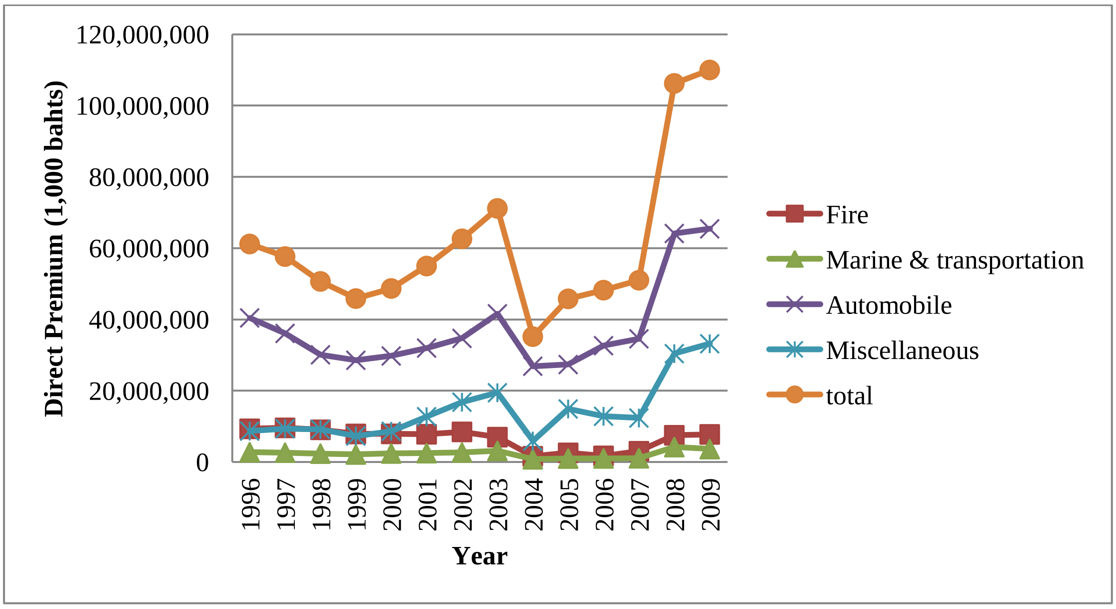

Figure 6-2: Direct premium of non life insurance business lines from 1996 to 2009

Data from Office of Insurance Commission

[29] Non-life insurers sell all types of insurance other than life insurance. The four main product lines used in this research are fire, marine & transportation (including hull & cargo), automobile (including. compulsory & voluntary) and miscellaneous (including industrial all risks, public liability, engineering insurance, aviation insurance, personal accident, health insurance, crop insurance, and other insurance), which are derived from the insurance categories defined by the Thai non-life insurance act B.E. 2535 (1992), amended by the non-life insurance act (no.2) B.E. 2551 (2008).

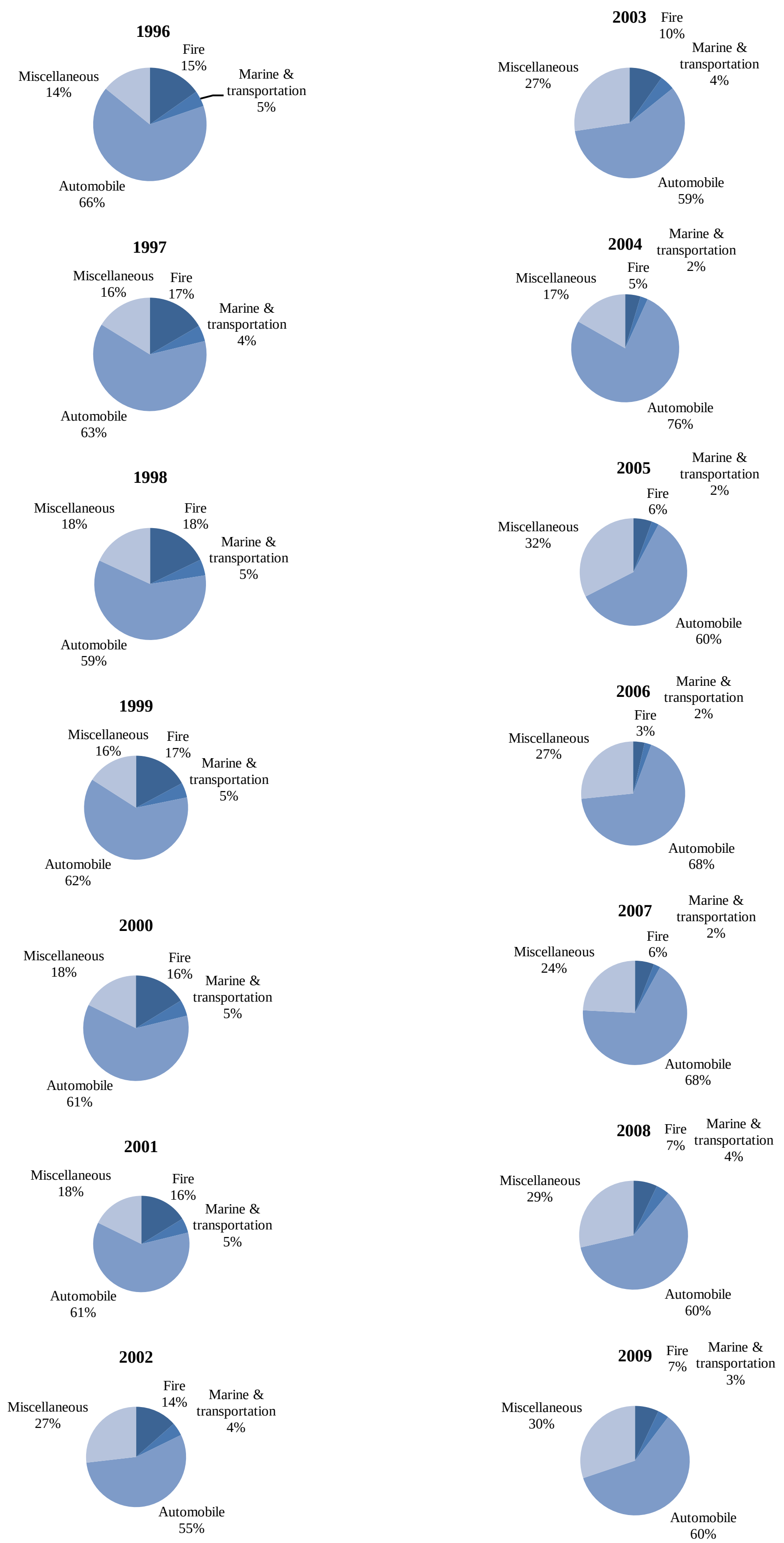

Figure 6-3: Market share of non-life insurance business lines from 1996 to 2009

Data from Office of Insurance Commission

The markets for each non-life insurance business line in 2009 were also highly concentrated, as shown in Table 6-2 to Table 6-5. The top ten competitors in each non-life insurance business line in 2009 covered over 60% of the market and the rest contained 61 smaller companies.

Table 6-2: Market share of direct premiums of fire insurance in 2009

Data from Office of Insurance Commission

Rank	Companies	Direct Premiums (1000 bahts)	Market share (%)	Cumulative market share (%)
1	BANGKOK INSURANCE	1,084,605	14.00	14.00
2	MUANG THAI INSURANCE PUBLIC	842,122	10.87	24.87
3	DHIPAYAINSURANCE	829,423	10.70	35.57
4	NEW HAMPSHIRE INSURANCE*	530,004	6.84	42.41
5	SIAM COMMERCIAL SAMAGGI	458,019	5.91	48.32
6	AYUDHYAINSURANCE	403,651	5.21	53.53
7	THE SOUTHEAST INSURANC	340,696	4.40	57.93
8	KRUNGTHAI PANICH INSURANCE	337,067	4.35	62.28
9	VIRIYAH INSURANCE	231,562	2.99	65.27
10	NAVAKIJ INSURANCE	228,242	2.95	68.22
11-71	Other 61 firms	2,464,286	31.78	100.00
	Total Market	7,749,677	100.00	

* foreign branches (the rest have domestic firm status)

Table 6-3: Market share of direct premiums of marine and transportation insurance in 2009

Data from Office of Insurance Commission

Rank	Companies	Direct Premiums (1000 bahts)	Market share (%)	Cumulative market share (%)
1	TOKIO MARINE SRIMUANG INSURANCE	467,395	12.86	12.86
2	MITSUI SUMITOMO INSURANCE*	430,141	11.84	24.70
3	BANGKOK INSURANCE	291,255	8.02	32.72
4	MSIG INSURANCE	244,174	6.72	39.44
5	AYUDHYA INSURANCE	241,070	6.63	46.07
6	DHIPAYA INSURANCE	188,364	5.18	51.25
7	NEW HAMPSHIRE INSURANCE*	162,446	4.47	55.72
8	ALLIANZ C.P GENERAL INSURANCE	153,545	4.23	59.95
9	AXA INSURANCE	116,510	3.21	63.16
10	NAVAKIJ INSURANCE	111,586	3.07	66.23
11-71	Other 61 firms	5,343,191	33.77	100.00
	Total Market	7,749,677	100.00	

* foreign branches (the rest have domestic firm status)

Table 6-4: Market share of direct premiums of automobile insurance in 2009

Data from Office of Insurance Commission

Rank	Companies	Direct Premiums (1000 bahts)	Market share (%)	Cumulative market share (%)
1	VIRIYAH INSURANCE	16,281,346	24.88	24.88
2	SYNMUNKONG INSURANCE	4,397,215	6.72	31.60
3	LMG INSURANCE	3,396,607	5.19	36.79
4	THE SAFETY INSURANCE	3,294,147	5.03	41.82
5	BANGKOK INSURANCE	3,198,053	4.89	46.71
6	THANACHART INSURANCE	2,431,590	3.72	50.43
7	MITTARE INSURANCE	1,928,093	2.95	53.38
8	DHIPAYAINSURANCE	1,910,282	2.92	56.30
9	MUANG THAI INSURANCE PUBLIC	1,899,620	2.90	59.20
10	TOKIO MARINE SRIMUANG INSURANCE	1,758,978	2.69	61.89
11-71	Other 61 firms	-32,746,254	38.11	100.00
	Total Market	7,749,677	100.00	

* foreign branches (the rest have domestic firm status)

Table 6-5: Market share of direct premiums of miscellaneous insurance in 2009

Data from Office of Insurance Commission

Rank	Companies	Direct Premiums (1000 bahts)	Market share (%)	Cumulative market share (%)
1	DHIPAYA INSURANCE	5,894,420	17.76	17.76
2	BANGKOK INSURANCE	3,256,714	9.81	27.57
3	ACE INA OVERSEAS*	2,903,919	8.75	36.32
4	NEW HAMPSHIRE INSURANCE*	1,410,590	4.25	40.57
5	MUANG THAI INSURANCE PUBLIC	1,375,483	4.14	44.71
6	DEVES INSURANCE	1,326,613	4.00	48.71
7	MITSUI SUMITOMO INSURANCE*	1,307,943	3.94	52.65
8	SIAM COMMERCIAL SAMAGGI	1,297,315	3.91	56.56
9	BUPA HEALTH INSURANCE	1,166,671	3.51	60.07
10	TOKIO MARINE SRI MUANG INSURANCE	1,085,038	3.27	63.34
11-71	Other 61 firms	-13,275,029	36.66	100.00
	Total Market	7,749,677	100.00	

* foreign branches (the rest have domestic firm status)

Thai non-life insurance is a regulated industry. The Office of Insurance Commission (OIC) is charged with supervising premium rates, investment activities and quality of service provided by insurance companies. Insurance premium rates have traditionally been set in concert through general techniques and rate-making formulae, which the OIC applied under its previous approval rate regulation. This tended to discourage price competition and endorse product and service differentiation. However, there are still some players, especially family-owned and small non-professional firms, trying to sell their products at a lower margin to gain short-term liquidity, notwithstanding the potential loss from inappropriate pricing.

Regarding entry barriers, any insurance company must be licensed in order to operate in Thailand. The Non-Life Insurance Act specifies a minimum amount of paid-in capital necessary to commence operations. It also indicates in what types of securities the minimum capital is to be kept, as well as specifying eligible investments for other financial reserves. A further requirement regarding the designated amount, types, procedures and conditions of asset maintenance in Thailand of branches of foreign non-life insurance companies is also demanded.

Although the minimum capital requirements and other statutory restrictions appear to be easily achievable for prospective entrepreneurs, the main constraint on entry is government policy on issuing new licences: it does so rarely as it perceives that the current number of players is much higher than the optimum. Moreover, it has continuously encouraged, both directly and indirectly, mergers and acquisitions (M&A) between non-life insurance firms, especially over the most recent years. For example, the OIC has given a clear signal that it will not allow any group of major shareholders to own more than one brand of insurance company, and requires them to merge all their firms and return or sell unused licences. It has also set up a more stringent risk-based capital regime, which requires insurers to have more capital to back their insurance business and indirectly forces firms to improve their efficiency to reduce costs. There is also a recently-issued tax treatment and incentive for M&A activity. Consequently, over the last two decades, there have been five successful M&As, grouped according to the number of final firms (from 13 companies). Furthermore, four groups of insurance firms covering ten companies with the same major shareholder are preparing for M&A, and another three companies are likely undergo M&A in the near future owing to close coordination between them. (Details of M&As and their potential in Thailand are provided in Appendix 13.3.)

In summary, the Thai non-life insurance industry during the period under consideration possesses the structural characteristics associated with an oligopolic market: a small number of firms (for an industry of this size) as well as many potential M&As in the near future, high concentration levels, high entry barriers for new and potential competitors, essentially identical products, provided at constant unit costs and, most importantly, concerted rate setting requiring prior approval, which makes price competition very difficult. This situation demands that players make strategic choices. In other words, limitations in price competition encourage business units to choose from a variety of GOCs that match their firms' key FCs in order to survive. This notion is also reflected in the findings of a preliminary study.

For exploratory purposes, before the full-scale study, semi-structured interviews were conducted with ten insurers out of 68 companies in this industry, supplemented by a panel discussion with the regulator, academics and a reinsurer. This sample group was selected to represent each type of firm (international subsidiaries, local bank affiliates, and small and large local insurers) to observe how they respond to current rules and potential changes.

The interviews revealed specific characteristics of this emerging market, such as a small number of players with a wide sophistication gap and a highly-regulated environment to protect unsophisticated and highly price-sensitive customers in a rapidly growing market. Two key environmental functional demands used to observe firm reactions are the current tariff control with no new product licence protection and the forthcoming solvency rule. With less flexibility to compete on price and imitation of innovative products, insurers respond differently according to their particular strengths.

The findings from sample companies earning a comparable level of ROE show that some large local insurers tend to compete on their specialized claims service, their cost control activity, or both, which supports the hypotheses of differentiated defender, low-cost defender, and best-cost defender respectively, as shown in their responses. For example, Company A said:

> Motor insurance claim's high frequency gives us more chance to provide our differentiated claims service such as a country-wide claims centre with GPRS to reach the customer sooner, which is impossible to mimic. We don't need to be cost leaders due to our high level brand name. Conversely, non-motor insurance claims' low frequency leaves less chance for consumers to recognize differentiated claims services, thus making them more price sensitive. We therefore need to greatly control our costs to compete with our smaller competitors that have just finished their M&As.

The two main FCs of analyzers were also identified. While local bank affiliates tend to capitalize on their distribution channels (e.g. Company B: "We expand our market through our partners' unmatched bank branches, so-called bancassurance service."), international subsidiaries use their strong database to select only profitable businesses to pursue (e.g. Company C: "Our well-structured and complete databank helps analyze a profitable market segment."). Finally, some small local insurers invest heavily in R&D to launch innovative products, supporting the prospector typology (e.g. Company D: "Because of copycat problems, we must continuously offer new products to gain first mover advantage before they copy us.").

Although the proposed four complementarity hypotheses were broadly supported by the preliminary semi-structured interviews and panel discussions, these qualitative methods cannot empirically test equifinality and cannot take a holistic view of the organizations, nor are they able to identify all combinations of interconnected attributes related to high performance from all possible combinations. Likewise, a quantitative analysis (correlation-based analysis) is also inappropriate owing to the mismatch between the additive and symmetrical relationship assumption of this methodology and the core argument of this research regarding complementarity and equifinality, which are based on causal complexity (conjunctural causation) and an asymmetric relationship assumption (Fiss, 2007).

In other words, while complementarity and equifinality support the hypothesis that a combination of factors produces an outcome, correlation-based analysis assumes that a single independent variable has an isolating effect on the outcome that is independent of other independent variables; hence, adding up the effects of each individual variable yields the outcome. Moreover, in contrast with the presupposition of complementarity and equifinality that the presence and absence of outcomes have different explanations (causal condition), quantitative analysis takes for granted that the result of correlation analysis of the inverse of high performance is the same as that of high performance except for the sign of the coefficients (Fiss, 2011).

Another concern in the methodology decision is the small to medium-sized sample of the emerging market dataset of this research,[30] which is too small to be statistically significant for quantitative analysis and, at the same time, is too large to acquire in-depth knowledge of each case for qualitative analysis (Ragin, 2000), hence my recommendation to use a set theoretic method, fsQCA (Ragin, 1987, 2000), to cope with such limitations in conducting a detailed analysis of the causal complexity relationship.

Moreover, the Thai non-life insurance industry's high market concentration supports my decision to collect data only from business units of the top 25 companies in 2011 according to revenue, rather than the whole population.

In the next chapter I will discuss the operationalization of all research constructs which are components of this research main hypotheses. Then, I will describe the sampling techniques and descriptive data.

[30] Since the total number of players in the Thai non-life insurance industry during 2011 was 68, in total there were up to 272 business units (68 non-life insurers x 4 main product lines = 272 business units). Nevertheless, like many emerging markets, some players are small and are experts in a particular type of business. They do not provide all types of insurance products. Moreover, a 100% response rate is unlikely in practice. As a result, roughly 100 or so business units are the best estimate for the potential sample size (approximately 36.76% response rate if the researcher approaches the whole population).

7 OPERATIONALIZATION OF CONSTRUCTS

Before testing the four main hypotheses proposed in Chapters 2 and 3, each of which consists of sub-hypotheses to explain all four performance dimensions and the overall performance proxy as clarified in details in Chapter 4, in this chapter I will justify the operationalization of all research constructs, comprising unit of analysis, measurement methods and the calibration criteria required by fsQCA, the technique adopted in this research. Then, I will describe the sampling techniques and descriptive data.

In this chapter, first I will discuss possible approaches to identifying and measuring the research constructs (page 153), and then propose an approach that is appropriate for this research project. Next, I will explain why the business unit is an appropriate unit of analysis (page 155). The operationalization of each research construct will be described separately according to the role of each in this research, starting with assumptions regarding the combination of research constructs in each dataset (page 156), and followed by the two research constructs treated as potential causal conditions – the GOCs of Miles and Snow's (1978) (page 158) and Porter's (1980) typologies (page 162), and FCs (page 172) – and the outcome of interest (performance dimensions) (page 175). Finally, sampling techniques and descriptive data are provided (page 188). The final questionnaire is shown in Appendix 13.1 (page 360).

The structure of discussion for each research construct follows the same format, starting with the measurement methods used by previous research studies, and followed by the measurement method adopted in this research, with details of any required adjustment, including justifications, and the proposed calibration criteria for three anchor points[31] to calculate the membership score of each business unit for each research construct under fsQCA.

[31] Three anchor points will be used to denote being fully in the group (membership score = 1), most ambiguous (membership score = 0.5) and fully out of the group (membership score = 0).

7.1 Measurement approach

There are a few concerns regarding the choice of approach to research construct measurement. Firstly, organizational configuration should take priority in deciding an appropriate approach because it is the most abstract element of all research constructs, making it hardest to measure. The chosen method should be able to distinguish between typologies, based on a strong theoretical ground and with a high degree of reliability. Since organizational configuration is closely linked with strategy, this approach should be able to address intended strategy and strategic change as well as providing a broad view of the relative context of strategy between the cases. Secondly, the method should be applicable to both business unit and firm levels since these two levels are parts of the main argument of this research. Thirdly, an appropriate approach should allow for medium-sized datasets (between 50 and 100 cases), which is the target sample size of this research. It will be particularly advantageous if it is able to handle all constructs at the same time as this will reduce the time spent on fieldwork.

In considering Snow and Hambrick's (1980) suggested advantages and disadvantages of the four main methods for identifying and measuring business-level strategies,[32] self-typing appears to be the most appropriate as it satisfies all the above criteria.

Self-typing is a strategic measurement approach that asks top managers to characterize their own firm's strategy using written descriptions or Likert-type scale of strategy types of concern (i.e. Miles and Snow's (1978) and Porter's (1980) typologies). It can be used during an interview or as part of a mailed questionnaire (in neither case are the concerned strategic terms (e.g. defender, differentiation, etc.) used). In both modes, similar instructions are given to the respondent: 1) use industry competitors as a benchmark, 2) consider the organization as a whole (or the business unit in a divisionalized company) and 3) think of the

[32] Comprising: 1) *investigator inference* – researcher uses all available information to assesess the firm's strategy; 2) *self-typing* – allowing the firm's top managers to characterize their firm's strategy; 3) *external assessment* – an individual external to the focal firm distinguishes the firm's strategy; and 4) *objective indicators* – utilizing unbiased measurements as a proxy for firm's strategy.

organization's typical pattern of behavior over time rather than for any specific period. Self-typing is ideal for detecting strategic change, as an organization's executive are most up-to-date on their organization's directions and they tend to express strategies in terms of intentions, which lends itself to identifying the typology of GOC. This method also allows large sample sizes, matching the target dataset, facilitating a broader assessment of relative strategic properties. The questions asked in the self-typing method can also be designed to tap as many underlying theoretical dimensions as required. Furthermore, self-typing has no limitation regarding unit of research: it can be applied to both business unit and firm levels. Therefore, it is generally accepted as an appropriate method for strategy research (Conant, Mokwa & Varadarajan, 1990; Snow & Hambrick, 1980; Harrigan, 1983; Huber & Power, 1985). Finally, in addition to GOC, self-typing is also able to deal with FC and performance dimensions, thus reducing the time required for fieldwork.

In contrast, investigator inference, which is a strategic measurement approach that a researcher uses all the information available to assess the organization's strategy. Combining information gathered with a theoretical framework, and the ability to see the organization more objectively than its managers, may allow a researcher to make a relatively accurate identification of strategy. However, investigator inference allows only small sample sizes, reducing the opportunity to investigate relative strategies, nor will the researcher gain an in-depth comparative view (including longitudinal and industry-wide) to allow the identification of strategic change. This method is also time consuming.

Although external assessment, in which strategies are measured by reliance on the observations or perceptions of individuals external to the focal organization (e.g. competitors, consultants, industry analysts and expert panels), and objective indicators, in which measures of strategy do not rely on the perceptions of individuals (either internal or external to the focal organization), but on unbiased measurements as a proxy for firm's strategy, allow large sample sizes and support the rating of relative strategies, both are more suitable for identifying realized than intended strategies and are less likely to be updated to reflect recent strategic changes. It may also be difficult to identify experts for an external assessment and even more difficult to secure their involvement.

Most importantly, using objective indicators may attract criticism of tautology because most available data to measure GOC and FC relate to their effects on performance. Hence, if I were to adopt objective indicators, this research would identify GOC and FC by observing superior performance, but these two research constructs are also tested for the creation of performance, making the hypotheses of this research tautological. Therefore, in order to make this theory falsifiable, I will not use objective indicators for my proposed causal conditions (GOC and FC). For the outcome (performance), I will use both a self-typing approach and, whenever possible, financial data from secondary sources to provide the benefit of triangulation and show robustness.

For the reasons above, a self-typing approach has been chosen for this research as it has been widely used in strategic research (e.g. Conant, Mokwa & Varadarajan, 1990; Dess & Davis, 1984; Smith, Guthrie & Chen, 1986; Snow & Hrebiniak, 1980).

7.2 Unit of analysis

Strategic management researchers have debated the degree to which superior performance arises at the level of industry, corporation, firm or business unit (Rumelt, 1991; Powell, 1996; McGahan & Porter, 1997; Brush et al., 1999). Hence, their underlying assumption is that the source of competitive advantage (GOC in the context of this research) is not only relevant to the corporate level but also applies to the business unit level (division of a company). For instance, Govindarajan and Fisher (1990) argue that the different strategies pursued by business units regulate their level of resource sharing, which, if managed appropriately, as when a related diversified firm assembles a portfolio of mutually reinforcing business units (Barney, 1997), contribute to superior performance (gaining operational economies of scope). Business unit-level strategies focus on “how a business unit or division of a company chooses to compete in an industry” (Walker & Ruekert, 1987: 16; Barney, 2011).

Most attempts to define and categorize such strategies have been based on conceptual rather than empirical evidence, as mentioned in discussion of strategic groups and archetypes in Section 2.1.2 of Chapter 2 (page 17), and thus differ significantly in terms of generalizability (Hambrick, 1980; Walker & Ruekert, 1987). Porter’s (1980) and Miles and Snow’s (1978) typologies, to which this research refers collectively as GOC, are two important attempts to derive more generalizable typologies of business unit-level strategy from empirical observation (Walker & Ruekert, 1987). Even within the same firm, the various product lines may adopt a variety of strategies. For example, Tesco has a wide range of grocery products to match different customer demands: Tesco Value for cost-conscious customers, Tesco Light for weight-conscious customers, and Tesco Finest for sophisticated customers. Thus, rather than observing the corporate-level configuration-performance relationship, within which the performance of strategically conflicting business units may be offset, I will examine business units separately in order to reduce this offsetting effect and to show a clearer relationship with a particular strategic orientation. This research is intended to contribute to the long-established research stream focusing on strategy implementation at the business unit level by building on, reconfirming and extending previous research (e.g. Gupta & Govindarajan, 1984; Govindarajan, 1986a; Miller, 1988; Govindarajan & Fisher, 1990).

7.3 Assumptions regarding the combination of research constructs

In line with other previous organizational research on complementarity (e.g. Fiss, 2007, 2011; Grandori & Furnari, 2008), it is important to clarify my assumption regarding the combination of research constructs (GOC, FC and performance) that they are not mutually exclusive for each dataset (business unit). This assumption is rooted in the complementarity notion, which in turn is a fundamental criterion in the appropriate operationalization of each research construct and research technique.

Although it is quite obvious for FC and performance that a single business unit may have more than one superior FC and that we can measure all types of performance dimensions, some of which may be high while others may be low, GOC has commonly been regarded as a "discrete alternative" in previous research. However, in my proposed combinative approach, all business units are composed of "practices" that embody these typologies to varying degrees. I do not claim that the adopted typologies of Miles and Snow (1978) and Porter (1980) are exhaustive, since a new classification system with a different orientation and/or level of detail may always be developed. Rather, I simply propose to use a classification system based on previously well-accepted categorization schemes for organizational elements with known general properties (practices), allowing me to measure the business unit's elements, which in turn will enable me to test complementarity.

Consequently, in this research all typologies suggested by Miles and Snow (1978) and Porter (1980) are conceived as categories of each business unit's elements (or characteristics) and not as categories of each business unit itself. These elements are normally infused throughout the organizational system of each business unit through the application of "practices". Although, theoretically, any practice may represent more than one type of element, for the sake of simplicity in the operationalization of research constructs I select and measure practices that can be considered to be "carriers" of one (dominant) element, similarly to previous research in this field (e.g. Grandori &Furnari, 2008). Furthermore, it is essential to note that the logic of the model will not change with the use of multi-element practices.

In summary, each business unit is categorized by its practices and will display all types of elements (GOC, FC and performance) to varying degrees, some of which will be dominant characteristics and others merely subordinate ones. For instance, a business unit may exhibit a high degree of low-cost leadership, defender, operational capability, input efficiency and overall performance, while having a low level of the other research constructs.

7.4 Operationalization of Miles and Snow's (1978) typology

The operationalization of GOC for this research consists of two parts: those adopted from Miles and Snow (1978) and those adopted from Porter (1980). Each will be addressed separately.

A review of research which has addressed the operationalization and measurement of Miles and Snow's (1978) typology (e.g. Bourgeois, 1981; Flamholtz, 1979; Ginsberg, 1984; Hambrick, 1980; Montgomery, 1982; Ramanujam & Venkatraman, 1985; Snow & Hambrick, 1980; Venkatraman & Grant, 1986; Venkatraman & Ramanujam, 1986, 1987) reveals that a number of previous research studies have utilized a paragraph approach (e.g. Snow & Hrebiniak,1980; McDaniel & Kolari, 1987; Segev, 1987a; Zahra, 1987), which is oversimplified, as only a few strategic dimensions of Miles and Snow's (1978) 11-dimension adaptive cycle model are evaluated. Table 7-1, adapted from Conant, Mokwa and Varadarajan (1990), provides a summary of the distinctive characteristics of Miles and Snow's (1978) strategic archetypes along these eleven dimensions. Reactor types tend to be excluded from the analysis. Furthermore, some multi-item (Likert-type) scales, developed to measure each of the four strategic types (e.g. Segev, 1987b), have a problem of scale inconsistency, in which the number of items varies by strategic type (Conant, Mokwa & Varadarajan, 1990).

Table 7-1: Dimensions of the adaptive cycle and strategic type characteristics

Adapted from Conant, Mokwa & Varadarajan (1990: 367), which is based on Miles & Snow (1978: 13-93)

Adaptive cycle components	Dimensions	Strategic Types			
		Defenders	Prospectors	Analyzers	Reactors
Entrepreneurial problems and solutions	Product-market domain	Narrow and carefully focused	Broad and continuously expanding	Segmented and carefully adjusted	Uneven and transient
	Success posture	Prominence in "their" product market(s)	Active initiation of change	Calculated followers of change	Opportunistic thrusts and coping postures
	Surveillance	Domain dominated and cautious/strong organizational monitoring	Market and environmentally oriented/ aggressive search	Competitive oriented and thorough	Sporadic and issue dominated

	Growth	Cautious penetration and advances in productivity	Enacting product market development and diversification	Assertive penetration and careful product market development	Hasty change
Engineering problems and solutions	Technological goal	Cost-efficiencies	Flexibility and innovation	Technological synergism	Project development and completion
	Technological breadth	Focal, core technology/ basic expertise	Multiple technologies/ "pushing the edge"	Interrelated technologies/"at the edge"	Shifting technological applications/fluidity
	Technological buffers	Standardization, maintenance programmes	Technical personnel skills/diversity	Incrementalism and synergism	Ability to experiment and "rig solutions"
Administrative problems and solutions	Dominant coalition	Finance and production	Marketing and R&D	Planning staff	Trouble-shooters
	Planning	Inside/out control dominated	Problem and opportunity finding/ campaign (programme) perspective	Comprehensive with incremental changes	Crisis oriented and disjointed
	Structure	Functional/line authority	Product and/or market centred	Staff dominated/ matrix oriented	Tight formal authority/ loose operating design
	Control	Centralized and formal/financially anchored	Market performance/ sales volumes	Multiple methods/ careful risk calculations, sales contributions	Avoid problems, handle problems, remain solvent

Consequently, I adopt Conant, Mokwa and Varadarajan's (1990) 11-item scale to classify business units into Miles and Snow's (1978) strategic types because it is based on all of the underlying dimensions of Miles and Snow's (1978: 13-93) 11-dimension adaptive cycle with the same number of items per strategic type. In their proposed questionnaire, these eleven dimensions are transformed into eleven corresponding questions, with four response options randomly listed under each scale item characterizing the distinctive "adaptive stance activities" of the archetypes relative to the dimension of the adaptive cycle.

In the original research, organizations were classified as defenders, prospectors, analyzers or reactors, depending on the most often selected archetypal response option (majority rule). In the case of a tie, two separate, but related, decision rules were employed. Essentially, "ties between defender, prospector, and/or analyzer response options resulted in the organization being classified as an analyzer, while any ties involving reactor response options resulted in the organization being categorized as a reactor" (Conant, Mokwa & Varadarajan, 1990: 373).

These two decision rules regarding ties are anchored theoretically in Miles and Snow's (1978) original concepts (Conant, Mokwa & Varadarajan, 1990). This is because analyzers are "hybrid" organizations, possessing both defender and prospector characteristics, while reactors respond inconsistently to the challenges of the adaptive cycle, behaving like defenders when conducting environmental surveillance, like prospectors when developing new products, and like analyzers when controlling and evaluating their performance. Conant, Mokwa and Varadarajan (1990: 376) also propose a more conservative decision rule to identify relatively pure strategic typologies, using their set of questions alone for purposes of classification: only those cases in which at least six scale items (out of the eleven) are consistent with one archetypal response option will be classified and considered for further analysis. Although this rule does away with the decision rules for handling ties, it also prematurely discards valuable field data.

Conant, Mokwa and Varadarajan's (1990) multi-item scale has been successfully applied elsewhere (e.g. Dyer & Song, 1997; DeSarbo et al., 2004; DeSarbo et al., 2005). Among others, DeSarbo et al. (2005: 56) introduce an even more conservative decision rule by requiring that for a business unit "to be classified as a prospector or a defender, it must have at least 7 'correct' answers out of the 11 items".

With regard to fsQCA calibration of Miles and Snow's (1978) strategic typologies in this research, unlike previous research that has classified business units into only one (out of four) Miles and Snow typology using the cut-off rules mentioned above and has neglected other non-majority archetypal characters, I will take all archetypal responses into consideration, corresponding with the finer grain benefit of using the fsQCA concept. However, I will still adopt the previous cut-off rules for calibration purposes to produce a membership score for all of Miles and Snow's typologies for each business unit which, in line with previous research criteria, is proved to be anchored in theoretical grounds.

In this research, I propose that only those cases in which at least seven scale items (out of the eleven) are consistent with one archetypal response option will have a full membership score (1) for such a strategic typology (a relatively pure version of Miles and Snow's (1978) strategic typology). This criterion is consistent with DeSarbo et al.'s (2005) more conservative modification to Conant, Mokwa and Varadarajan's (1990) original Miles and Snow (1978) strategic typologies classification.

For the remaining two anchor points, I take possible answer combinations from all eleven questions into consideration and find that it is possible to have a tie between two or three highest scores for a particular archetypal response option when the highest score for a particular archetypal response option is equal to 5, 4 and 3 (the combinations 5, 5, 1, 0 and 4, 4, 3, 0 and 4, 4, 2, 1 and 3, 3, 3, 2).

Although there is good reason to support the classification of a case that has a tie between the two maximum values, which Conant, Mokwa and Varadarajan (1990) and DeSarbo et al. (2005) arbitrarily categorize into either reactor or analyzer, this decision rule can still be challenged as being biased toward either reactor or analyzer because only a minor misunderstanding of responses to a single question may lead to a tie, and hence this case will be classified as either reactor or analyzer. Therefore, to be more conservative, I will treat the tie case as the most ambiguous point. Thus, the combinations (5, 5, 1, 0), (4, 4, 3, 0), (4, 4, 2, 1) and (3, 3, 3, 2) are the most ambiguous points regarding whether they are more in or more out of the full membership of a particular strategic typology (a relatively pure Miles and Snow (1978) strategic typology). Hence, I propose using a midpoint between the two highest possible scores for a particular archetypal response option that may lead to a tie, which is 4.5 scale items (out of the eleven), as the crossover point for membership (0.5) of such a strategic typology. By doing this, I will avoid the use of a precise 0.5 membership score for causal conditions which, as Ragin (2008) suggests, is difficult to analyze.

In addition, since three scale items (out of the eleven) is the lowest possible number of highest scores for a particular archetypal response option (3, 3, 3, 2), this is the maximum score that cannot be classified as a single majority type from the observed dataset, as it creates a tie between three types. Hence, it cannot be treated as a concerned typology. As a result, I suggest using three scale items (out of the eleven) consistent with one archetypal response option as the full non-membership score (0) for such a strategic typology.

7.5 Operationalization of Porter's (1980) typology

A review of the operationalization and measurement of Porter's (1980) typology in self-type format (in line with the previous section) reveals that a number of previous research studies (e.g. Parnell, 2011) have utilized Zahra and Covin's (1993) self-reporting scale, asking respondents to compare themselves with their major competitors in terms of four business strategy dimensions related to Porter's (1980) typology: commodity-to-speciality products, marketing intensity, cost leadership and product line breadth.

These four dimensions truly match the suggested definitions of Porter's (1980) typologies', thus sharing their strength, which is the ability to represent fundamental strategic choices that are applicable to any environmental setting (Buzzell & Gale, 1987; Hambrick & Lei, 1985; Oster, 1990). An addition to this mainstream technique is Allen et al.'s (2007) self-reporting scale asking respondents to rate the frequency of their usage of strategic practices related to Porter's (1980) business strategy without comparing this with their competitors.

The former (mainstream technique) is preferable for three reasons. Firstly, anchoring scales with reference to a business unit's key competitors recognizes and is more consistent with the theoretical concept that "the task of measuring strategy is to attach absolute values to what is, in fact, a relative phenomenon" (Snow & Hambrick, 1980: 531). In other words, business-level strategy is largely predicated on competitors' actions (e.g. Hofer, 1975; Caves

& Porter, 1977). A more accurate assessment of a business unit's competitive commitment in its industry can be undertaken only by comparing its emphasis on a particular variable relative to that of its key rivals. Hence, this approach has been widely utilized in previous strategic management literature (e.g. Buzzell & Gale, 1987; Calori & Ardisson, 1988; Miller, 1988). Secondly, referring to the competition when measuring strategic constructs reduces the potentially confounding effect of industry variables on observed relationships in the data (Dess et al., 1990). Thirdly, using the same style of question (comparing with competitors) in line with other parts of the survey also reduces respondents' confusion and mistakes. Hence, the relativity of observed strategy is more suitable for measuring Porter's (1980) typology than the frequency of each business unit's strategic behaviour. Thus, Zahra and Covin's (1993) comparative self-reporting scale is utilized in this research.

In measuring the business strategy dimension, Zahra and Covin (1993) follow the approach of previous research (e.g. Dess & Davis, 1984; Miller, 1988), which is to group scale items according to their related strategic business dimensions to create overall indices of each dimension. To do this, a mean response to scale items (adding all responses for each item of the scale, then dividing by the number of items in the scale) for each dimension is used as the business unit's score for that measure. Zahra and Covin (1993) then perform Ward's method of hierarchical cluster analysis to classify business units (Everitt, 1974).

Although I adopt the mean response to scale items approach, slight modification of some of Zahra and Covin's (1993) comparative self-reporting item scales is required to better suit the research model. In this regard, Parnell's (2011) method, which is the most recent research that amends and utilizes this scale item and also shares the same objective of measuring Porter's (1980) typology, is used as another reference in deciding on any modification. Details of the alterations are as follows:

1. I group Zahra and Covin's (1993) three business strategy dimensions (commodity-to-speciality products, marketing intensity and product line breadth) into Porter's (1980) differentiation typology to make it easier for respondents to follow.
2. I modify the wording in the original item scales, which were aimed at manufacturing businesses, to better suit service business units and match the insurance industry, the dataset of this research.
3. I omit four item scales (rate of new product introduction, number of new products offered, level of operating efficiency and margin level) because these examine the intended performance measures of this research (dependent variables), rather than the intended strategy (independent variable). If they are not omitted, Porter's (1980) typology classification in this research might be subject to the challenge of tautology because it would identify organizational configuration by observing superior performance and the constructs of this research are also tested for the creation of performance. In this regard, Parnell (2011) also omits margin level but retains the rate of new product introduction to market and the number of new products offered to market. However, I keep Zahra and Covin's (1993) new market/product entry (0 = late, 10 = early), innovation effort (0 = follower, 10 = leader), and efficiency of distribution channels, which are omitted by Parnell (2011), to ensure that there is at least one item scale to represent each of Zahra and Covin's (1993) original business strategy dimensions.
4. I omit Zahra and Covin's (1993) automation and process innovation scale (comprising level of automation of plants and facilities, using the latest technology in production, capital investment in new equipment, and machinery) since they seem to support both differentiation and cost leadership strategies, thus reducing the argument regarding suitability. These groups are also not included in Parnell (2011).

A summary of modifications to Zahra and Covin's (1993) comparative self-reporting item scales by Parnell (2011) and in this research is provided in Table 7-2.

Table 7-2: Summary of modifications to Zahra and Covin's (1993) comparative self-reporting item scales used by Parnell (2011) and in this research

	Zahra and Covin, 1993		Parnell, 2011		This research
Cost leadership	Efficiency in securing raw materials	Cost leadership	COST1 Efficiency of securing raw materials or components	Cost leadership	Efficiency in securing human resources and operating resources
	Emphasis on finding ways to reduce cost of production		COST2 Finding ways to reduce costs		Emphasis on finding ways to reduce cost
	Level of operating efficiency		COST3 Level of operating efficiency		Omit
	Efficiency of distribution channels		Omit		Efficiency of distribution channels
	Level of capacity utilization		COST4 Level of production capacity utilization		Level of capacity utilization of both human resources (e.g. actuary, sale agent, claim agent) and operating resources (e.g. insurance operating system, database, office appliance) to provide non-life insurance products and service to customer
	Offering competitive prices		COST5 Price competition		Offering competitive prices
Automation and Process Innovation Scale	Level of automation of plants and facilities		Omit		Omit
	Using the latest technology in production		Omit		Omit
	Capital investment in new equipment and machinery		Omit		Omit

	Zahra and Covin, 1993		Parnell, 2011		This research
Aggressive Technological Posture Scale	Classify company’s innovation efforts: Type	Differentiation	Omit	Differentiation	Innovation effort (0 = Follower, 10 = Leader)
	Classify company’s innovation efforts: Timing of entry		Omit		New market/product entry (0 = Late, 10 = Early)
	Building a reputation for being first in the industry to try new methods and technologies		DIFF1 Using new methods and technologies to create superior products		Building a reputation for being first in the industry to try new methods and technologies to create superior products
New Product Development Scale	Emphasis on new product development		DIFF2 New product development		Emphasis on new product development
	Rate of new product introduction to market		DIFF3 Rate of new product introduction to market		Omit
	Number of new products offered		DIFF4 Number of new products offered to the market		Omit
Marketing Intensity Scale	Intensity of advertising		DIFF5 Intensity of advertising and marketing		Intensity of advertising
	Intensity of marketing efforts		Omit		Intensity of marketing efforts
Commodity-to-Speciality Products Scale	Emphasis on building strong brand identification		DIFF7 Building strong brand identification		Emphasis on building strong brand identification
	Targeting a clearly identified segment		Omit		Targeting a clearly identified segment
	Offering products suitable for high price segments		Omit		Offering non-life insurance products suitable for high price segments
	Offering speciality products		Omit		Offering speciality non-life insurance products tailored to a customer group
	Uniqueness of products		Omit		Uniqueness of non-life insurance products or claim service or distribution channel in terms of customer value (e.g. design, comfort, etc.)
			DIFF6 Developing and utilizing sales force		Developing and utilizing sales force (for better customer service)
	Rate current product line: low/high margin		Omit		Omit

As mentioned earlier, the mean response to scale items (derived by adding the responses for each item of the scale, then dividing by the number of items in the scale) will be utilized in this research as the business unit's score for each of Porter's (1980) two typologies (cost leadership and differentiation), making it possible to compare these two typologies that have different numbers of items, as well as preparing data for the process of further classification.

Rather than using cluster analysis, as in the original research, I will not classify business units for the proposed typologies that relate to both Porter's (1980) two typologies and Miles and Snow's (1978) typologies (low-cost defender (LCD), best cost defender (BCD), differentiated defender (DIFD) and stuck in the middle (SM)) at this stage. Rather, I will examine all business units at the same time using fsQCA and will use an interpretation of the results to classify typologies. As a result, all business units will have a score for mean response to scale items for both differentiation and low cost.

With regard to the calibration rule, the statistical distribution of the mean response for each typology item will be utilized because this research assumes that all four typologies (LCD, BCD, DIFD and SM) exist in this dataset. The fact that the dataset embraces only business units from the top 25 companies in 2011, according to the revenues of each of four product lines (insurance direct premium), makes it difficult to assign criteria on theoretical grounds.

In fact, there is no agreement on a theoretical cut-off point for each scale item to decide whether a case is fully in or fully out of the typology. The accepted notion is "the more, the better", but no exact number for the mean score of each item is proposed as it depends on both industry context and competitor actions (e.g. Hofer, 1975; Caves and Porter, 1977). Since the dataset is an elite group, members tend to report higher scores than the average for the whole industry (population). I aim to assess the relationship between all types of GOC and their related performance dimensions by hypothesizing that GOC (as well as FC, the other research construct) yields competitive advantage, which in turn generates superior performance. Thus, my underlying assumption in this research is that all typologies exist in this dataset. This assumption is appropriate as strategy is a study in comparative terms (Snow & Hambrick, 1980). Arend lends support to this argument, suggesting that as:

> the term competitive advantage includes the word *competitive*, it may be argued that the term has a relative basis, specifically relative to rivals. This is sensible because if all rivals held the same absolute competitive advantage then no relative advantage holds and competitive forces would tend to eliminate available rents. Thus, research that either uses relative measures or explicitly considers both positive and negative causes of performance is logically valid (2003: 280).

Hence, even within a market leader group, there will be some business units with comparatively low and/or high levels of cost leadership and differentiation.

Many fsQCA research studies in the management literature have also used calibration rules linked to in-depth knowledge of the cases (e.g. Crilly, 2011; Crilly, Zollo & Hansen, 2012). A calibration rule linked to in-depth knowledge of the cases is also fully supported by Rihoux and Ragin (2008).

It is logical to discuss the most ambiguous point (crossover point) first when using the statistical distribution of mean responses for each typology item in the calibration rule because, once agreed upon, the fully in and fully out of membership anchor points are much easier to follow.

Unlike the original research (Zahra & Covin, 1993), which used random datasets more likely to represent a population, resulting in no upward bias in the validity of response format, this research targets only business units from the top 25 companies in 2011 according to revenue. It is, therefore, potentially subject to respondent bias because it asks business units to compare themselves with their three main competitors which are also in a high-calibre group. Without bias, the answer should correctly reflect the relative position of the business unit within the whole industry. In other words, the mean of the answer should equal the scale midpoint of five. However, if there is a bias toward higher levels of business strategy scales, the mean answer will be more than the scale midpoint and vice versa. Either will result in a non-symmetrical population rather than a normal distribution. Hence, the median of both mean responses to scale items is used as a cut-off point – the most ambiguous point or crossover point (0.5) in the calibration – rather than the mean or the midpoint of the Likert scale (5), since this represents business units that lie midway in the whole sample group in terms of that particular typology item.

Being a full member of any typology item means that a business unit has the highest level of that particular typology item. Although, in theory, only one business unit can achieve low-cost leadership status (this concept is also applied to the differentiation typology for the same reason) and supports the use of the maximum scale score, I have decided to be less conservative (more flexible) in the results and consider the possibility of response bias toward optimistic answers. Hence, I suggest quartile 3 as a full membership score. Porter (1985: 13) supports this point, giving the example of the aluminium industry that has limited ability to add low-cost capacity, resulting in a situation in which "a firm that is in the lowest quartile of costs though not the cost leader will usually still be an above-average performer". This argument is also applied to differentiation.

Therefore, the calibration rule for full membership (1) is a business unit that has a mean response score for each typology item more than or equal to quartile 3 of the scale score of the observed dataset. By the same token, to be flexible regarding response bias toward pessimism, I suggest quartile 1 as the full non-membership score, rather than the empirically lowest mean response score of that particular typology item. Hence, the calibration rule for full non-membership (0) is a business unit that has a mean response score for each typology item less than or equal to quartile 1 of the scale score of the observed dataset.

In line with the calibration rule, the classification of business units according to Porter's typology, as well as another two groups resulting from a combination of these two main types but with a different level of efficiency (best-cost and stuck in the middle), can be identified from the fsQCA solution.

To interpret the fsQCA results, the sign used in fsQCA must first be clearly understood (see also looseleaf glossary). If a case (business unit) has a mean response score to scale items for each typology higher than quartile 2 (median) of the observed dataset (which is the 0.5 crossover point of this research), fsQCA will display an abbreviation corresponding to such a set ("dif" for more in the membership of differentiation and "lc" for more in the membership of low cost). If, on the other hand, a case has a mean response score to scale items for each typology lower than quartile 2 of the observed dataset, fsQCA will display a negation symbol ("~", which means "not") in front of an abbreviation corresponding to such a set ("~dif" for more out of the membership of differentiation and "~lc" for more out of the membership of low cost).

In the interpretation, I propose that a business unit that has a mean response score to scale items for both typologies (differentiation and low cost dimensions) higher than the respective quartile 2 of the observed dataset will be classified as best cost (in this case, the fsQCA solution will display "dif·lc"). This case represents a business unit that performs in both typologies better than half of the competitors in the observed dataset. In contrast, a business unit that has a mean response score to scale items for both typologies lower than the respective quartile 2 of the observed dataset will be classified as stuck in the middle (in this case, the fsQCA solution will display "~dif·~lc"). This case represents a business unit that performs in both typologies worse than half of competitors in the observed dataset. A business unit that has a mean response score to scale items higher than the respective quartile 2 of the observed dataset for only one typology will be classified according to the superior dimension (for low cost the fsQCA solution will display "~dif·lc", and for differentiation the fsQCA solution will display "dif·~lc"). This case represents a business unit that performs in one typology better than half of competitors in the observed dataset. This is similar to the way in which fsQCA treats two possible attributes, which is to make sense of a business unit by using two characteristics. A visualized format of this classification rule is best presented by plotting all data in an XY diagram with each of Porter's typologies on the axes, as shown in Figure 7-1.

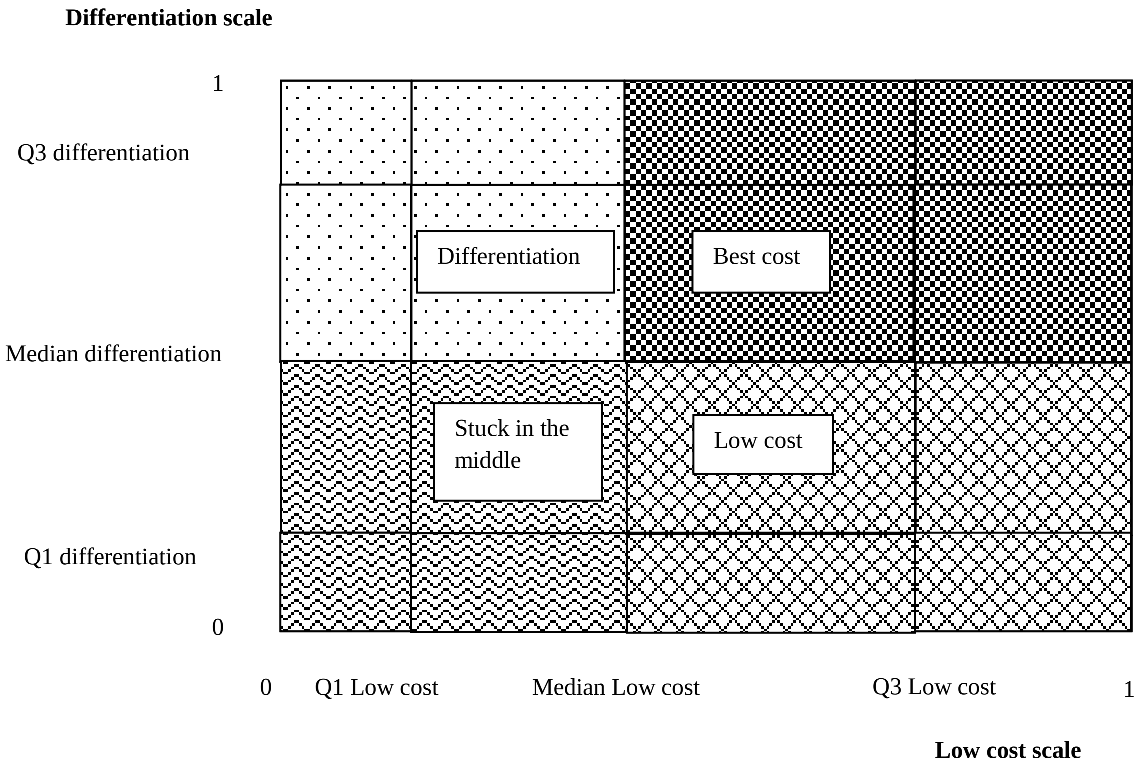

Figure 7-1: Visualization of Porter's typology classification rule

The classification criteria for the interpretation and calibration rules are summarized in Table 7-3 as follows:

Table 7-3: Summary of Porter's typology classifiation criteria and related calibration rules

Typologies	Classification criteria for interpretation at a later stage	Scale score	Calibration		
			0	0.5	1
Differentiation	dif >= Median dif and lc < Median lc	diff	Q1 dif	Median dif (Q2)	Q3 dif
Low cost	dif < Median dif and lc >= Median lc	lc	Q1 lc	Median lc (Q2)	Q3 lc
Best cost	dif >= Median dif and lc >= Median lc	No need to calculate as this research considers only two dimension criteria (differentiation and low cost) and defines this typology (best cost) as the SBU that achieves both criteria.			
Stuck in the middle	dif < Median dif and lc < Median lc	No need to calculate as this typology will not be incorporated in the research.			

Legend: (dif) = mean response to scale items of differentiation, (lc) = mean response to scale items of low cost

In the same way as classification of Porter's typology, there is no need to find the intersection between Miles and Snow's (1978) typology (defender) and Porter's (1980) typology at the beginning of the test. Rather, this research will classify typology during interpretation of the fsQCA results.

However, as with other data collected in social science, some of the data may show a clear non-normal distribution in the mean, or quartile 2 equal to quartile 3 or quartile 1, making it impossible to apply the proposed calibration criteria. In this case, I will arbitrarily use the observed gap (big shift) shown in such data as a substitute for that cut-off point because the observed gap displays a significant level of difference in such attributes among datasets and has therefore been widely used in previous fsQCA research (eg. Crilly, 2011). This method will be applied to all research constructs with similar problems (FC and performance dimensions).

7.6 Operationalization of FC

Before discussing the proposed operationalization of FC, it should be noted that FC is the only research construct in this research that is collected as a firm-level characteristic rather than a business-level one. This is because FC is a routine of the firm that transcends the business unit.[33] However, like GOC, the performance dimension is still at the business unit level because the objective of this research is to examine whether or not a firm's specific characteristics overrule a business unit's strategic choices.

In line with the previous section, a review of the operationalization and measurement of FC, another proposed research construct, in self-type format reveals no scales for most of the capabilities being studied until DeSarbo et al. (2005) developed the multi-item scale based on competitive capability theory (Conant, Mokwa & Varadarajan, 1990; Day, 1994). This multi-item scale went through a rigorous multi-step instrument development procedure to ensure the validity and reliability of the operationalized constructs (Churchill, 1979). As a

[33] Business units have to share facilities within the firm; thus, the firm's capabilities are the overriding characteristic across all business units within the firm.

result, a number of research studies (e.g. Parnell, 2011), including the current research, adopt their measurement scales.

DeSarbo et al. (2005) explicitly measure five major strategic capabilities, each with six relative measurement item scales, which closely match the proposed FCs of this research adapted from Grant's (2010: 132) functional classification of organizational capabilities. These two groups of capabilities share the same definition and are different only in the group labels. Detail are given in Table 7-4.

Table 7-4: Comparison of DeSarbo et al.'s (2005) strategic capabilities and the proposed FC of this research

DeSarbo et al.'s (2005) strategic capabilities	Definition	Proposed FC of this research
Market-Linking Capabilities	Capabilities that relate to focused market sensing, customer linking, and channel bonding outside the organization (Day, 1994; DeSarbo et al., 2005). These capabilities allow a firm to respond quickly to changing customer needs and to make use of its technological strengths (from management information system capabilities) most effectively.	Sales & Distribution Capabilities
Technological Capabilities	Capabilities that pertain to technology and new product development, the production process, predicting technological changes, and quality control skills (Day, 1994; DeSarbo et al., 2005). These capabilities allow a firm to differentiate its offering through better product design and increased production efficiency.	Product design + R&D Capabilities
Marketing Capabilities	Capabilities that integrate many marketing activities, e.g. segmentation and targeting market, pricing, advertising, and monitoring both customers' and competitors' current situations (Day, 1994; DeSarbo et al., 2005). These capabilities permit a firm to take advantage of market sensing and technological strengths (from management	Marketing Capabilities *Grant (2010) uses the same label as DeSarbo et al. (2005).

	information system capabilities) to implement effective marketing programmes.	
Information Technology Capabilities	Capabilities that help a firm to create technology and market knowledge and facilitate inter- and intra-organizational communication flow (DeSarbo et al., 2005). These capabilities allow a firm to disseminate market information effectively across all pertinent functional areas to direct new product development process.	Management Information System Capabilities
Management Capabilities	Capabilities that integrate logistics systems, control costs, manage financial and human resources, forecast revenues, and manage marketing planning (DeSarbo et al., 2005). These capabilities enable a firm to control costs by pursuing corporate functions (e.g. financial control, management development, strategic innovation and multidivisional coordination).	Operations Capabilities *This definition is suitable for service businesses, in which there are no manufacturing activities (transformation of raw materials into products), but rather a range of corporate functions conducted toward the provision of services to customers.

In line with Desarbo et al. (2005) and with previous research on capabilities, as well as the other part of the survey of this research, I will use the mean response to scale items within the same capability group of each firm (derived by adding the responses for each item of the scale, then dividing by the number of items in the scale.) as the firm's score for each FC. Not only can this score be compared between a variety of FCs within a firm (to identify the predominant FC), but its distribution within each FC can also be used to locate three anchor points for calibration purposes as follows.

The original research (Desarbo et al., 2005) showed a different level of mean response for different types of capabilities, ranging from 1 to 9. Therefore, it is essential to calculate three anchor points for each FC separately. Moreover, using the previous research results as three anchor points is inappropriate owing to differences between the sample group (country and industry type) of the previous research and this research. Hence, in line with the concept of distinctive competencies, referring to things that a firm does exceptionally well in comparison with its competitors (Selznick, 1957), and the previous calibration of Porter's typology also derived from the same format of scale items, which asked firms to compare themselves with their major competitors, the full membership score (1) of a firm in a particular FC will be a level above quartile 3 (75% of the level of other competitors in that industry), the most ambiguous (crossover) point (0.5) will be a firm with a mean response for each capability item equal to the median score for each capability, and the full non-membership (0) will be a firm that has a mean response for each capability item less than quartile 1 for each capability. Again, if there is parity between quartile 3 or quartile 1 and quartile 2 in the collected data, the observed gap (big shift) shown in such data will be utilized as a substitute for that cut-off point.

7.7 Operationalization of performance dimension

In this section, I will argue that it is appropriate to use different performance dimensions as the outcome of interest in different typologies of GOC and different types of FC as well as their combination. I will then discuss their operationalization.

Walker and Ruekert (1987: 20) posit that "different strategies are expected to perform well on different performance dimensions". A prospector business should outperform a defender in new product development and achieve growth in market share, whereas defender strategies should lead to a better return on investment (ROI).

The problem arising when comparing the same performance dimension across business units is that they involve considerable trade-offs: good performance on one dimension often means sacrificing performance on another (Donaldson, 1984). Miles and Snow (1978) describe the adaptive decision made by a defender as having a narrow and stable product-market domain and tending to ignore developments outside its domain (not searching for new opportunities) as well as seldom needing to make major adjustments to its technology, structure or methods of operation. Its product development involves only simple additions to its current product or extensions to closely-related areas. The measurement of adaptability (the number of successful new products introduced and the percentage of sales accounted for by products introduced within the last year), one of the proposed performance dimensions in this research, is not a concern of a defender; hence, it is not appropriate to use this measurement to assess a defender's success.

By the same token, the measurement of effectiveness (sales growth and relative market share), another proposed performance dimension in this research, is not suitable for evaluating a defender's performance. In the case of sales growth, a defender usually expands its production capacity internally, rather than through acquisition, making it unable to keep pace with rapid growth in its own market segment. Thus, penetrating deeper into its familiar and well-established current market domain, a defender's "growth normally occurs cautiously and incrementally" (Miles & Snow, 1978: 38). Furthermore, sales growth is sometimes misleading for a cost leader with the largest market share when comparing its effectiveness with a smaller business unit with only a trivial market share because it is much more difficult for a market leader than for a smaller competitor to gain higher sales growth owing to its much larger market base. While market share appears to fit well with a defender using a low-cost strategy (LCD and BCD) that requires a high market share (volume building) to spread fixed costs and earn economies of scale, a high market share target is sometimes incompatible with a defender utilizing differentiation (DIFD and BCD) since this requires customers to perceive exclusivity. Moreover, even if all customers in the industry acknowledge the superiority of a differentiated defender's products and services, not all customers will be willing or able to pay the required higher prices. Owing to the potential for mixed results, market share is inappropriate for measuring a defender's achievements.

However, in one particular case (BCD), pursuing both low cost and differentiation is possible without trade-off between the scale requirements of a low-cost strategy and differentiation. Porter (1985) raises this point in the example of Hertz's large-scale car rental (in term of its locations) that underlies some of its differentiation (e.g. convenience to pick up and drop off car, and fast field service). In fact, since a defender devotes its main attention to improving the efficiency of its existing operations in order to "maintain aggressively its prominence within the chosen market segment" (Miles & Snow, 1978: 37) on either a price or quality basis, efficiency is an appropriate performance measure for a defender. Hambrick (1983a) and Donaldson (1984) also support this argument, proposing that a defender is likely to gain a higher return on investment (ROI), representing better operational efficiency than a prospector.

In this regard, Walker and Ruekert (1987) use three different performance dimensions in their research: *efficiency* – ratio of input to output, e.g. return on sales (ROS) and return on investment (ROI) for defenders; *effectiveness* – the success of a business' products and programme, e.g. sales growth and change in market share; and *adaptability* – the business' success in responding over time to changing conditions and opportunities in the environment, e.g. number of successful new products introduced and percentage of sales accounted for by products introduced within the past year for prospectors. This allows them to examine the performance dimension most relevant to each type of configuration. Hence, the concept of measuring different aspects of business performance has been widely accepted and applied by subsequent research (e.g. Gupta & Somers, 1996; Smith & Reece, 1999; Ward & Duray, 2000; González-Benito & Suárez-González, 2010).

Agreeing with their argument, I adopt Walker and Ruekert's (1987) three performance dimensions: efficiency, effectiveness and adaptability. For the latter two, I fully adopt their measurement proxies, which are sales growth and relative market share for effectiveness, and the number of successful new product introductions and percentage of sales accounted for by products introduced within the last year[34] for adaptability. However, for efficiency I propose two additional sub-dimensions to better understand the mechanism of efficiency

[34] Adjusted over five years in order to suit my cross-sectional research objective, for reasons given in Section 6of Chapter 5 (page 152).

development resulting from different strategies used by business units. Details are as follows.

Building on Walker and Ruekert's (1987: 19) work that defines efficiency as "the outcome of a business' programs in relation to the resource employed in implementing them", which reflects a firm's relative competency in economic rent generation stemming from its (internal) strategic activities or, in other words, the extent of outcome produced per amount of resources consumed, I contribute to efficiency measurement in the strategic management field by suggesting two efficiency sub-dimensions rather than the conventional one (e.g. ROS and ROI), based on the argument that different generic competitive strategies (Porter, 1980) have implications for different sub-types of operating efficiency because, generally, a business unit can compete through either low cost or differentiation (Walker & Ruekert, 1987) or in a special case through both dimensions, which I define as best-cost defender (BCD). This proposition is consistent with Porter's (1985: 11) argument that "The significance of any strength or weakness a firm possesses is ultimately a function of its impact on relative cost or differentiation", resulting in the ability to cope with the five forces faced by the industry, each of which leads to "a fundamentally different route to competitive advantage". Hence, I propose considering efficiency from two different perspectives as follows:

1) *Input efficiency* (IE), which I define as "the ability to reduce cost to produce any given level of outcome". To measure IE for this dataset (non-life insurance product lines), I propose using *expense ratio* (an insurance industry-specific ratio calculated as the sum of loss adjustment expenses, commission and brokerage, other underwriting expenses, and operating expenses, all divided by earned premium) as a proxy because expense ratio is equivalent to overhead cost ratio, providing a comparison of operating expenses resulting from normal, day-to-day business operations (not directly related to the gross profit margin of products or services) and total income. Therefore, the lower the expense

ratio, the higher the input efficiency. However, the business unit must balance its cost-cutting activities with maintenance of its business quality.

2) *Output efficiency* (OE), which I define as "the ability to increase revenue (outcome in term of value to customer) from any given level of input". To measure output efficiency for this research dataset, I propose using two measurements to cover all sources of revenue (underwriting and investment). First, I use *loss ratio* (also known as *claim ratio*), an insurance industry-specific ratio calculated as losses incurred after deduction divided by earned premium, as a proxy because loss ratio is equivalent to a complement of gross profit margin (ignoring investment activities), providing a comparison of gross profit and total income. Therefore, the lower the loss ratio, the higher the output efficiency. Secondly, *investment yield* (calculated as the net investment income before income taxes divided by earned premium) is used as a proxy because investment yield exhibits the profitability (or ability to generate earnings) of investment activity. Therefore, the higher the investment yield, the higher the output efficiency.

Since the levels of these two efficiency types are independent of each other, considering both will help improve our understanding of the consequences for a business unit's efficiency of different strategic choices, in particular a defender's competitive strategy decision (to compete on either cost or differentiation, or both).

To avoid potential confusion regarding the efficiency measurement used in this research with that of similar but not identical research areas, it should be noted that, apart from in this research, the broad concept of two efficiency dimensions has been adopted and developed further by frontier efficiency methodologies (Aigner, Lovell & Schmidt, 1977), especially data envelopment analysis (DEA) (Charnes, Cooper & Rhodes, 1978). In these, rather than comparing each business unit's input and output at a time, cost efficiency is assessed by determining how close a business unit's cost is to the cost of a best practice business unit producing the same bundle of outputs under the same conditions (the ratio of the minimum required inputs (cost) to a given business unit's actual inputs utilized to produce a given level of output) and evaluating revenue efficiency by gauging how close a business unit's revenue is to the revenue generated by a best practice business unit from the same bundle of inputs under the same conditions (the ratio of the outputs (revenue) of a given business unit to the outputs of a fully efficient business unit with the same input vector and output prices). Clearly, these two research streams share the same root of multi-dimensional efficiency but differ in terms of how to measure them.

Previous research has been based on financial measures of performance but there is a growing support for a broader conceptualization of performance (Robinson & Pearce, 1985; Conant, Mokwa & Varadarajan, 1990; Venkatraman, 1990; Morrison & Roth, 1992; Dunk, 1993, 2005, 2007; Kaplan & Norton, 1997; Hillman & Keim, 2001; Laitinen, 2002; Iselin, Sands & Mia, 2011). Moreover, viewing performance through a qualitative lens allows the researcher to understand the organizational processes and outcomes from different perspectives that cannot be seen from financial measures (Huselid, 1995; Ayadi, Dufrene & Obi, 1996; Parnell, O'Regan & Ghobadian, 2006; Parnell, 2011). In general, managerial judgments are quite consistent with objective performance measures internal to the organization (Dess & Robinson, 1984), and with secondary published performance data external to the organization (Venkatraman & Ramanujam, 1986). Abernethy and Stoelwinder (1991) also argue that there is insufficient evidence to infer that managers are consistently lenient in rating performance.

Although fsQCA will be used to test the hypotheses of this research, it should be noted that performance self-rating is also well supported by quantitative methodology (correlation, regression) in that, even if managers are lenient when rating their performance, which would be regarded by Dunk (1993, 2005, 2007) as a type of measurement error, either systematic (non-random) or random bias created by managers' leniency does not affect the conservative form of the results of research hypothesis testing (Iselin, Sands & Mia, 2011). Since, in the case of systematic bias, a constant is added (or subtracted) to (or from) the true score for the dependent variable, the relationship between the independent and dependent variables in a correlation or regression does not change (Nunnally, 1981): only the y-interception varies. With regard to random bias, such error is added to the error term in the regression model (Neter, Wasserman & Kutner, 1985) and "thus makes it more difficult, rather than easier, to reject the null hypothesis" (Iselin, Sands & Mia, 2011: 28). Furthermore, using self-ratings overcomes inconsistencies due to the use of different accounting methods by different companies and in earnings management in archival data (Iselin, Sands & Mia, 2011). Archival data for business units, as used here, may in any case not be available if the company has more than one business unit (Iselin, Sands & Mia, 2011). Self-rating appears to be the most appropriate method of performance measurement for this research.

Thus, I adopt a subjective self-reporting scale from Desarbo et al. (2005) to assess relative competitive and objective performance, with some modifications (expense ratio, loss ratio, combined ratio and investment yield) and additions suggested by Walker and Ruekert (1987) (sales growth, relative market share, number of successful new products introduced in relation to those of competitors, and percentage of sales accounted for by products introduced within the last year) to better suit the dataset and research objective.

I also require respondents to rate their performance in relation to all competitors in the industry on ten-point scales, but to rate other causal factors in relation to their three main competitors on eight-point scales. This practice is consistent with González-Benito and Suárez-González's (2010: 1036) claim that the use of different scales potentially improves the reliability of the information provided by respondents and reduces the effects of common method bias because:

> [s]cales with different numbers of points compel respondents to pay greater attention to the explanation of each scale for each section of the questionnaire and prevents them from mindlessly dragging the same patterns of response from one section of the questionnaire to the others.

With regard to the possibility of common method bias (Podsakoff et al., 2003), I also collect financial data for each performance dimension wherever possible in order to reconcile and reconfirm the results with those of the subjective self-reporting scale. (Unfortunately, financial data for adaptability at the business unit level are unavailable.) These financial data are gathered from many sources, including the Office of Insurance Commission's (OIC) database, the Thai General Insurance Association's (GIA) websites and annual reports, the Insurance Premium Rating Bureau's (IPRB) website, the Stock Exchange of Thailand's (SET) database, companies' data published on websites and in annual reports, and unpublished data provided by companies' finance offices.

In this research, I aim to examine the business unit's performance for its main business operations. Since the target dataset, a non-life insurance industry, has a unique characteristic – uncertainty about the claims incurred – a specific type of performance measurement must be used. In this regard, apart from underwriting a non-life insurance product to a policyholder, two insurance industry-specific activities must be discussed.

Firstly, reinsurance activity is another major part of the underwriting business of insurance companies. It transfers the risk from insurer to reinsurer. In effect, reinsurance make the insurer act as if it is a broker that gains commission and transfers both risk and premium to the reinsurer. Reinsurance relates to the business unit's organizational configuration because it links to the insurer's core business (underwriting), reflecting each business unit's decision on its GOC. As a result, reinsurance activity is incorporated in the performance measurement whenever possible, e.g. "Expense ratio (included amounts reimbursed by reinsurance)" and "net written premium (instead of gross written premium)", to truly reflect the risk being carried by an insurer rather than being passed to reinsurers, removing the need for a reinsurance factor as another standalone causal condition.

Secondly, investment is also a major part of every insurer's activity because an insurer must invest insurance premiums earned to support its underwriting business. Some succeed, while others fail in this activity. As another primary source of revenue, investment profits are often larger than underwriting profits and help to sustain the firm. Some firms use investment profits to keep their businesses running when they face underwriting losses. This situation can easily be detected using the above 100% combined ratio. This is because the combined ratio equals the sum of operating expenses and claims divided by the net written premium, which includes amounts reimbursed by reinsurance but excludes investment activities. In effect, the combined ratio is equivalent to the expense to revenue ratio for the underwriting business of the insurer. Thus, a combined ratio above 100% means that the insurer is experiencing an underwriting loss and must have investment income to support the gap between its underwriting business and its overall costs.

Furthermore, investment indirectly affects flexibility to conduct the insurance business because it provides a capital inflow (from investment profits) to support the issue of new insurance policies according to the regulator’s requirements. Although investment is important to the performance of the insurer, investment income is affected by many uncontrollable factors such as capital market instability. Moreover, it does not reflect or, at best, has a blurred relationship with a business unit’s organizational configuration, as the investment strategy may be either similar to or vary independently of the business unit’s strategic decision. Hence, I consider the performance of underwriting activity, which clearly reflects the business unit’s organizational configuration, separately from that of investment activity. As such, the expense ratio (operating expenses as a percentage of premium income), loss ratio (losses incurred after deduction as a percentage of premium income), and combined ratio (losses incurred after deduction and operating expenses as a percentage of premium income) are used, rather than overhead cost ratio, gross profit margin or ROS, to demonstrate the real effect of the strategic decision making of each business unit, rather than incorporating uncontrollable capital market fluctuations underlying investment profits. It should also be noted that expense ratio, loss ratio and combined ratio must be reordered from descending to ascending order in the fsQCA analysis because the lower these ratios, the better the insurance activity performance, and the higher the ratio, the greater the domination by investment activity.

However, omitting investment activity will obscure the picture of how firms run their businesses. Thus, in order to take investment activity into account, as well as to be consistent with the definition of the financial management scale under operations capability, which includes both investment and financial leverage, two performance dimensions that incorporate investment income are added to the survey: “investment yield” in the output efficiency section and “return on equity (ROE) of your non-life insurance products line” in the overall performance section.

I will consider each performance measurement within the same category separately (e.g. loss ratio and investment yield in the output efficiency section) because it will be less biased toward the weight (or significance) of each performance measurement within the same category. In order to avoid potential upward bias, because the target sample comes from business units of the top 25 companies in 2011 according to revenue, the calibration rule will be set from a distribution parameter of the performance score observed, in the same way as the previous calibration for Porter’s typology and FC.

Thus, full membership (1) is a business unit with a performance item score more than or equal to quartile 3, meaning that a business unit above 75% of the other competitors in the industry in a particular performance will have full membership status for that performance. The most ambiguous point (0.5) is a business unit with a performance item score equal to the median, meaning that the business unit’s performance is both above half of the other competitors and below half of the other competitors in the industry, making it difficult to identify whether it is more in or more out of the set of high levels of such performance. Full non membership (0) is a business unit with a performance item score less than or equal to quartile 1, meaning that business units below 75% of the other competitors in the industry in a particular performance will have full non-membership status for that performance. Again, if there is parity between quartile 3 or quartile 1 and quartile 2 in the collected data, the observed gap (big shift) shown in such data will be utilized as a substitute for that cut-off point.

A summary of all constructs, measurement scales and related calibration rules is provided in Table 7-5 (also provided in a looseleaf glossary).

It should be noted that the control variable, as in quantitative analysis, is not in line with the fsQCA concept because fsQCA does not assume that any variable is held constant. fsQCA does not aim to determine the net effect of any single variable; rather, it aims to understand the combined effect of combinations of causal conditions. Thus, potential control variables are not taken into consideration in this thesis. However, I take into account possible causal conditions that may also contribute to the outcome of interest. Thus, some more promising causal conditions are asked in the survey and could be tested in combination with other proposed causal conditions in the future, especially if there is an unclear relationship (if the interpretation raises concern that there may be other causal conditions that better explain the outcome). Hence, these are treated as a contingency plan in this research to back up and further understanding of the causal relationship between GOC, FC and performance dimensions. Details of the operationalization of potential causal conditions are provided in Appendix 13.2 (page 378).

Table 7-5: Summary of constructs, measurement scales and related calibration rules

(also provided in a looseleaf glossary)

Construct		Definition	Ref. for proxy	Calibration – 3 anchor points		
				0	0.5	1
Generic Organizational Configurations: GOC	Defender: D	Business units that have a narrow product-market focus to secure a stable market niche (Miles & Snow, 1978)	Conant, Mokwa & Varadarajan (1990)	3	4.5	7
	Analyzer: A	Business units that operate in two types of product-market domains, one that is relatively stable and the other in flux (Miles & Snow, 1978)				
	Prospector: P	Business units that continually search for new market opportunities (Miles & Snow, 1978)				
	Reactor: R	Business units that respond to the challenges of the adaptive cycle in uneven and transient ways (Miles & Snow, 1978)				
	Low-Cost Leadership: LC	Business units that provide comparable products at lower cost than their competitors (Porter, 1980)	Zahra & Covin (1993)	Q1	Q2	Q3
	Differentiation: DIF	Business units that tailor their products or services to fulfil unique customer needs, allowing organizations to charge a premium price to capture market share (Porter, 1980)				
Functional Capabilities: FC	Operations: OP	Capability that integrates logistics systems, controls costs, manages financial and human resources, forecasts revenues, and manages marketing planning (DeSarbo et al., 2005)	DeSarbo et al. (2005)	Q1	Q2	Q3
	Product design and R&D: RD	Capability that pertains to production process efficiency, cost reduction, greater consistency in delivery and greater competitiveness (DeSarbo et al., 2005, developed from Day, 1994)				
	Management information system: MIS	Capability that helps an organization create technical and market knowledge and facilitates intra-organizational communication flow (DeSarbo et al., 2005)				
	Sales & Distribution: SD	Capability that relates to focused market sensing and linking outside the organization (DeSarbo et al., 2005, developed from Day, 1994)				
	Marketing: MKT	Capability that integrates many marketing activities (DeSarbo et al., 2005, developed from Conant, Mokwa & Varadarajan, 1990.)				

Construct		Definition	Ref. for proxy	Calibration 3 anchor points		
				0	0.5	1
Performance Dimension	Input Efficiency: IE	The business unit's cost reduction advantage	Desarbo et al. (2005) expense ratio	Q1	Q2	Q3
	Output Efficiency: OE	The revenue expansion advantage	Desarbo et al. (2005) loss ratio and investment yield	Q1	Q2	Q3
	Effectiveness: EF	The success of a business' products and programmes in relation to those of its competitors in the market (Walker & Ruekert, 1987: 19)	Walker & Ruekert (1987) sales growth and relative market share	Q1	Q2	Q3
	Adaptability: AD	The business' success in responding to changing conditions and opportunities in the environment (Walker & Ruekert, 1987: 19)	Walker & Ruekert (1987) number of successful new products introduced in relation to those of competitors and percentage of sales accounted for by products introduced within the past year	Q1	Q2	Q3
	Overall Performance Proxy: OA	The overall corporate performance goal is to increase long-run profits with a view to maximizing the value of the firm (Grant, 2010: 50)	Desarbo et al (2005) ROE and combine ratio	Q1	Q2	Q3

7.8 Sample and data

This research is cross-sectional (one year period of 2011) and was conducted in a field setting in a single industry (non-life insurance in Thailand). Subjective measures of GOC, FC and performance were collected from single informants completing self-reports. The pros and cons of this method for research involving managerial respondents have been discussed and debated (Snow & Hambrick, 1980; Philips, 1981; Harrigan, 1983; Dess & Robinson, 1984; Huber & Power, 1985) and can be summarized as follows.

Although the generalizability of findings of a single-industry-based study is limited to other industries sharing similar structural characteristics, an advantage of this study is that it provides a greater degree of control over market and environmental peculiarity (Conant, Mokwa & Varadarajan, 1990). Likewise, while the use of a multiple informant approach to measure organizational-level constructs may be generally preferable, the single informant approach allows for a larger number of organizations to be surveyed, especially when time and resources are constrained (Conant, Mokwa & Varadarajan, 1990).

Although the CEO is normally viewed as the single most-qualified individual in an organization to provide valid responses to questions about organization-level constructs, a top management team member, a head of a non-life insurance product line, a head of a marketing department, and a head of an actuary department[35] were also added to this study as key informants because the findings of exploratory interviews indicated that they often play an active role in both business-level strategy formulation and firm-level FC, as well as being responsible for the performance of each business unit under their control (four non-life insurance product lines). Hence, all were viewed as distinctively qualified to be key informants for this study focusing both on business-level and firm-level issues.

To enhance the response rate and response quality of this research survey, a modified version of Dillman's (1978) "total design method" was used. The questionnaire was pre-

[35] Also called an underwriter's department or non-life insurance product development department.

tested twice with the aim of testing the clarity of the questions and the ability of this method to generate the data required. A draft questionnaire was pre-tested with two professors, three PhD students and ten MBA students (some with an insurance industry background.) at Warwick Business School. A second pre-test of the actual instrument after revision, to reflect the pre-test findings as well as back translation for all bilingual pilot test takers, was conducted with two Thai university professors (strategy and insurance) and four Thai insurance regulator's officers. Since the dataset is quite small, conducting a pilot test with the target group would make the population size even smaller.

Three-wave mailing and emailing as well as calling were employed. The first mailing included a cover letter, questionnaire,[36] and postage-paid return envelope. This package was also sent via email. One week later all potential respondents were sent a reminder email as well as a reminder call. The third emailing, together with a reminder call, was sent out two weeks after the second reminder. To increase the response rate still further, I asked for support from the Office of Insurance Commission (OIC) and the Thai General Insurance Association (who endorsed the introduction letter) in exchange for the final report.

Rather than sending a postal survey alone, I offered to visit the respondents in person in their firms to administer a survey and conduct a short interview to provide complementary information for data triangulation. The particular focus of the interviews was perceptions and causal relationships between GOC and relevant performance dimensions (e.g. performance measurement preferences/incentives), and between FC and relevant performance dimensions (e.g. the perceived strength of the firm as a whole), as well as the complementing influence of FC on the GOC-performance relationship (e.g. the match between a business unit's core strategy and its firm's overall strength). This would be essential for an understanding of context to ensure a useful and sound interpretation of the fsQCA results. In addition to asking questions which directly addressed the strategic typologies (e.g. their intent to produce a differentiated product, whether they intended to

[36] Cover letter and questionnaire are provided in Appendix 13.1.

enter new markets, and how they viewed their competitive advantage), a range of questions delving into the business background of the company, the management team and other staff (education, employment history, etc.), consultants, boards and advisory committees, financing methods, ownership structure, intellectual property management, and marketing tactics was used to discern whether their stated strategy matched their actions.

Furthermore, in term of data quality, the respondents were carefully selected and recommended by either insurance regulators or major insurance broker companies to ensure that they were all responsible for their product strategies and well-informed about their products' performance. To expedite the time taken by this process, since sometimes respondents from different non-life insurance product lines within the same firm might not be available at the same time, demanding several visits, I hired five staff to undertake clerical work such as emailing and calling to remind target respondents as well as disseminating and collecting questionnaires and, sometimes, driving me to respondents' offices. These staff did not interfere in any way with the data collection because as messengers they only collected the completed questionnaires and as drivers they did not join me when I visited and interviewed respondents.

Regarding the target dataset, I sent out questionnaires only to business units of the top 25 companies in 2011 according to revenue. The total number from which data were collected was 43 companies because most firms had achieved a top 25 ranking in more than one product line.[37] Thus, this group was more than sufficient to represent the big picture of the market and exhibit not only the viable strategies utilized but also the profitable ones. The benefit of having all players in the industry did not match the time and resources to achieve this. Hence, the population size would be up to 172 business units. Altogether 43 companies belonged to the top 25 companies ranked in terms of each product line's revenue in 2011,

[37] As shown earlier, this market is highly concentrated, with the top 20 competitors covering about three quarters of the market size, a trend which continues to grow.

each of which might have up to four product lines. Nevertheless, some firms might not provide all four product lines.

After three months of fieldwork between January and March 2012, 107 completed questionnaires were received from 32 companies. Considering the research population of 172 possible business units and 43 companies, I achieved response rates of 62.21% and 74.42% in term of business units and companies. The mean, mode and median of firm size range were the same, at 101-500 employees. In terms of the respondents' demographics, I received a response from 32 CEOs and top management team members, 49 heads of non-life insurance product lines, 14 heads of marketing departments, and 11 heads of actuary departments, of which the majority had 11-20 years' working experience in the Thai non-life insurance industry and 6-10 years' working experience in their representative firms and their current positions. Their backgrounds or expert areas were management (51 persons), actuary (30 persons), marketing or sales (21 persons), finance (1 person), and others (3 persons).

7.8.1 Descriptive statistics

Before performing fsQCA, it is beneficial to understand the distribution of the collected data because this information may help during the interpretation of the research results. Note, however, that researchers can not directly compare and contrast the dataset of this current research with those of previous research since the underlying assumptions regarding the combination of GOC of previous research studies using a correlation-based technique and this research using fsQCA are different.[38]

To understand the distribution of all research constructs in this dataset following the calibration criteria for fsQCA mentioned earlier, descriptive statistics of the survey data and financial data are displayed in Table 7-6 and Table 7-7 respectively.

[38] A correlation-based technique allows only one typology from each classification scheme for each dataset (business unit), while fsQCA assumes that each dataset embodies the characteristics of all typologies to various degrees.

Table 7-6: Descriptive statistics of membership scores of survey data after calibration

Survey data						
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N Cases**	**Missing**
Generic organizational configurations: GOC						
Prospector (p)	0.07675969	0.1860109	0.00012339	0.95257	107	0
Analyzer (a)	0.5891829	0.3795915	0.00012339	0.99959	107	0
Defender (d)	0.1822357	0.3078002	0.00012339	0.9955	107	0
Reactor (r)	0.01510802	0.06770562	0.00012339	0.64566	107	0
Differentiation (dif)	0.4970566	0.413801	0.000049522	0.99945	107	0
Low-Cost leadership (lc)	0.4859037	0.3995412	0.00074603	0.99966	107	0
Functional capabilities: FC						
Operation capabilities (op)	0.5204947	0.404373	0.00027961	0.99978	107	0
R&D capabilities (rd)	0.5359848	0.4050848	0.00055278	0.99753	107	0
MIS capabilities (mis)	0.5054322	0.4291049	0.0000061442	0.99995	107	0
Sale & distribution capabilities (sd)	0.5148085	0.4215927	0.000037169	0.99331	107	0
Marketing capabilities (mkt)	0.5303368	0.4190876	0.000013007	0.99925	107	0
Performance dimensions						
Input efficiency: Expense ratio (ie)	0.4532633	0.3889686	0.00091105	0.99753	107	0
Output efficiency 1: Loss ratio (oe1)	0.5119707	0.3844112	0.00055278	0.99753	107	0
Output efficiency 2: Investment Yield (oe2)	0.4389924	0.3259911	0.047426	0.99945	107	0
Effectiveness 1: Net written premium growth (ef1)	0.4658962	0.3812927	0.017986	0.99945	107	0
Effectiveness 2: Market shares (ef2)	0.5024591	0.417362	0.0066929	0.98201	107	0
Adaptability 1: Number of new products offered (ad1)	0.5139921	0.4050486	0.047426	0.99978	107	0
Adaptability 2: Percentage of net written premium accounted for by new product within the past year (ad2)	0.4468843	0.4096512	0.047426	0.99999	107	0
Overall performance 1: Combined ratio (oa1)	0.5215535	0.398142	0.00055278	0.99753	107	0
Overall performance 2: ROE (oa2)	0.555875	0.4073075	0.0000061442	0.99945	107	0

Table 7-7: Descriptive statistics of membership scores of financial data after calibration

Financial data						
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N Cases**	**Missing**
Performance dimensions						
Input efficiency financial data: Expense ratio (ief)	0.5118582	0.4083942	0	1	107	0
Output efficiency1 financial data: Loss ratio (oe1f)	0.5194394	0.4005764	0	1	107	0
Output efficiency 2 financial data: Investment Yield (oe2f)	0.4905283	0.4075051	0.00000013387	1	107	0
Effectiveness 1 financial data: Net written premium growth (ef1f)	0.5266003	0.3468532	0.0000000038756	1	107	0
Effectiveness 2 financial data: Market shares (ef2)	0.4792512	0.4131929	0.0012278	1	107	0
Adaptability 1 financial data: Number of new products offered (ad1f)	Unavailable data					
Adaptability 2 financial data: Percentage of net written premium accounted for by new product within the past year (ad2f)	Unavailable data					
Overall performance 1 financial data: Combined ratio (oa1f)	0.4955197	0.4066703	0	1	107	0
Overall performance 2 financial data: ROE (oa2f)	0.4868096	0.4118733	0	1	107	0

It should be noted that the attributes prospector (p) and reactor (r) are highly skewed toward non-membership scores (both means are quite close to 0). Moreover, defender (d) is also slightly skewed toward a non-membership score. To better understand the distribution of these research constructs, detailed frequency tables for each are provided in Appendix 13.5

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8 HYPOTHESIS TESTING: GOC, FC AND PERFORMANCE

In this chapter, I will report the findings of testing the first two main hypotheses regarding the relationship of each separate proposed research construct (GOC in H1 and FC in H2) with different performance dimensions (four sub-hypotheses for each test). In addition to using two types of performance measure for each performance dimension, and taking into consideration concern about common method bias (Podsakoff et al., 2003), for triangulation purposes I will also report findings using financial data which match the survey data used for each performance dimension in the analysis, with the exception of adaptability for which no financial data are available.

Each section in this chapter (each hypothesis tested) and each section in the next chapter will follow the same format, presenting a summary table of the findings (solution paths) and a brief interpretation of the results, as well as a possible explanation for any deviation from the proposed hypotheses.

At the end of the chapter, post-hoc analysis of each of the two main hypotheses will be conducted to examine patterns and further implications and, finally, each sub-hypothesis and each hypothesis as a whole will be summarized.

However, since fsQCA is a relatively new technique which requires some rules and pre-specified conditions as part of the calculation, in Appendix 13.4 I provide an in-depth example of my analytical process and a justification for any rule and condition used in the analysis, as well as an explanation of the hypothesis testing which will be applied to all tests in this dissertation (also provided in a looseleaf glossary). Please also refer to my summarized conventional steps in interpretation of fsQCA results (e.g. Crilly, 2011; Fiss, 2011; Greckhamer, 2011) that involve considering both parameters and contexuality of solution paths, especially definitions and implications of core and peripheral conditions, first-order equifinality (different across-group), second-order equifinality (different within-group) and an empirically dominant combination in Section 5.2 of Chapter 5 (page 130-132).

8.1 Hypothesis testing: relationship between GOC and performance (H1)

In order to test the first main hypothesis regarding the relationship between GOC and performance dimensions (H1), I separately test each of the four sub-hypotheses at a time, which correspond with four performance dimensions as follows. (also provided in a looseleaf glossary)

1. Input Efficiency: "ie" represents a high membership score with a high input efficiency (expense ratio), while "~ie" represents a low membership score with a high input efficiency.
2. Output Efficiency: "oe1" and "oe2" represent high membership scores with a high output efficiency 1 (loss ratio) and 2 (investment yield) while "~oe1" and "~oe2" represent low membership scores with a high output efficiency 1 and 2.
3. Effectiveness: "ef1" and "ef2" represent high membership scores with a high effectiveness 1 (net written premium growth) and 2 (relative market shares) while "~ef 1" and "~ef 2" represent low membership scores with a high effectiveness 1 and 2.
4. Adaptability: "ad1" and "ad2" represent high membership scores with a high adaptability 1 (number of new products within the past year) and 2 (percentage of net written premiums accounted for by new products within the past year) while "~ad1" and "~ad2" represent low membership scores with a high adaptability 1 and 2)

These symbolic expressions are also applied to their financial data (ief, oef1, oef2, eff1, eff2).

Using fsQCA, I set one performance dimension as the outcome of interest and test it against all six possible GOC attributes as causal conditions: (also provided in a looseleaf glossary)

1. Prospector: “p” represents a high membership score with a strong characteristic of prospector while “~p” represents a low membership score with a strong characteristic of prospector.
2. Analyzer: “a” represents a high membership score with a strong characteristic of analyzer while “~a” represents a low membership score with a strong characteristic of analyzer.
3. Defender: “d” represents a high membership score with a strong characteristic of defender while “~d” represents a low membership score with a strong characteristic of defender.
4. Reactor: “r” represents a high membership score with a strong characteristic of reactor while “~r” represents a low membership score with a strong characteristic of reactor.
5. Differentiation: “dif” represents a high membership score with a strong characteristic of differentiation while “~dif” represents a low membership score with a strong characteristic of differentiation.
6. Low cost: “lc” represents a high membership score with a strong characteristic of low cost while “~lc” represents a low membership score with a strong characteristic of low cost.

In this chapter and the next, I will report the results of fuzzy set analyses for each hypothesis using the notation of the solution table recently introduced by Ragin & Fiss (2008), which has been widely adopted by later fsQCA research (e.g. Crilly, 2011; Fiss, 2011; Greckhamer, 2011) because it is able to present combinations of both parsimonious and intermediate solutions at the same time. (also provided in a looseleaf glossary)

According to this notation, each row represents each causal condition or *ingredient* for the outcome, while each column represents an alternative combination of causal conditions or *recipe* or solution path linked to the respective outcome, consecutively numbered S1, S2, etc. Full circles (●) indicate a condition’s presence, while barred circles (ϴ) indicate a condition’s absence. *Core* and *peripheral* conditions are distinguished by the size of the symbols: larger circles indicate *core* conditions (conditions that are part of both parsimonious and intermediate solutions), while small circles indicate *peripheral* conditions (conditions that occur only in intermediate solutions). I also add an asterisk (*) to indicate a trivial necessary condition. Blank spaces in a solution indicate a "don't care" situation, in which that causal condition may be either present or absent. In the numerical section, I report the number of observed cases that match the respective solution path, followed by consistency, raw coverage, unique coverage of each solution path, and all solutions in combination. A **bold** number in the consistency value indicates a consistency level above 0.7 (the consistency threshold for this research), suggesting that this solution path is at an acceptable consistency level and will be considered further for its relative empirical weight by assessing its raw and unique coverage, as suggested by Greckhamer (2011). Only such solution paths will be the focus of hypothesis testing.

In addition to Ragin and Fiss's (2008) solution table, I present the consistency and raw coverage of four intersections between the hypothesis and each empirical solution path for the hypothesis tests mentioned in Appendix 13.4. Again, a **bold** number in the consistency value for hypothesis test 1 (T1: $H \bullet S \subset Y$) indicates a consistency level above 0.7 and suggests that the proposed hypothesis is highly supported by this solution path derived from the empirical analysis, while an ***italic bold*** number in the consistency value, which will be displayed only for hypothesis tests 2, 3, and 4 ((T2: $\sim H \bullet S \subset Y$), (T3: $H \bullet \sim S \subset \sim Y$), and (T4: $\sim H \bullet \sim S \subset Y$)) indicates a consistency level above 0.7 and suggests that the proposed hypothesis is <u>less</u> supported by the solution result. Finally, I provide the result of each solution path hypothesis based on the criteria previously discussed, the result for the combined solution path's unique coverage of the same hypothesis, and the result for the overall hypothesis for each analysis.

Solution tables for each hypothesis (both survey data and financial data for all performance measurements within the same dimension) will be presented together to provide an overall picture of each hypothesis as well as allowing for triangulation between different sources of outcome data.

Like that of Crilly (2011), Fiss (2011) and Greckhamer (2011), the explanation format for the analysis of each sub-hypothesis will begin with an analysis of necessity, followed by an analysis of sufficiency: only solution paths which pass the consistency threshold of this research (0.7) will be discussed further regarding their unique coverage (issue of dominant combination) and grouped by their core conditions (issues of first-order and second-order equifinality (Fiss, 2011)). An overview of the validity of the sub-hypotheses will then be supported with an interpretation of the hypothesis testing section. For triangulation purposes, analysis of another performance measure within the same dimension and analysis of financial outcome data may be described separately from or concurrently with the primary sub-hypothesis analysis, depending on how space can best be utilized from the observed results.

I will suggest possible explanations for any deviation from the proposed hypothesis. In this regard, I expect there to be three possible explanations for deviation, ranging from those least against the current hypothesis to those most against as follows.

1) *External validity* (particularly the problem of measurement), which exists when respondents find it difficult to answer the questionnaire (e.g. in order to answer a comparative question correctly, respondents must closely monitor all competitors' market positions, which they do not always do, hence the answer may not truly represent the actual situation). This problem may be solved and the hypothesis may still be supported only by adjusting the question to better suit the respondent's knowledge or by using financial rather than survey data.
2) *Empirical context*, in which a specific characteristic leads to a weakly supported hypothesis, hence the validity of the hypothesis cannot be confirmed using only current empirical data (e.g. when a dataset's products are treated as commodities, rather than

differentiated products, the study findings may not be generalizable). This problem may be solved and the hypothesis may still be supported by repeating the analysis in a different empirical context (e.g. one that is generalizable). In this way, the hypothesis may be refined to allow for different conclusions depending on different empirical contexts.

3) *Alternative theory*, which suggests other explanations for the concerned phenomenon. Alternative theory may be based on either different factors within the framework of the current study (e.g. a different sub-group within the same research construct or a different research construct) or on a completely different causal factor that has not previously been tested in the current study. The former is less detrimental to the current study than the latter.

Obviously, these three alternative explanations provide different levels of justification for the current hypothesis. I will also refer to previous research findings wherever applicable.

Reports for each sub-hypothesis of H1, which test all GOC typologies with one performance dimension at a time, are as follows.

8.1.1 Analysis of H1a (LCD-BCD-IE):

Only two trivial necessary conditions (~p, ~r) are found. Therefore, even though they are shown in all paths, they are not necessary conditions. Rather, this situation occurs simply because of the highly skewed distribution of the dataset toward ~p and ~r. Consequently, both are trivial necessary conditions for all subsequent analyses that have GOC as a causal condition of concern. From now on I will report trivial necessary conditions only when additional ones are observed (e.g. ~d in H1b).

A sufficiency analysis of the survey data of ie suggests three combinations of conditions that predict input efficiency, all of which pass the consistency threshold. (Table 8-1). The consistency and coverage of the solution are 0.72 and 0.44 respectively. These paths encompass different core and peripheral conditions and thus cannot be grouped further, indicating a situation of first-order (across-type) equifinality.

Only S2 (lc*~dif*~r*~d*a*~p), which can be categorized as a low cost analyzer, is coherent with H1a. However, S2 is not the dominant combination because it does not have the highest unique coverage level, suggesting that it is not the most empirically relevant in generating ie. Interestingly, S3 (~lc*dif*~r*~d*a*~p) also achieves ie. This is probably due to the use of a differentiation strategy that also helps reduce its costs (e.g. distribution channel).

However, S3 has the lowest score for all three parameters, suggesting that differentiation is the least likely to generate ie. Surprisingly, S1 (~lc*~dif*~r*~d*~a*~p), which can be categorized as a stuck in the middle reactor according to the theoretical definition and previous research since S1 has no majority in any typologies, has the highest levels for consistency, raw coverage and unique coverage. This is possibly because a reactor can take better advantage of the highly consumer protection-based Thai non-life insurance industry, which has a required price range and no patent protection, in that it can spread its costs better than a low-cost leader through its wider service offering, while a low-cost leader cannot reduce its price beyond the required range to fully gain a cost reduction advantage, and a reactor may incur lower costs in mimicking a differentiator as it does not need to spend on R&D. Therefore, in general, H1a is not supported. The hypothesis testing section also endorses this conclusion. T1 displays low consistency for all paths, while T2 and T3 show high consistency for all paths; all of which suggest that H1a is rejected.

Unlike the previous analysis that has three paths, the analysis using financial data (ief) exhibits only one path with very high consistency (0.9) but covers only one observed case, resulting in very low unique coverage (0.02). However, this solution is consistent with S1 and S3 of the analysis of survey data. Moreover, although T1’s consistency level is high (0.81), its coverage is very low (0.003), and T2’s consistency level is also high (0.89), suggesting that although H1a for ief is supported, it could be extended further to better explain the presence of ief.

Deviation from H1a (LCD-IE) probably arises from all three possible explanations. Regarding external validity, although my questionnaire, which asked respondents to compare their business units with their three main competitors, and my GOC typology classification technique[39] comply with previous research (e.g. Hambrick, 1983c; Miller & Dess, 1993; González-Benito & Suárez-González, 2010) and enable me to consider both best cost and stuck in the middle, they unintentionally fall into Cronshaw, Davis and Kay's (1994: 22) "narrow sense" interpretation of Porter's (1980) stuck in the middle[40] that mistakenly assumes that business units with "mid-market positions are generally unattractive or unprofitable", even though there are many examples of successful firms using mid-market positions (e.g. Sainsbury occupies a middle market position between Waitrose and Kwik Save but is still viable and profitable). Therefore, Cronshaw, Davis and Kay's (1994) claim suggests that I incorrectly classify business units for which both LC and DIF scales are below the median as stuck in the middle, which in turn results in the finding that stuck in the middle also performs well in ie. (This argument also applies to any sub-hypothesis in this study that has stuck in the middle as one of many solutions leading to high performance, a situation that arises occasionally though infrequently.) In other words, it can be inferred from their research that my study incorrectly classifies business units as stuck in the middle, thereby producing erroneous findings. Rather, Cronshaw, Davis and Kay (1994) propose two broader interpretations: one uses strategic clarity as a criterion (a firm which is stuck in the middle has multiple objectives rather than a single goal), while the other uses strategic outcome as a criterion (a firm which is stuck in the middle does not establish lower costs or better differentiated products). They prefer the latter. However, I would suggest that future research studies should adjust their questionnaires and classification techniques to

[39] My GOC typology classification technique uses medians of LC and DIF scales as cut-off points for a 2x2 matrix, treating them as two dimensions of a strategic position rather than two opposite ends of a continuum.

[40] As in Hax & Majluf (1984: 266), Porter (1985: 17-18), Rue & Holland (1986: 137-138), and Chrisman et al. (1988: 417).

incorporate the concept of strategic clarity rather than strategic outcome because the latter encounters a problem of tautology in this research framework.

Regarding empirical context, as a financial product rather than a physical product, insurance is intangible (Shostack, 1982; Bowen & Schneider, 1988) and the main transaction is related to the transfer of money under an insurance contract, which is complex and difficult to understand (Bateson, 1997). Customers pay a premium (price) to the insurer to receive financial compensation in case of damage occurring to them within a certain coverage period. Thus, the core objective of all insurers is to gain a high market share to achieve a risk diversification effect (lowering the ratio of claims to premiums) by the law of large numbers in probability theory (Grimmett & Stirzaker, 2001), no matter what strategy is pursued. In other words, economy of scale is a necessary condition for the insurance business model as a whole. Obviously, an insurer's cost position is heavily determined by market share, rather than product design, technology level, service provided or other factors, a condition mentioned by Porter (1985: 19) who suggests that cost leadership and differentiation may be achieved simultaneously. Consequently, either a low-cost or a differentiation strategy may lead to high input efficiency for the dataset of this study, as shown in the findings.

Moreover, although insurance is arguably a differentiated product owing to the variety of claims services and insurers' solvency, position and reputation (Donnelly, Berry & Thompson, 1985; Zeithaml, Parasuraman & Berry, 1985; Howcroft & Lavis, 1986; Easingwood & Mahajan, 1989; Devlin, Ennew & Mirza, 1995), it is rarely interpreted as such in the current global insurance industry. Instead, insurance is mistakenly perceived as a commodity by the majority of insurance market participants, both customers and insurers alike (Garee & Schori, 1998), meaning it is considered to be identical and price is the only purchasing criterion.

This misconception occurs when top managers and agencies mistakenly perceive an insurance product to be a commodity, and hence focus their customer communications only on price, as in "name your own price" and "we're the cheapest" advertising campaigns

(O’Brien, 2012). As a result of this view, their sales staff and agents are less motivated to develop technical knowledge of the product, and thus are unable to explain the value of their insurance product. Customers, therefore, are not informed about the insurance product and coverage, and hence shift their purchasing criteria from value to price alone (Burand, 2007), which in turn reconfirms the misbelief of top managers and agencies (Garee & Schori, 1998). Furthermore, increased automation of underwriting and identical premium quotations based on customer inputs result in price-taker, rather than price-maker activity within the industry (Trembly, 2011; Allen, 2013). This is especially true of “compulsory” motor insurance; however, for “voluntary” insurance policies there is still a difference, depending on each insurer’s pricing policy (profit margin) as a result of its differentiation strategy. This misunderstanding has been identified and attempts are being made to correct it, but this endeavour is still far from succeeding (Garee & Schori, 1998; O’Brien, 2012; Wojcik, 2013).

The highly consumer protection-based Thai non-life insurance industry with a strict price range requirement and no patent protection allows firms classified as stuck in the middle and reactor to take advantage of their counterparts, in that low-cost leaders cannot reduce their prices beyond the required range to fully gain a cost reduction advantage. Furthermore, since services cannot be patented, a differentiator’s insurance product features can usually be easily copied by stuck in the middle and reactor firms at lower costs as they do not have to spend on R&D (Davison et al, 1989), which in turn allows them to spread their costs better than low-cost leaders through their wider service offerings.

In terms of alternative theory, since cost is a result of every activity, a cost reduction programme appears to be adopted by all business units no matter which GOC they intend to pursue. Porter (1980: 14, 18, 20) also argues that “a differentiator cannot ignore its cost position, because its premium prices will be nullified by a markedly inferior cost position”; therefore, it “should always aggressively pursue all cost reduction opportunities that do not sacrifice differentiation” to achieve “cost parity or proximity relative to its competitors”.

Cost reduction is treated as a basic objective but is insufficient on its own to create high input efficiency. In this regard, this finding raises the concern that the posture of a business unit (LCD) alone is insufficient to predict a cost-saving ability. Rather, researchers probably need to take the routinization of the firm (OP) into consideration. This argument is supported by observations of many firms, such as Ryan Air and other low-cost carriers (e.g. Flybe, BMI Baby), and Walmart and Kmart. Although all pursue a low-cost strategy, only the former in each case has coherence between business unit posture and firm routine, thereby successfully defeating their competitors by being low-cost leaders.

Table 8-1: fsQCA results for H1a: LCD-BCD-IE/IEF

This format for presenting the results of fuzzy-set analysis is based on Ragin & Fiss (2008) with additional information for subset/superset analyses. It will be applied to all findings of this thesis.

	H1a: GOC-IE			**H1a: GOC-IEF**
Condition	S1	S2	S3	S1
Prospector (P)	θ*	Θ*	Θ*	Θ*
Analyzer (A)	Θ	●	●	Θ
Defender (D)	Θ	Θ	θ	θ
Reactor (R)	θ*	θ*	Θ*	●
Differentiation (Dif)	Θ	Θ	●	•
Low cost (Lc)	Θ	●	Θ	
Observed cases	7	5	4	1
Consistency	**0.724529**	**0.713514**	**0.704821**	**0.900405**
Raw coverage	0.229618	0.209680	0.183706	0.022014
Unique coverage	0.137127	0.107350	0.069850	0.022014
Solution consistency		**0.718015**		**0.900405**
Solution coverage		0.437901		0.022014
T1: H•S⊂Y -Consistency	0.539667	0.545450	0.622072	**0.808104**
T1: H•S⊂Y -Raw coverage	0.043730	0.043524	0.036555	0.003689
T2: ~H•S⊂Y -Consistency	***0.722497***	***0.713185***	***0.703511***	***0.890097***
T2: ~H•S⊂Y -Raw coverage	0.227479	0.210136	0.183932	0.022590
T3: H•~S⊂~Y - Consistency	***0.814957***	***0.814957***	***0.814957***	0.651971
T3: H•~S⊂~Y -Raw coverage	0.112421	0.112421	0.112421	0.100733
T4: ~H•~S⊂Y -Consistency	0.463812	0.478831	0.485383	0.523584
T4: ~H•~S⊂Y -Raw coverage	0.837649	0.873858	0.891719	0.934861
Solution path hypothesis result	Reject	Reject	Reject	Support
Combined solution path unique coverage of same hypothesis result		0.314327		0.022014
Overall hypothesis result		**Reject**		**Support**

Legend:

(Also provided in looseleaf glossary)

● = Core causal condition present

Θ = Core causal condition absent

• = Peripheral causal condition present

θ = Peripheral causal condition absent

* =Trivial necessary condition

Blank spaces = "don't care"

Bold number = above 0.7 consistency level

Italic Bold number = above 0.7 consistency level and only used for T2, T3, T4.

8.1.2 Analysis of H1b: DIFD-BCD-OE

Two solution paths (S3, S4) out of four pass the consistency threshold (Table 8-2). The core conditions of both combinations show a lack of both low-cost and prospector cases, and peripheral conditions exhibit a lack of analyzers. While the presence of differentiation is a core condition of S4, it is only a peripheral of S3. In addition, while the absence of reactor is a core condition of S4, neither the presence nor absence of reactor affects the generation of oe1 for S3. Likewise, while the absence of defender is a peripheral condition of S3, neither the presence nor absence of defender affects the generation of oe1 for S4. This situation suggests a trade-off between the absence of reactor and defender within the differentiation group, indicating the presence of second-order equifinality. Both have fair raw coverage but very low unique coverage, indicating that the coverage of these combinations overlaps with each other and perhaps with S1. From core and peripheral analysis, these two causal paths support H1b, as shown in their high T1 and T2 consistency.

Sufficiency analysis for oe1f (financial data) fairly supports the previous analysis for oe1, as two combinations (S2, a dominant combination with the highest unique coverage, and S4) out of three that pass the consistency threshold are in line with S4 of the previous analysis, especially in the core condition of differentiation and a lack of low cost. Although the other solution path (S3) suggests the opposite, with a core condition of low cost and a lack of differentiation, it covers only one observation with very low unique coverage and is therefore negligible. Like those for oe1, the hypotheses test results (T1, T2) of this analysis (oe1f) also support H1b.

In considering the analysis for oe2 (in which, apart from ~p and ~r, ~d are found to be trivial necessary conditions.) and oe2f, the sufficiency analysis produces different results (Table 8-3). Four and three paths, respectively, pass the consistency threshold, each of which portrays first-order equifinality. Moreover, the former also displays second-order equifinality. As in the analysis of oe2 that has three main groups of combinations – low cost (S1), a dominant combination; analyzer defender (S2); and differentiator and differentiated defender (S3, S5) – the analysis of oe2f also contains three different groups: low cost (S1), the lowest unique coverage; differentiator (S2), a dominant combination; and best cost (S3). These two analyses suggest that there are many possible ways other than just being a differentiator to achieve high oe2 or oe2f. Moreover, the high consistency level for T2 and T3 also suggests that H1b, using oe2 and oe2f as outcomes, can be improved further or should even be dropped, resulting in fair support, rather than strong support for H1b. A possible explanation for this result is that oe2 and oe2f, which is the investment yield, may not be suitable parameters for output efficiency in this analysis because any typology of GOC may have either strong or weak investment skills. Some may be more risk-taking, while others may be more conservative, resulting in a variety of investment yields beyond the control of the chosen GOC typology. Thus, although the overall hypothesis results are consistent with those of oe1 and oe1f, they can be ignored as their outcomes do not strictly relate to the proposed causal condition.

In summary, H1b is supported by the analysis of oe1and oe1f.

Table 8-2: fsQCA results for H1b: DIFD-BCD-OE1/OE1F

	H1b: GOC-OE1				**H1b: GOC-OE1F**			
Condition	S1	S2	S3	S4	S1	S2	S3	S4
Prospector (P)	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	θ*	ϴ*
Analyzer (A)			θ	θ	●	ϴ	ϴ	
Defender (D)	ϴ		θ		●	θ	ϴ	•
Reactor (R)	θ*	ϴ*		ϴ*	ϴ*		θ*	θ*
Differentiation (Dif)		ϴ	•	●		●	ϴ	●
Low cost (Lc)	ϴ	●	ϴ	ϴ		ϴ	●	ϴ
Observed cases	33	11	5	5	5	5	1	1
Consistency	0.625760	0.693128	**0.772698**	**0.752416**	0.663176	**0.724664**	**0.794016**	**0.709135**
Raw coverage	0.479140	0.226493	0.172121	0.172026	0.098641	0.159101	0.110858	0.055455
Unique coverage	0.238754	0.069801	0.002659	0.002450	0.040192	0.074229	0.019843	0.002375
Solution consistency	0.602613				0.688200			
Solution coverage	0.554164				0.242285			
T1: H•S⊂Y -Consistency	**0.782081**	**0.873616**	**0.775306**	**0.728530**	0.674924	**0.778808**	**0.824348**	**0.711809**
T1: H•S⊂Y -Raw coverage	0.056821	0.052946	0.054630	0.057186	0.050152	0.054088	0.043457	0.056607
T2: ~H•S⊂Y -Consistency	0.625714	0.692681	***0.771952***	***0.779462***	0.678735	***0.723961***	***0.793858***	***0.763640***
T2: ~H•S⊂Y -Raw coverage	0.478587	0.226085	0.171354	0.171172	0.100992	0.158391	0.109838	0.056607
T3: H•~S⊂~Y - Consistency	0.666045	0.666045	0.666045	0.636616	0.670967	0.681394	0.681394	0.663628
T3: H•~S⊂~Y -Raw coverage	0.072447	0.072447	0.072447	0.063638	0.071768	0.075269	0.075269	0.069434
T4: ~H•~S⊂Y -Consistency	0.538359	0.532113	0.526908	0.527574	0.536492	0.536244	0.537995	0.530698
T4: ~H•~S⊂Y -Raw coverage	0.623064	0.842742	0.894709	0.896900	0.936302	0.897471	0.934667	0.967440
Solution path hypothesis result	Ignore	Ignore	Support	Support	Ignore	Support	Support	Support
Combined solution path unique coverage of same hypothesis result			0.005109			0.096447		
Overall hypothesis result	**Support**				**Support**			

Table 8-3: fsQCA results for H1b: DIFD-BCD-OE2/OE2F

	H1b: GOC-OE2					**H1b: GOC-OE2F**		
Condition	S1	S2	S3	S4	S5	S1	S2	S3
Prospector (P)	Θ*	Θ*	Θ*	Θ*	Θ*	Θ*	Θ*	
Analyzer (A)		●	Θ	Θ		Θ	Θ	Θ
Defender (D)		●	θ*	θ*	•			Θ
Reactor (R)	Θ*	Θ*		θ*	θ*	θ*	Θ*	Θ*
Differentiation (Dif)	Θ		●	●	●		●	●
Low cost (Lc)	●		θ		θ	●		•
Observed cases	11	5	5	10	1	9	11	10
Consistency	**0.714269**	**0.745312**	**0.756022**	0.673542	**0.760762**	**0.821701**	**0.769282**	**0.849219**
Raw coverage	0.272201	0.131173	0.196403	0.265147	0.070395	0.259547	0.284802	0.266998
Unique coverage	0.137118	0.037563	0.005708	0.054258	0.002810	0.051003	0.076259	0.060114
Solution consistency	0.660851					**0.802112**		
Solution coverage	0.477160					0.395919		
T1: H•S⊂Y-Consistency	**0.901349**	**0.819554**	**0.823014**	**0.816842**	**0.760675**	**0.865469**	**0.850784**	**0.862620**
T1: H•S⊂Y -Raw coverage	0.063707	0.072059	0.067632	0.084341	0.071578	0.071564	0.087208	0.069849
T2: ~H•S⊂Y -Consistency	***0.715188***	***0.762347***	***0.755263***	0.673175	***0.816064***	***0.821572***	***0.760743***	***0.849751***
T2: ~H•S⊂Y -Raw coverage	0.272237	0.134220	0.195520	0.263983	0.071578	0.256083	0.270314	0.266000
T3: H•~S⊂~Y - Consistency	***0.910560***	***0.907633***	***0.910560***	***0.910560***	***0.905573***	0.529645	0.595851	0.520320
T3: H•~S⊂~Y -Raw coverage	0.086160	0.083161	0.086160	0.086160	0.081162	0.054214	0.054214	0.054214
T4: ~H•~S⊂Y -Consistency	0.474625	0.472827	0.471777	0.481787	0.458589	0.478524	0.473277	0.463005
T4: ~H•~S⊂Y -Raw coverage	0.876657	0.976411	0.934270	0.900039	0.989185	0.813244	0.787465	0.786341
Solution path hypothesis result	Support	Support	Support	Ignore	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result	0.183199					0.187376		
Overall hypothesis result	**Support**					**Support**		

8.1.3 Analysis of H1c: A-EF

All five solution paths pass the consistency threshold (Table 8-4), which can be categorized into three different groups, suggesting a first-order equifinality. S1 (lc*~dif*~r*~a*~p) and S4 (lc*~dif*~r*d*~p) can be grouped as low-cost leadership, with S4 as a specific type with a defender characteristic.

Another group is differentiator, comprising S2 (~lc*dif*~d*~a*~p) and S3 (~lc*dif*~r*~a*~p). Both share all core conditions (high in differentiation with a lack of prospector, analyzer and low cost) and differ only in one peripheral condition (either lack of defender or lack of reactor), indicating second-order equifinality and suggesting a trade-off between these peripheral conditions.

The last group is best-cost prospector, S5 (lc*dif*~r*~d*p), which is the dominant combination with the highest unique coverage of 0.07. Interestingly, while all solutions have specific Porter's (1980) typologies, none has a fully-specified Miles and Snow's (1978) typology (all paths have one "don't care" condition), suggesting that the presence or absence of Miles and Snow's (1978) typologies depend on the context provided by Porter's (1980) typologies. In other words, Porter's (1980) typologies seem to better predict effectiveness than Miles and Snow's (1978) typologies.

The results for the financial data outcome (ef1f) are quite similar to those of the survey. Three solutions passing the consistency threshold can be classified into two groups. The first is differentiator (S3 (~lc*dif*~d*~a*~p) and S2 (~lc*~r*~a*~p)), although in S2 differentiation is a "don't care" condition and low cost cannot be present. Thus, S2 may be either a differentiator or stuck in the middle. However, the latter is unlikely to achieve high effectiveness. The second group is low-cost defender (S5 (lc*~dif*~r*d*~p)). Nevertheless, the lack of best-cost prospectors in the survey outcome raises a concern that only the pure form, rather than the hybrid, of Porter's (1980) typologies lead to high effectiveness.

The analyses for ef2 and ef2f (Table 8-5) show only one group of solutions, differentiator. All paths are high in differentiation and lack low cost as common core conditions, while the remaining conditions are quite similar. Combined with the previous analysis for ef1/ef1f, they suggest that a differentiator has a better chance of generating effectiveness than other configurations. Unlike the analyses for ef1, ef1f and ef2f that support H1c, analysis of ef2 rejects H1c. This raises a concern but is not significant enough to change the overall validity of the hypothesis owing to its low consistency (0.711).

Deviation from H1c (A-EF2) probably arises only from the empirical context. Most industry players fall into a questionable organizational orthodoxy (Kuhn & Marsick, 2005: 31), which is "self-imposed beliefs and theories of success about business", particularly a belief that the insurance industry is a commodity business and is a highly-regulated and mature industry. Therefore, they mistakenly believe that truly new products and innovation are difficult to create; conditions can only be changed slightly. Furthermore, even if they devise innovative products, such products will be imitated almost instantly by the competition (Kuhn & Marsick, 2005; Insurancejournal.tv, 2010). Consequently, they tend to compete in terms of scale via price, not differentiation.

However, with a price range requirement, price competition is not a viable option to gain market share. On the other hand, only a handful of business units that do not fall into this organizational orthodoxy pursue differentiation (Deloitte Center for Financial Services, 2013) and enjoy high market share, as shown in the findings. Evidently, an insurer gains a higher market share by pursuing differentiation rather than an analyzer strategy because brand loyalty resulting from differentiation directly and simultaneously helps a business unit both in maintaining its current customers and in gaining new markets, while an analyzer must pursue both defender and prospector strategies in order to achieve the same result. It is more difficult to balance these activities in the insurance market, which most customers and competitors still perceive to be a commodity.

Table 8-4: fsQCA results for H1c: A-EF1/EF1F

	H1c: GOC-EF1					H1c: GOC-EF1F				
Condition	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5
Prospector (P)	Θ*	Θ*	Θ*	Θ*	●	Θ*	Θ*	θ*	Θ*	Θ*
Analyzer (A)	Θ	Θ	Θ			Θ	θ	θ		
Defender (D)		θ		●	Θ	θ		Θ	θ	●
Reactor (R)	θ*		θ*	Θ*	Θ*	θ*	Θ*		Θ*	Θ*
Differentiation (Dif)	Θ	●	●	θ	•			●	●	θ
Low cost (Lc)	●	Θ	Θ	●	•		Θ	Θ	Θ	●
Observed cases	3	5	5	5	4	18	22	5	8	5
Consistency	**0.770447**	**0.756489**	**0.739491**	**0.800157**	**0.777157**	0.695167	**0.701578**	**0.762059**	0.689534	**0.746008**
Raw coverage	0.136668	0.185175	0.185791	0.102848	0.105708	0.341586	0.361502	0.165036	0.219214	0.084834
Unique coverage	0.008621	0.005378	0.005869	0.011813	0.071621	0.081440	0.103796	0.004758	0.056710	0.012912
Solution consistency	**0.718146**					0.668564				
Solution coverage	0.326723					0.525807				
T1: H•S⊂Y-Consistency	**0.748112**	**0.777327**	**0.777656**	**0.766726**	**0.758921**	**0.783995**	**0.772517**	**0.851344**	**0.717966**	**0.782018**
T1: H•S⊂Y -Raw coverage	0.096045	0.105565	0.105766	0.073980	0.043083	0.184637	0.153828	0.102289	0.161569	0.066757
T2: ~H•S⊂Y -Consistency	***0.767797***	***0.754910***	***0.737366***	***0.852405***	***0.774985***	0.695350	***0.701556***	***0.761716***	***0.756305***	***0.777220***
T2: ~H•S⊂Y -Raw coverage	0.134921	0.184143	0.184745	0.091993	0.096075	0.339862	0.360202	0.164385	0.159593	0.074210
T3: H•~S⊂~Y - Consistency	0.624387	0.624387	0.624387	0.627555	0.628727	0.573064	0.573064	0.573064	0.586666	0.575807
T3: H•~S⊂~Y -Raw coverage	0.690934	0.690934	0.690934	0.682360	0.688585	0.715457	0.715457	0.715457	0.662948	0.706377
T4: ~H•~S⊂Y -Consistency	0.601636	0.589292	0.597139	0.598663	0.582272	***0.735984***	***0.723446***	***0.707032***	***0.708400***	0.678233
T4: ~H•~S⊂Y -Raw coverage	0.499644	0.453575	0.455782	0.505462	0.464408	0.385193	0.334464	0.481466	0.484661	0.506632
Solution path hypothesis result	Support	Support	Support	Support	Support	Ignore	Support	Weak Support	Ignore	Support
Combined solution path unique coverage of same hypothesis result	0.103302						0.116708	0.004758		
Overall hypothesis result	**Support**					**Support**				

Table 8-5: fsQCA results for H1c: A-EF2/EF12F

	H1c: GOC-EF2	H1c: GOC-EF2F	
Condition	S1	S1	S2
Prospector (P)	θ*	Θ*	Θ*
Analyzer (A)	Θ		
Defender (D)	Θ	Θ	
Reactor (R)			Θ*
Differentiation (Dif)	●	●	●
Low cost (Lc)	Θ	Θ	Θ
Observed cases	5	9	9
Consistency	**0.710821**	**0.765686**	**0.765449**
Raw coverage	0.161335	0.271478	0.276201
Unique coverage	0.161335	0.005228	0.009951
Solution consistency	**0.710821**	**0.768799**	
Solution coverage	0.161335	0.281429	
T1: H•S⊂Y-Consistency	0.691323	**0.759535**	**0.759724**
T1: H•S⊂Y -Raw coverage	0.087053	0.187811	0.188006
T2: ~H•S⊂Y -Consistency	***0.707803***	***0.741407***	***0.742004***
T2: ~H•S⊂Y -Raw coverage	0.160089	0.175810	0.180727
T3: H•~S⊂~Y - Consistency	0.560523	0.623238	0.623238
T3: H•~S⊂~Y -Raw coverage	0.665845	0.640238	0.640238
T4: ~H•~S⊂Y -Consistency	0.597557	0.559862	0.556151
T4: ~H•~S⊂Y -Raw coverage	0.426468	0.417932	0.411692
Solution path hypothesis result	Reject	Support	Support
Combined solution path unique coverage of same hypothesis result	0.161335	0.015179	
Overall hypothesis result	**Reject**	**Support**	

8.1.4 Analysis of H1d: P-AD

Three out of five solution paths pass the consistency threshold (Table 8-6), which can be categorized in two different groups, suggesting first-order equifinality. The differentiator group comprises S3 (~lc*dif*~d*~a*~p) and S4 (~lc*dif*~r*~a*~p), which share the same core and peripheral causal conditions except that the core condition lacks either defender or reactor, which can be treated as substitutes, indicating second-order equifinality. Although these combinations lack prospector (~p), differentiation is a characteristic quite similar to prospector (Fiss, 2011), and thus still supports the hypothesis. In the second group, low-cost defender, S5 (lc*~dif*~r*d*~p) is a dominant combination with a unique coverage of 0.032. This is probably because current industry conditions allow copycats (market followers) to issue new products resembling those of pioneers without incurring R&D costs. Note that ~p is a trivial necessary condition (because of data skewness); therefore, it cannot be inferred that the hypothesis is rejected only from the observed solutions. Rather, the proposed hypothesis testing criteria are preferred and suggest support for H1d.

Analysis of AD2 provides slightly different solutions. While S1 (~lc*dif*r*~d*~a), differentiated reactor, is consistent with previous analysis, S2 (lc*dif*~r*~d*a), which is a dominant combination with a sizeable unique coverage of 0.43, indicates best-cost analyzer, contradicting the previously-observed low-cost defender. This probably suggests that in order to achieve high adaptability it is more important to be a best-cost analyzer than a low-cost defender (copycat). Moreover, both solution paths require the presence of differentiation, albeit at different levels of importance, thereby fairly endorsing the hypothesis.

In summary, both tests support the hypothesis.

Table 8-6: fsQCA results for H1d: P-AD1/AD2

	H1d: GOC-AD1					**H1d: GOC-AD2**	
Condition	S1	S2	S3	S4	S5	S1	S2
Prospector (P)		Θ*	Θ*	Θ*	Θ*		
Analyzer (A)	Θ		θ	θ		Θ	●
Defender (D)	Θ	θ	Θ		●	Θ	Θ
Reactor (R)	θ*	Θ*		Θ*	Θ*	●	Θ*
Differentiation (Dif)		●	●	●	θ	•	●
Low cost (Lc)	●		θ	θ	●	θ	●
Observed cases	11	40	5	5	5	1	26
Consistency	0.698892	0.692181	**0.740252**	**0.733449**	**0.785004**	**0.970090**	**0.712693**
Raw coverage	0.236909	0.566492	0.164245	0.167030	0.091458	0.027005	0.445208
Unique coverage	0.048374	0.336715	0.002648	0.005320	0.031859	0.010598	0.428800
Solution consistency	0.686555					**0.716547**	
Solution coverage	0.665239					0.455806	
T1: H•S⊂Y-Consistency	**0.75716**	**0.812902**	**0.827317**	**0.827317**	**0.988559**	**0.991696**	**0.916804**
T1: H•S⊂Y -Raw coverage	0.085357	0.067400	0.034448	0.034448	0.008089	0.006429	0.054261
T2: ~H•S⊂Y -Consistency	0.689295	0.692412	***0.739000***	***0.731484***	***0.786105***	***0.959823***	***0.711222***
T2: ~H•S⊂Y -Raw coverage	0.191634	0.565667	0.163395	0.166122	0.092622	0.027701	0.435212
T3: H•~S⊂~Y - Consistency	0.600079	0.466213	0.466213	0.466213	0.466213	0.548037	0.577609
T3: H•~S⊂~Y -Raw coverage	0.058389	0.074411	0.074411	0.074411	0.074411	0.076858	0.074661
T4: ~H•~S⊂Y -Consistency	0.535569	0.476600	0.532806	0.534341	0.512781	0.446069	0.388852
T4: ~H•~S⊂Y -Raw coverage	0.841081	0.505483	0.860575	0.859848	0.864034	0.910765	0.582426
Solution path hypothesis result	Ignore	Ignore	Support	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result			0.039827			0.439398	
Overall hypothesis result	**Support**					**Support**	

8.2 Hypothesis testing: relationship between FC and performance (H2)

In order to test the second main hypothesis regarding the relationship between FC and performance dimensions (H2), I again use fsQCA to test each of the four sub-hypotheses separately, which correspond with four performance dimensions, by setting one performance dimension as the outcome of interest and testing it with all five possible FC attributes as causal conditions as follows. (also provided in a looseleaf glossary)

1. Operations capability: "op" represents a high membership score with a strong operations capability while "~op" represents a low membership score with a strong operations capability.
2. R&D capability: "rd" represents a high membership score with a strong R&D capability while "~rd" represents a low membership score with a strong R&D capability.
3. MIS capability: "mis" represents a high membership score with a strong MIS capability while "~mis" represents a low membership score with a strong MIS capability.
4. Sales & distribution capability: "sd" represents a high membership score with a strong sales & distribution capability while "~sd" represents a low membership score with a strong sales & distribution capability.
5. Marketing capability: "mkt" represents a high membership score with a strong marketing capability while "~mkt" represents a low membership score with a strong marketing capability.

Reports for each sub-hypothesis of H2, which test all FCs against one performance dimension at a time, are as follows.

8.2.1 Analysis of H2a: OP-IE

Since H2 concerns only FC, there is no trivial necessary condition (~p and ~r) in any of the H2 analysis.

Both solution paths of the H2a analysis are above the consistency threshold with different patterns (Table 8-7). S1 (~mkt*~sd*mis*rd) has high MIS and a lack of sales & distribution as core conditions, while S2 (mkt*sd*~mis*rd*op) has marketing and R&D and lacks MIS as core conditions. S1 has a lower unique coverage, probably because MIS has an indirect influence on input efficiency, whereas S2's marketing and R&D strengths in customer-base expansion directly reduce costs through economies of scale and insurance risk diversification. Consequently, S1 rejects the hypothesis while S2 strongly supports it. Note that S2's peripheral conditions are the presence of operations (the proposed hypothesis) and sales & distribution, so it has all FCs except MIS. This may suggest that, in order to achieve high input efficiency, almost all FCs must exist and work in cooperation.

Financial data also reveal similar patterns. All three solution paths are above the consistency threshold and can be classified into two groups. S1 and S2 are similar to S2 of the previous test, while S3 is similar to S1 of the previous test. The results for the hypothesis are fairly consistent, with a slightly lower level of support in S1 and S2, which only support, rather than strongly support, H2a.

Table 8-7: fsQCA results for H2a: OP-IE/IEF

	H2a: FC-IE		**H2a: FC-IEF**		
Condition	S1	S2	S1	S2	S3
Operations (OP)		•		●	ϴ
R&D (RD)	•	●	θ		•
MIS (MIS)	●	ϴ	ϴ	ϴ	•
Sales & distribution (SD)	ϴ	•	●	•	θ
Marketing (MKT)	θ	●	●	•	ϴ
Observed cases	1	1	3	1	1
Consistency	**0.737169**	**0.710147**	**0.764703**	**0.776655**	**0.790485**
Raw coverage	0.085003	0.100142	0.115943	0.123956	0.073065
Unique coverage	0.049563	0.064702	0.025406	0.033267	0.041147
Solution consistency	**0.736867**		**0.821077**		
Solution coverage	0.149705		0.191247		
T1: H•S⊂Y-Consistency	0.695337	**0.707760**	**0.725705**	**0.777665**	0.693290
T1: H•S⊂Y -Raw coverage	0.055628	0.098067	0.088645	0.122538	0.041773
T2: ~H•S⊂Y -Consistency	***0.739448***	0.646986	***0.744838***	***0.709019***	***0.792344***
T2: ~H•S⊂Y -Raw coverage	0.076386	0.059097	0.082686	0.064340	0.072480
T3: H•~S⊂~Y - Consistency	0.631375	0.647222	0.607701	0.623507	0.591050
T3: H•~S⊂~Y -Raw coverage	0.595426	0.591453	0.623162	0.621822	0.630869
T4: ~H•~S⊂Y -Consistency	0.540970	0.541457	0.625643	0.623802	0.619940
T4: ~H•~S⊂Y -Raw coverage	0.552580	0.572168	0.567398	0.583724	0.560753
Solution path hypothesis result	Reject	Strong support	Support	Support	Reject
Combined solution path unique coverage of same hypothesis result	0.049563	0.064702	0.058673		0.041147
Overall hypothesis result	**Strong support**		**Support**		

8.2.2 Analysis of H2b: RD-OE

All seven solution paths of the H2b analysis are above the consistency threshold (Table 8-8), and can be sorted into three main groups based on the requirement for R&D (proposed hypothesis). First, those for which R&D is a "don't care" condition (S1 (mkt*~mis*~op) and S2 (~mkt*~sd*~mis*op)), which are two dominant conditions with unique coverage of 0.063 and 0.067 respectively, suggest that there are trade-offs between a high degree of operations and marketing in generating oe1 (loss ratio, which is equivalent to profit margin ratio). Nevertheless, the existence of this group does not reject H2b. Secondly, those in which R&D is present (S3 (mkt*sd*rd*~op), S5 (~mkt*sd*rd*op), S6 (~mkt*~sd*mis*rd*~op) and S7 (sd*~mis*rd*op)), in which R&D is a core condition for three out of four paths, suggest that R&D is an INUS condition (Mackie, 1974) for generating oe1. Thirdly, the group in which R&D is absent (S4 (mkt*sd*~rd*op)) suggests that strong marketing, sales and distribution, and operations can be treated as substitutes for R&D in creating oe1. This agrees with the notion that differentiation can be achieved through either R&D or marketing, or both. Clearly, all three groups support the hypothesis.

Financial data reveal identical patterns, except for S6 (mkt*sd*~mis) which is almost a subset of S3 from the previous analysis. Similarly, analysis for oe2 provides five out of seven identical solutions (Table 8-9) to that of oe1. The deviation is only slight as the solution for oe2 (S6) is almost a subset of that for oe1 (S3). Likewise, all four paths of the oe2f analysis that pass the consistency threshold are identical with those of oe2, reconfirming support for H2b.

Table 8-8: fsQCA results for H2b: RD-OE1/OE1F

	H2b: FC-OE1						
Condition	S1	S2	S3	S4	S5	S6	S7
Operations (OP)	ө	●	Ө	•	•	ө	●
R&D (RD)			●	Ө	●	●	•
MIS (MIS)	Ө	Ө				•	Ө
Sales & distribution (SD)		ө	•	•	•	ө	•
Marketing (MKT)	●	ө	•	●	Ө	Ө	
Observed cases	3	5	5	2	5	1	2
Consistency	**0.793156**	**0.777088**	**0.775229**	**0.755311**	**0.860643**	**0.762031**	**0.781217**
Raw coverage	0.151049	0.134623	0.142804	0.125786	0.130888	0.070419	0.109356
Unique coverage	0.062875	0.066940	0.047280	0.029209	0.048338	0.017503	0.013124
Solution consistency	**0.760072**						
Solution coverage	0.430462						
T1: H•S⊂Y-Consistency	**0.785602**	**0.805686**	**0.775045**	**0.825182**	**0.862248**	**0.757407**	**0.780279**
T1: H•S⊂Y -Raw coverage	0.084181	0.080744	0.141481	0.098665	0.130956	0.069269	0.107682
T2: ~H•S⊂Y -Consistency	***0.808090***	***0.785524***	***0.855294***	***0.754137***	***0.837106***	0.695468	***0.852027***
T2: ~H•S⊂Y -Raw coverage	0.146776	0.127047	0.083998	0.124586	0.063875	0.050274	0.076678
T3: H•~S⊂~Y - Consistency	0.517142	0.518360	0.534262	0.516897	0.548324	0.526356	0.524705
T3: H•~S⊂~Y -Raw coverage	0.564092	0.563832	0.540307	0.568478	0.559569	0.568297	0.550638
T4: ~H•~S⊂Y -Consistency	0.573405	0.571344	0.545416	0.549898	0.545416	0.545416	0.545416
T4: ~H•~S⊂Y -Raw coverage	0.471235	0.475278	0.493535	0.472495	0.493535	0.493535	0.493535
Solution path hypothesis result	Support	Support	Support	Support	Support	Strong support	Support
Combined solution path unique coverage of same hypothesis result	0.267766					0.017503	
Overall hypothesis result	**Support**						

	H2b: FC-OE1F						
Condition	S1	S2	S3	S4	S5	S6	S7
Operations (OP)	θ	●	•	•	θ		●
R&D (RD)			Θ	●	●		•
MIS (MIS)	Θ	Θ			•	Θ	Θ
Sales & distribution (SD)		θ	•	•	θ	•	•
Marketing (MKT)	●	θ	●	Θ	Θ	●	
Observed cases	3	5	2	5	1	4	2
Consistency	**0.784883**	**0.753194**	**0.768164**	**0.738856**	**0.718017**	**0.774667**	**0.769932**
Raw coverage	0.147324	0.128608	0.126087	0.110751	0.065398	0.146150	0.106227
Unique coverage	0.035045	0.059687	0.029041	0.038328	0.011757	-0.000000	0.002621
Solution consistency	0.669155						
Solution coverage	0.377785						
T1: H•S⊂Y-Consistency	**0.795529**	**0.769410**	**0.889051**	**0.739157**	**0.718292**	**0.819156**	**0.772127**
T1: H•S⊂Y -Raw coverage	0.084019	0.076000	0.104773	0.110647	0.064747	0.110243	0.105025
T2: ~H•S⊂Y -Consistency	***0.795205***	***0.767365***	***0.769518***	***0.850465***	***0.787816***	***0.800764***	***0.861565***
T2: ~H•S⊂Y -Raw coverage	0.142358	0.122326	0.125299	0.063961	0.056131	0.119149	0.076422
T3: H•~S⊂~Y - Consistency	0.516712	0.516407	0.515966	0.527055	0.515446	0.523272	0.521746
T3: H•~S⊂~Y -Raw coverage	0.572383	0.570438	0.576273	0.546223	0.565166	0.562655	0.556042
T4: ~H•~S⊂Y -Consistency	0.572778	0.569176	0.572563	0.560459	0.560459	0.560391	0.560459
T4: ~H•~S⊂Y -Raw coverage	0.463952	0.466666	0.484897	0.499855	0.499855	0.470252	0.499855
Solution path hypothesis result	Support	Support	Support	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result	0.176479						
Overall hypothesis result	**Support**						

Table 8-9: fsQCA results for H2b: RD-OE2/OE2F

	H2b: FC-OE2							H2b: FC-OE2F				
Condition	S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5
Operations (OP)	●		•	•	ϴ	ϴ	●	θ	●	•	●	θ
R&D (RD)		ϴ	ϴ	●	●	●	•	ϴ		ϴ	•	●
MIS (MIS)	ϴ	θ			•	•	ϴ	θ	ϴ		ϴ	•
Sales & distribution (SD)	θ	●	●	•	θ	•	•		θ	•	•	ϴ
Marketing (MKT)	θ	•	•	ϴ	θ	•		●	θ	●		θ
Observed cases	5	3	2	5	1	5	2	3	5	2	2	1
Consistency	**0.758981**	0.672589	**0.746798**	**0.788748**	**0.872892**	**0.753113**	**0.745734**	0.697646	**0.802344**	**0.893413**	**0.714466**	**0.768479**
Raw coverage	0.153345	0.118903	0.145043	0.139896	0.094074	0.136517	0.121743	0.131969	0.145075	0.155288	0.104384	0.074119
Unique coverage	0.077501	0.012854	0.020641	0.048869	0.027373	0.048765	0.021669	0.040570	0.068934	0.063018	0.020535	0.014923
Solution consistency	0.688993							0.699581				
Solution coverage	0.410388							0.322408				
T1: H•S⊂Y -Consistency	**0.794100**	**0.871676**	**0.833135**	**0.786903**	**0.870305**	**0.752888**	**0.746007**	**0.853988**	**0.883733**	**0.862407**	**0.712902**	**0.764976**
T1: H•S⊂Y -Raw coverage	0.092813	0.099467	0.116176	0.139381	0.092826	0.134638	0.120067	0.087861	0.092437	0.107623	0.102684	0.073019
T2: ~H•S⊂Y -Consistency	***0.779091***	0.673811	***0.747583***	***0.849189***	***0.835916***	***0.888739***	***0.855904***	0.698485	***0.809106***	***0.895238***	***0.864201***	***0.910380***
T2: ~H•S⊂Y -Raw coverage	0.146954	0.118632	0.144035	0.075568	0.070472	0.074925	0.089832	0.132414	0.136581	0.154362	0.081173	0.068686
T3: H•~S⊂~Y - Consistency	0.557086	0.556765	0.556765	0.578579	0.567134	0.572559	0.561409	0.575412	0.578739	0.575412	0.575637	0.571539
T3: H•~S⊂~Y -Raw coverage	0.527130	0.532670	0.532670	0.513636	0.532670	0.505430	0.512516	0.606197	0.603014	0.606197	0.578663	0.591108
T4: ~H•~S⊂Y -Consistency	0.447217	0.447961	0.435137	0.434078	0.434078	0.434078	0.434078	0.585850	0.570792	0.550756	0.566924	0.566924
T4: ~H•~S⊂Y -Raw coverage	0.433866	0.444984	0.436043	0.458084	0.458084	0.458084	0.458084	0.502510	0.495574	0.493919	0.535422	0.535422
Solution path hypothesis result	Support	Ignore	Support	Support	Support	Support	Support	Ignore	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result			0.244818						0.16741			
Overall hypothesis result	**Support**							**Support**				

8.2.3 Analysis of H2c: MIS-SD-EF

Four out of five solution paths pass the consistency threshold (Table 7-10), and can be categorized into two different groups: those that have either MIS (S3 (~mkt*mis*rd)) or sales & distribution (S4 (sd*~mis*op)), or both (S5 (sd*mis*rd*~op)); and those that have both MIS and sales & distribution as "don't care" conditions (S1 (~mkt*op)). Obviously, all paths are consistent with H2c at different levels of support. Among the former group, S5 is a dominant combination with the highest unique coverage of 0.043, suggesting that having both MIS and sales & distribution covers more cases of high ef1 than having only one of them, which in turn indicates complementarity between these two FCs. This path also shows strong support for the proposed hypothesis, while the rest suggest only medium support. Therefore, in combination, the overall hypothesis is supported. Moreover, comparing the unique coverage of S3 and S4 suggests that, if one focuses only on core conditions, sales & distribution has more causal relevance than MIS in generating ef1.

Likewise, analysis of the financial data provides a mirror image of that of the survey data. All paths are exactly the same, which reconfirms the support result. S2 (mkt*sd*~rd) passes the consistency threshold, which further reinforces the argument that sales & distribution is more relevant than MIS in generating ef1f.

Analysis of ef2 (Table 8-11) provides only one path (~mkt*~rd*op) which is a superset of S1 from the ef1 analysis, and hence also supports H2c. However, analysis of ef2f reveals three different paths which, although supporting H2c, suggest slightly different messages. When focusing only on two conditions proposed in H2c, either MIS or sales & distribution or neither, but not both, are exhibited as core conditions in these solution paths and the other is a "don't care" condition, suggesting that they are not complementary but substitutes for each other.

Table 8-10: fsQCA results for H2c: MIS-SD-EF1/EF1F

	H2c: FC-EF1					**H2c: FC-EF1F**				
Condition	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5
Operations (OP)	●			•	ϴ	●			•	ϴ
R&D (RD)		ϴ	•		•		ϴ	•		•
MIS (MIS)			●	ϴ	•			●	ϴ	•
Sales & distribution (SD)		●		●	●		●		●	●
Marketing (MKT)	ϴ	•	θ			ϴ	•	θ		
Observed cases	10	4	5	3	5	10	4	5	3	5
Consistency	**0.810221**	0.630946	**0.794263**	**0.703823**	**0.720522**	**0.779445**	**0.787822**	**0.765779**	**0.801304**	**0.820539**
Raw coverage	0.246446	0.134989	0.137137	0.149149	0.123738	0.209755	0.149122	0.116978	0.150232	0.124671
Unique coverage	0.088958	0.017743	0.019238	0.034994	0.042879	0.070423	0.031882	0.014005	0.028619	0.049826
Solution consistency	0.682169					**0.755792**				
Solution coverage	0.393117					0.385337				
T1: H•S⊂Y- Consistency	**0.852770**	**0.737392**	**0.839997**	**0.793497**	**0.719166**	**0.814597**	**0.816997**	**0.830638**	**0.869343**	**0.821331**
T1: H•S⊂Y -Raw coverage	0.122140	0.096591	0.110706	0.086591	0.121758	0.103223	0.094682	0.096853	0.083932	0.123026
T2: ~H•S⊂Y - Consistency	***0.830457***	0.659127	***0.824492***	***0.703441***	0.658091	***0.779647***	***0.806163***	***0.756353***	***0.800525***	***0.853360***
T2: ~H•S⊂Y -Raw coverage	0.206736	0.118204	0.096258	0.147177	0.068250	0.171714	0.127907	0.078124	0.148182	0.078299
T3: H•~S⊂~Y - Consistency	0.509483	0.494303	0.509483	0.495242	0.519911	0.506156	0.495533	0.506156	0.488636	0.509209
T3: H•~S⊂~Y - Raw coverage	0.372022	0.370192	0.372022	0.385541	0.374997	0.416986	0.418702	0.416986	0.429177	0.414374
T4: ~H•~S⊂Y - Consistency	0.426150	0.445174	0.437796	0.428749	0.438237	0.554048	0.541307	0.548544	0.536385	0.537445
T4: ~H•~S⊂Y - Raw coverage	0.465722	0.521608	0.531317	0.494708	0.549523	0.535698	0.561133	0.588982	0.547558	0.596236
Solution path hypothesis result	Support	Ignore	Support	Support	Strong support	Support	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result			0.14319		0.042879	0.194755				
Overall hypothesis result	**Support**					**Support**				

Table 8-11: fsQCA results for H2c: MIS-SD-EF2/EF2F

	H2c: FC-EF2	**H2c: FC-EF2F**		
Condition	S1	S1	S2	S3
Operations (OP)	●	ɵ		Ɵ
R&D (RD)	Ɵ	Ɵ	Ɵ	•
MIS (MIS)				●
Sales & distribution (SD)			•	
Marketing (MKT)	Ɵ	●	●	Ɵ
Observed cases	4	3	4	1
Consistency	**0.732735**	**0.710499**	**0.757212**	**0.776710**
Raw coverage	0.142092	0.149561	0.157488	0.079930
Unique coverage	0.142092	0.050177	0.066607	0.031718
Solution consistency	**0.732735**	**0.764849**		
Solution coverage	0.142092	0.247886		
T1: H•S⊂Y-Consistency	**0.800540**	0.651014	**0.723364**	**0.737608**
T1: H•S⊂Y -Raw coverage	0.054945	0.056748	0.092113	0.046316
T2: ~H•S⊂Y -Consistency	***0.729397***	***0.741126***	***0.767807***	***0.768565***
T2: ~H•S⊂Y -Raw coverage	0.140281	0.146694	0.133857	0.076887
T3: H•~S⊂~Y - Consistency	0.607950	0.596473	0.610785	0.600480
T3: H•~S⊂~Y -Raw coverage	0.507264	0.469406	0.469159	0.478379
T4: ~H•~S⊂Y -Consistency	0.608108	0.544808	0.523172	0.527446
T4: ~H•~S⊂Y -Raw coverage	0.631034	0.596974	0.595916	0.622280
Solution path hypothesis result	Support	Reject	Support	Support
Combined solution path unique coverage of same hypothesis result	0.142092	0.050177	0.098325	
Overall hypothesis result	**Support**	**Support**		

8.2.4 Analysis of H2d: MKT-AD

Three out of four solution paths of the ad1 analysis are above the consistency threshold (Table 8-12), and can be categorized into two different groups: those that have marketing, in either core or peripheral conditions (S1 (mkt*~mis*~rd*~op) and S3 (mkt*sd*~mis*op)); and those that do not have marketing (S4 (~mkt*~sd*mis*rd*~op)). A combination S4 contradictory to the hypothesis probably exists because the business unit needs strong R&D capability to design new products to suit the changing customer needs that are observed and reported in its MIS. However, its unique coverage is quite low at 0.032. S1, which has the presence of marketing as a core condition, is a dominant combination with 0.064 unique coverage; therefore, H2d is supported. Moreover, S3 also suggests complementarity between marketing and sales and distribution in generating ad1.

The analysis of ad2 is very similar to that of ad1 in that its S1 and S2 are exactly the same as S1 and S2 of the ad1 analysis respectively, and its S3 is quite similar to S3 of the ad1 analysis, thereby reconfirming the support result for H2d with no major contradiction.

Table 8-12: fsQCA results for H2d: MKT-AD1/AD2

	H2d: FC-AD1				H2d: FC-AD2		
Condition	S1	S2	S3	S4	S1	S2	S3
Operations (OP)	θ	•	•	θ	θ	•	•
R&D (RD)	Θ	Θ		•	Θ	Θ	•
MIS (MIS)	θ		Θ	●	θ		Θ
Sales & distribution (SD)		•	●	θ		•	●
Marketing (MKT)	●	●	•	Θ	●	●	
Observed cases	3	2	2	1	3	2	2
Consistency	**0.778090**	0.685793	**0.717131**	**0.863319**	**0.834968**	**0.707299**	**0.736667**
Raw coverage	0.140467	0.113759	0.113980	0.079466	0.173370	0.134946	0.118139
Unique coverage	0.063863	0.023117	0.023786	0.031932	0.095228	0.042382	0.036761
Solution consistency	**0.726515**				**0.737450**		
Solution coverage	0.243319				0.266934		
T1: H•S⊂Y-Consistency	**0.780527**	0.687665	**0.717971**	**0.852982**	**0.835743**	**0.706701**	**0.817127**
T1: H•S⊂Y -Raw coverage	0.141212	0.113158	0.112662	0.053353	0.173907	0.133754	0.114837
T2: ~H•S⊂Y -Consistency	***0.869145***	***0.852866***	***0.859074***	***0.862612***	***0.899974***	***0.849789***	***0.719493***
T2: ~H•S⊂Y -Raw coverage	0.127850	0.077847	0.078258	0.078580	0.152265	0.089215	0.070871
T3: H•~S⊂~Y - Consistency	0.510259	0.512996	0.515814	0.513359	0.500944	0.501170	0.513012
T3: H•~S⊂~Y -Raw coverage	0.538882	0.520367	0.527292	0.560519	0.464858	0.446691	0.467474
T4: ~H•~S⊂Y -Consistency	0.544917	0.544917	0.544917	0.548205	0.385775	0.385775	0.389300
T4: ~H•~S⊂Y -Raw coverage	0.497584	0.497584	0.497584	0.484937	0.405165	0.405165	0.402029
Solution path hypothesis result	Support	Ignore	Support	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result			0.119581		0.174371		
Overall hypothesis result	**Support**				**Support**		

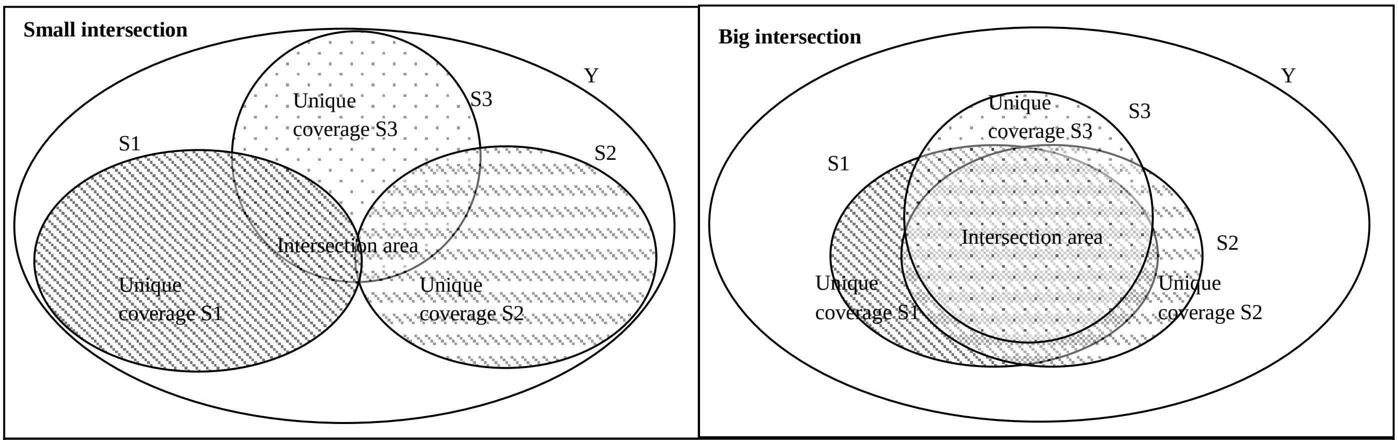
8.3 Post-hoc analysis

In this section, I will consider all sub-hypotheses within each of the two main hypotheses tested in this chapter to identify patterns and further implications of the relationship between causal conditions and outcomes.

For H1, ten out of twelve sub-hypothesis tests are supported. This answers the first research sub-question that the equivocal empirical evidence of previous research can be improved, if not fully resolved, by selecting an appropriate performance dimension to measure business units with different GOCs. However, H1a and H1c are both rejected, suggesting that ie and ef2 are likely to have causal factors other than those proposed in this study. In this regard, H2a and H2c, for which there is strong and medium support respectively, show that the proposed related FCs (op, mis and sd, respectively) are sufficient to explain the variation of ie and ef2, suggesting that they may be either substitutes for or complementary to the proposed GOC typologies. To answer this question, H3 is a necessary next step.

For H2, all sub-hypothesis tests are supported, except H2a which is strongly supported, thus, further strengthening H2. To answer the second research sub-question about whether FCs better explain performance than GOCs, as claimed by Barney and Hoskisson (1990), I compare solution coverages, which portrays their explanatory power, between all sub-hypotheses of H1 and H2 tested against the same performance dimension with a consistency level above 0.7 (passing the consistency threshold).

The rationale behind this comparison is as follows. Firstly, although combined unique coverage could be used in the prior analyses of this research to compare within the same hypothesis test because it is based on the same outcome and the intersection is the same area, it cannot be compared across different analyses because the intersection areas are different, which may result in an incorrect interpretation. For example, it is not necessary for ie to be covered more by GOC (as in H1a (GOC-IE), in which the combined unique coverage is 0.314) than by FC (as in H2a (FC-IE), in which the combined unique coverage is 0.114) because the commonly covered area of the H1a analysis may be less than that of the H2a analysis. Figure 8-1 illustrates this issue in a Venn diagram. Likewise, the combined raw coverage of all single solution paths cannot be used for the same reason.



Assuming 3 solution paths are exhibited from the analysis, the solution coverage is the overall area of Y covered by S1, S2 and S3. Therefore, given the same size of S1, S2, and S3 (raw coverage), the bigger the intersection area, the smaller the unique coverage of each solution path and the smaller the solution coverage. Therefore, comparing either the combined raw coverage or the combined unique coverage of each solution path across different analyses is inappropriate.

Figure 8-1: Intersection area problem when comparing combined unique coverage across different analyses

Secondly, while two parameters can be compared across different analyses based on the same outcome, only one provides a meaningful implication. It is possible to compare the raw coverage between each single solution path from different analyses (e.g. to compare S1 of H1a with S1 of H2a); however, each solution path is not a good representative for the whole solution, thus this option is inappropriate. The only suitable alternative is to compare the solution coverage of each analysis with each other (e.g. to compare the H1a solution with the H2a solution). The intersection size problem is solved since it considers the amount of outcome covered by all solution paths within the same analysis, rather than by a single path. However, like other previous analyses, I will consider solution coverage only when the solution consistency is above the 0.7 consistency threshold of this research.

The results of the solution coverage comparison are mixed (Table 8-13). The empirical evidence shows that six out of twelve performance dimensions are better explained by H1 (GOC), shown in orange, while only four performance dimensions are better explained by

H2 (FC), shown in purple, and two performance dimensions (oe1f and oe2) are not applicable since both H1 and H2 sub-hypotheses have a solution consistency lower than the 0.7 consistency threshold. It can be inferred that neither is always a better performance predictor. In fact, it raises concern about potential improvement through the use of a combination of both to explain performance (H3).

Table 8-13: Comparison of solution coverage of all sub-hypotheses testing H1 & H2

Hypothesis testing		Solution consistency	Solution coverage	Hypothesis testing		Solution consistency	Solution coverage	Max coverage (of H: that has above consistency threshold)	Perf
H1	**H1a**	**0.71802**	**0.437901**	H2	**H2a**	**0.73687**	0.149705	H1	IE
	H1af	**0.90041**	0.022014		**H2af**	**0.82108**	**0.191247**	H2	IEF
	H1b1	0.602613	0.554164		**H2b1**	**0.76007**	**0.430462**	H2	OE1
	H1b1f	0.6882	0.242285		H2b1f	0.669155	0.377785	n/a	OE1F
	H1b2	0.660851	0.47716		H2b2	0.688993	0.410388	n/a	OE2
	H1b2f	**0.80211**	**0.395919**		H2b2f	0.699581	0.322408	H1	OE2F
	H1c1	**0.71815**	**0.326723**		H2c1	0.682169	0.393117	H1	EF1
	H1c1f	0.668564	0.525807		**H2c1f**	**0.75579**	**0.385337**	H2	EF1F
	H1c2	**0.71082**	**0.161335**		**H2c2**	**0.73274**	0.142092	H1	EF2
	H1c2f	**0.7688**	**0.281429**		**H2c2f**	**0.76485**	0.247886	H1	EF2F
	H1d1	0.686555	0.665239		**H2d1**	**0.72652**	**0.243319**	H2	AD1
	H1d2	**0.71655**	**0.455806**		**H2d2**	**0.73745**	0.266934	H1	AD2

- The colour of the hypothesis heading is the result of previous (standalone) analysis (red = reject, blue = support, green = strong support)
- Bold indicates those that have a solution consistency above the 0.7 consistency threshold.
- The colour in the last column indicates which sub-hypothesis with the same outcome has the larger solution coverage. (orange = H1, supporting GOC; light purple = H2, supporting FC)

It should be noted that the results of the previous hypothesis testing and of this analysis are not directly related. Supporting or rejecting the hypothesis does not affect the interpretation of the comparison of solution coverage. The former tests whether the proposed specific type of research construct is sufficient to generate the corresponding performance dimension by feeding all types of the research construct into fsQCA and then interpreting the results, while the latter compares a by-product of the former analysis, which is the overall solution consistency and coverage that are combined values of all solution paths shown, without restricting them only to the proposed specific type of research construct, meaning that these numbers do not take the research hypotheses into consideration. Rather, all possible combinations of all types of research construct are considered. Consequently, it is unsurprising that ie and ef2 (from H1a and H1c, respectively), which were previously rejected, are among the group of performance dimensions in which H1 has more solution coverage than H2, suggesting that GOC better explains related performance than FC. In other words, although the proposed GOC (LCD, A) is insufficient to generate the related performance dimension, other GOC typologies displayed in the solution paths still provide a better performance explanation than that of FC.

8.4 Chapter summary

In this chapter, I have reported the findings from testing the first two main hypotheses regarding the relationship of each separate proposed research construct with different performance dimensions.

In summary (Table 8-14), all sub-hypotheses of H1 and H2, except H1a and H2a, are supported. Thus, it can be inferred that either GOC or FC is a "usually"[41] sufficient condition to generate high corresponding performance, except input efficiency. A rejected H1a and a strongly supported H2a suggest that GOC (especially low-cost defender) is not a "usually" sufficient condition for input efficiency, but FC (especially operations) is a "usually" sufficient condition for input efficiency.

For the necessity test, prospector, defender and reactor are found to be trivial necessary conditions for some solutions. However, they are shown as necessary only because of the skewness of the data, as suggested by Schneider and Wagemann (2012), and can be disregarded for inference purposes.

However, since a sufficient condition can be expressed in terms of a necessary condition when applying De Morgan's laws, the previous summary can also be expressed as follows.

[41] Please note that I adopt the probabilistic concept of quasi sufficiency (Braumoeller & Goertz, 2000; Ragin, 2000, 2005; Greckhamer et al., 2008: 715) in which sufficiency is considered based on certain benchmarks (significance levels). Since I require a consistency threshold above 0.7 for each solution path for it to be considered as sufficient, the results of this study fall into the "usually" sufficient category according to Ragin (2000: 109), which requires that a particular solution path significantly passes a benchmark of 0.65. Meaning that 65 per cent of the cases with a specific combination must exhibit the outcome for the combination to pass the significance test.

The absence of a high intensity level of either GOC or FC is a “usually” necessary condition for a business unit not to achieve the high performance that corresponds with that GOC or FC, except input efficiency. A rejected H1a and a strongly supported H2a suggest that the absence of a high intensity level of GOC (especially low-cost defender) is not a “usually” necessary condition for a business unit not to achieve high input efficiency, while the absence of a high intensity level of FC (especially operations) is a “usually” necessary condition for a business unit not to achieve high input efficiency.

In the next chapter, I will test these two causal conditions together to establish whether complementarity exists between them and whether such complementarity generates equifinality, apart from what has already been observed in the absence of complementarity in this chapter.

Table 8-14: Summary test results of H1 & H2

Hypothesis	Sub-hypothesis	Sub-hypothesis result	Sum of unique coverage for paths supporting classification	Dominant result for each hypothesis
H1	H1a: LCD-BCD-IE	Reject	0.314327	Reject
	H1a: LCD-BCD-IEF	Support	0.022014	
	H1b: DIFD-BCD-OE1	Support	0.005109	Support
	H1b: DIFD-BCD -OE1F	Support	0.096447	
	H1b: DIFD-BCD -OE2	Support	0.183199	
	H1b: DIFD-BCD -OE2F	Support	0.187376	
	H1c: A-EF1	Support	0.103302	Support
	H1c: A-EF1F	Support	0.116708	
	H1c: A-EF2	Reject	0.161335	
	H1c: A-EF2F	Support	0.015179	
	H1d: P-AD1	Support	0.039827	Support
	H1d: P-AD2	Support	0.439398	
H2	H2a: OP-IE	Strong support	0.064702	Strong support
	H2a: OP-IEF	Support	0.058673	
	H2b: RD-OE1	Support	0.267766	Support
	H2b: RD-OE1F	Support	0.176479	
	H2b: RD-OE2	Support	0.244818	
	H2b: RD-OE2F	Support	0.16741	
	H2c: MIS-SD-EF1	Support	0.14319	Support
	H2c: MIS-SD-EF1F	Support	0.194755	
	H2c: MIS-SD-EF2	Support	0.142092	
	H2c: MIS-SD-EF2F	Support	0.098325	
	H2d: MKT-AD1	Support	0.119581	Support
	H2d: MKT-AD2	Support	0.174371	

9 HYPOTHESIS TESTING: COMPLEMENTARITY AND EQUIFINALITY

In this chapter, I will report the findings from testing the last two main hypotheses regarding the relationship of both proposed research constructs (GOC and FC) with different performance dimensions (which translate into four sub-hypotheses for each test) to test complementarity (H3), and with the overall performance proxy to test equifinality between them (H4). Again, two types of performance measures and financial data for each performance dimension are provided for the purposes of triangulation and to answer the concern about common method bias (Podsakoff et al., 2003). At the end of chapter, post-hoc analysis of each of the two main hypotheses will be discussed for patterns and further implications, and each sub-hypothesis and each hypothesis as a whole will be summarized.

9.1 Hypothesis testing: Complementarity (H3)

Note that there are two dimensions to test the third main hypothesis regarding complementarity between GOC and FC on performance dimensions (H3) based on Milgrom and Roberts' (1995) assumption about the origin of complementarity and their definition of complementarity.

First, testing whether a proposed combination of GOC and FC that share similar practices lead to high corresponding performance. This test is built on Milgrom and Roberts' (1995) assumption that complementarity stems from similarity (or practices "of the same kind"). To do so, I set one performance dimension as the outcome of interest and test it with all six possible GOC attributes and one or two FC attributes expected by the research sub-hypothesis to correspond with that performance dimension as causal conditions, resulting in four sub-hypotheses. We can argue that complementarity exists if a proposed combination of GOC and FC under each sub-hypothesis leads to high corresponding performance. The findings of each sub-hypothesis test will be reported in the next section.

Second, comparing explanation powers whether the proposed combination of GOC and FC better explain the variation in corresponding performance than considering each research construct alone. This test is based on Milgrom & Robert's (1995: 181) complementarity definition (i.e. a circumstance in which "doing more of one thing increases the returns to doing more of another"). We can argue that complementarity exists if the explanation power of a proposed combination of GOC and FC under each sub-hypothesis better explain the variation in corresponding performance than considering either GOC or FC under such sub-hypothesis alone. This comparison will be reported in post-hoc analysis section.

9.1.1 Analysis of H3a: LCD-BCD-OP-IE

Five out of six solution paths pass the consistency threshold (Table 9-1). Four have analyzer as either a core condition (S3 (op*~dif*~r*~d*a*~p), S5 (~lc*dif*~r*~d*a*~p) and S6 (~op*~dif*~r*d*a*~p)) or a peripheral condition (S4 (lc*~dif*~r*~d*a*~p)) and another attribute present (either operations, differentiation, defender or low-cost), suggesting a trade-off relationship between them. Moreover, their unique coverages are quite similar, raising a concern that high input efficiency may be achieved through a variety of causal conditions, not just operations and low cost as proposed in the hypothesis. Furthermore, like S1 of the H1a analysis (~lc·~dif·~r·~d·~a·~p), S2 (~op*~dif*~r*~d*~a*~p) of this analysis, which can also be categorized as a stuck in the middle reactor, is the dominant condition with the highest unique coverage (0.12), reconfirming that other FC attributes should be considered to better explain or predict input efficiency. The hypothesis testing section also endorses such a conclusion. T1 displays low consistency for most paths, while T2 and T3 show high consistency for all paths, all of which suggests that H3a is weakly supported.

The financial data analysis (ief) displays quite a different pattern. While analyzer is present in most paths in the survey analysis, its absence is a core condition in two out of three paths (S1 (~op*dif*~d*~a*~p) and S3 (~op*lc*dif*~r*~d*~a)) and is a "don't care" condition for the other path (S2 (~op*~dif*~r*d*~p)). Moreover, the absence of operations is a core condition for all paths. It can be inferred that the proposed hypothesis regarding complementarity between low cost and operations is not strongly supported and more types of FC should be added to improve explanatory power. The hypothesis testing section reconfirms this argument, showing high consistency levels in T1, T2 and T3 of all paths, resulting in an overall support result.

Deviation from H3a (LCD-BCD-OP-IE) probably arises only from alternative theory. In order to understand the H3a findings clearly, it is necessary to refer to the validity of H1a and H2a because these are the tests of the two research constructs examined in H3a and also share the same outcome as H3a. Since H1a has already been discussed, I will not repeat it here. On careful examination of the combination of FCs for each solution of H2a, I find that operations capability (OP) by itself is insufficient to generate high input efficiency (ie). In fact, OP is only displayed as a peripheral or a “don’t care” condition. It needs marketing and R&D as a core part of the combination to generate high ie.

Therefore, it is not beyond expectation that H3a, which considers all types of GOC as in H1a (which is rejected) and only OP from H2a (which is shown as a peripheral or “don’t care” condition in the solution), is weakly supported because of the weak explanatory power of each research construct examined in this test. Consequently, according to fsQCA practice (Schneider & Wagemann, 2012), this deviant H3a finding suggests that the researcher should add other FCs (in this case, marketing and R&D) in order to refine and improve the explanatory power of the current sub-hypothesis for performance.

In order to understand clearly whether H3a provides an improvement over each of its two research constructs alone (an argument for complementarity), the H1a and H2a findings must be considered and compared. The fact that H1a is rejected while H2a is strongly supported merely suggests that, when comparing two proposed causal factors under sub-hypotheses H1a and H2a, OP is a better predictor than low-cost defender (LCD) for high ie. This means that having only the intention to pursue a low-cost and defender strategy is insufficient to achieve high ie, whereas having OP is sufficient for a business unit to achieve high ie. However, since all types of GOC and FC, rather than only a proposed type, are examined in H1a and H2a respectively (e.g. all GOC typologies, not just LCD, are investigated in H1a), comparing their solution coverages will indicate whether GOC or FC as a whole better explains the outcome, irrespective of each of their proposed types alone.

In other words, which research construct is better is another question that cannot be answered on the basis of the validity of the two sub-hypotheses. Rather, comparison between the overall solution coverage of each sub-hypothesis is required. The fact that the solution coverage of H1a (0.44) is greater than that of H2a (0.15) – both have a solution consistency above the 0.7 threshold – suggests that considering a combination of GOC (all typologies) provides greater explanatory power than that of FC (all types).

Essentially, although a proposed GOC typology in H1a (LCD) is not supported, other GOC typologies tested at the same time (those not proposed in sub-hypothesis H1a) still provide better explanatory power (as shown in higher coverage) for ie than considering all types of FC as in H2a, which in turn casts doubt on Barney and Hoskisson's (1990) claim that FC is better than GOC in explaining performance, and on their suggestion that GOC should be replaced with FC. Moreover, I find that considering all GOCs and OP simultaneously (H3a) provides the highest solution coverage (0.54), compared with that of H1a (0.44) and H2a (0.15), supporting my argument for complementarity.

Table 9-1: fsQCA results for H3a: LCD-BCD-OP-IE/IEF

	H3a: GOC-OP-IE						H3a: GOC-OP-IEF		
Condition	S1	S2	S3	S4	S5	S6	S1	S2	S3
Prospector (P)	Θ*	θ*	θ*	θ*	Θ*	Θ*	θ*	Θ*	
Analyzer (A)	θ	Θ	●	•	●	●	Θ		Θ
Defender (D)	●	Θ	Θ	Θ	θ	●	Θ	●	Θ
Reactor (R)	Θ*	θ*	Θ*	Θ*	Θ*	Θ*		Θ*	θ*
Differentiation (Dif)	●	Θ	Θ	Θ	●	θ	•	θ	•
Low cost (Lc)				●	Θ				•
Operations (OP)		Θ	●			Θ	Θ	Θ	Θ
Observed cases	1	6	10	5	4	1	5	7	4
Consistency	0.541017	**0.809458**	**0.738754**	**0.713514**	**0.704821**	**0.832197**	**0.752608**	**0.750066**	**0.741754**
Raw coverage	0.058826	0.226452	0.256795	0.209680	0.183706	0.067485	0.170743	0.153932	0.129075
Unique coverage	0.016973	0.120518	0.052179	0.000233	0.054643	0.023382	0.053508	0.124083	0.019507
Solution consistency	**0.720577**						**0.759119**		
Solution coverage	0.535373						0.314333		
T1: H•S⊂Y-Consistency	0.466552	**0.745894**	0.523277	0.523277	0.563929	**0.852646**	**0.706112**	**0.804982**	**0.706112**
T1: H•S⊂Y -Raw coverage	0.037132	0.028298	0.039813	0.039813	0.028720	0.029535	0.026172	0.033658	0.026172
T2: ~H•S⊂Y -Consistency	0.557338	***0.808985***	***0.738073***	***0.713185***	***0.703511***	***0.833603***	***0.754514***	***0.750571***	***0.744141***
T2: ~H•S⊂Y -Raw coverage	0.060791	0.224518	0.257189	0.210136	0.183932	0.069439	0.170138	0.154996	0.128397
T3: H•~S⊂~Y - Consistency	***0.883664***	***0.885203***	***0.885203***	***0.885203***	***0.885203***	***0.885203***	***0.711670***	***0.711670***	***0.711670***
T3: H•~S⊂~Y -Raw coverage	0.101355	0.102894	0.102894	0.102894	0.102894	0.102894	0.092653	0.092653	0.092653
T4: ~H•~S⊂Y -Consistency	0.474977	0.466305	0.463463	0.480596	0.485694	0.484881	0.528534	0.521645	0.529742
T4: ~H•~S⊂Y -Raw coverage	0.966423	0.851670	0.831285	0.887879	0.901204	0.978176	0.867366	0.868442	0.897398
Solution path hypothesis result	Ignore	Weak support	Reject	Reject	Reject	Weak support	Weak support	Support	Weak support
Combined solution path unique coverage of same hypothesis result		0.1439	0.107055				0.073015	0.124083	
Overall hypothesis result	**Weak support**						**Support**		

9.1.2 Analysis of H3b: DIFD-BCD-RD-OE

Only two of four paths pass the consistency threshold (Table 9-2). Both seem to support the hypothesis in that at least one of the proposed causal conditions (Dif and RD) is presented and the other is a "don't care" condition (S3 (rd*~r*d*~p) and S4 (~lc*dif*~d*~a*~p)). Their T1 and T2 consistencies are high, while those for T3 and T4 are low, showing a support result.

The financial data analysis exhibits five paths (out of six) that pass the consistency threshold, two of which (S1 (rd*~r*d*~p) and S2 (~lc*dif*~d*~a*~p)) are exactly same as S3 and S4 of the previous test. Another two paths (S3 (lc*~dif*~r*~d*~a*~p) and S5 (~rd*dif*~r*~d*a*~p)) are a subset of S1 (lc*~r*~a*~p) and S2 (~lc*~r*a*~p) of the previous analysis respectively, which also somewhat supports the hypothesis owing to the "don't care" condition for R&D and the presence of differentiation. Finally, S6 (~rd*lc*dif*~r*~d*~a*p), which can be categorized as best-cost prospector, also corresponds with the hypothesis in the presence of differentiation. Consequently, the financial data analysis also supports H3a.

In the oe2 analysis, six out of seven paths pass the consistency threshold (Table 9-3). These can be classified into three groups. The first group comprises those that show complementarity by the presence of both R&D and differentiation (S7 (rd*~lc*dif*~r*a*~p)). The second group is those that exhibit the presence of one of the proposed causal conditions (S2 (rd*lc*~dif*~r*~p), S4 (~rd*~lc*dif*~d*~a*~p) and S6 (~rd*lc*dif*~r*~d*~a)), suggesting a trade-off relationship between them. This group is the dominant group with a combined unique coverage of 0.166. The third group comprises those that have a "don't care" condition for one of the proposed causal conditions (S1 (lc*~dif*~r*~a*~p), S3 (~lc*~r*d*a*~p) and S4 (~rd*~lc*dif*~d*~a*~p)), which may still support this hypothesis. The hypothesis testing section also supports this pattern, suggesting support for H3a. The analysis for oe2f also shows the same pattern as the second group (S2 (dif*~r*~a*~p), S4 (~rd*dif*~r*~d*~p) and S5 (lc*dif*~r*~d*~a)) and third group (S1 (lc*~r*~a*~p)) of the previous test, as well as providing the same support result.

Table 9-2: fsQCA results for H3b: DIFD-BCD-RD-OE1/OE1F

	H3b: GOC-RD-OE1				**H3b: GOC-RD-OE1F**					
Condition	S1	S2	S3	S4	S1	S2	S3	S4	S5	S6
Prospector (P)	Θ*	Θ*	Θ*	Θ*	Θ*	θ*	θ*	θ*	θ*	●
Analyzer (A)	Θ	●		θ		Θ	Θ	●	●	θ
Defender (D)			●	Θ	●	Θ	Θ	Θ	Θ	Θ
Reactor (R)	θ*	Θ*	Θ*		Θ*		θ*	Θ*	Θ*	Θ*
Differentiation (Dif)				•		●	Θ		•	•
Low cost (Lc)	●	Θ		Θ		Θ	●	θ		•
R&D (RD)			●		●			Θ	Θ	Θ
Observed cases	9	24	6	5	6	5	1	13	3	1
Consistency	0.648344	0.663247	**0.782438**	**0.772698**	**0.707672**	**0.724664**	**0.794016**	0.697460	**0.773250**	**0.778194**
Raw coverage	0.196212	0.374276	0.115329	0.172121	0.102809	0.159101	0.110858	0.250632	0.153986	0.033637
Unique coverage	0.054184	0.241412	0.037515	0.032313	0.032455	0.058696	0.016003	0.120965	0.028882	0.010464
Solution consistency	0.635798				**0.714627**					
Solution coverage	0.538797				0.454133					
T1: H•S⊂Y-Consistency	**0.791743**	**0.954857**	**0.796242**	**0.875266**	**0.748266**	**0.776939**	**0.833337**	0.672732	0.688173	**0.865103**
T1: H•S⊂Y -Raw coverage	0.054777	0.042356	0.059158	0.046974	0.054794	0.041098	0.039283	0.016219	0.018201	0.005915
T2: ~H•S⊂Y -Consistency	0.645642	0.663392	***0.774616***	***0.771952***	***0.721813***	***0.723961***	***0.793858***	0.697353	***0.772928***	***0.780676***
T2: ~H•S⊂Y -Raw coverage	0.192817	0.375529	0.111991	0.171354	0.102856	0.158391	0.109838	0.250811	0.154502	0.033991
T3: H•~S⊂~Y - Consistency	0.615825	0.600694	0.643375	0.600694	0.596100	0.600781	0.600781	0.600781	0.600781	0.600781
T3: H•~S⊂~Y -Raw coverage	0.046819	0.046819	0.046819	0.046819	0.044053	0.047553	0.047553	0.047553	0.047553	0.047553
T4: ~H•~S⊂Y -Consistency	0.544902	0.542449	0.517564	0.524309	0.525862	0.532296	0.532542	0.526383	0.539682	0.528046
T4: ~H•~S⊂Y -Raw coverage	0.897811	0.736226	0.933547	0.896900	0.934876	0.897471	0.937648	0.798192	0.905846	0.958520
Solution path hypothesis result	Ignore	Ignore	Support	Support	Support	Support	Support	Ignore	Reject	Support
Combined solution path unique coverage of same hypothesis result			0.069828		0.117618				0.028882	
Overall hypothesis result	**Support**				**Support**					

Table 9-3: fsQCA results for H3b: DIFD-BCD-RD-OE2/OE2F

	H3b: GOC-RD-OE2							H3b: GOC-RD-OE2F				
Condition	S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4	S5
Prospector (P)	Θ*	Θ*	Θ*	θ*	θ*		Θ*	Θ*	θ*	Θ*	Θ*	
Analyzer (A)	θ		●	Θ		Θ	•	Θ	Θ			Θ
Defender (D)			●	Θ*	Θ*	Θ*				θ	θ	Θ
Reactor (R)	Θ*	Θ*	Θ*		Θ*	θ*	Θ*	θ*	Θ*	Θ*	Θ*	Θ*
Differentiation (Dif)	Θ	Θ		●	•	●	●		●	●	●	●
Low cost (Lc)	●	●	θ	θ	●	•	Θ	●		Θ		•
R&D (RD)		•		Θ	Θ	Θ	●				Θ	
Observed cases	3	9	2	5	2	6	2	9	11	8	12	10
Consistency	**0.787646**	**0.755536**	**0.767557**	**0.743361**	0.688015	**0.734725**	**0.702059**	**0.821701**	**0.769282**	0.669804	**0.731773**	**0.849219**
Raw coverage	0.148281	0.240705	0.102530	0.163666	0.170731	0.140549	0.132670	0.259547	0.284802	0.228601	0.261149	0.266998
Unique coverage	0.014541	0.102085	0.037641	0.051884	0.020881	0.011608	0.021251	0.051003	0.021670	0.013007	0.030008	0.060114
Solution consistency	0.684780							**0.755821**				
Solution coverage	0.483686							0.483687				
T1: H•S⊂Y - Consistency	**0.907640**	**0.913392**	**0.817749**	**0.732503**	**0.722283**	**0.722283**	**0.817749**	**0.887499**	**0.877538**	**0.847579**	**0.943977**	**0.884763**
T1: H•S⊂Y - Raw coverage	0.052365	0.056197	0.042304	0.027134	0.027986	0.027986	0.042304	0.064085	0.065038	0.047477	0.034352	0.062371
T2: ~H•S⊂Y - Consistency	***0.786262***	***0.756616***	***0.768671***	***0.741886***	0.688755	***0.734261***	***0.701126***	***0.821572***	***0.766990***	0.668632	***0.730965***	***0.849751***
T2: ~H•S⊂Y - Raw coverage	0.146633	0.241133	0.104896	0.162522	0.170091	0.139749	0.132994	0.256083	0.279841	0.227903	0.260290	0.266000
T3: H•~S⊂~Y - Consistency	***0.939062***	***0.939062***	***0.939062***	***0.939062***	***0.939062***	***0.939062***	***0.939062***	0.576488	0.594456	0.562324	0.562324	0.562324
T3: H•~S⊂~Y -Raw coverage	0.063670	0.063670	0.063670	0.063670	0.063670	0.063670	0.063670	0.041983	0.041983	0.041983	0.041983	0.041983
T4: ~H•~S⊂Y -Consistency	0.473974	0.462183	0.470280	0.468264	0.474937	0.459873	0.471612	0.481693	0.473723	0.504682	0.499662	0.466358
T4: ~H•~S⊂Y -Raw coverage	0.977570	0.893918	0.990675	0.940870	0.941842	0.938010	0.968382	0.828358	0.789290	0.845968	0.820131	0.801454
Solution path hypothesis result	Support	Support	Support	Support	Ignore	Support	Support	Support	Support	Ignore	Support	Support
Combined solution path unique coverage of same hypothesis result	0.23901							0.162795				
Overall hypothesis result	**Support**							**Support**				

9.1.3 Analysis of H3c: A-MIS-SD-EF

Out of seven paths (Table 9-4), only three are above the consistency threshold, and can be categorized into two groups. The first comprises those that display a "don't care" condition for FC attributes (S1 (lc*~dif*~r*~a*~p) and S2 (~lc*dif*~d*~a*~p)); this group does not reject H3c. Since both have only one GOC attribute present, they suggest a trade-off relationship between low cost and differentiation in order to achieve ef1. The second group comprises those that display attributes of both GOC and FC (S6 (sd*mis*~dif*~r*d*~p)), which quite support the complementarity of H3c. Likewise, the hypothesis testing section also suggests overall support for H3c.

The financial data analysis reveals five paths (out of seven) exceeding the consistency threshold, which can be grouped in the same way as those in the previous test with one additional group. Regarding the similarity, for the first group, S1 (~dif*~r*~a*~p) is a superset of the previous test's S1. S2 (~lc*dif*~d*~a*~p) and S4 (lc*dif*~r*~d*~a) are exactly the same as the previous test's S2 and S4 respectively. For the second group, S6 (sd*mis*~dif*~r*d*~p) and S7 (sd*mis*lc*dif*~r*~d) are exactly the same as the previous test's S6 and S7 respectively. The additional group comprises those that display attributes of FC and have no attribute of GOC present (S5 (mis*~lc*~dif*~r*~d*~p)). This group is also coherent with H3c, resulting in overall support.

However, the analysis of ef2 (Table 9-5) shows only one group that has one GOC attribute present and either a "don't care" condition or the absence of FC attributes (S1 (~lc*dif*~d*~a*~p)), which is exactly the same as S2 of the ef1 test (S2 (~mis*~lc*~dif*~r*d*~p)). By itself, this group does not provide strong support for the hypothesis, though it does not reject it. Thus, to find a finer grained hypothesis validity, the hypothesis testing section is necessary and it rejects H3c because T1 of S1 (a dominant combination) is below the consistency threshold. The financial data for ef2 indicate the same direction as the survey analysis. Two groups can be classified from all six paths, four of which are similar to the pattern of ef2 analysis (S1 (~lc*dif*~d*~p), S2 (~lc*dif*~r*~p), S3

(~mis*lc*~dif*~r*~p) and S4 (~sd*lc*~dif*~r*~p)). This group shows a potential trade-off relationship between differentiation and low cost in generating ef2f. Another group is one supporting complementarity between sales & distribution and either differentiation or low cost (S5 (sd*dif*~r*~d*~a*~p) and S6 (sd*~mis*lc*~r*~d*~p)). Nevertheless, the latter, which is a dominant group with a combined unique coverage of 0.08, has a T1 consistency below the consistency threshold, resulting in overall rejection of H3c.

Similarly to the discussion of H3a above, deviation from H3c (A-MIS-SD-EF2/EF2F) also arises only from alternative theory, for which the validity of H1c and H2c must be referred to because they are the tests of the two research constructs examined in H3c and also share the same outcome as H3c. I will not repeat H1c as it has been discussed earlier. Careful examination of the combination of FCs for each solution of H2c reveals that MIS and sales and distribution (SD) by themselves are insufficient to generate high market share (ef2). In fact, they are often displayed as a peripheral or a “don’t care” condition (apart from one solution path in which MIS is exhibited as a core condition, while SD is displayed as a “don’t care” condition). Clearly, marketing and operations are required to be a core parts of the combination to generate high ef2.

Therefore, it is not beyond expectation that H3c, which considers all types of GOC as in H1c (which is rejected) and only MIS and SD from H2c (which are often shown as peripheral or “don’t care” conditions) are rejected because of the weak explanatory power of each research construct examined in this test. Consequently, according to fsQCA practice (Schneider & Wagemann, 2012), this deviant H3c finding suggests that the researcher should add other FCs (in this case, marketing and operations) to refine and improve the explanatory power of the current sub-hypothesis for performance.

In order to understand clearly whether H3c provides an improvement over each of its two research constructs alone (an argument for complementarity), the findings of H1c and H2c must be considered and compared. The fact that H1c is rejected while H2c is supported merely suggests that, when comparing two proposed causal factors under sub-hypotheses H1c and H2c, MIS and SD are better predictors than analyzer of high market share. This means that having only the intention to pursue an analyzer strategy is insufficient to gain high market share, whereas having MIS and SD is sufficient for a business unit to achieve high market share.

However, since all types of GOC and FC, rather than only a proposed type, are examined in H1c and H2c respectively (e.g. all GOC typologies, not just analyzer, are investigated in H1c), comparing their solution coverages will indicate whether GOC or FC as a whole group better explains the outcome, irrespective of each of their proposed types alone. In other words, which research construct is better is another question that cannot be answered on the basis of the validity of the two sub-hypotheses. Rather, comparison of the overall solution coverage of each sub-hypothesis is required.

The fact that the solution coverage of H1c (0.16 for ef2 and 0.28 for ef2f) is greater than that of H2c (0.14 for ef2 and 0.25 for ef2f) – all have a solution consistency above the 0.7 threshold – suggests that considering a combination of GOCs (all typologies) provides more explanatory power for market share than a combination of FCs (all types). Essentially, although a proposed GOC typology in H1c (analyzer) is not supported, other GOC typologies tested at the same time (those not proposed in sub-hypothesis H1c) still provide better explanatory power (as shown in higher coverage) for market share than considering all types of FC as in H2c, which in turn again casts doubt on Barney and Hoskisson's (1990) claim that FC is better than GOC in explaining performance, and on their suggestion that GOC should be replaced with FC. Moreover, I find that considering all GOCs and OP simultaneously (H3c) provides the highest solution coverage (0.27 for ef2 and 0.43 for ef2f) compared with that of H1c (0.16 for ef2 and 0.28 for ef2f) and H2c (0.14 for ef2 and 0.25 for ef2f), supporting my argument for complementarity.

Table 9-4: fsQCA results for H3c: A-MIS-SD-EF1/EF1F

	H3c: GOC-MIS-SD-EF1						
Condition	S1	S2	S3	S4	S5	S6	S7
Prospector (P)	Θ*	θ*	Θ*		Θ*	Θ*	
Analyzer (A)	Θ	Θ		Θ	●		
Defender (D)		Θ	Θ	Θ	●	●	Θ
Reactor (R)	θ*		θ*	θ*	Θ*	Θ*	Θ*
Differentiation (Dif)	θ	●	●	●	θ	θ	●
Low cost (Lc)	●	θ		•	θ		•
MIS (MIS)						•	•
Sales & distribution (SD)			●			●	●
Observed cases	3	5	30	9	2	6	28
Consistency	**0.770447**	**0.756489**	0.691651	0.695848	0.682610	**0.772270**	0.676070
Raw coverage	0.136668	0.185175	0.461778	0.230345	0.080959	0.090902	0.398668
Unique coverage	0.028184	0.043180	0.048283	0.037023	0.020250	0.024377	0.000000
Solution consistency	0.673365						
Solution coverage	0.692684						
T1: H•S⊂Y-Consistency	**0.748419**	**0.910834**	**0.718837**	**0.840547**	**0.739235**	**0.738335**	**0.712783**
T1: H•S⊂Y -Raw coverage	0.066208	0.063584	0.346939	0.098132	0.050418	0.065612	0.344732
T2: ~H•S⊂Y -Consistency	***0.767797***	***0.754910***	0.679861	0.694787	***0.721060***	***0.842208***	0.664079
T2: ~H•S⊂Y -Raw coverage	0.134921	0.184143	0.221752	0.228990	0.083170	0.082614	0.170646
T3: H•~S⊂~Y - Consistency	0.526228	0.526228	0.741027	0.526228	0.522128	0.525249	***0.714871***
T3: H•~S⊂~Y -Raw coverage	0.322003	0.322003	0.234046	0.322003	0.316754	0.312029	0.231289
T4: ~H•~S⊂Y -Consistency	0.464312	0.455414	0.448308	0.453566	0.477883	0.457350	0.456913
T4: ~H•~S⊂Y -Raw coverage	0.630372	0.578735	0.565748	0.558827	0.665093	0.647251	0.612720
Solution path hypothesis result	Support	Support	Ignore	Ignore	Ignore	Support	Ignore
Combined solution path unique coverage of same hypothesis result	0.095741						
Overall hypothesis result	**Support**						

	H3c: GOC-MIS-SD-EF1F						
Condition	S1	S2	S3	S4	S5	S6	S7
Prospector (P)	Θ*	θ*	Θ*		Θ*	Θ*	
Analyzer (A)	Θ	Θ		Θ			
Defender (D)		Θ	θ	Θ	θ	●	Θ
Reactor (R)	θ*		Θ*	θ*	Θ*	Θ*	Θ*
Differentiation (Dif)	Θ	•	●	•	Θ	θ	●
Low cost (Lc)		θ		•	Θ		•
MIS (MIS)					●	•	•
Sales & distribution (SD)			●			●	●
Observed cases	20	4	30	9	5	6	28
Consistency	**0.735369**	**0.762059**	0.681173	**0.752217**	**0.738033**	**0.803126**	0.673230
Raw coverage	0.338897	0.165036	0.402357	0.220300	0.154973	0.083637	0.351230
Unique coverage	0.163257	0.009004	0.035479	0.028725	0.060011	0.007472	0.000000
Solution consistency	0.659029						
Solution coverage	0.799455						
T1: H•S⊂Y-Consistency	**0.881385**	**0.921763**	**0.701861**	**0.925860**	**0.787913**	**0.758613**	0.688025
T1: H•S⊂Y -Raw coverage	0.075240	0.056929	0.299697	0.095632	0.114804	0.059643	0.294399
T2: ~H•S⊂Y -Consistency	***0.735216***	***0.761716***	***0.800584***	***0.750830***	***0.746818***	***0.883570***	***0.828801***
T2: ~H•S⊂Y -Raw coverage	0.337426	0.164385	0.231027	0.218935	0.120745	0.076680	0.188423
T3: H•~S⊂~Y - Consistency	0.543262	0.543262	0.646449	0.543262	0.563360	0.541911	0.628340
T3: H•~S⊂~Y -Raw coverage	0.375054	0.375054	0.230356	0.375054	0.359345	0.363209	0.229361
T4: ~H•~S⊂Y -Consistency	0.588322	0.592421	0.559641	0.576523	0.573292	0.553283	0.559987
T4: ~H•~S⊂Y -Raw coverage	0.532292	0.666058	0.624833	0.628436	0.696644	0.692755	0.664377
Solution path hypothesis result	Support	Support	Ignore	Support	Support	Support	Ignore
Combined solution path unique coverage of same hypothesis result	0.268469						
Overall hypothesis result	**Support**						

Table 9-5: fsQCA results for H3c: A-MIS-SD-EF2/EF2F

	H3c: GOC-MIS-SD-EF2		H3c: GOC-MIS-SD-EF2F					
Condition	S1	S2	S1	S2	S3	S4	S5	S6
Prospector (P)	θ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*
Analyzer (A)	ϴ						ϴ	
Defender (D)	ϴ	●	ϴ				θ	θ
Reactor (R)		ϴ*		ϴ*	ϴ*	ϴ*	θ*	ϴ*
Differentiation (Dif)	•	θ	●	●	ϴ	ϴ	●	
Low cost (Lc)	ϴ	θ	ϴ	ϴ	●	●		•
MIS (MIS)		ϴ			ϴ			ϴ
Sales & distribution (SD)						ϴ	●	●
Observed cases	5	10	9	9	2	2	5	2
Consistency	**0.710821**	**0.707768**	**0.765686**	**0.765449**	**0.744607**	**0.721643**	**0.752359**	**0.724879**
Raw coverage	0.161335	0.141693	0.271478	0.276201	0.122971	0.135516	0.176421	0.122943
Unique coverage	0.133212	0.113569	0.005228	0.009829	0.000000	0.014413	0.059603	0.020313
Solution consistency	0.698729		**0.737556**					
Solution coverage	0.274904		0.433273					
T1: H•S⊂Y-Consistency	0.577474	**0.885895**	**0.741731**	**0.742281**	**0.738684**	**0.741347**	0.661336	0.632467
T1: H•S⊂Y -Raw coverage	0.037379	0.019773	0.067693	0.067888	0.036445	0.060719	0.076477	0.052048
T2: ~H•S⊂Y -Consistency	***0.707803***	***0.707659***	***0.758817***	***0.758912***	***0.741195***	***0.720002***	***0.751887***	***0.721963***
T2: ~H•S⊂Y -Raw coverage	0.160089	0.142945	0.261769	0.266685	0.121413	0.135352	0.174923	0.121360
T3: H•~S⊂~Y - Consistency	0.592729	0.592729	0.646881	0.646881	0.638187	0.638187	0.638187	0.638187
T3: H•~S⊂~Y -Raw coverage	0.389349	0.389349	0.400526	0.400526	0.400526	0.400526	0.400526	0.400526
T4: ~H•~S⊂Y -Consistency	0.555285	0.560079	0.532188	0.529617	0.539168	0.545114	0.523206	0.528620
T4: ~H•~S⊂Y -Raw coverage	0.654301	0.649741	0.607637	0.601397	0.695621	0.707863	0.673700	0.697165
Solution path hypothesis result	Reject	Support	Support	Support	Support	Support	Reject	Reject
Combined solution path unique coverage of same hypothesis result	0.133212	0.113569	0.02947				0.079916	
Overall hypothesis result	**Reject**		**Reject**					

9.1.4 Analysis of H3d: P-MKT-AD

Five out of six paths pass the consistency threshold (Table 9-6), all of which have the same pattern in that they display either a “don’t care” condition or the absence of FC attributes with one or two GOC attributes present. S2 (~lc*dif*~d*~a), S4 (~lc*dif*~r*~a*~p) and S5 (~lc*dif*~r*~d*~p), which is a dominant combination, are very similar in that they display the presence of differentiation and absence of the other conditions. They provide good support for H3d. On the other hand, S3 (lc*~dif*~r*~a*~p), displaying the presence of low cost, and S6 (~mkt*~dif*~r*d*a*~p), exhibiting the absence of marketing and the presence of two GOC attributes, provide less support for H3d. However, S3 and S6 have low unique coverage; therefore, their effect is low. The hypothesis testing section also suggests a support result.

Analysis of ad2 provides three paths, all of which display the presence of differentiation, suggesting the importance of this attribute in generating ad2. S2 (mkt*lc*dif*~r*~d*~p), which is a dominant combination with a sizable unique coverage of 0.44, is a good match with H3d. Moreover, since S2 and S3 (~mkt*lc*dif*~r*~d*~a*p) are different only between prospector and marketing (two conditions proposed in H3d), the two conditions can be treated as substitutes. S1 (~lc*dif*r*~d*~a) is also consistent with H3d owing to its “don’t care” condition for both conditions proposed in H3d. Therefore, the overall hypothesis is supported, as also suggested by the hypothesis testing section.

Table 9-6: fsQCA results for H3d: P-MKT-AD1/AD2

	H3d: GOC-MKT-AD1						**H3d: GOC-MKT-AD2**		
Condition	S1	S2	S3	S4	S5	S6	S1	S2	S3
Prospector (P)			Θ*	Θ*	Θ*	Θ*		Θ*	●
Analyzer (A)	Θ	Θ	Θ	θ		●	Θ		θ
Defender (D)	Θ	Θ			θ	●	Θ*	θ*	Θ*
Reactor (R)	θ*		θ*	Θ*	Θ*	Θ*	●	Θ*	Θ*
Differentiation (Dif)	●	●	θ	●	●	θ	•	●	•
Low cost (Lc)		θ	●	Θ	Θ		θ	•	•
Marketing (MKT)						Θ		●	Θ
Observed cases	10	3	3	3	3	4	1	29	1
Consistency	0.686327	**0.734068**	**0.762409**	**0.733449**	**0.769484**	**0.851297**	**0.970090**	**0.720484**	**0.821792**
Raw coverage	0.280026	0.167176	0.122587	0.167030	0.250633	0.088057	0.027005	0.476571	0.046173
Unique coverage	0.105196	0.002648	0.020246	0.005280	0.089036	0.035288	0.015458	0.443178	0.018686
Solution consistency	0.693129						**0.728978**		
Solution coverage	0.443688						0.511286		
T1: H•S⊂Y-Consistency	**0.729945**	**0.740807**	**0.861210**	**0.801838**	**0.801838**	**0.985291**	**0.990466**	**0.834103**	**0.822977**
T1: H•S⊂Y -Raw coverage	0.071538	0.022629	0.017538	0.020266	0.020266	0.006270	0.005593	0.062100	0.029947
T2: ~H•S⊂Y -Consistency	0.691858	***0.740586***	***0.760692***	***0.731484***	***0.768836***	***0.851061***	***0.959823***	***0.720516***	***0.819252***
T2: ~H•S⊂Y -Raw coverage	0.244050	0.166304	0.121164	0.166122	0.250094	0.090217	0.027701	0.476310	0.046260
T3: H•~S⊂~Y - Consistency	***0.774825***	0.560471	0.569823	0.569823	0.569823	0.569823	0.643419	0.643419	0.643419
T3: H•~S⊂~Y -Raw coverage	0.047083	0.064451	0.066951	0.066951	0.066951	0.066951	0.066426	0.066426	0.066426
T4: ~H•~S⊂Y -Consistency	0.530683	0.537898	0.534615	0.539583	0.531241	0.524059	0.452218	0.394305	0.449468
T4: ~H•~S⊂Y -Raw coverage	0.809864	0.881122	0.906462	0.880940	0.815159	0.909147	0.943653	0.600654	0.939324
Solution path hypothesis result	Ignore	Support	Support	Support	Support	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result		0.152498					0.477322		
Overall hypothesis result	**Support**						**Support**		

9.2 Hypothesis testing: Equifinality (H4)

To test the fourth main hypothesis regarding equifinality between combinations of GOC and FC (H4), I set one overall performance proxy as the outcome of interest and test it with all six possible GOC attributes and one or two FC attributes according to the research hypothesis (in line with those of H3) as causal conditions, resulting in four sub-hypotheses. In another test of the sub-hypotheses, I treat all performance dimensions as causal conditions to be examined with the overall performance proxy as the final outcome of concern to test whether each performance dimension is an intermediate performance toward the overall performance proxy, which in turn helps support the equifinality argument. This results in five sub-hypotheses.

9.2.1 Analysis of H4a: LCD-BCD-OP-OA

Four out of five paths (Table 9-7) pass the consistency threshold, which can be categorized into two groups. The first group comprises those that quite support H4a by having either a present or "don't care" condition for operations (S1 (op*~dif*~r*~p), which is a dominant combination suggesting that FC overpowers GOC, S2 (~dif*~r*~d*~a*~p) and S4 (~dif*~r*d*a*~p)). S1 and S4 also suggest that the presence of operations and the presence of analyzer and defender can be treated as substitutes. The second group comprises those that are quite against H4a because they display the absence of both operations and low cost, though leaving defender as a "don't care" condition (S5 (~op*~lc*dif*~r*~a*~p)). However, since S5 has low unique coverage (0.04), its effect is small, resulting in overall support, as shown in the hypothesis testing section. All three paths of the financial data analysis (Table 8-8) exceed the consistency threshold and reveal the same pattern as the dominant group of the previous survey analysis (S1 (op*~dif*~r*~a*~p), which is a dominant combination, also suggesting that FC overpowers GOC (S2 (dif*r*~d*~a*~p) and S3 (op*~lc*~dif*~r*d*~p)), resulting in strong support for H4a.

Analysis of oa2 (Table 9-8) provides six paths, all of which pass the consistency threshold. They can also be classified into two groups as in the oa1 analysis. The first comprises those that support complementarity between GOC and FC (having a present or “don’t care” condition for at least one attribute of both GOC and FC), comprising S1 (op*~r*~d*~a*~p), S2 (~lc*dif*~d*~a*~p), S3 (~lc*dif*~r*~a*~p), S4 (op*lc*~dif*~r*~p) and S5 (~dif*~r*d*a*~p). S4, which matches H4a most closely, having the presence of both operations and low cost, is the dominant combination with a unique coverage of 0.096. The second group is those that offer less support for H4a by having an absence of operations (S6 (~op*lc*dif*~r*~d*~a*p)), because this suggests that only a combination within the GOC attributes and without the proposed FC attribute is sufficient to generate oa2. However, S6 does not completely reject the hypothesis because it is still possible for this combination to be complementary with other FC attributes not yet tested in the analysis owing to technical limitations (appropriate number of causal conditions). Consequently, the overall hypothesis result is supported. However, the oa2f analysis exhibits a different picture. Only S1 (dif*r*~d*~a*~p) fits with the supporting group, while S2 (~op*~dif*~r*~d*~a*~p) and S3 (~op*lc*dif*~r*~d*~a*p) match the less supporting group. Since S2 is the dominant combination with a unique coverage of 0.15, the overall hypothesis is rejected.

Table 9-7: fsQCA results for H4a: LCD-BCD-OP-OA1

	H4a: GOC-OP-OA1					**H4a: GOC-OP-OA1F**		
Condition	S1	S2	S3	S4	S5	S1	S2	S3
Prospector (P)	ϴ*	θ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*
Analyzer (A)		ϴ		●	θ	ϴ	ϴ	
Defender (D)		ϴ	θ	●			θ	●
Reactor (R)	ϴ*	θ*	ϴ*	ϴ*	ϴ*	θ*	●	ϴ*
Differentiation (Dif)	ϴ	ϴ	ϴ	θ	●	ϴ	•	θ
Low cost (Lc)			●		ϴ			ϴ
Operations (OP)	●				ϴ	●		●
Observed cases	17	7	5	5	2	3	1	2
Consistency	**0.763913**	**0.751682**	0.690030	**0.767942**	**0.777452**	**0.705287**	**0.900013**	**0.744652**
Raw coverage	0.319791	0.224194	0.196632	0.098132	0.138411	0.135570	0.022730	0.094514
Unique coverage	0.095767	0.073882	0.002741	0.000727	0.041629	0.045524	0.013280	0.009672
Solution consistency	**0.731587**					**0.732550**		
Solution coverage	0.490663					0.158522		
T1: H•S⊂Y-Consistency	**0.778244**	**0.771931**	**0.784021**	**0.816038**	**0.761024**	**0.746731**	**0.744965**	**0.766578**
T1: H•S⊂Y -Raw coverage	0.077118	0.054361	0.058303	0.067703	0.024546	0.064645	0.003513	0.055519
T2: ~H•S⊂Y -Consistency	***0.780748***	***0.751373***	0.689291	***0.785469***	***0.774987***	0.697319	***0.889444***	***0.743557***
T2: ~H•S⊂Y -Raw coverage	0.301072	0.222829	0.196266	0.092472	0.136927	0.130335	0.023318	0.095503
T3: H•~S⊂~Y - Consistency	***0.845701***	***0.734511***	***0.734511***	***0.777085***	***0.734511***	0.638614	0.618892	0.618892
T3: H•~S⊂~Y -Raw coverage	0.081937	0.097564	0.097564	0.092290	0.097564	0.077964	0.077964	0.077964
T4: ~H•~S⊂Y -Consistency	0.529065	0.540981	0.541687	0.549152	0.538308	0.507846	0.501117	0.500067
T4: ~H•~S⊂Y -Raw coverage	0.780900	0.848994	0.858642	0.959826	0.888785	0.906775	0.936251	0.917031
Solution path hypothesis result	Support	Support	Ignore	Support	Weak support	Strong support	Support	Support
Combined solution path unique coverage of same hypothesis result	0.170376				0.041629	0.045524	0.022952	
Overall hypothesis result	**Support**					**Strong support**		

Table 9-8: fsQCA results for H4a: LCD-BCD-OP-OA2

	H4a: GOC-OP-OA2						**H4a: GOC-OP-OA2F**		
Condition	S1	S2	S3	S4	S5	S6	S1	S2	S3
Prospector (P)	Θ*	Θ*	Θ*	Θ*	Θ*	●	Θ*	θ*	●
Analyzer (A)	Θ	Θ	Θ		●	θ	Θ	Θ	θ
Defender (D)	Θ	θ			●	Θ	θ	Θ	Θ
Reactor (R)	θ*		θ*	Θ*	Θ*	Θ*	●	θ*	Θ*
Differentiation (Dif)		●	●	Θ	θ	•	•	Θ	•
Low cost (Lc)		Θ	Θ	●		•			•
Operations (OP)	●			●		Θ		Θ	Θ
Observed cases	7	4	5	8	5	1	1	6	1
Consistency	**0.730454**	**0.746076**	**0.729245**	**0.747734**	**0.773055**	**0.807737**	**0.903026**	**0.712054**	**0.874591**
Raw coverage	0.173165	0.153065	0.153560	0.187967	0.092686	0.040676	0.023214	0.185475	0.050292
Unique coverage	0.047546	0.004508	0.004898	0.095579	0.024202	0.016948	0.005147	0.154515	0.031710
Solution consistency	**0.739136**						**0.737562**		
Solution coverage	0.391140						0.222809		
T1: H•S⊂Y-Consistency	**0.849508**	**0.775188**	**0.775188**	**0.810222**	**0.790610**	**0.744664**	0.671525	0.645614	**0.784337**
T1: H•S⊂Y -Raw coverage	0.070413	0.036493	0.036493	0.075330	0.061544	0.004758	0.003223	0.022806	0.005722
T2: ~H•S⊂Y -Consistency	***0.730599***	***0.744282***	***0.727217***	***0.758976***	***0.789612***	***0.803340***	***0.890471***	***0.711645***	***0.873360***
T2: ~H•S⊂Y -Raw coverage	0.172213	0.152164	0.152709	0.178392	0.087220	0.040654	0.023762	0.183893	0.050468
T3: H•~S⊂~Y - Consistency	0.667086	0.667086	0.667086	***0.715100***	***0.701675***	0.667086	0.695513	0.695513	0.695513
T3: H•~S⊂~Y -Raw coverage	0.095456	0.095456	0.095456	0.087880	0.089774	0.095456	0.086129	0.086129	0.086129
T4: ~H•~S⊂Y -Consistency	0.585681	0.570378	0.570800	0.568673	0.572344	0.568247	0.499334	0.500246	0.502446
T4: ~H•~S⊂Y -Raw coverage	0.897152	0.871122	0.868600	0.868040	0.938596	0.932165	0.949613	0.850700	0.941158
Solution path hypothesis result	Support	Support	Support	Support	Support	Support	Reject	Reject	Support
Combined solution path unique coverage of same hypothesis result	0.193681						0.159662		0.03171
Overall hypothesis result	**Support**						**Reject**		

9.2.2 Analysis of H4b: DIFD-BCD-RD-OA

All six paths are above the consistency threshold (Table 9-9). Five belong to a group that seems to support complementarity (having a present or "don't care" condition for at least one attribute of both GOC and FC), comprising S1 (~dif*~r*~d*~a*~p), S2 (lc*~dif*~r*~a*~p), S3 (~lc*dif*~r*d*~p), S4 (rd*~lc*~r*a*~p) and S5 (~lc*~r*d*a*~p). S4 is a dominant combination with the highest unique coverage of 0.11. S3 and S4 also suggest that the presence of defender and differentiation and the presence of R&D and analyzer can be treated as substitutes. Likewise, S4 and S5 suggest that the presence of defender and the presence of R&D can also be treated as substitutes.

Another group is those offering less support for the hypothesis, comprising S6 (~rd*dif*~r*~d*a*~p), in that it requires the absence of R&D to generate oa1. Again, this does not completely reject the hypothesis by itself. Rather, it suggests the potential to add other FC attributes to the analysis. However, S6's unique coverage is low at 0.046; thus, the overall hypothesis result is supported. Analysis for oa1f reveals a different pattern. Only three out of six paths pass the consistency threshold and only one belongs to the supporting group (S3 (~lc*dif*r*~d*~a*~p)) but with a very low unique coverage of 0.009, while another two paths (S5 (~rd*lc*dif*~r*~d*a*~p), which is a dominant combination with the highest unique coverage of 0.048, and S6 (~rd*lc*dif*~r*~d*~a*p)) fit in the less supporting group. Similarly, the hypothesis testing section also suggests rejection of H4a.

The analysis of oa2 (Table 9-10) displays a similar pattern. Most fit in the supporting group (S1 (lc*~r*d*~a*~p), S2 (dif*~r*d*~a*~p), S3 (rd*~dif*~r*a*~p), which is a dominant combination with the highest unique coverage of 0.198, S4 (~lc*dif*r*~d*~a*~p) and S6 (rd*~r*d*~a*~p)) whereas only S5 (~rd*lc*dif*~r*~d*~a*p) matches the less supporting group and also has a low unique coverage of 0.022. Hence, the overall hypothesis is supported. Like the oa1f analysis, the oa2f analysis shows only two out of five paths exceeding the consistency threshold and the dominant combination (S2 (~rd*lc*~r*~a*~p)) belongs to the less supporting group. Thus, the overall hypothesis is rejected.

Table 9-9: fsQCA results for H4b: DIFD-BCD-RD-OA1/OA1F

	H4b: GOC-RD-OA1						**H4b: GOC-RD-OA1F**					
Condition	S1	S2	S3	S4	S5	S6	S1	S2	S3	S4	S5	S6
Prospector (P)	θ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	●
Analyzer (A)	ϴ	θ		•	●	●	ϴ	ϴ	ϴ	●	●	θ
Defender (D)	ϴ		●		●	θ		θ	θ	●	θ	ϴ
Reactor (R)	θ*	ϴ*	ϴ*	ϴ*	ϴ*	ϴ*	θ*	θ*	●	ϴ*	ϴ*	ϴ*
Differentiation (Dif)	ϴ	ϴ	●			●	ϴ		•		•	•
Low cost (Lc)		●	θ	ϴ	θ		●	●	θ	ϴ	●	•
R&D (RD)				●		ϴ		●		●	ϴ	ϴ
Observed cases	8	3	1	10	2	3	3	1	1	1	1	1
Consistency	**0.751682**	**0.709208**	**0.869599**	**0.805589**	**0.809541**	**0.725893**	0.699061	0.688357	**0.899418**	0.668734	**0.729954**	**0.828485**
Raw coverage	0.224194	0.112379	0.067728	0.239050	0.091020	0.143970	0.116591	0.148449	0.022580	0.052657	0.103988	0.037539
Unique coverage	0.088797	0.013574	0.011282	0.105505	0.013668	0.046278	0.022289	0.048372	0.008598	0.011788	0.047550	0.010284
Solution consistency	**0.736105**						**0.712239**					
Solution coverage	0.452546						0.257856					
T1: H•S⊂Y - Consistency	**0.842230**	**0.844559**	**0.833476**	**0.957318**	**0.957318**	**0.931195**	**0.741233**	**0.734100**	**0.853223**	**0.713954**	0.610107	**0.917465**
T1: H•S⊂Y - Raw coverage	0.040296	0.041013	0.044059	0.041685	0.041685	0.024529	0.037886	0.051229	0.003701	0.032721	0.016800	0.006575
T2: ~H•S⊂Y -Consistency	***0.751373***	***0.707985***	***0.868720***	***0.803586***	***0.809755***	***0.725133***	0.697738	0.688977	***0.888643***	0.670571	***0.731884***	***0.830275***
T2: ~H•S⊂Y - Raw coverage	0.222829	0.111134	0.068805	0.239177	0.093010	0.144361	0.115279	0.147358	0.023129	0.053751	0.104633	0.037896
T3: H•~S⊂~Y - Consistency	***0.885221***	***0.885221***	***0.885221***	***0.885221***	***0.885221***	***0.885221***	***0.711381***	***0.711381***	***0.711381***	***0.711381***	***0.711381***	***0.711381***
T3: H•~S⊂~Y -Raw coverage	0.070377	0.070377	0.070377	0.070377	0.070377	0.070377	0.053638	0.053638	0.053638	0.053638	0.053638	0.053638
T4: ~H•~S⊂Y -Consistency	0.542580	0.546798	0.537674	0.531120	0.548670	0.547173	0.510847	0.520260	0.501990	0.506283	0.515602	0.504416
T4: ~H•~S⊂Y -Raw coverage	0.865794	0.949244	0.977533	0.844653	0.972846	0.914697	0.933427	0.935025	0.963635	0.965479	0.941434	0.959825
Solution path hypothesis result	Support	Support	Support	Support	Support	Support	Ignore	Ignore	Weak support	Ignore	Reject	Weak support
Combined solution path unique coverage of same hypothesis result	0.279104								0.018882		0.04755	
Overall hypothesis result	**Support**						Reject					

Table 9-10: fsQCA results for H4b: DIFD-BCD-RD-OA2/OA2F

	H4b: GOC-RD-OA2						**H4b: GOC-RD-OA2F**				
Condition	S1	S2	S3	S4	S5	S6	S1	S2	S3	S4	S5
Prospector (P)	ϴ*	ϴ*	ϴ*	ϴ*	●	ϴ*	θ*	ϴ*	ϴ*	ϴ*	●
Analyzer (A)	θ	θ	•	ϴ	θ	ϴ	ϴ	ϴ	ϴ	●	θ
Defender (D)	●	●		θ	ϴ	●	ϴ		θ	●	ϴ
Reactor (R)	ϴ*	ϴ*	ϴ*	●	ϴ*	θ*	θ*	θ*	●	ϴ*	ϴ*
Differentiation (Dif)		●	ϴ	•	•		ϴ		•		•
Low cost (Lc)	●			θ	•			●	θ	θ	•
R&D (RD)			●		ϴ	•		ϴ		ϴ	
Observed cases	2	1	16	1	1	2	8	7	1	1	4
Consistency	**0.837823**	**0.822846**	**0.755209**	**0.771245**	**0.804013**	**0.864116**	0.682665	**0.742646**	**0.906550**	0.693382	0.692425
Raw coverage	0.094663	0.072954	0.261158	0.017260	0.032475	0.098533	0.218140	0.149580	0.023167	0.055868	0.081689
Unique coverage	0.016552	0.012881	0.197998	0.010198	0.021935	0.019859	0.126746	0.061916	0.005147	0.019493	0.047562
Solution consistency	**0.781932**						0.683559				
Solution coverage	0.374339						0.367767				
T1: H•S⊂Y-Consistency	**0.812157**	**0.794485**	**0.823552**	0.490674	0.639401	**0.794485**	0.488169	0.654083	**0.860353**	0.586033	**0.813746**
T1: H•S⊂Y -Raw coverage	0.051751	0.051961	0.035862	0.001897	0.004085	0.051961	0.025023	0.022854	0.003799	0.015188	0.006874
T2: ~H•S⊂Y - Consistency	***0.845981***	***0.819804***	***0.754258***	***0.764824***	***0.796719***	***0.871573***	0.682227	***0.742510***	***0.889677***	0.690637	0.692841
T2: ~H•S⊂Y -Raw coverage	0.095296	0.074153	0.261993	0.017745	0.032416	0.099205	0.216763	0.148534	0.023570	0.057278	0.082201
T3: H•~S⊂~Y - Consistency	***0.724550***	***0.730641***	***0.730641***	***0.730641***	***0.730641***	***0.724550***	***0.762733***	***0.762733***	***0.762733***	***0.762733***	***0.762733***
T3: H•~S⊂~Y -Raw coverage	0.060682	0.062576	0.062576	0.062576	0.062576	0.060682	0.056533	0.056533	0.056533	0.056533	0.056533
T4: ~H•~S⊂Y - Consistency	0.571007	0.568999	0.548496	0.567061	0.566274	0.559369	0.496378	0.496558	0.496845	0.498777	0.504049
T4: ~H•~S⊂Y -Raw coverage	0.959349	0.970420	0.782556	0.970357	0.960537	0.940077	0.848600	0.899243	0.970823	0.957172	0.940483
Solution path hypothesis result	Support	Support	Support	Reject	Reject	Support	Ignore	Reject	Weak support	Ignore	Ignore
Combined solution path unique coverage of same hypothesis result	0.24729			0.032133				0.061916	0.005147		
Overall hypothesis result	**Support**						Reject				

9.2.3 Analysis of H4c: A-MIS-SD-OA

Eight out of nine paths are above the consistency threshold (Table 9-11), all of which belong to a group that seems to support complementarity (having a present or "don't care" condition for at least one attribute of both GOC and FC), comprising S1 (lc*~dif*~r*d*~p), S2 (~dif*~r*d*a*~p), S3 (~sd*~lc*~r*~d*~a*~p)), which is a dominant combination with the highest unique coverage of 0.088, S5 (sd*~lc*~dif*~r*a*~p), S6 (mis*~lc*~dif*~r*a*~p), S7 (sd*mis*~dif*~r*d*~p), S8 (sd*mis*~dif*~r*a*~p) and S9 (sd*~mis*dif*~r*~d*a*~p)). With more conservative consideration, I find that the combined unique coverage (0.125) of those that have the presence of at least one attribute of each research construct (GOC, FC) – S5, S6, S7, S8 and S9 –is greater than for those that do not (0.095) – S1, S2 and S3 – suggesting support, which is consistent with the hypothesis testing section.

The financial data analysis provides the same picture in that all four paths belong to a group that seems to support complementarity (S1 (~mis*lc*dif*~r*~d)), which is a dominant combination with the highest unique coverage of 0.1, S2 (~lc*dif*r*~d*~p), S3 (sd*mis*~lc*~dif*~r*d*~p) and S4 (sd*~mis*~lc*dif*~d*~p)). Nonetheless, with more conservative consideration as in the survey data analysis, the combined unique coverage of S3 and S4 (0.07) is less than that of S1 and S2 (0.108). This inconsistency is also shown in the hypothesis testing section, in that S4 rejects H4c while the others support H4c. However, since the unique coverage of S4 is low, the overall hypothesis is still supported.

The oa2 analysis (Table 9-12) shows seven out of eight paths exceeding the consistency threshold. Like the oa1 test, all belong to a group that seems to support complementarity (S1 (lc*~dif*~r*d*~p), S2 (~sd*~lc*dif*~d*~a*~p), S3 (~sd*~lc*dif*~r*~a*~p), S4 (sd*mis*~dif*~r*d*~p), S5 (sd*mis*~dif*~r*a*~p), S6 (~mis*lc*dif*~r*~d*p) and S8 (sd*mis*lc*dif*~r*~d*~a*~p)). Most importantly, S5, which perfectly matches H4c, is a dominant combination with the highest unique coverage of 0.119. Furthermore, S4, S5 and S8 seem to support complementarity between MIS and sales & distribution, as proposed in the hypothesis. In addition, many trade-off relationships can be observed (between the absence of defender (S2) and reactor (S3), between the presence of defender (S4) and analyzer (S5), between the presence of prospector (S6) and MIS and sales & distribution (S8)), indicating second-order equifinality. Likewise, the hypothesis testing section suggests support for H4c. The financial data analysis reveals a similar picture. Four out of seven paths pass the consistency threshold. All of them (S2 (~lc*dif*r*~d*~p), S3 (sd*~mis*lc*dif*~r*~d), S5 (sd*~mis*~lc*~dif*~r*a*~p) and S7 (sd*~mis*~lc*~r*~d*a*~p)) fit in the group supporting complementarity. S5 and S7 indicate complementarity between analyzer and sales & distribution and are, thus, quite consistent with H4c. Although S7 is not a dominant combination (S3 has the highest unique coverage of 0.05), it has the second highest unique coverage of 0.01. Without significant consistency of T3 and T4 for all four paths, the hypothesis testing section suggests support for H4c.

Table 9-11: fsQCA results for H4c: A-MIS-SD-OA1/OA1F

	H4c: GOC-MIS-SD-OA1								
Condition	S1	S2	S3	S4	S5	S6	S7	S8	S9
Prospector (P)	⊖*	⊖*	θ*	⊖*	⊖*	⊖*	⊖*	⊖*	θ*
Analyzer (A)		●	⊖		●	•		•	●
Defender (D)	●	●	⊖		⊖		•		⊖
Reactor (R)	⊖*	⊖*	⊖*	⊖*		⊖*	⊖*	⊖*	⊖*
Differentiation (Dif)	θ	θ		●	θ	⊖	⊖	⊖	•
Low cost (Lc)	●		⊖	⊖	θ	θ			
MIS (MIS)				⊖		●	●	●	⊖
Sales & distribution (SD)			⊖	⊖	●		•	•	●
Observed cases	5	5	9	5	5	6	6	13	2
Consistency	**0.729725**	**0.767942**	**0.758664**	0.697209	**0.833859**	**0.757641**	**0.823183**	**0.724674**	**0.736290**
Raw coverage	0.083785	0.098132	0.221425	0.149703	0.177268	0.156127	0.086555	0.186065	0.087575
Unique coverage	0.009831	0.006832	0.088051	0.034063	0.016880	0.013763	0.016422	0.043304	0.034366
Solution consistency	**0.725540**								
Solution coverage	0.523089								
T1: H•S⊂Y-Consistency	**0.782121**	**0.812123**	**0.910674**	0.779950	**0.845753**	**0.845753**	**0.812123**	**0.723082**	**0.812793**
T1: H•S⊂Y -Raw coverage	0.053537	0.064468	0.045855	0.031726	0.130941	0.130941	0.064468	0.185415	0.055200
T2: ~H•S⊂Y -Consistency	***0.746747***	***0.775205***	***0.757201***	0.695517	***0.854511***	***0.753470***	***0.841132***	***0.821090***	***0.733017***
T2: ~H•S⊂Y -Raw coverage	0.077075	0.087097	0.219808	0.148934	0.136431	0.115978	0.073704	0.098284	0.086560
T3: H•~S⊂~Y - Consistency	0.520322	0.524920	0.517330	0.517330	0.542814	0.542645	0.524920	0.560478	0.517330
T3: H•~S⊂~Y -Raw coverage	0.348110	0.348110	0.353384	0.353384	0.340148	0.340148	0.348110	0.299323	0.353384
T4: ~H•~S⊂Y -Consistency	0.544567	0.555828	0.539539	0.544468	0.537755	0.551401	0.537750	0.540431	0.539760
T4: ~H•~S⊂Y -Raw coverage	0.676924	0.688930	0.566936	0.608312	0.663639	0.683740	0.679821	0.697543	0.669595
Solution path hypothesis result	Support	Support	Support	Ignore	Support	Support	Support	Support	Support
Combined solution path unique coverage of same hypothesis result	0.229449								
Overall hypothesis result	**Support**								

	H4c: GOC-MIS-SD-OA1F			
Condition	S1	S2	S3	S4
Prospector (P)		⊖*	⊖*	⊖*
Analyzer (A)				
Defender (D)	⊖	⊖	●	⊖
Reactor (R)	⊖*	●	⊖*	
Differentiation (Dif)	•	•	θ	●
Low cost (Lc)	●	θ	⊖	θ
MIS (MIS)	⊖		•	⊖
Sales & distribution (SD)			●	●
Observed cases	6	1	2	3
Consistency	**0.747191**	**0.899418**	**0.728039**	**0.709546**
Raw coverage	0.171174	0.022580	0.063624	0.090567
Unique coverage	0.099682	0.008335	0.048836	0.020997
Solution consistency	**0.735348**			
Solution coverage	0.250992			
T1: H•S⊂Y-Consistency	**0.718437**	**0.837301**	**0.797373**	0.594113
T1: H•S⊂Y -Raw coverage	0.051084	0.005211	0.051132	0.025884
T2: ~H•S⊂Y -Consistency	***0.747593***	***0.888643***	***0.706465***	***0.709069***
T2: ~H•S⊂Y -Raw coverage	0.169906	0.023129	0.058094	0.089067
T3: H•~S⊂~Y - Consistency	0.559523	0.559523	0.564364	0.559523
T3: H•~S⊂~Y -Raw coverage	0.362481	0.362481	0.362481	0.362481
T4: ~H•~S⊂Y -Consistency	0.512592	0.519353	0.523923	0.513193
T4: ~H•~S⊂Y -Raw coverage	0.616322	0.695271	0.699313	0.655083
Solution path hypothesis result	Support	Support	Support	Reject
Combined solution path unique coverage of same hypothesis result	0.156853			0.020997
Overall hypothesis result	**Support**			

Table 9-12: fsQCA results for H4c: A-MIS-SD-OA2/OA2F

	H4c: GOC-MIS-SD-OA2							
Condition	S1	S2	S3	S4	S5	S6	S7	S8
Prospector (P)	Θ*	Θ*	Θ*	Θ*	Θ*	●	●	Θ*
Analyzer (A)		Θ	Θ		•			Θ
Defender (D)	●	θ		•		Θ	Θ	θ
Reactor (R)	Θ*		θ*	Θ*	Θ*	Θ*	Θ*	θ*
Differentiation (Dif)	θ	●	●	Θ	Θ	•	•	•
Low cost (Lc)	●	Θ	Θ			•	•	•
MIS (MIS)				●	●	Θ		●
Sales & distribution (SD)		Θ	Θ	●	●		Θ	•
Observed cases	5	3	3	6	13	1	1	2
Consistency	**0.778822**	**0.822214**	**0.810829**	**0.884529**	**0.823798**	**0.721577**	0.685508	**0.762194**
Raw coverage	0.083901	0.125371	0.125866	0.087263	0.198456	0.033345	0.035927	0.102389
Unique coverage	0.016595	0.004508	0.004898	0.015408	0.119141	-0.000000	-0.000000	0.037749
Solution consistency	**0.794248**							
Solution coverage	0.390780							
T1: H•S⊂Y-Consistency	**0.869214**	**0.844841**	**0.842516**	**0.863464**	**0.825825**	0.517578	0.505671	**0.807619**
T1: H•S⊂Y -Raw coverage	0.055825	0.036362	0.036404	0.064311	0.198686	0.008876	0.012072	0.079026
T2: ~H•S⊂Y -Consistency	***0.797396***	***0.819742***	***0.808137***	***0.919253***	***0.842449***	***0.721321***	0.683969	***0.763034***
T2: ~H•S⊂Y -Raw coverage	0.077221	0.124591	0.125136	0.075576	0.094615	0.033593	0.036453	0.101219
T3: H•~S⊂~Y - Consistency	0.426346	0.425289	0.425289	0.430114	0.491308	0.425289	0.425289	0.425289
T3: H•~S⊂~Y -Raw coverage	0.307280	0.312962	0.312962	0.307280	0.282660	0.312962	0.312962	0.312962
T4: ~H•~S⊂Y -Consistency	0.556319	0.530084	0.530922	0.542784	0.546730	0.540663	0.540983	0.545910
T4: ~H•~S⊂Y -Raw coverage	0.648836	0.584193	0.583689	0.643819	0.662103	0.638848	0.639226	0.642111
Solution path hypothesis result	Support	Support	Support	Support	Support	Reject	Ignore	Support
Combined solution path unique coverage of same hypothesis result	0.198299					0		
Overall hypothesis result	**Support**							

	H4c: GOC-MIS-SD-OA2F						
Condition	S1	S2	S3	S4	S5	S6	S7
Prospector (P)	θ*	Θ*		●	Θ*	Θ*	θ*
Analyzer (A)	Θ				●	●	●
Defender (D)	Θ	Θ	Θ	Θ		●	Θ
Reactor (R)	θ*	●	Θ*	Θ*	Θ*	Θ*	Θ*
Differentiation (Dif)	Θ	•	•	•	θ	θ	
Low cost (Lc)		θ	●	•	θ	θ	θ
MIS (MIS)			Θ		Θ		Θ
Sales & distribution (SD)			●	Θ	●	Θ	●
Observed cases	8	1	2	1	1	1	2
Consistency	0.682665	**0.906550**	**0.846142**	0.689838	**0.738947**	0.654316	**0.779471**
Raw coverage	0.218140	0.023167	0.123753	0.041283	0.079940	0.049198	0.101576
Unique coverage	0.143932	0.005617	0.054792	0.015966	-0.000000	0.013831	0.010310
Solution consistency	**0.728592**						
Solution coverage	0.370982						
T1: H•S⊂Y-Consistency	0.549263	**0.723485**	**0.734533**	0.529406	**0.736855**	0.597742	**0.765895**
T1: H•S⊂Y -Raw coverage	0.049350	0.004584	0.053163	0.014432	0.033951	0.018590	0.040876
T2: ~H•S⊂Y -Consistency	0.682227	***0.889677***	***0.850780***	0.691406	***0.741124***	0.652770	***0.783651***
T2: ~H•S⊂Y -Raw coverage	0.216763	0.023570	0.122990	0.042077	0.078966	0.050754	0.101250
T3: H•~S⊂~Y - Consistency	0.607489	0.607489	0.607489	0.607489	0.607489	0.607489	0.607489
T3: H•~S⊂~Y -Raw coverage	0.386876	0.386876	0.386876	0.386876	0.386876	0.386876	0.386876
T4: ~H•~S⊂Y -Consistency	0.535094	0.532984	0.529980	0.537528	0.539109	0.536360	0.536725
T4: ~H•~S⊂Y -Raw coverage	0.618009	0.726285	0.694618	0.725254	0.712897	0.716676	0.701502
Solution path hypothesis result	Ignore	Support	Support	Ignore	Support	Ignore	Support
Combined solution path unique coverage of same hypothesis result		0.070719					
Overall hypothesis result	**Support**						

9.2.4 Analysis of H4d: P-MKT-OA

Six out of seven paths are above the consistency threshold (Table 9-13). Although all belong to a group that seems to support complementarity, having a present or "don't care" condition for at least one attribute of both GOC and FC (S1 (~dif*~r*~d*~a), S2 (mkt*~dif*~r*~p), S3 (~lc*dif*~r*~a*~p), S5 (~dif*~r*d*a*~p), S6 (lc*~dif*~r*~a*~p) and S7 (lc*~dif*~r*d*~p)), only S2, which is a dominant combination, requires the presence of marketing. The rest leave marketing as a "don't care" condition, raising a concern that the hypothesis may, at best, be weakly supported. However, the combined unique coverage (0.098) of those that do not have the presence of marketing (S1, S3, S5, S6 and S7) is less than that of S2 (0.177), suggesting a fairly supportive result. Thus, to provide a decisive hypothesis result from this mixed evidence, it is necessary to rely on the hypothesis testing section.

All paths except S5 and S7 have a T1 consistency below the consistency threshold, suggesting rejection of the hypothesis. Since these paths include a dominant combination (S2), their combined unique coverage is higher than that of S5 and S7. Thus, the overall hypothesis is rejected. Moreover, when considering S5 and S7, both have T2 and T3 consistencies above the consistency threshold and their absolute T3 coverage is greater than that of T1, resulting in weak support. In other words, the deviation paths with a minority combined unique coverage suggest little validity improvement over that of the dominant one.

Likewise, the financial data analysis suggests a slight increase in the level of hypothesis support to that of the survey data, recommending overall weak support. One out of all four paths that pass the consistency threshold exhibits the presence of both GOC and FC attributes (S4 (mkt*~lc*~dif*~r*d*~p)), which matches H4d quite well, while the rest either have an FC attribute in a "don't care" condition (S1 (~lc*dif*r*~d*~a)) or an absence condition (S2 (~mkt*lc*~dif*~r*~a*~p) and S3 (~mkt*lc*dif*~r*~d*~a)). While the latter group includes a dominant combination (S3) with a unique coverage of 0.051, S4 has the second highest unique coverage (0.042), hence their relevance is quite similar. In addition, the hypothesis testing section shows that all four paths have a similar pattern to that of S5 and S7 of the survey data analysis, leading to the same hypothesis result.

The oa2 analysis (Table 9-14) displays seven paths, all of which pass the consistency threshold. Four belong to a group that seems to support complementarity (S3 (mkt*~dif*~r*d*~p), S4 (~dif*~r*d*a*~p), S6 (mkt*lc*~dif*~r*a*~p) and S7 (lc*~dif*~r*d*~p)). This group resembles the solution paths of the oa1 analysis. While S3 is a subset of S2 of the oa1 analysis, S4 and S7 are the exactly the same as S5 and S7 of the oa1 analysis, respectively. The other three paths belong to a group that seems to offer less support for complementarity as it requires the absence of marketing to generate oa2 (S1 (~mkt*~r*~d*~a), S2 (~mkt*~lc*dif*~d*~a) and S5 (~mkt*~lc*dif*~r*~a*~p)). Whereas the former includes S6, which has the second highest unique coverage of 0.102, the latter includes S1, which has the highest unique coverage of 0.104.

Owing to the mixed evidence, the hypothesis testing section becomes essential. Although S2, S3, S4 and S7 suggest support, their combined unique coverage is lower than that of S1, S5 and S6, which suggests rejection of the hypothesis. Therefore, the validity of the latter hypothesis dominates the results of the overall oa2 analysis.

Analysis of the financial data (oa2f) differs from the survey data. Only two paths are shown. One is in a group supporting complementarity (S1 (~lc*dif*r*~d*~a)) while the other is in a less supporting one (S2 (~mkt*lc*dif*~r*~d*~a*p)). However, the hypothesis testing section exhibits support for both because the T1 and T2 consistencies of both are above the consistency threshold.

Table 9-13: fsQCA results for H4d: P-MKT-OA1/OA1F

	H4d: GOC-MKT-OA1							**H4d: GOC-MKT-OA1F**			
Condition	S1	S2	S3	S4	S5	S6	S7	S1	S2	S3	S4
Prospector (P)		Θ*	Θ*	Θ*	Θ*	Θ*	Θ*		Θ*		Θ*
Analyzer (A)	Θ		θ		●	θ		Θ	Θ	θ	
Defender (D)	Θ			θ	●		•	Θ		Θ	●
Reactor (R)	θ*	Θ*	Θ*	Θ*	Θ*	Θ*	Θ*	●	θ*	Θ*	Θ*
Differentiation (Dif)	Θ	Θ	●	●	θ	Θ	Θ	•	θ	•	θ
Low cost (Lc)			Θ	Θ		●	●	θ	●	●	θ
Marketing (MKT)		●							Θ	Θ	●
Observed cases	8	12	3	3	5	3	5	1	3	2	2
Consistency	**0.754025**	**0.776094**	**0.721253**	0.698399	**0.767942**	**0.709208**	**0.729725**	**0.899418**	**0.764098**	**0.756372**	**0.714784**
Raw coverage	0.227035	0.304315	0.161872	0.224181	0.098132	0.112379	0.083785	0.022580	0.102099	0.122158	0.078244
Unique coverage	0.078231	0.177149	0.005220	0.043184	0.012635	0.000000	0.001550	0.009366	0.026142	0.051273	0.042032
Solution consistency	**0.716344**							**0.729537**			
Solution coverage	0.565388							0.204857			
T1: H•S⊂Y-Consistency	0.600149	0.600149	0.542163	0.542163	**0.828620**	0.568018	**0.783675**	**0.893170**	**0.850206**	**0.830545**	**0.863273**
T1: H•S⊂Y -Raw coverage	0.013013	0.013013	0.013504	0.013504	0.005345	0.011400	0.004494	0.004548	0.014592	0.027256	0.006024
T2: ~H•S⊂Y -Consistency	***0.753753***	***0.775914***	***0.719077***	0.697239	***0.769620***	***0.707985***	***0.733220***	***0.888643***	***0.762230***	***0.755541***	***0.713372***
T2: ~H•S⊂Y -Raw coverage	0.225696	0.305187	0.160937	0.223516	0.100536	0.111134	0.085139	0.023129	0.100633	0.121267	0.079248
T3: H•~S⊂~Y -Consistency	***0.730920***	***0.730920***	***0.730920***	***0.730920***	***0.730920***	***0.730920***	***0.730920***	***0.814911***	***0.814911***	***0.814911***	***0.814911***
T3: H•~S⊂~Y -Raw coverage	0.087236	0.087236	0.087236	0.087236	0.087236	0.087236	0.087236	0.092241	0.092241	0.092241	0.092241
T4: ~H•~S⊂Y -Consistency	0.549108	0.515290	0.549226	0.549122	0.560422	0.554882	0.551988	0.512290	0.522944	0.521766	0.527126
T4: ~H•~S⊂Y -Raw coverage	0.840198	0.740070	0.883683	0.830381	0.943573	0.927186	0.936989	0.964083	0.935015	0.926217	0.948160
Solution path hypothesis result	Reject	Reject	Reject	Ignore	Weak support	Reject	Weak support	Weak support	Weak support	Weak support	Weak support
Combined solution path unique coverage of same hypothesis result	0.2606				0.014185			0.128813			
Overall hypothesis result	**Reject**							**Weak support**			

Table 9-14: fsQCA results for H4d: P-MKT-OA2/OA2F

	H4d: GOC-MKT-OA2							H4d: GOC-MKT-OA2F	
Condition	S1	S2	S3	S4	S5	S6	S7	S1	S2
Prospector (P)			ϴ*	ϴ*	ϴ*	ϴ*	ϴ*		●
Analyzer (A)	ϴ	ϴ		●	ϴ	•		ϴ	θ
Defender (D)	ϴ	ϴ	●	●			•	ϴ	ϴ
Reactor (R)	θ*		ϴ*	ϴ*	θ*	ϴ*	ϴ*	●	ϴ*
Differentiation (Dif)		•	θ	θ	●	ϴ	ϴ	•	•
Low cost (Lc)		θ			θ	●	●	θ	•
Marketing (MKT)	ϴ	ϴ	●		ϴ	•			ϴ
Observed cases	12	3	2	5	3	5	5	1	1
Consistency	**0.737597**	**0.781741**	**0.805963**	**0.773055**	**0.768248**	**0.751417**	**0.778822**	**0.906550**	**0.826419**
Raw coverage	0.267357	0.138236	0.082867	0.092686	0.135420	0.158141	0.083901	0.023167	0.042625
Unique coverage	0.104308	0.004508	0.015767	0.007035	0.004898	0.101725	0.009509	0.018854	0.038313
Solution consistency	**0.734957**							**0.848244**	
Solution coverage	0.443810							0.061479	
T1: H•S⊂Y-Consistency	0.663949	**0.709901**	**0.764790**	**0.758256**	0.673063	0.688305	**0.728039**	**0.928749**	**0.897087**
T1: H•S⊂Y -Raw coverage	0.020651	0.016948	0.004758	0.004589	0.014258	0.009721	0.003917	0.004814	0.029967
T2: ~H•S⊂Y -Consistency	***0.737200***	***0.780148***	***0.803812***	***0.773354***	***0.766554***	***0.751035***	***0.778240***	***0.889677***	***0.825486***
T2: ~H•S⊂Y -Raw coverage	0.265983	0.137198	0.084194	0.094786	0.134550	0.158974	0.084787	0.023570	0.042789
T3: H•~S⊂~Y - Consistency	0.566281	0.566281	0.566281	0.566281	0.566281	0.566281	0.566281	0.663628	0.663628
T3: H•~S⊂~Y -Raw coverage	0.072809	0.072809	0.072809	0.072809	0.072809	0.072809	0.072809	0.073842	0.073842
T4: ~H•~S⊂Y -Consistency	0.570036	0.567966	0.571828	0.576833	0.568833	0.564772	0.578602	0.496246	0.497362
T4: ~H•~S⊂Y -Raw coverage	0.778978	0.877083	0.913618	0.911240	0.877083	0.846418	0.921525	0.950600	0.954171
Solution path hypothesis result	Reject	Support	Support	Support	Reject	Reject	Support	Support	Support
Combined solution path unique coverage of same hypothesis result	0.210931	0.036819						0.057167	
Overall hypothesis result	**Reject**							**Support**	

9.2.5 Analysis of H4e: IE-OE-EF-AD-OA

Unlike the previous analysis that tested equifinality from different combinations of GOC and FC and expected that they would perform equally well for the overall performance proxy, the current analysis adopts a different approach to test for equifinality by examining whether achieving different types of performance dimensions (which are the result of different complementarities from the previous tests) is sufficient to generate the overall performance proxy. Therefore, the more solution paths displayed and the higher the level of support from the hypothesis testing section, the higher the support for equifinality.

All analyses (oa1 and oa1f (Table 9-15), and oa2 and oa2f (Table 9-16) reveal the same pattern, comprising six and four solution paths respectively. Moreover, almost all paths support H4e, except those that are ignored owing to their low consistency level (S1 of oa1f (ef2f*~oe2f), S4 of oa1f (ef2f*~ef1f*~oe1f) and S5 of oa1f (oe2f*oe1f*~ief)) and those that suggest strong support but have a quite small unique coverage (S3 of oa1f (ef1f*ief), S4 of oa2 (ef2*ef1*oe2*oe1*ie), S1 of oa2f (ef2f*~oe2f*ief) and S4 of oa2f (ef2f*~ef1f*oe2f*oe1f)). Therefore, it is fair to argue that equifinality is supported by these analyses.

Table 9-15: fsQCA results for H4e: IE-OE-EF-AD-OA1/OA1F

	H4e: PERF-OA1						**H4e: PERFF-OA1F**					
Condition	S1	S2	S3	S4	S5	S6	S1	S2	S3	S4	S5	S6
Input Efficiency (IE, IEF)			●	•	ϴ				●		ϴ	●
Output Efficiency 1 (OE1, OE1F)	●	●		●				●		ϴ	●	●
Output Efficiency 2 (OE2, OE2F)					•	ϴ	ϴ				●	
Effectiveness 1 (EF1, EF1F)					ϴ	•		●	●	ϴ		
Effectiveness 2 (EF2, EF2F)		•	●			•	●			●		ϴ
Adaptability 1 (AD1)	•				●	●	N/A as financial data for AD1F is not available.					
Adaptability 2 (AD2)					•	•	N/A as financial data for AD2F is not available.					
Observed cases	4	7	11	10	1	1	16	28	30	10	10	13
Consistency	**0.818468**	**0.902995**	**0.797904**	**0.915019**	**0.817370**	**0.801825**	0.693052	**0.772743**	**0.758903**	0.658606	0.658246	**0.781890**
Raw coverage	0.431795	0.470668	0.443640	0.518098	0.171230	0.157317	0.272495	0.503358	0.464513	0.208527	0.235484	0.272904
Unique coverage	0.084226	0.022812	0.075444	0.111615	0.013444	0.005366	0.020178	0.050684	0.083531	0.020804	0.017051	0.052592
Solution consistency	**0.748544**						0.666839					
Solution coverage	0.831948						0.794223					
T1: H•S⊂Y - Consistency	**0.817335**	**0.901974**	**0.798489**	**0.914343**	**0.814949**	**0.801760**	0.692516	**0.772837**	**0.758700**	0.658260	0.657293	**0.782404**
T1: H•S⊂Y - Raw coverage	0.432055	0.471625	0.445416	0.518562	0.171880	0.159616	0.271805	0.503169	0.464201	0.207954	0.235294	0.273440
T2: ~H•S⊂Y -Consistency	***0.712286***	***0.870894***	***0.777295***	***0.825007***	***0.793198***	***0.915097***	***0.746239***	***0.928425***	0.698953	***0.746239***	***0.926999***	***0.929671***
T2: ~H•S⊂Y -Raw coverage	0.043268	0.051031	0.049446	0.058099	0.039371	0.032959	0.041942	0.045002	0.035330	0.041942	0.037765	0.046290
T3: H•~S⊂~Y - Consistency	0.576636	0.602466	0.573487	0.623913	0.497251	0.493008	0.536802	0.622029	0.611278	0.518774	0.521302	0.546080
T3: H•~S⊂~Y - Raw coverage	0.808741	0.847321	0.787857	0.855426	0.863593	0.855260	0.789699	0.752366	0.764162	0.802196	0.776650	0.822973
T4: ~H•~S⊂Y - Consistency	0.408361	0.408361	0.408361	0.408361	0.408361	0.408361	0.415020	0.415020	0.415020	0.415020	0.415020	0.415020
T4: ~H•~S⊂Y - Raw coverage	0.066516	0.066516	0.066516	0.066516	0.066516	0.066516	0.076397	0.076397	0.076397	0.076397	0.076397	0.076397
Solution path hypothesis result	Support	Support	Support	Support	Support	Support	Ignore	Support	Strong support	Ignore	Ignore	Support
Combined solution path unique coverage of same hypothesis result	0.312907							0.103276	0.083531			
Overall hypothesis result	**Support**						**Support**					

Table 9-16: fsQCA results for H4e: IE-OE-EF-AD-OA2/OA2F

	H4e: PERF-OA2				H4e: PERFF-OA2F			
Condition	S1	S2	S3	S4	S1	S2	S3	S4
Input Efficiency (IE, IEF)	●		●	•	●	●		
Output Efficiency 1 (OE1, OE1F)			ϴ	•		●	●	●
Output Efficiency 2 (OE2, OE2F)		●		●	ϴ		ϴ	●
Effectiveness 1 (EF1, EF1F)				•		●	●	ϴ
Effectiveness 2 (EF2, EF2F)	●		●	•	●		●	●
Adaptability 1 (AD1)	ϴ	•			N/A as financial data for AD1F is not available.			
Adaptability 2 (AD2)		•	•		N/A as financial data for AD2F is not available.			
Observed cases	5	5	3	1	11	17	5	5
Consistency	**0.884555**	**0.807826**	**0.887087**	**0.829131**	**0.743242**	**0.802972**	**0.822224**	**0.741388**
Raw coverage	0.270335	0.344949	0.150908	0.144641	0.235578	0.332482	0.173502	0.181588
Unique coverage	0.167496	0.206974	0.034826	0.022832	0.075453	0.140851	0.018053	0.074579
Solution consistency	**0.845298**				**0.746053**			
Solution coverage	0.615736				0.512183			
T1: H•S⊂Y -Consistency	**0.883678**	**0.807131**	**0.885960**	**0.827117**	**0.742242**	**0.801997**	**0.820995**	**0.740033**
T1: H•S⊂Y -Raw coverage	0.272033	0.346852	0.153125	0.146571	0.234834	0.331801	0.172589	0.180716
T2: ~H•S⊂Y -Consistency	***0.707765***	***0.706695***	***0.784124***	0.657269	0.662988	***0.800041***	***0.733381***	0.683897
T2: ~H•S⊂Y -Raw coverage	0.042243	0.032912	0.026103	0.024422	0.027874	0.029797	0.023654	0.017856
T3: H•~S⊂~Y - Consistency	0.509760	0.523984	0.476889	0.473478	0.569326	0.603585	0.559545	0.557272
T3: H•~S⊂~Y -Raw coverage	0.891946	0.828294	0.899259	0.892528	0.860032	0.853308	0.896411	0.871559
T4: ~H•~S⊂Y -Consistency	0.555285	0.555285	0.555285	0.555285	0.572130	0.572130	0.572130	0.572130
T4: ~H•~S⊂Y -Raw coverage	0.084863	0.084863	0.084863	0.084863	0.107202	0.107202	0.107202	0.107202
Solution path hypothesis result	Support	Support	Support	Strong support	Strong support	Support	Support	Strong support
Combined solution path unique coverage of same hypothesis result	0.409296			0.022832	0.150032	0.158904		
Overall hypothesis result	**Support**				**Support**			

In analyzing deviations in the results of each of H4's sub-hypotheses (H4a (LCD-BCD-OP-OA2F), H4b (DIFD-BCD-RD-OA1F/OA2F) and H4d (P-MKT-OA1/OA1F/OA2)), I will consider all overall performance proxies simultaneously, identifying any inconsistencies between the survey and financial data as well as between different proxies within each sub-hypothesis, and I will then try to make sense of these deviations. With regard to explaining the deviations, this is left to the reader's judgment to infer from the findings (whether to take the majority of the analysis results for each sub-hypothesis or trust a particular test over the others). Table 9-17 shows the results for each of the H4 sub-hypotheses. Obviously, although H4a, H4b and H4d display inconsistency between the survey and financial data, only H4b shows a mixed result, while H4a and H4d, as well as H4c, exhibit dominant patterns.

Table 9-17: Summary of results for H4 sub-hypotheses

Overall performance proxy	H4a	H4b	H4c	H4d
oa1	Support	Support	Support	Reject
oa1f	Strong support	Reject	Support	Weak support
oa2	Support	Support	Support	Reject
oa2f	Reject	Reject	Support	Support

A possible explanation for inconsistency between the survey and financial data arises from external validity and the empirical context.

Regarding external validity, particularly the measurement problem, although overall performance proxies are derived from (intermediate) performance dimensions that are tested in prior sub-hypotheses[42] and each seems to be well-monitored by the market players, it is more difficult for respondents to estimate overall performance proxies than to separately estimate each of their components because: 1) respondents must not only monitor all performance dimensions (components) relative to those of their competitors, but must also be able to compare the proportion between those components; and 2) unlike the financial data for oa1 and oa2 that are cardinal scales, a Likert scale was used for the survey data,

[42] oa1 (combined ratio) = ie (expense ratio) + oe1 (loss ratio) and oa2 (ROE) = (profit from insurance + profit from investment) /equity

which is an ordinal scale that allows the data to be sorted by rank order but does not allow for relative degrees of difference between them. For instance, it is difficult for a respondent to compare the oa1 of his or her business unit which ranks number three in ie and number five in oe1, with a competitor which ranks number four in ie and number two in oe1, because he cannot make quantitative comparisons with this information.

One piece of supporting evidence gained during my person-to-person survey is that many respondents were reluctant to answer oa1 and oa2 because they could not compare the relative amounts between each component, especially those of oa2, because, unlike oa1, which has only insurance-related activities, oa2 covers investment yield, which is even harder to monitor and compare with insurance activities. In this regard, respondents tended to be optimistic by selecting a choice slightly above the Likert scale mid-point, probably because they recognized that their business units were in the top 25 companies in 2011 according to revenue. Thus, the reader, and future researchers, should focus more on the financial data when testing for overall performance proxies owing to external validity issues, particularly measurement difficulty.

In terms of empirical context, there was an unforeseen catastrophe (a severe flood) in Thailand during the data collection period (2011), the aftermath of which was mixed. When considering the impact of flood by insurance product line, fire and miscellaneous (industrial all risk) insurance was most affected. For example, Japanese firms which heavily insured industrial parks, which are mainly Japanese subsidiary or joint-venture factories (their target market), lost about six years of accumulated profits due to this flood. Marine and motor insurance were least affected, since the losses from motor insurance policies as a result of the flood were off-set by the fact that there were fewer car accidents owing to the very limited roads available during the flood period. This made it even more difficult for respondents to estimate the industry situation and provide an accurate answer. Thus, future researchers should take business unit ownership conditions and size into consideration, as well as conducting this research framework over a certain period of time (longitudinal study rather than cross sectional study), to allow the impact of any catastrophe to average out over time, which will help improve the generalizability of this study.

A possible explanation for inconsistency between proxies (financial data) within each sub-hypothesis arises from external validity (measurement difficulty). As mentioned earlier, oa1 and oa2 cover different dimensions of the insurer's main activities: the former covers both cost (ie) and revenue (oe1) of its insurance activities but focuses neither on investment activities nor on equity size, whereas the latter covers all activities of the business unit (insurance and investment) relative to its equity size.

Consequently, the hypothesis results for the financial data (oa1f and oa2f) might go in any direction, as shown in the findings of this study, depending on the proportion of investment to insurance activities. However, each proxy has its own benefit. Although oa1 does not cover all activities, it is a worldwide standard parameter for the insurance industry. Unlike oa2, oa1 will not be affected by financial market downturns. Thus, the decision to focus on either or both depends on the user's objectives and the financial market situation at that time. In this regard, future researchers should consider economic turbulence as another causal condition to be tested in a much-refined framework.

A further possible explanation for each sub-hypothesis arises from alternative theory which builds on the aforementioned measurement issue, leading to inconsistency between proxies.

The proposed combination of causal conditions under H3a (LCD and OP), which is the same as that of H4a, is weakly supported as a sufficient combination for ie, which in turn only partially covers the oa2 tested in H4a (since investment activity is neglected). This transitive relationship supports the deviation found in H4a for oa2f. Therefore, in order to refine the current study, I would suggest that future researchers should: 1) add other FCs, especially those displayed as sufficient to generate ie and oe2, to cover all the main activities of the insurer; 2) perform a sufficiency test on a proposed combination of causal conditions under H3a for other (intermediate) performance dimensions to understand how this combination affects other performance dimensions, which in turn are parts of oa that have not been covered in this current study; and 3) add economic turbulence as another causal factor into the framework to take into account the effect of financial market conditions, which are an uncontrollable factor in investment yield.

Although the proposed combination of causal conditions under H3b (DIFD and RD), which is the same as those of H4b, is supported as a sufficient combination for oe1 and oe2, these two (intermediate) performance dimensions still only partially cover oa1 and oa2 because the cost advantage (ie) is not included. This argument is supported by the finding in H4e that all overall performance proxies comprise more than one high performance dimension. Since cost reduction through economies of scale is the main business model of insurance companies, I suspect that the deviation of H4b for both oa1f and oa2f arises from the relatively high proportion of ie in oa1 and oa2, which may significantly affect the validity of these sub-hypotheses. This suggestion is consistent with Porter's (1980: 14, 18, 20) assertion that differentiators "should always aggressively pursue all cost reduction opportunities that do not sacrifice differentiation", as mentioned earlier.

To prove my assumption, future researchers might perform a sufficiency test on the proposed combination of causal conditions under H3b for ie, which I would expect to display only weak support. Moreover, when comparing the overall solution coverages of H1b and H2b, I find that those of H2b, except for oe2f, are higher than those of H1b, suggesting that considering a combination of FCs (all types) provides more explanatory power than that of GOCs (all typologies). Thus, it is advisable, in order to refine the current sub-hypotheses (H4b), to add into this research framework other FCs (such as marketing and sales and distribution) that are found in H2 to be sufficient to generate the high performance dimensions displayed (in combination with either oe1 or oe2, or both) in H4e to be sufficient to generate a high overall performance proxy.

Finally, it makes sense that the majority of sub-hypothesis results for the different overall performance proxies reject H4d and suggest the addition of causal conditions to improve this sub-hypothesis because, although pursuing a prospector strategy and having marketing capability leads to high adaptability, as tested and supported in H1d, H2d and H3d,[43] prospectors tend not to care much about their short term profits; rather, they aim to capture new markets, so their high market introduction costs override initial profits.

This interpretation is consistent with Walker and Ruekert's (1987: 20) argument that "different strategies are expected to perform well on different performance dimensions". It appears that respondents agree with this explanation because they tend to be pessimistic in answering oa1 and oa2, which is supported by the fact that H4d is the only sub-hypothesis of H4 for which the level of support for the survey data is less than that of the financial data. Therefore, longitudinal research is required to address this presupposition, in which I would expect to find that, over a longer period of analysis, this proposed combination of causal conditions would perform as well as other combinations.

9.3 Post-hoc analysis

In this section, I will consider all sub-hypotheses within each of the two main hypotheses tested in this chapter to identify patterns of and further implications for the relationship between causal conditions and outcomes.

For H3, nine out of twelve sub-hypothesis tests are supported while one (H3a for ie) is weakly supported and two (H3c for ef2 and ef2f) are rejected, suggesting another potential improvement on previous research in explaining performance variance by: 1) combining a matching pair of GOC and FC as proposed in this research, but only for those that are supported – those that are not supported are likely to have other or additional causal factors to those proposed in this study to explain the variation of ie, ef2 and ef2f; and 2) selecting an

[43] All are tested only with survey data because no financial data are available for both number (ad1) and percentage of sales (ad2) of new products offered to the market.

appropriate performance dimension to measure a business unit with those different combinations.

To answer the third research sub-question regarding whether a matching combination of GOC and FC provides a better explanation of the corresponding performance outcome than considering either construct at a time, I compare the solution coverages (which portray explanatory powers) for all sub-hypotheses of H1, H2 and H3 tested against the same performance dimension (e.g. H1a GOC-IE, H2a FC-IE and H3a GOC-OP-IE) only when they have a consistency level above the 0.7 consistency threshold. (See Section 8.3 on page 226).

The results of the solution coverage comparison are mixed but still exhibit a dominant theme (Table 9-18). The empirical evidence shows that six out of twelve performance dimensions are better explained by H3 (proposed complementarity), shown in light green, while the rest are split almost equally in that three are better explained by H2 (FC), shown in light purple, while two are better explained by H1 (GOC), shown in orange, and one (oe2) is not applicable because all related sub-hypotheses (H1b, H2b and H3b) have a solution consistency lower than the 0.7 consistency threshold. Obviously, performance is better explained by considering complementarity, rather than one research construct at a time.

It can be inferred that, usually if not always, the proposed combination of GOC and FC is a better performance predictor. Interestingly, the financial data lend greater support to the complementarity argument (four out of five cases) than the survey data. The latter provide mixed results in that GOC, FC and complementarity are equally supported by only two out of seven cases (as shown in orange, light purple and light green, respectively) and one not applicable case (white) is found. This is probably due to external validity issues, especially measurement difficulty, as previously discussed.

Note that testing whether complementarity is a better performance predictor by identifying the maximum solution coverage of the sub-hypotheses of H1, H2 and H3 is independent of the results for the validity of the H3 sub-hypothesis that examines whether a proposed combination leads to a high corresponding performance. For example, a weakly supported H3a, as a standalone analysis, means that the proposed combination (LC, D, OP) is insufficient to generate ie (yellow). However, when comparing the H3a solution coverage with that of H1a and H2a, the argument that complementarity better predicts performance than either GOC or FC alone still holds (lime green). Paradoxically, the two analysis dimensions seem to go against each other (shown in red, otherwise green). The former supports substitution between the proposed GOC and FC while the latter supports complementarity between them.

Nevertheless, the validity of a particular H3 sub-hypothesis depends only on a proposed combination between GOC and FC, but does not cover complementarity between all typologies of GOC and all types of FC in general. In fact, other GOC typologies tested at the same time (those not proposed in each of the H3 sub-hypotheses), together with a proposed FC, still provide better explanatory power (as shown in higher coverage) for a particular performance dimension than considering all typologies of GOC without any FC, as in H1a, or all types of FC without any GOC, as in H2a. According to fsQCA practice (Schneider & Wagemann, 2012), the deviant findings of the H3 sub-hypotheses suggest that the researcher should take other FCs into consideration to refine and improve the explanatory power of the sub-hypothesis for performance.

Considering all performance dimensions, I find that cases supporting the argument that complementarity is a better performance predictor are in the majority, regardless of the level of support for the H3 sub-hypotheses.

Out of nine cases that support the proposed combination between GOC and FC (blue), four display H3 as a maximum solution coverage (light green) while three display H2 (light purple) and one displays either H1 (orange) or not applicable (white). Likewise, out of three cases that do not support the proposed combination between GOC and FC (either yellow or red), H3 still has a maximum solution coverage (light green) for two cases, with only one case for H1 (orange). Thus, it can be inferred that no matter how strong the support for a proposed combination of GOC and FC, complementarity tends to provide a better explanation of performance than considering only one research construct.

Table 9-18: Comparison of solution coverage for all sub-hypotheses of H1, H2 & H3

Hypothesis testing		Solution consistency	Solution coverage	Hypothesis testing		Solution consistency	Solution coverage	Hypothesis testing		Solution consistency	Solution coverage	Max coverage (of H: that has above consistency threshold)	Perf	Agree result?
H1	**H1a**	**0.71802**	0.437901	H2	**H2a**	**0.73687**	0.149705	H3	**H3a**	**0.72058**	0.535373	H3	IE	N
	H1af	**0.90041**	0.022014		**H2af**	**0.82108**	0.191247		**H3af**	**0.75912**	0.314333	H3	IEF	Y
	H1b1	0.602613	0.554164		**H2b1**	**0.76007**	0.430462		H3b1	0.635798	0.538797	H2	OE1	N
	H1b1f	0.6882	0.242285		H2b1f	0.669155	0.377785		**H3b1f**	**0.71463**	0.454133	H3	OE1F	Y
	H1b2	0.660851	0.47716		H2b2	0.688993	0.410388		H3b2	0.68478	0.483686	n/a	OE2	n/a
	H1b2f	**0.80211**	0.395919		H2b2f	0.699581	0.322408		**H3b2f**	**0.75582**	0.483687	H3	OE2F	Y
	H1c1	**0.71815**	0.326723		H2c1	0.682169	0.393117		H3c1	0.673365	0.692684	H1	EF1	N
	H1c1f	0.668564	0.525807		**H2c1f**	**0.75579**	0.385337		H3c1f	0.659029	0.799455	H2	EF1F	N
	H1c2	**0.71082**	0.161335		**H2c2**	**0.73274**	0.142092		H3c2	0.698729	0.274904	H1	EF2	N
	H1c2f	**0.7688**	0.281429		**H2c2f**	**0.76485**	0.247886		**H3c2f**	**0.73756**	0.433273	H3	EF2F	N
	H1d1	0.686555	0.665239		**H2d1**	**0.72652**	0.243319		H3d1	0.693129	0.443688	H2	AD1	N
	H1d2	**0.71655**	0.455806		**H2d2**	**0.73745**	0.266934		**H3d2**	**0.72898**	0.511286	H3	AD2	Y

- The colour of the hypothesis heading is the result of previous (standalone) analysis (red = reject, yellow = weak support, blue = support, green = strong support)
- Bold indicates those that have a solution consistency above the 0.7 consistency threshold.
- The colour in the third from last column indicates which sub-hypothesis with the same outcome has the maximum solution coverage. (orange = H1, supporting GOC; light purple = H2, supporting FC; light green = H3, supporting complementarity)
- The colour in the last column indicates whether standalone analysis (H3) and comparative analysis (Max (H1, H2, H3)) are consistent with each other in supporting complementarity. (green = consistent, red = inconsistent)

For H4, out of sixteen sub-hypothesis tests (Table 9-19), one is strongly supported, nine are supported, one is weakly supported (H4c for oa1f) and five are rejected (H4a for oa2f, H4b for oa1f and oa2f, and H4d for oa1 and oa2). When comparing different proposed combinations of GOC and FC based on the same proxy (e.g. H4a, H4b, H4c and H4d based on oa1), the empirical evidence shows that at least two out of four tests for each proxy are either supported or strongly supported, suggesting that the strongly supported and supported combinations proposed in this research are equally sufficient to generate high overall performance.

Hence, the complementarity of the proposed combination tested earlier supports the existence of equifinality. Furthermore, since at least one pair of sub-hypotheses based on the same overall performance proxy shares similar, though not the same, levels of solution coverage, it can be inferred that their explanatory power for performance is roughly equal, supporting equifinality. However, since there are only four data points per proxy, it is impossible to calculate a reliable mean and standard deviation to understand the distribution of these data.

Table 9-19: Comparison of solution coverage for all sub-hypotheses of H4

	Solution consistency	Solution coverage		Solution consistency	Solution coverage		Solution consistency	Solution coverage		Solution consistency	Solution coverage	Perf
H4a1	**0.73159**	0.490663	H4b1	**0.73611**	0.452546	H4c1	**0.72554**	0.523089	H4d1	**0.71634**	0.565388	oa1
H4a1f	**0.73255**	0.158522	H4b1f	**0.71224**	0.257856	H4c1f	**0.73535**	0.250992	H4d1f	**0.72954**	0.204857	oa1f
H4a2	**0.73914**	0.39114	H4b2	**0.78193**	0.374339	H4c2	**0.79425**	0.39078	H4d2	**0.73496**	0.44381	oa2
H4a2f	**0.73756**	0.222809	H4b2f	0.683559	0.367767	H4c2f	**0.72859**	0.370982	H4d2f	**0.84824**	0.061479	oa2f

- The colour of the hypothesis heading is the result of previous (standalone) analysis (red = reject, yellow = weak support, blue = support, green = strong support)
- Bold indicates those that have a solution consistency above the 0.7 consistency threshold.

Apart from the equifinality test arising from proposed complementarity (H4), equifinality is also explicitly displayed in all analyses of this study (H1, H2, H3 and H4). All sub-hypothesis tests display more than one solution path, suggesting a contextualized combination. While some have different core and peripheral conditions, others share the same core conditions with a deviation in a peripheral, suggesting the existence of first-order (across-group) and second-order (within-group) equifinality respectively for each performance dimension. The details of each analysis (e.g. level of solution coverage and existence of an empirically dominant combination) provide insights into understanding the contextualization of the solution paths. H4e provides another analytical dimension supporting equifinality by showing that business units which succeed on different performance dimensions also achieve high overall performance proxy.

9.4 Chapter summary

In this chapter, I have reported the findings from testing the last two main hypotheses regarding complementarity between proposed research constructs and different performance dimensions and equifinality.

In summary (Table 9-20), all sub-hypotheses of H3 and H4, except H3a and H4d, are supported. Thus, it can be inferred that complementarity between the proposed combination of GOC and FC is a “usually” sufficient condition (see Section 8.4) to generate high corresponding performance, except a combination between either low-cost defender or best-cost defender and operations capability, which is not a “usually” sufficient condition for input efficiency (weakly supported H3a); and that equifinality exists according to the complementarity between a variety of proposed combinations of GOC and FC, except the combination of prospector and marketing capability, which is not “usually” sufficient to generate the overall performance proxy (rejected H4d).

For the necessity test, as in the testing of the two previous main hypotheses, prospector, defender and reactor are found to be trivial necessary conditions for some solutions. They are shown to be necessary only because of the data skewness, as suggested by Schneider and Wagemann (2012), and hence little can be inferred from this.

However, since a sufficient condition can be expressed in terms of a necessary condition when applying De Morgan’s laws, the previous summary can also be expressed as follows. For complementarity hypotheses, the absence of both being a part of a firm that has a high intensity level of any type of proposed FC and having a high intensity level of a particular typology of proposed GOC that is compatible with the firm’s FC is a “usually” necessary condition for a business unit not to achieve high performance corresponding with the proposed combination. The exception is the absence of both being a part of a firm that has a high intensity level of operations capability and having a high intensity level of either low-cost defender or best-cost defender, because this situation is not a “usually” necessary condition for a business unit not to achieve high input efficiency.

For equifinality hypotheses, the absence of both being a part of a firm that has a high intensity level of any type of proposed FC and having a high intensity level of a particular typology of proposed GOC that is compatible with the firm’s FC is a “usually” necessary condition for a business unit not to achieve high overall performance proxy. The exception is the absence of both being a part of a firm that has a high intensity level of marketing capability and having a high intensity level of a prospector, because this situation is not a "usually" necessary condition for a business unit not to achieve high overall performance proxy.

In the next chapter, I will discuss the implications of this thesis for both theory and practice, as well as its limitations.

Table 9-20: Summary test results for H3 &H4

Hypothesis	Sub-hypothesis	Sub-hypothesis result	Sum of unique coverage for paths supporting classification	Dominant result for each hypothesis
H3	H3a: LCD-BCD-OP-IE	Weak support	0.1439	Weak support
	H3a: LCD-BCD-OP-IEF	Support	0.124083	
	H3b: DIFD-BCD-RD-OE1	Support	0.069828	Support
	H3b: DIFD-BCD-RD-OE1F	Support	0.117618	
	H3b: DIFD-BCD-RD-OE2	Support	0.23901	
	H3b: DIFD-BCD-RD-OE2F	Support	0.162795	
	H3c: A-MIS-SD-EF1	Support	0.095741	Support
	H3c: A-MIS-SD-EF1F	Support	0.268469	
	H3c: A-MIS-SD-EF2	Reject	0.133212	
	H3c: A-MIS-SD-EF2F	Reject	0.079916	
	H3d: P-MKT-AD1	Support	0.152498	Support
	H3d: P-MKT-AD2	Support	0.477322	
H4	H4a: LCD-BCD-OP-OA1	Support	0.170376	Support
	H4a: LCD-BCD-OP-OA1F	Strong support	0.045524	
	H4a: LCD-BCD-OP-OA2	Support	0.193681	
	H4a: LCD-BCD-OP-OA2F	Reject	0.159662	
	H4b: DIFD-BCD-RD-OA1	Support	0.279104	Support
	H4b: DIFD-BCD-RD-OA1F	Reject	0.04755	
	H4b: DIFD-BCD-RD-OA2	Support	0.24729	
	H4b: DIFD-BCD-RD-OA2F	Reject	0.061916	
	H4c: A-MIS-SD-OA1	Support	0.229449	Support
	H4c: A-MIS-SD-OA1F	Support	0.156853	
	H4c: A-MIS-SD-OA2	Support	0.198299	
	H4c: A-MIS-SD-OA2F	Support	0.070719	
	H4d: P-MKT-OA1	Reject	0.2606	Reject
	H4d: P-MKT-OA1F	Weak support	0.128813	
	H4d: P-MKT-OA2	Reject	0.210931	
	H4d: P-MKT-OA2F	Support	0.057167	
	H4e: IE-OE-EF-AD -OA1	Support	0.312907	Support
	H4e: IEF-OEF-EFF-ADF-OA1F	Support	0.103276	
	H4e: IE-OE-EF-AD -OA2	Support	0.409296	
	H4e: IEF-OEF-EFF-OA2F	Support	0.158904	

10 DISCUSSION

In this chapter, I will recap the findings and then further discuss: 1) the implications for theory, comprising current (GOC and FC) and proposed theory (complementarity, and equifinality); 2) the implications for practice, comprising the insurance industry (insurer and regulator) and other industries; and 3) the limitations of this research regarding the dataset and technical issues.

It can be deduced from the two previous chapters that most hypotheses are supported, suggesting that the proposed GOC typology, FC type and the combination of them are "usually" sufficient to generate corresponding performance dimensions. In other words, each type of GOC, FC and their proposed combination is better able to explain a particular type of performance.

In addition, the analyses of survey data and financial data for performance measurement are generally consistent, except those of H4, which may arise from the issue of external validity (respondents' inability to answer those questions accurately). The fact that more than one solution path is shown for each analysis does not mean that the proposed hypothesis is rejected because the hypothesis is merely tested for sufficient conditions, not simultaneously tested for both sufficient and necessary conditions as in correlation-based research.

The causal asymmetry concept adopted in this research is useful in enhancing our understanding of the phenomenon in question, in that it may resolve previous inconsistent findings. However, some deviations suggest areas for hypothesis improvement, either by adding more causal conditions or by completely dropping a hypothesis, depending on the results shown in the hypothesis testing section mentioned earlier. For the necessity test, prospector, defender and reactor are found to be trivial necessary conditions for almost all hypothesis testing. They are shown as necessary only because of the data skewness, as suggested by Schneider and Wagemann (2012) and are hence of little relevance for inference. However, a sufficient condition may be expressed in terms of a necessary condition when applying De Morgan's laws; therefore, the sufficiency inference of this study can also be rephrased in terms of necessity, as mentioned in the summaries of the two previous chapters.

10.1 Implications for theory

Although configuration remains attractive to organization and strategy research, as shown by the number of recent studies, its promise is still far from fulfilled (Short, Payne & Ketchen, 2008; Fiss, 2011). In fact, it is being challenged because of a lack of empirical support (McGee & Thomas, 1986; Thomas & Venkatraman, 1988) and theoretical rigour (Bacharach, 1989), especially by its counterpart theory, the resource-based view (Barney & Hoskisson, 1990). In this study, I have argued that our understanding of the cause-effect relationship between configuration and performance will become less equivocal if:

1) Different performance dimensions are used;
2) The analysis is based on causal asymmetry and the notion of complex causality;
3) GOC and FC are considered simultaneously (the concept of complementarity);
4) The contextualization of other causal conditions is taken into consideration (the notion of equifinality).

In this regard, I use fsQCA rather than a correlation-based technique as a suitable method to allow me to test such arguments. In proposing an alternative theory and utilizing novel methodology, the current study takes a step toward building a better understanding of the explanation of performance, a theme central to the literature of both strategy and organization, using both GOC and FC rather than a single factor as antecedents. In this section, I synthesize the findings and discuss the implications of this study, first for each current literature (GOC and FC) individually, and then for both considered in combination according to my proposed theories (complementarity and equifinality) to shed light on the complexity of the phenomena under study.

10.1.1 Implications for existing theory

10.1.1.1 Implications for GOC

This thesis has two main implications for GOC, one of which is a foundation for the other.

1) This study tries to reconcile the inconsistencies of previous research, reconfirming Ketchen et al.'s (1997) meta-analysis regarding the existence of a GOC-performance relationship both by correcting the long-held but mistaken assumption that this relationship is symmetrical, whereas it is actually an asymmetrical causal relationship, by using the business unit rather than the firm as the unit of analysis, and also by testing different performance dimensions commensurate with each GOC. This study also supports a previous recommendation that survey data and financial data may be used interchangeably (Venkatraman & Ramanujam, 1986).
2) Building on appropriate assumptions and research criteria, this study provides a more refined understanding of compatibility between GOC and performance dimensions and the relationship between GOCs. Considering other conditions in the solution path (contexuality) also sheds light on hybrid types and has direct implications for the organizational ambidexterity literature (Tushman & O'Reilly, 1996), especially with a hybrid type and a stuck in the middle strategy (Porter, 1980) because contextuality is a factor differentiating the two.

These theoretical implications will be discussed in turn.

Unlike most previous strategy and organization research studies that have implied a linear (or curvilinear) relationship between their theoretical constructs, this study is among the first (e.g. Fiss, 2007, 2011; Grandori &Furnari, 2008) to investigate configuration by utilizing fsQCA, which is based on asymmetrical causal relationships. fsQCA avoids the mismatch of previous research between assumed symmetrical theoretical relationships and actual underlying asymmetrical causal relationships (Ragin, 1987, 2000; Fiss, 2011), which in turn may be mistakenly critized for being inconsistent empirical findings (e.g. Rajagopalan & Spreitzer, 1997; Daily, Dalton & Cannella, 2003).

For instance, if high differentiation (dif) is in fact a sufficient though not necessary condition for high output efficiency (oe), then high dif by itself will guarantee high oe. However, business units are not limited only to having high dif to achieve high oe. Rather, other strategies (low cost leadership or analyzer) may also lead to such an outcome, supporting the equifinality notion. Although perfectly consistent with the set-theoretic method, such a data pattern would result in weak or no correlation between dif and oe. In other words, apart from the GOCs suggested in the hypotheses, other GOCs are also sufficient for the outcome concerned, depending on their contextual combination.

These findings do not go against the hypotheses because, unlike correlation-based research that relies on causal symmetry (which argues for both sufficient and necessary conditions simultaneously), this research only claims a sufficient condition for the proposed GOC owing to the concept of causal asymmetry. Therefore, methodology-wise, fsQCA holds considerable promise for resolving previous inconsistent findings.

It is also important to reiterate two other chosen research criteria (unit of analysis and performance dimension) before discussing the findings because different choices yield substantial differences in empirical results (Dess, Newport & Rasheed, 1993), which in turn may be further reasons for the inconsistency of previous research. In line with previous research (e.g. Gupta & Govindarajan, 1984; Govindarajan, 1986a; Miller, 1988; Govindarajan & Fisher, 1990), I examine business units separately, rather than conducting corporate-level research, in order to reduce the potential off-setting effect between different business units within a firm which may pursue different strategies, which in turn may reveal a clearer relationship with a particular strategic orientation.

As raised by Hambrick (1983a) and Donaldson (1984) and highlighted by Walker and Ruekert (1987: 20), “different strategies are expected to perform well on different performance dimensions". Similarly, the present study has revealed that only a few of the proposed GOC typologies are shown to be sufficient to accomplish a particular performance dimension and, at the same time, only few of them are found to achieve more than one (but not all) performance dimension. Furthermore, even if few typologies are shown as solution paths, a single (rather than many) dominant combination usually prevails, i.e. a solution path with the highest unique coverage, representing the combination most empirically relevant to generating the outcome. Thus, consistent with Walker and Ruekert (1987), it can be inferred that a particular GOC is best suited to explain a few but definitely not all performance dimensions.

Furthermore, since the solution paths from the analysis of the survey data and those of the financial data are quite similar in many analyses, the current study supports the recommendation that survey data and financial data may be used interchangeably (Dess & Robinson, 1984; Venkatraman & Ramanujam, 1986; Conant, Mokwa & Varadarajan, 1990; Abernethy & Stoelwinder, 1991; Dunk, 1993, 2005, 2007; Kaplan & Norton, 1997; Hillman & Keim, 2001; Laitinen, 2002; Iselin, Sands & Mia, 2011).

In brief, the choices of the current study mentioned above play a part in reconciling the inconsistency of previous research, as can be seen from the findings for H1 (except H1a) which support the existence of a configuration-performance relationship, reconfirming Ketchen et al. (1997), Nair and Kotha (2001), Leask and Parker (2007) and Short et al. (2007). The solution coverage of H4 for oa2f, representing GOC's explanatory power for ROE (financial data), (0.22 for H4a, 0.37 for H4b, 0.37 for H4c), except that of H4d (0.06) for which a possible explanation is provided, conveys the same message as the average effect size (0.276) of Ketchen et al.'s (1997) meta-analysis, in that organizational configurations account for approximately 20-30% of the utility available if one were able to perfectly predict differences in firm performance. By the same token, this current finding argues against previous challenges to this research scheme regarding its lack of empirical rigour (McGee & Thomas, 1986; Thomas & Venkatraman, 1988: 548; Barney & Hoskisson, 1990), supporting the appropriateness of the chosen approach for future research in this field.

Regarding proposed GOC typologies, by taking both Miles and Snow's (1978) and Porter's (1980) typologies as causal conditions in the analysis, the present finding is not only comparable with the results of previous research (Walker & Ruekert, 1987; Fiss, 2011) but also provides a more refined understanding of compatibility between GOC and the performance dimension. Walker and Ruekert (1987) investigate neither analyzer nor best-cost defender, nor effectiveness and different types of efficiency, while Fiss (2011) examines only Porter's (1980) typology.

As mentioned earlier, a supported hypothesis (H1) under a sufficient test does not mean that other typologies cannot exist as other sufficient solution paths (causal asymmetry). Thus, a closer look at solution paths offers an in-depth understanding of the relationship between the causal conditions examined because one condition may be required either to be present or absent in tandem with a particular condition (also with different levels of importance, core or peripheral), while still others may have no impact in any direction on such a condition ("don't care" condition). No solution path in this test has a single GOC typology present and the rest as "don't care" conditions, meaning that no GOC typology is a sufficient condition on its own; rather, all of them can only be an INUS condition. Likewise, the absence of a particular GOC typology is also an INUS condition and is a requirement for a pure type of GOC to be sufficient. Clearly, contextuality, which is how GOC attributes are arranged within the solution path (as present, absent or "don't care" conditions) as well as their levels of importance (as core or peripheral condition), is essential to determine the sufficiency of the solution path to which those GOC attributes belong.

When contextuality is taken into account, the current findings reconfirm Walker and Ruekert's (1987) argument that differentiated defenders and prospectors will outperform other typologies in efficiency and adaptability respectively (as shown in support for H1b and

H1d) but refute their claim that low-cost defenders will outperform other typologies in (input) efficiency. It also provides an additional argument beyond their study that analyzers will not outperform other typologies in market share (as shown in the rejection of H1a and H1c for ef2, for which possible explanations are provided earlier). The rejection of these two sub-hypotheses suggests the need for further within-case and comparative studies of cases identified as typical and deviant by fsQCA (Schneider & Wagemann, 2012) to refine the proposed hypotheses regarding ie and ef2.

With in-depth investigation of contextuality regarding Porter's (1980) typology, the findings of the present study shed light on a hybrid type (the presence of both low cost and differentiation, which is called best cost in this research) which is evidenced in real life (Gilbert & Strebel, 1988; Miller, 1988; Baden-Fuller & Stopford, 1992; Cronshaw, Davis & Kay, 1994; Dess et al., 1997) yet under-researched. Apart from a pure type consistent with Walker and Ruekert's (1987) findings, the current study also reveals a hybrid, which is in line with Fiss' (2011) findings. For instance, while some solution paths generating ef1 (in H1c) are pure types, for example either lc (in S1 and S4) or dif (in S2 and S3), still others, albeit rarely, are hybrids (lc•dif in S5), suggesting that either pure or hybrid types may achieve high performance.

Like that of Fiss (2011), the present study provides further supporting evidence in addition to the relatively limited previous research which has established the economic viability of a combined cost leadership and differentiation strategy (Hall, 1980; Dess & Davis, 1984; White, 1986; Kim & Lim, 1988; Miller & Dess, 1993) to challenge Porter's (1980) stuck in the middle claim, as well as other research supporting his argument (Hambrick, 1983b; Murray, 1988; Miller, 1989) that only ideal pure types of configuration can achieve high performance and that deviation from pure types usually results in lower performance. To make sense of this example, it is possible that the presence of prospector and the absence of other Miles and Snow (1978) typologies (except analyzer as a "don't care" condition) as parts of a combination in the solution path are essential to support the hybrid type in Porter's

(1980) typology because, with the objective of continually searching for new market opportunities, a prospector must focus on innovation and product features, making it similar to a differentiator, and these same features, as well as not yet having any direct competitor in the newly-created market, allow it to perform well with a cost leadership strategy (Miller, 1986; Segev, 1989; Parnell, 1997; Fiss, 2011).

Unlike previous studies that have used variable-based approaches (e.g. Doty, Glick & Huber, 1993; Ketchen, Thomas & Snow, 1993), which disaggregate cases into independent, analytically separate aspects, the current study applies set-theoretic methods, which treat combinations of attributes (different GOC typologies) as different types of cases. Thus, in this study, a variety of combinations give cases their uniqueness (Fiss, 2011). Consequently, considering other conditions in a solution path has direct implications for the organizational ambidexterity literature (Tushman & O'Reilly, 1996), especially with a hybrid type and a stuck in the middle strategy (Porter, 1980), because solution tables only list configurations that consistently lead to the outcome of interest (best cost), but do not include configurations that do not lead to high performance (stuck in the middle), that do not pass the frequency threshold, or that show no consistent pattern and thus do not pass the consistency threshold (unreliable combination).

This research shows that contextuality is a factor differentiating the two and may improve understanding in this literature. However, discovering the holistic context would be an exercise in itself, and not one I am currently undertaking. Although the contextuality rule for a feasible hybrid in this study is far from perfect, since only one research construct (GOC) is investigated without taking into account environmental factors and organizational structures as well as other research constructs (FCs), a review of the findings of all H1 sub-hypotheses suggests that best cost will generate high ef1 (H1c) and ad2 (H1d) only if the business unit pursues either a prospector or analyzer but not a defender or reactor strategy. This is probably because, unlike the latter two, the former two either fully or partly aim to expand to new markets, which both supports differentiation and allows for a cost leadership position, as mentioned earlier.

Interestingly, best cost is a dominant combination in both analyses, meaning that best cost is the most empirically relevant in generating ef1 and ad2. However, the result of repeating sufficiency analysis for higher levels of ef1 than the current test[44] supports Fiss' finding and argument that:

> it may be possible to achieve high performance using a hybrid type, but as one approaches very high performance, trade-offs between differentiation and cost leadership as well as their associated characteristics of organizational structure appear to make hybrid types such as the Analyzer infeasible: the very high performers appear to rely on pure types (2011: 410).

To further test for causal asymmetry to establish whether or not the hybrid type of GOC is still a sufficient condition and to reconfirm Fiss (2011), future research should repeat the current analytical framework with two more performance criteria (not high performance and low performance), rather than only the high performance and very high performance tested here. This additional test might resolve some of the mixed findings regarding the relationship between ambidexterity and performance (Raisch & Birkinshaw, 2008).

Unlike Porter's (1980) typology, the notion of hybrids is not new to Miles and Snow's (1978) typology because they perceive analyzer as a hybrid along a continuum between prospector and defender. Therefore, the analyzer found in the study provides no new insight into this typology, but simply reconfirms it. The finding shows that pure types always prevail except in only one solution path that comprises both analyzer and defender, none of which are dominant combinations. This finding could be interpreted as an analyzer with a strategy more inclined toward defender than prospector characteristics, and hence also does not contradict previous research.

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[44] The new anchor points for fully in, most ambiguous point, and fully out of the set of very high ef1 (vef1) are the 87.5, 75 and 50 percentile, respectively.

Comparing these two typologies, I also find that the presence of Porter’s (1978) typology appears to dominate that of Miles and Snow (1980) in terms of sufficiency to generate high performance dimensions. Out of 33 solution paths for all H1 sub-hypotheses, 26 have at least one of Porter’s typologies present as an INUS condition to generate high performance dimensions, while only 13 require at least one of Miles and Snow’s typologies to be present as an INUS condition to generate high performance dimensions. According to Miller (1989) and Kumar, Subramanian and Strandholm (2001), this may be because Porter’s (1978) typology appears to integrate the central concepts of the other typologies (e.g. Miles & Snow, 1980; Hambrick, 1983b; Miller & Friesen, 1986) and hence covers more aspects of causal factors. Consequently, Porter’s (1980) typology appears to be the most popular paradigm in the literature (e.g., Dess et al., 1995; Hill, 1988; Lee & Miller, 1999; Miller, 1989; Miller & Dess, 1993).

10.1.1.2 Implications for FC

This thesis raises three main implications for FC. The first two are similar to the previously-mentioned implications for GOC.

1) By applying a set-theoretic approach in resource-based theory and separately testing different performance dimensions commensurate with each FC, this study is likely to solve previous FC research inconsistencies, which in turn provides a solid foundation for subsequent implications.
2) This study also provides a more refined understanding of the FC-performance relationship by suggesting a holistic combination of FC-performance dimension as well as careful consideration of the contexuality of solution paths, especially compatibility between FC types and the existence of core and peripheral conditions. This research finding suggests a shift in our understanding of the FC-performance relationship from the original hypothesis (H2) of one-to-one (one FC to one performance dimension) to many-to-one, albeit at different levels of importance (core and peripheral), and, in a rare case, to many-to-many. Moreover, consideration of core and peripheral conditions also

raises another implication regarding a substitution relationship between peripheral conditions of different solution paths that share the same core condition, and a "true" complementarity between core conditions that are displayed within the same solution path.

3) By using the same research technique, which allows for a direct comparison of the explanatory power of two research constructs, the empirical findings challenge the argument of previous criticisms of the configuration literature, that firm-specific characteristics (FC) are better performance predictors (Barney & Hoskisson, 1990), by arguing that neither GOC nor FC provides a "universally better" explanation.

These theoretical implications will be discussed in turn.

The current study is, to the best of my knowledge, the first to apply a set-theoretic approach to resource-based theory (RBT).[45] As previously mentioned, fsQCA, based on asymmetrical causal relationships, is more appropriate to describe social science relationships than correlational tests that assume both sufficient and necessary conditions simultaneously (Ragin, 1987, 2000; Fiss, 2011). Moreover, the separate tests for different performance dimensions in this study are likely to resolve previous research inconsistencies because each performance dimension should be more commensurate with some (but not all) objectives of different FCs. Therefore, support for all proposed sub-hypotheses in this study addresses Godfrey and Hill's (1995) challenge of RBT regarding the accuracy of performance prediction and Newbert's (2007) claim that RBT receives "only modest support overall" by providing even more reliable evidence supporting previous claims that FC leads to high performance (e.g. Barney & Arikan, 2001; Crook et al., 2008), especially with a more refined understanding of the relationship by suggesting a holistic combination of FC-performance dimension in addition to previous research. Moreover, using the same

[45] For a bibliography of QCA application in business and economics (48 researches) and management and organization (24 researches), see Compass (2014), particularly http://www.compasss.org/bibliography/busEco.htm and http://www.compasss.org/bibliography/manOrg.htm respectively.

technique allows for a direct comparison of the explanatory power of GOC and FC, as in the meta-analyses of organizational configuration and RBT by Ketchen et al. (1997) and Crook et al. (2008) respectively.

As in the previous section, the theoretical implication arises from considering the contexuality of solution paths. No solution path in this test has a single FC present and the rest as “don’t care” conditions, meaning that no FC is a sufficient condition on its own; rather, each can only be an INUS condition. Similarly, the absence of a particular FC is also an INUS condition, which when required suggests that there are some FCs that work against each other. By the same token, the study also shows that each solution path of the H2 analysis usually displays the presence of more than one FC, apart from the suggested FC in the sub-hypotheses (only 25% of all H2 solution paths display one FC attribute present and the rest absent or as a “don’t care” condition), suggesting that FCs often work in combination, rather than alone.

Challenging Skinner (1969, 1974), who defends a trade-off between manufacturing capabilities and the need to focus on a single competitive priority, this finding is consistent with the more recent works of Ferdows and De Meyer (1990), Noble (1995) and González-Benito and Suárez-González (2010), which suggest compatibilities between different manufacturing capabilities, especially those with opposing competitive priorities such as flexibility and cost reduction (De Meyer et al., 1989; Rosenzweig & Roth, 2004). In other words, this study suggests complementarity between FC types, which raises the importance of contexuality in this literature.

Consideration of core and peripheral conditions raises another implication for the literature. When considering solution paths that have more than one FC present, while most have only one FC present as a core condition, pointing to the potential substitutability of FCs present as peripheral conditions, still others, albeit quite rarely, have two FC attributes present as core conditions, suggesting a potential “true” complementarity between different types of

FC because both are required with the same level of importance. Therefore, this study suggests a novel concept to refine the current hypothesis (H2), in that actually multiple FCs rather than a single FC are sufficient for the outcome, albeit at different levels of importance (core and peripheral).

Moreover, a holistic view of the dominant (core) and subordinate (peripheral) FCs within a combination provides better insight into the relationship between FCs within a combination. Solution paths with different core conditions illustrate different unique types of business units that equally achieve a particular performance dimension (first-order/across-group equifinality); yet the proposed FC under each sub-hypothesis tends to be a core condition more often than others in most analyses, consistent with support for all H2 sub-hypotheses. Different constellations of peripheral conditions surrounding core conditions in the same analysis provide a finer-grained understanding of which FCs are substitutes for each other (other peripheral FCs) under second-order (within-group) equifinality.

Paradoxically, the reverse of the notion that multiple FCs are a sufficient combination for a particular performance dimension is also true, though quite rare. I occasionally observe that some FC combinations achieve more than one, though not all, performance dimension. This is possibly either because these FC combinations allow business units to perform particular activities that enhance many performance dimensions or because they fit well with many strategic choices, or both. This calls for future research to investigate this phenomenon.

This result is also in line with Noble's (1995) cumulative model and González-Benito and Suárez-González's (2010) finding that a combination of different manufacturing capabilities achieves both commercial and financial performance. Therefore, another theoretical implication of this study is a shift in our understanding of the FC-performance relationship from the original hypothesis of one-to-one (one FC to one performance dimension) to many-to-one and, for a rare case, to many-to-many.

Thus, although the emphasis on a single FC as proposed in my sub-hypotheses cannot by itself explain business performance (since they are INUS conditions), it appears to facilitate a better alignment with other FCs and contribute to one or a few performance dimensions (but not all), in so far as complementarity between FCs is achieved (as displayed in this analysis). Although this argument requires additional empirical support for full validation, because my sample is quite distinctive (commodity-like) and the results leave several questions open to subjective interpretation, my research draws attention to combinations of FCs (contexuality) as a relevant element in explaining high performance.

Another main implication is that the empirical findings counter the arguments of previous challenges to the configuration literature, especially those of McGee and Thomas (1986) and Thomas and Venkatraman (1988) regarding GOC's weak explanatory power for performance and that of Barney and Hoskisson (1990) claiming that firm-specific characteristics are better performance predictors.

When considering only solution paths that pass the 0.7 consistency threshold of this research, the solution coverage of H1 (explanatory power of GOC) is higher than that of H2 (explanatory power of of FC) for six performance dimensions tested (out of ten), while the findings for the remaining four performance dimensions support the opposite. In other words, neither GOC nor FC provides a "universally better" explanation. Which matters more may also be contextually dependent; discovering that context would be an exercise in itself, and not one I am currently undertaking as I aim to argue that considering both will provide a better explanation than selecting either one. This empirical result is consistent with the results of Ketchen et al.'s (1997) and Crook et al.'s (2008) meta-analyses, which show no significant differences between the explanatory power of GOC and FC for performance, implying that both are of equal importance in explaining performance differences between firms.

10.1.2 Implications for proposed theory

10.1.2.1 Implications for complementarity

This thesis raises two main theoretical implications for the complimentarity notion, the latter of which offers a detailed understanding of the former.

1) This study suggests complementarity between GOC and FC as a proposed theory to improve explanatory power for performance by linking both current theories that have not previously been considered together. Careful consideration of complex causality in the empirical findings (e.g. an increasing number of solution paths in H3 sub-hypotheses compared with those of H1 for the same performance dimension, the presence of both components of proposed combinations as core INUS conditions and a high consistency level of almost all solution paths with both components of proposed combinations) contributes further new evidence to endorse this argument.
2) This study provides a finer-grained understanding of the aforementioned complementarity between GOC and FC in explaining performance by offering a holistic examination of all possible combinations to test a proposed compatible combination, and by presenting evidence that raises concern about the importance of having GOC compared with having FC. In short, this study shifts the focus from falsifying GOC and replacing it with FC to searching for a matching combination of the two.

These theoretical implications will be discussed in turn.

Complementarity is built on the previous implication that neither GOC nor FC provides a "universally better" performance explanation, as well as on the deviations found in some of the H1 sub-hypotheses that also support the addition of other potential factors, raising a theoretical implication for both current theories in that it suggests a potential additional factor to improve explanatory power for performance that has never been considered before. (Just as FC is introduced to GOC, so too GOC is recommended for FC.) In addition to support from most H3 sub-hypotheses (except H3c), the empirical results of the financial data also support the existence of complementarity by showing that the solution coverage (explanatory power for performance) of the combination of GOC and FC (H3) is often higher than that of either GOC or FC alone (H1 and H2).

Although the survey data show mixed results, when comparing solution coverage across analyses with the same performance dimension, complementarity still displays an improvement over each research construct individiually, in that six out of twelve performance dimensions are better explained by complementarity while others are split between GOC and FC for two and three performance dimensions. (Another performance dimension (oe2) shows “not applicable” because all related solution consistencies are lower than the 0.7 threshold.) This research, therefore, addresses Priem and Butler’s (2001) call for further development of resource-based theory to investigate conditions under which different resources and capabilities are and are not valuable, and Crook et al.’s (2008) call for an inquiry that considers how strategic resources and organizational configurations (two competing sources of competitive advantage) interact by providing a holistic view of combinations of GOC and FC that generate high levels of different performance dimensions. Most importantly, because fsQCA highlights the complex causality notion in the empirical findings, this study provides a finer-grained understanding of the relationship between GOC and FC in explaining performance.

In addition to receiving support from hypothesis testing (H3), the complimentarity argument is also endorsed by inferences drawn from careful consideration and comparison of causal conditions within solution paths. It is noticeable that the number of solution paths in the sub-hypotheses of H3 is greater than in those of H1 for the same performance dimension, suggesting that an additional FC for a sufficient analysis of all typologies of GOC assists in identifying more successful cases for a particular performance dimension that have not previously been covered by GOC. This is probably because FC provides an internal competitive advantage for a business unit in addition to an external one covered by GOC, resulting in the character of the business unit being taken into consideration in finer detail.

This is consistent with Spanos and Lioukas' (2001) argument that GOC and FC jointly supply full-dimension explanations for firm performance (both internal and external domains in the SWOT framework) regarding sources of competitive advantage.

Moreover, the majority of solution paths (25 out of 62 solution paths for H3 sub-hypotheses and 27 out of 88 solution paths for H4 sub-hypotheses) that comprise the presence of either a proposed GOC or a proposed FC (but not both) as a core INUS condition for the outcome under consideration, with the other as a "don't care" condition or absent, is consistent with the previous tests (H1, H2) which show that each (on its own) is a necessary part of a combination that is sufficient to generate high performance, which in turn seems to suggest a trade-off relationship between GOC and FC.

However, the presence of both components of proposed complementarity combinations as core INUS conditions, even as a minority of solution paths (3 out of 62 solution paths for H3 sub-hypotheses and 7 out of 88 solution paths for H4 sub-hypotheses), implies that both are necessary parts of a conjunction that is sufficient, albeit rare, to produce the outcome, which in turn helps support the existence of complementarity between GOC and FC.

Furthermore, when considering the tests for complementarity (H3 and H4), unlike other solution paths with only one research construct present that sometimes fail to meet the 0.7 consistency threshold, solution paths with both components of a proposed combination pass the 0.7 consistency threshold almost every time (except H4b for oa1f which has a consistency level of 0.67). Therefore, it can be inferred that the proposed combinations are more reliable predictors of high performance dimensions because the higher the consistency value, the more accurately such a condition predicts the outcome (higher predictive power). Since consistency and coverage are inversely related (when one is high, the other will be low.), it is unsurprising that the proposed combinations have lower coverage than their counterparts. This implies that, although complementarity provides a more accurate prediction, it covers fewer cases of high performance (lower explanatory power).

Furthermore, the proposed complementary combinations are found more frequently in H4 (overall performance proxies) than in H3 (performance dimension).

This is probably because these combinations achieve more than one performance dimension, resulting in better overall performance proxies. Therefore, this research finding contributes new evidence to confirm the arguments of previous research that both GOC and FC play essential roles in achieving business performance and that ignoring one may hinder or blur important implications (Wernerfelt, 1984; Cool & Schendel, 1988; Conner, 1991; Barney, 1992; Barney & Griffin, 1992, Mahoney & Pandian, 1992; Amit & Schoemaker, 1993; Peteraf, 1993; Barney & Zajac, 1994; Henderson & Cockburn, 1994; Spanos & Lioukas, 2001; Short et al., 2007; Sirmon, Hitt & Ireland, 2007; González-Benito & Suárez-González, 2010).

Apart from support for the existence of complementarity, another main theoretical implication of this study is compatibility between the research constructs tested. To my knowledge, no empirical research has jointly considered GOC and FC in all possible combinations. In fact, even a specific alignment between a particular pair such as Porter's (1980) typologies and manufacturing strategy (equivalent to the operations capacity of the current research) has received limited empirical attention (Ward & Duray, 2000). In this regard, González-Benito and Suárez-González's (2010) work seems to be a closely comparable study for GOC and operations capability (H3a). The current finding is also consistent with their claim that "an appropriate alignment of the manufacturing function with a business strategy emerges as a crucial circumstance that explains a significant part of the success of that strategy" (González-Benito & Suárez-González, 2010: 1039).

Therefore, this thesis offers an initial step to test a proposed compatible combination by examining all typologies of GOC (to allow testing for a hybrid type) and one or two types of FC at a time. Further research should complement this by including additional FCs that are also hypothetically justified or retesting the current analysis with all types of FC and one or two typologies of GOC at a time (up to the level that the total number of causal conditions still comply with the limiting ratio of explanatory cases to characteristics (Marx, 2010)) in order to gain an understanding from a different perspective regarding which GOC is compatible with a particular combination of FCs and whether one FC is compatible with more than one GOC typology.

Furthermore, some solution paths in the H3 and H4 sub-hypotheses still have some GOC typologies present and have FC as either absent or "don't care" conditions, and no solution path (except those in H4a for oa1, oa1f, oa2, and H4d for oa1) has FC present and has the remaining GOC typologies as either absent or "don't care" conditions, suggesting that it may be possible for business units to achieve high performance by having only GOC typologies but they are less likely to do so by having only one or two FC types without any clear direction of GOC.

The findings of this study, therefore, strengthen Hofer and Schendel's (1978) argument about the intervening role played by consistent functional strategies in a business strategy's positive impact on performance by confirming the evidence of previous research regarding the relevance of functional strategies for the efficacy of a business strategy (Miles & Snow, 1984; Lengnick-Hall & Lengnick-Hall, 1988; Slater & Olson, 2001). In addition, building on the previous analysis (H2) that FC often works in combination rather than alone, it raises concern over whether, to be successful, business units without any clear GOC should have more than one or two FC types, as proposed in the sub-hypotheses. Further research might address this by repeating the H3 sub-hypotheses with the additional FCs found in the H2 sub-hypotheses for the same performance dimension.

Although this complementarity argument requires additional empirical support for full validation (for example, because my sample has a specific characteristic of commodity-like products) and the results leave several questions open to further analysis (whether complementarity always outperforms one causal factor and, if not, what is the required condition), this research draws attention to compatibility between GOC and FC as relevant in explaining high performance.

In this regard, I would like to mention one possible future test as follows. Given that a calibration in fsQCA predetermines a certain level of performance as an anchor point for a high level of a particular performance dimension (any business unit that passes this anchor point will be considered as a high performer in that dimension, no matter how high its performance really is), it is impossible to compare the level of performance between solution paths by considering only the results of the current analysis. Therefore, it would be possible to establish indirectly whether complementary combinations outperform a single research construct by conducting a separate sufficiency analysis with an even higher level of anchor point for the performance dimension and then drawing inferences from a comparison of the observed results. This is similar to testing whether it is feasible for hybrid types to achieve very high performance, as suggested in the previous section.

10.1.2.2 Implications for equifinality

This thesis raises two main theoretical implications for the notion of equifinality. Like that of complimentarity, the latter offers a detailed understanding of the former.

1) This study provides holistic evidence supporting the existence of equifinality, which in turn lends support to the validity of the configuration-performance relationship because it offers an alternative explanation for challenges regarding the equivocality of configuration by counterarguing that these are mistakenly based on the notion of causal symmetry whereas the actual nature of this social science relationship is asymmetrical.
2) This study explicitly displays the existence of equifinality at all levels of analysis, comprising equifinality within each research construct, between GOC and FC, among proposed combinations of GOC and FC, and among performance dimensions, each of which provides a finer-grained understanding of the field, such as the first-order (across-

group) and second-order (within-group) equifinality exhibited between different solution paths within a particular hypothesis test.

These theoretical implications will be discussed in turn.

Although equifinality is an implicit assumption of the configuration concept, particularly in both Miles and Snow’s (1978) and Porter’s (1980) typologies (Marlin, Ketchen & Lamont, 2007), it has received less attention in the literature. Only a handful of previous research studies in the configuration literature have explicitly tested the existence of equifinality (Doty, Glick & Huber, 1993; Gresov & Drazin, 1997; Fiss, 2011), though not exhaustively in terms of the variety of GOC typologies, other potential causal factors (FCs) and different performance dimensions. Hence, equifinality has become a weak link in configuration and has been subject to challenges by other research paradigms (RBV).

In response to this concern, the current study reconfirms the empirical studies of Doty, Glick and Huber, (1993), Gresov and Drazin (1997) and Fiss (2011) by providing holistic evidence supporting the existence of equifinality, which in turn lends further support to the validity of the configuration-performance relationship because it provides an alternative explanation for the challenges regarding configuration’s “weak evidence of performance variations across groups” (McGee & Thomas, 1986; Thomas & Venkatraman, 1988: 548). To address the challenge that empirical evidence for the configuration-performance relationship is equivocal, I counterargue that the challenges are mistakenly based on the notion of causal symmetry whereas the actual nature of this social science relationship is asymmetrical, providing holistic empirical evidence on many dimensions. Thus, the claim of equivocality is essentially a normal characteristic of equifinality and these assertions cannot falsify the configuration-performance relationship.

This research finding is consistent with Fiss (2007, 2011) in that it also suggests a new perspective on the causal asymmetry relationship for the configuration literature. In addition, because equifinality is a condition that supports the configuration concept, the attempt of this study to prove the existence of equifinality for different GOC typologies fosters the validity not only of the equifinality notion (Tushman & Nadler, 1978; Scott, 1981; Van de Ven & Drazin, 1985; Hrebiniak & Joyce, 1985; Nadler & Tushman, 1988; Pennings, 1992; Galunic & Eisenhardt, 1994; Gresov & Drazin, 1997) but also of the configuration concept (Miles & Snow 1978; Miller & Friesen, 1978; Snow & Hrebiniak, 1980; Segev et al., 1999). If equifinality exists, then one of the implicit assumptions of configuration is empirically supported. Likewise, this theoretical implication also applies to FC and the complementarity literature.

Furthermore, the argument for the existence of equifinality is endorsed by inference from a careful consideration of the findings of this research in many dimensions, each of which has further theoretical implications as follows.

Equifinality within each research construct: The finding for H1 elaborates the concept of equifinality in GOC, raised by Doty, Glick and Huber (1993) and tested empirically by Gresov and Drazin (1997) and Fiss (2011), by providing new empirical support in a holistic manner in terms of a variety of performance dimensions that seem to match better with different GOCs. Unlike the GOC literature, the FC literature has not previously raised the issue of equifinality. Therefore, the finding for H2 is among the first to raise this concern in the FC field in the same manner as that of GOC.

As in Fiss' (2011) analysis, the use of fsQCA in this research allows us to infer the existence of equifinality in many ways. Unobserved necessary conditions suggest that there is no one best way to achieve any performance dimension, indirectly supporting the equifinality concept. Sufficiency analysis directly displays equifinality at two levels through several solution paths with different core and peripheral conditions for each analysis. In a broader sense, the fact that there is no single solution path for each performance dimension in the analysis (i.e. no one best way) supports the existence of equifinality. In detail, when considering these solution paths, those that have different core characteristics exhibit first-order (across-group) equifinality while those that share the same core attributes but have different peripheral conditions reveal second-order (within-group) equifinality. The presence of first-order equifinality suggests a trade-off (substitution) in a broader sense, which is across different groups based on their unique combination of core conditions, to achieve a same level of desired outcome while the presence of second-order equifinality suggests a trade-off (substitution) in a narrow sense, which is between different combinations of peripheral conditions within a group that shares the same combination of core conditions, to also achieve a same level of desired outcome. Therefore, different constellations of peripheral conditions surrounding core conditions in the same analysis provide a finer-grained understanding of which conditions are substitutes for each other (other peripheral conditions) under second-order (within-group) equifinality.

Equifinality between GOC and FC: Since I test different research constructs with the same performance dimensions in H1 and H2, their different solution paths for a particular performance dimension also prove the existence of equifinality. Again, this indicates another theoretical implication that GOC and FC may also be treated as substitutes, rather than Barney and Hoskisson's (1990) claim that FC is a universally better performance predictor.

Equifinality between proposed combinations of GOC and FC: In considering overall performance proxies (H4), allowing comparability between different proposed combinations, I find that the presence of conditions under proposed combinations are often displayed as core conditions and that different proposed combinations, except that of prospector and marketing capability (H4d), are sufficient to generate high overall performance proxies. This supports the existence of equifinality between proposed complementary combinations. The deviation found (for H4d) not only suggests the addition of a causal condition to improve the current sub-hypothesis but also raises a concern to adopt long-term achievement as another performance measure in addition to the proposed overall performance proxies that provide only a snapshot assessment. Future research might repeat this study over a period of time (longitudinal test) in order to perceive the dynamic of this relationship.

Equifinality between performance dimensions: Although both H3 and H4 sub-hypotheses exhibit proposed combinations, the number of solution paths for a particular proposed combination are different, suggesting: 1) that there are other possible solution paths, apart from those that achieve a particular performance dimension, that also achieve the overall performance proxy (this also means that some solution paths achieve more than one overall performance proxy); and 2) that some solution paths that achieve a particular performance dimension may not be able to achieve the overall performance proxy.

This is confirmed by the solution paths in the H4e sub-hypotheses that require at least two performance dimensions to be present, suggesting that achieving only one performance dimension is usually insufficient on its own to achieve the overall performance proxy; rather each performance dimension can only be an INUS condition. Therefore, each performance dimension is merely a component of the overall performance proxy. This conclusion supports the claim by Walker and Ruekert (1987), Dye (2004) and Van der Stede, Chow and Lin (2006) that it is inappropriate to use one of these performance dimensions as the only outcome of concern to compare different GOCs or FCs or their combination.

10.2 Implications for practice

This thesis raises two main practical implications:

1) *Implication for this research dataset* (non-life insurance industry): The comprehensive view of the complex causality between GOC and FC in these research findings allows managers to consider their firm's FC and then select either a compatible business unit GOC, as proposed in the hypothesis, or one that creates a combination similar to the solution path displayed in the findings. In doing so, they should prioritize their resources toward core conditions, high unique coverage and the costs related to acquiring or

building such an option. Moreover, this knowledge also allows regulators to review the potential impact of their policies.

2) *Implication for other industries:* Although the understanding from this study has direct managerial implications for this research dataset and other industries alike, it should not be over-generalized owing to some industry-specific characteristics of the current dataset. The Thai non-life insurance industry offers a commodity-like product and can be described as a highly-regulated and mature industry with low innovation. Therefore, the level of confidence is slightly lower when applying the findings of this research to other industries which have different characteristics from those of the current dataset, and researchers should make appropriate adjustments.

These practical implications will be discussed in turn.

Overall, my research gives managers a comprehensive view of the complex causality (contextuality, core and peripheral conditions) between GOC and FC in generating a high level of a particular type of performance dimension. Therefore, it suggests that, although either GOC or FC is likely to be related to a particular performance in general, when considered together they may not be of similar critical levels, depending on the context within the solution path. For instance, although D, Dif and RD are sufficient to generate high oe2, as shown in H1b and H2b, they are displayed at different levels of importance as core, peripheral or even “don’t care” conditions in H3b for oe2, depending on the context of the solution paths to which they belong. For example, in H3b for oe2 there is a trade-off relationship between RD in S2 and Dif in S5 (both of which are peripheral conditions in a solution path that has L as a core condition) as well as a substitute relationship between D in S3 and a combination of RD and Dif in S7 (all of which are core conditions in a solution path that has A present). Hence, to be more certain about the expected result, all causal conditions must be taken into consideration.

In order to gain competitive advantage (high performance), managers should consider their firms' strengths and weaknesses reflected in FC as a starting point (since FC is difficult to create or amend in the short term owing to path dependence), and then select a compatible GOC (which is a positioning of their business units to take advantage of market opportunities and neutralize threats) that fosters the same objective as their FC, or select a GOC to create a combination that is similar to the solution path displayed in the findings. For example, to increase the likelihood of achieving a high oe2, if a firm has strong RD, its business unit should pursue either L, as in S2, or both Dif and A, as in S7. Moreover, managers should set incentives to motivate workers toward an appropriate performance target.

In addition, since a single causal factor, especially FC, is unlikely to be a sufficient condition on its own to generate high performance, managers should promote only compatible ones (as shown from my analyses). In doing so, managers should prioritize their resources toward a core condition exhibited in this study rather than a peripheral one, and toward those that have high unique coverage as they are more likely than others lead to the desired outcome. By understanding possible substitution relationships between these research constructs, they will be able to decide which choice is most economical for them.

Likewise, this study raises some concerns for regulators regarding the impact of their regulations and policies in that, although a particular policy may serve one objective well, it may have different effects on different business units. For example, the requirement for upper and lower bounds for insurance premiums and the non-protection policy for new product design successfully encourages customer protection schemes. However, these very policies tend to jeopardize fair competition because they allow less efficient business units still to be viable in the industry while discouraging highly efficient business units from maximizing their full potential. Thus, the regulator must weigh the costs and benefits of each objective before making a decision. Nevertheless, the regulator may do better to subsidize shared fundamental facilities (e.g. back office services) that will enhance industry-wide FC, which in turn may increase a particular performance dimension for all business units, no matter what GOC they pursue.

Although the overall concepts of complementarity and equifinality may be applied to other industries, managers of those industries should bear in mind that this study is industry-specific and is suitable for commodity-like products and mature industries with low innovation. Therefore, they should not over-generalize, especially if their industries do not produce commodity-like products or are immature with a high potential for innovation.

I am very confident of the managerial implications within the sample (the Thai non-life insurance industry) because the dataset used (business units from the top 25 companies in 2011 according to the revenue of each of four product lines) is representative of the whole population owing to very high market concentration. However, the level of confidence is slightly less for other countries' insurance industries owing to differences in the level of regulatory control, especially consumer protection schemes in terms of a strict required price range and new product protection policy, despite the fact that, overall, the specific characteristics of the insurance industry (e.g. an intangible financial product that is frequently mistakenly perceived as a commodity) remain the same globally.

In this regard, the potential results should be very similar to those of the current analysis, except for some deviations of the current analysis that result from the different level of regulatory control. For example, in a developed industry with patent protection and no required price range, stuck in the middles and reactors cannot take advantage of their counterparts, hence these typologies may not be part of the solution paths for input efficiency, as in the results for H1a in this research, while either low cost or differentiation strategies may still lead to high input efficiency because economies of scale are a necessary condition for any insurance business model and the misbelief that insurance is a commodity is still unresolved.

None of the research constructs used here are culturally-related; thus, these findings are not limited by socio-cultural issues and, ceteris paribus, should be applicable elsewhere. However, the main concern in applying the findings of this study to another industry is whether that industry offers a commodity-like or differentiated product, whether it is mature or still in a growth period, and whether economies of scale are not only sufficient but also necessary conditions for the viability of the industry (e.g. the law of large numbers is required by the insurance business model), because this will determine the feasibility of a differentiated strategy, which in turn will affect the solution paths for achieving input efficiency.

10.3 Limitations of the research

Naturally, this current study also has limitations, which can be classified into two main issues as follows.

10.3.1 Limitations of the dataset

While using only the non-life insurance industry in Thailand achieves the aim of enriching the study of the configuration-performance relationship by addressing an untapped dataset in a service industry in an emerging market, and avoids the problem of market and environmental differences between datasets characterstic of multi-industry research (Conant, Mokwa & Varadarajan, 1990), in doing so it also has the drawback of having industry-specific characteristics, losing the advantage of generalizability of multi-industry studies. As financial products, the costs and revenues of insurance policies are two sides of the same coin, meaning that pursuing LC will simultaneously achieve both ie and oe. The commodity-like characteristic of insurance products may also spoil the results, as mentioned earlier in the discussion of a possible explanation for the deviation found in the current findings.

Although the findings of the current study are quite limited in their generalizability, the logic of its conclusions is not context-specific and offers ample opportunity for further research. Thus, in order to test the generalizability of the hypotheses of this research, especially concern about the deviations found in the current findings, future research should repeat the analytical framework of this research with a different dataset, for example a dataset from a different industry that is not a financial service and has no commodity-like characteristics, a dataset from a developed country, or a multi-industry dataset.

The non-life insurance industry was also selected because of its relatively large number of players compared with other industries in Thailand, and because it is well-regulated, with available, reliable and comparable financial data (17 insurers are listed on the stock exchange of Thailand, which has a total of 487 listed companies). However, like other studies of emerging markets, the population of the selected industry is quite small at up to only 272 business units (68 non-life insurers x 4 main product lines = 272 business units, but not all insurers pursue all four product lines) and I have targeted only business units in the top 25 companies in 2011 according to revenue, which comprise 43 companies owing to the highly concentrated market. Hence, the actual population size is only up to 172 business units. Although 107 responses were collected from 32 companies (response rates of 62.21% and 74.42% in terms of business units and companies respectively), which is appropriate for the current technique (fsQCA), this is too few to permit a reliable statistical test for triangulation, thereby limiting the ability to draw definite conclusions from this dataset and calling for further studies to verify the current results.

This study is also limited to one point in time (cross-sectional study) and relies on a single informant within each business unit owing to the difficulty of data collection. Developing this framework to cover a period of time (longitudinal study) to understand the dynamics of this relationship, as well as using multiple respondents, would enable further insights into this research area.

Although I have used both subjective (Likert scale) and objective (financial data) measures of performance, neither perfectly measures performance as the outcome of concern. The former are subject to respondent bias while the latter are unavailable for some measures (ad1, ad2). Some are rather coarse and do not perfectly fit the theory, especially financial data for ie and oe, and cannot handle multiple inputs and outputs with different units, nor provide direct comparability with "best practice" within the sample group, restricting investigation of this research area on various dimensions.

Future research might apply frontier efficiency methodologies (Aigner, Lovell & Schmidt, 1977) known as data envelopment analysis (DEA) (Charnes, Cooper & Rhodes, 1978) to measure these two performance proxies. In brief, recognizing that some business units will not be as successful as others in meeting their objectives, the concept of efficiency measurement means that the performance of a business unit is measured relative to a "best practice" frontier of the production possibility set, which is determined by the most efficient business unit in the industry (in terms of either ie or oe).

In other words, DEA provides measures of relative efficiencies (called efficiency scores). The aim of DEA is to identify efficient and inefficient decision-making units (DMUs). A business unit is fully efficient if it lies on the frontier, and inefficient if it is not on the frontier. The benefits of DEA over other efficiency measurement methods are that it not only provides benchmarks and identifies better-performing peers, but also that it can incorporate multiple inputs and outputs with different units at the same time. This will help better comprehend the different kinds of efficiency of different organizational configuration typologies.

In addition, as previously mentioned in detail in discussion of the deviation of the H4 sub-hypotheses, there was an unforeseen severe flood in Thailand during the data collection period (2011), the aftermath of which was mixed: while fire and miscellaneous (industrial all-risk) insurance were most affected, marine and motor insurance were least affected. This made it even more difficult for respondents to estimate the industry situation and provide an accurate answer. Thus, it would be advisable for future researchers to take business unit ownership conditions and size, which are factors that differentiate between those that can recover from potential catastrophe and those that cannot, into consideration, as well as conducting this research framework over a period of time (longitudinal rather than cross-sectional study), to allow the impact of any catastrophe to average out over time, which would help improve the generalizability of this study.

10.3.2 Technical limitations

The strategy concept is quite broad and involves multiple dimensions (Miller, 1986). Like that of Fiss (2011), this study focuses on a few measures as a representative set of categories to characterize strategy, to the exclusion of others that might have been used. Nevertheless, the measures selected for this study (Miles & Snow's (1978) and Porter's (1980) typologies) are arguably central to the strategy concept, and this study is relatively comprehensive in that it is one of only a handful to consider both typology classifications simultaneously. As such, it goes beyond much previous work in offering a holistic assessment of typological configurations.

A second limitation of the study may be seen in the original measurement instrument. The research constructs under study (GOC and FC) are latent variables, and their measures are derived from a self-reported study. Although I took great care to select a broadly accepted measurement instrument (questionnaires) that were tested for validity and reliability, and collected data through personal interviews and surveys with some second-wave calls to avoid misunderstandings by respondents, the precision of fuzzy set calibration might be improved in the presence of observed measures. Future studies should try to address this issue, perhaps proposing other, less subjective measurement instruments for the criterion condition.

Another technical shortcoming in this research is the unsolved causality inference limitation that fsQCA, like conventional correlational approach (i.e. regression and other standard statistical methods) utilized in prior researches, still identifies associations, not causality. In a typical analysis, fsQCA reveals combinations of attributes associated with an outcome; it is up to the researcher, however, to hypothesize any possible causal mechanisms. Thus, to cope with this unsolved limitation, the justification for a set theoretical interpretation of the hypotheses should be justified. In this regards, I offer a transparent research sub-hypotheses, which are open to discussion regarding their justification. Given that they are justified, I can then array the possible causal conditions in hypothetical chains and claim that it is necessary to conduct separate analyses for each intermediate outcome. Future studies should try to address this issue still further, perhaps by modifying fsQCA to include temporality in the analysis by explicitly including attributes that include time patterns, such as "X preceded Y," in the analysis (Caren & Panofsky, 2005; Ragin & Strand, 2008).

The next limitation is that, beside the fact that in fsQCA researchers must make a number of choices regarding how to analyze the data (e.g. calibration criteria, consistency threshold level) which are transparent and open to debate as well as subject to retesting with different conditions in future for sensitivity analysis, I have had to be creative in order to be able to undertake hypothesis testing using fsQCA. Although the approach to using fsQCA to test hypotheses is established and growing (Schneider & Wagemann, 2012), it focuses on identifying an area of hypothesis improvement, which does not match well with the main objective of my research to respond to challenges regarding the ability of GOC to explain performance and to examine a potentially improved explanation of performance from complimentarity, all of which require an ability to judge each hypothesis decisively. Moreover, for each hypothesis, I examine performance in both surveyed and financial data and most have two measurements, resulting in 56 tests in total. Thus, it is essential to set criteria to summarize the test results for each hypothesis. I have therefore creatively proposed additional criteria to make use of previous approaches (Ragin, 1987: 118-121; Schneider & Wagemann, 2012: 297) in providing a decisive and summarized hypothesis validity result in accordance with that of traditional quantitative research (whether or not to reject a hypothesis and, if not, how strongly the hypothesis is supported). In order to do so, I have proposed criteria to infer whether to prove or disprove a particular hypothesis by applying “process tracing” (George & Bennett, 2005; Bennett, 2006, 2008; Collier, 2011). A clear rationale for each criterion is provided in Appendix 13.4. This proposed non-standard method is, therefore, potentially open to debate.

Lastly, the number of causal conditions in each analysis is limited by both the technique itself and the software. Schneider and Wagemann (2012: 276) recommend that “the number of conditions included in a QCA should be kept at a moderate level” because the number of possible logical combinations of characteristics grows exponentially with the number of characteristics, leading to severe problem of limited diversity, a situation that the logically possible combination of attributes of a case does not reveal itself empirically (Ragin, 1987, 2000). Consequently, solution terms tend to be either too complex or based on too many assumptions on remainders. “Complex solutions often apply only to single cases and are difficult to interpret in a theoretically meaningful manner, whereas a high number of assumptions increases the risk that some of those are untenable” (Schneider and Wagemann, 2012: 277). Furthermore, as mentioned earlier about fsQCA limitation in Section 5.2 of Chapter 5 (page 128), researchers have to consider a limiting ratio of explanatory cases to characteristics. Below this ratio, there is an unacceptably high likelihood of incorrectly finding “meaning”, when there is really just random variation. The ratios vary according to the number of characteristics in the model. With three or four characteristics, a ratio greater than 3:1 is preferred; with five or six characteristics, the ratio should be greater than 4:1. A study of 50 cases should ideally include no more than seven characteristics in the explanatory model (Marx, 2010). Additionally, although fsQCA 2.5 is the oldest and most widely used software probably due to its ability to produce all the standard parameters of fit and indicate which cases are member of the different sets involved in a solution formula, it is slow when the number of cases and/or the number of conditions is high and prone to break down quite often (Schneider and Wagemann, 2012). Thus, reconfirming Schneider and Wagemann’s (2012) recommendation regarding moderate level of the number of conditions.

As a result, to be in line with the fsQCA best practices as well as the current software capability, all ten proposed causal conditions cannot be tested in the same analysis, resulting in the separation of four sub-hypotheses for each hypothesis. Particularly, my 107 explanatory cases was analyzed with either six or seven characteristics depending on a sub-hypothesis, resulting in a highly acceptable ratio of 17.83:1 or 15.29:1. Nonetheless, this makes it far from holistic in terms of all potential causal conditions involved in each hypothesis. Therefore, further studies should test any possible combinations (six to eight conditions) to verify the current results or refine them still further. For instance, rather than testing all GOCs with one FC, future research might test all FCs with one GOC to search for a corresponding FC for each GOC. Moreover, adding other dimensions of causal conditions, for example environment (market turbulence), firm structure, business unit ownership conditions, firm size or product complexity, would be another promising extension of the current research. The potential causal conditions questioned in the survey of this research (see Appendix 13.2) are not within a scope of this current study but have been collected for the purposes of future research.

11 CONCLUSION

In this thesis, I have aimed to defend the existence of the configuration-performance relationship by providing empirical evidence in response to falsification attempts, especially Barney and Hoskisson's (1990) challenge regarding the lack of theoretical and empirical rigour of this relationship. In order to do so, I have developed one main research question (how do GOC and FC, either alone or in combination, affect different performance dimensions?), which comprises four sub-questions, each of which is addressed by one hypothesis and will be summarized in turn.

11.1 Recap of H1

To address the first sub-question, "will the relationship between GOC and performance become less equivocal if researchers consider performance measures commensurate with different GOC typologies, rather than judging the GOC-performance relationship on only one performance measure for all GOC typologies?", I have developed H1: "having a high intensity level of at least one particular typology of proposed GOC is a sufficient condition for a business unit to achieve a high level of performance dimension corresponding with that typology". I have then tested it, using fsQCA to avoid the mistakes of previous research that has assumed the causal relationship to be symmetrical rather than asymmetrical (Ragin, 1987, 2000; Fiss, 2011), and have found that ten out of twelve H1 sub-hypothesis tests are supported. This has answered the first research sub-question that the equivocal empirical evidence of previous research can be improved, if not resolved, by selecting an appropriate performance dimension to measure a business unit with different GOCs.

In addition, as a by-product of the findings from fsQCA, considering other conditions in the solution path carries direct implications for the organizational ambidexterity literature (Tushman & O'Reilly, 1996). Apart from a pure type, which is consistent with Walker and Ruekert's (1987) finding, the current study also displays the rare occurrence of a hybrid type (the presence of both low cost and differentiation), which is in line with Fiss' (2011) finding, suggesting that either pure or hybrid types can achieve high performance dimension. This challenges Porter's (1980) claim and those of other supporting research (Hambrick, 1983b; Miller, 1989) regarding the stuck in the middle typology.

11.2 Recap of H2

In order to address the second sub-question, "how do a firm's FCs relate to performance through different measurements that are commensurate with each FC, especially compared with the matching GOC, in explaining the same performance dimension?", I have developed H2: "being part of a firm that has a high intensity level of at least one particular type of proposed FC is a sufficient condition for a business unit to achieve a high level of performance dimension corresponding with that type of FC". I have found that all sub-hypothesis tests are supported, and that one even gained strong support, thereby addressing a previous challenge of resource-based theory, a root of FC, regarding the accuracy of performance prediction.

Again, fsQCA allows for an even more refined understanding of compatibility between FCs through consideration of the contextuality of each solution path. I have found that each solution path of the H2 analysis usually displays the presence of more than one FC apart from the proposed FC in the sub-hypotheses, suggesting that FCs often work in combination, which is consistent with De Meyer et al. (1989), rather than alone as suggested by Skinner (1969, 1974). Therefore, this thesis suggests a novel concept to refine the current hypothesis (H2) in that multiple FCs, rather than a single FC, may in fact be sufficient for the outcome, albeit at different levels of importance (core and peripheral). Paradoxically, the reverse of this notion is also true, albeit quite rarely. Therefore, another theoretical implication of this study is a shift in our understanding of the FC-performance relationship from the original hypothesis of one-to-one (one FC to one performance dimension) to many-to-one and then, for a rare case, to many-to-many.

However, considering H2 alone only answers the first part of the second research sub-question. To answer the latter part, I have compared solution coverages (which portray explanatory power) between all sub-hypotheses of H1 and H2 tested against the same performance dimension and have found that the results of solution coverage comparison are mixed, from which it can be inferred that neither GOC nor FC provides a “universally better” explanation. In counterargument to Barney and Hoskisson’s (1990) falsification attempt, this empirical result is consistent with a comparison of the results of Ketchen et al.’s (1997) and Crook et al.’s (2008) meta-analyses, which suggest that both are of equal importance in explaining performance differences between firms. Hence, rather than trying to determine which one matters more, this raises a concern for potential improvement through the use of a combination of both to explain performance (H3).

11.3 Recap of H3

In order to address the third sub-question, “to what extent do FCs complement the relationship between GOC and performance in different measurements and does this combination provide a better explanation of the performance outcome than considering either construct one at a time?”, I have developed H3: “being part of a firm that has a high intensity level of at least one type of proposed FC and having a high intensity level of a particular typology of proposed GOC that is compatible with its firm’s FC is a sufficient combination of conditions for a business unit to achieve a high level of performance dimension corresponding with that combination”. I have found that nine out of twelve sub-hypothesis tests are supported, suggesting another potential improvement to previous research in explaining performance variance by 1) combining a matching pair of GOC and FC, as proposed in this research according to similarity (or practices “of the same kind”) (only for those that are supported), and 2) selecting an appropriate performance dimension to measure a business unit with those different combinations.

To answer the latter part of the third research sub-question, I have again compared the solution coverages of all sub-hypotheses of H1, H2 and H3 tested against the same performance dimension. The results of solution coverage comparison are mixed but still exhibit the dominant theme. The empirical evidence shows that six out of twelve performance dimensions are better explained by H3 (proposed complementarity), while the rest are split almost equally between H1 (GOC) and H2 (FC). It can be inferred that usually, though not always, the proposed combination between GOC and FC is a better performance predictor, raising a theoretical implication for both current theories in that it suggests a potential additional factor to improve explanatory power for performance that has never been considered before. (Just as FC is introduced to GOC, so too GOC is recommended for FC.)

Once more, careful consideration of the findings from fsQCA strengthens this argument still further (for example, an increasing number of solution paths in the H3 sub-hypotheses compared with those of H1 for the same performance dimension, the presence of both components of proposed combinations as core INUS conditions, and a high consistency level for almost all solution paths with both components of proposed combinations). This dissertation not only addresses Crook et al.'s (2008) call for an inquiry that considers how GOC (market power) and FC (efficiency) interact, but also contributes new evidence to confirm the arguments of previous research that both play essential roles in achieving business performance, and that ignoring one may hinder or blur important implications (e.g. Spanos & Lioukas, 2001; Short et al., 2007; González-Benito & Suárez-González, 2010). Most importantly, it suggests that researchers should take into account compatibility between GOC and FC. This shifts the focus from falsifying and replacing the former with the latter to searching for matching combinations of the two.

11.4 Recap of H4

In order to address the fourth sub-question, "can more than one proposed combination of GOC and FC, as well as their corresponding performance dimensions, lead to an equally high overall performance outcome?", I have developed H4: "being part of a firm that has a high intensity level of at least one type of proposed FC and having a high intensity level of a particular typology of proposed GOC that is compatible with its firm's FC is a sufficient combination of conditions for a business unit to achieve a high level of overall performance proxy". I find that nine out of sixteen sub-hypothesis tests are supported, and one even receives strong support, suggesting that the complementarity of the proposed combinations tested earlier (H3) and their corresponding performance dimensions support the existence of equifinality. With finer consideration of the fsQCA findings (e.g. similar solution coverage level of at least two sub-hypotheses based on the same overall performance proxy), the equifinality argument is further reinforced. In fact, equifinality is explicitly displayed at all levels of analysis in this study, comprising equifinality within each research construct, between GOC and FC, between proposed combinations of GOC and FC, and between performance dimensions, each of which provides a finer-grained understanding of this field, such as a finer-grained understanding of which conditions are substitutes for each other under first-order and second-order equifinality exhibited in different solution paths within a particular hypothesis test.

As an implicit and less prominent assumption of configuration, equifinality has become a weak link in configuration and has been subject to challenge by another research paradigm (RBV). In addressing this concern, the current study provides holistic evidence supporting the existence of equifinality, which in turn lends further support to the validity of the GOC-performance relationship because it provides an alternative explanation for challenges regarding configuration's "weak evidence of performance variations across groups" (Thomas & Venkatraman, 1988: 548) by counterarguing that these challenges are mistakenly based on the notion of causal symmetry whereas the actual nature of this social science relationship is an asymmetrical one. Thus, their claims of equivocality are essentially a normal character of equifinality.

11.5 Concluding remarks

In this thesis, I have argued that the theory of GOC may benefit both conceptually and empirically from reorientation toward joint consideration with FC through the concepts of causal asymmetry, neutral permutation, and causal core and periphery. I have made a case for further research to extend this approach and show its utility in developing the proposed theories of complementarity and equifinality in organization research. Future research studies might try to regroup the currently available causal conditions and/or add more causal conditions that are also hypothetically justified but have not yet been tested in this research or include attributes that include time patterns to this framework up to the level that the total number of causal conditions still comply with the limiting ratio of explanatory cases to characteristics (Marx, 2010) or readjust the calibration criteria of the concerned outcome to develop a more holistic view regarding the creation of competitive advantage.

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13 Appendices

13.1 Cover letter & questionnaire

Re: Request for questionnaire about strategy-performance relationship research

Dear Sir or Madam,

My name is Sirus Pussayanavin. I am a PhD student at Warwick Business School, University of Warwick conducting research under the supervision of Professor Dr. Michael J. Mol. I am researching the effect of functional capabilities and strategies on performance and aiming to use the Thai non-life insurance industry as a research setting. The study is being conducted with funding from the Ministry of Commerce (my scholarship sponsor) and Warwick Business School for the data collection and has a strong support from both the General Insurance Association and the Office of Insurance Commission.

This research aims to increase the levels of explained performance variance across business units (i.e. each of four of your non-life insurance product line divisions) by suggesting an overall firm's functional capabilities as a moderator supporting the relationship between a business unit's organizational configurations (i.e. intended strategies or key characteristics) and its performance. Through your kind cooperation and participation, I eventually hope to understand how best to match the functional capabilities of organizations and the strategies of their business units.

There are two phases to this project. In the first phase, I have sent all non-life insurance companies in Thailand the enclosed questionnaire (four copies for four of your non-life insurance product line divisions (i.e. fire, marine & transportation, automobile, and miscellaneous). Instructions for completing the questionnaire can be found on the form itself. In brief, this questionnaire asks a variety of questions about your business units' broad key characteristics, about how they react to the environment or market change (no specific strategy asked, thus protecting commercial confidentiality), then asks you to rate your firm and your business units' performance in comparison with your main competitors. I would greatly appreciate it if you would kindly assign the head of each division to look over the attached questionnaire and, if he or she chooses to do so, complete the questionnaire and send it back to me in the enclosed postage-paid envelope by March 15, 2012. In this regard, I am more than happy to visit his or her offices to clarify any questions they may have or even go through each question with them.

Completion of the questionnaire would take 45 minutes of your time. Participation in this project is completely voluntary. If there are any questions that you prefer not to answer, you may skip them. If you would like to write additional comments on the questionnaire, please feel free to do so.

In the second phase of the study, I would like to conduct follow-up interviews with those who are willing from the group that has filled out this questionnaire. Participation in the interview would again be completely voluntary and you may decline answering any questions you prefer not to answer. Your involvement in the first phase of the study does not obligate you to participate in the second part. I shall contact you in about one week to determine whether you would be willing to participate, and to decide on a mutually convenient time and location. You may indicate your preference at this time.

Please be assured that all information you provide through your participation in this study will be kept strictly confidential. Further, you will not be identified in the thesis or in any report or publication based on this research. All results from this study will be reported as statistical summaries only. There are no known or anticipated risks to participation in this study. The data collected through this study will be kept for a period of three years (my PhD study period) in a secure location.

This research hopes to make contributions to both academia and practice. Not only will it improves the accuracy of prediction but will also offer suggestions for future emerging market research. In addition, it will enhance managers' ability to predict the consequences of available decision choices and choose an appropriate performance goal suitable for the strategy used. Without the help of people like you, research on the strategy and performance relationship could not be conducted. As a token of our appreciation for your support in this important study, a summary report will be distributed to all respondents on completion of the research. The sponsoring organizations will not receive any more detailed information than is contained within my dissertation.

If, after receiving this letter, you have any questions about this study, or would like additional information to assist you in reaching a decision about participating, please feel free to contact myself, Sirus Pussayanavin, at 088-902-8488 or e-mail at phd09sp@mail.wbs.ac.uk or sirus.pussayanavin.09@mail.wbs.ac.uk . You may also contact my research advisor, Professor Dr. Michael J. Mol, at Michael.Mol@wbs.ac.uk.

Thank you in advance for your co-operation in my research.

Yours sincerely,

Sirus Pussayanavin

Doctoral Researcher

Marketing and Strategic Management Group

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Questionnaire: The effect of functional capabilities and strategies on performance in the Thai non-life insurance industry

Confidentiality: Your responses will remain anonymous and any analysis will be conducted at the aggregate level.

This questionnaire is filled out for the following non-life insurance business:

☐ Fire ☐ Marine & transportation ☐ Automobile ☐ Miscellaneous

Characteristics of your business (your non-life insurance product line division)

*Please evaluate your non-life insurance product line division's characteristics relative to your three major competitors (i.e. other non-life insurance companies' comparable product line divisions) during the **last year** by **circling** the appropriate score.*

Example: *When considering the proportion of retail customers between your business and three other main competitors in your principally-served market segment,*

- *if you believe that yours is the highest of all, rate yourself an 8.*
- *if you believe that yours is much higher than that of 2 key competitors (the follower group) but less than 1 of your main competitors (the leader), rate yourself a 7 if you believe that yours is closer to the leader or rate yourself a 6 if you believe that yours is closer to the follower group.*
- *if you believe that yours is somewhat comparable to that of the rest, rate yourself a 5 if you believe that yours is slightly the leader or rate yourself a 4 if you believe that yours is slightly the follower.*
- *if you believe that yours is much less than that of 2 key competitors (the leader group) but more than 1 of your main competitors (the follower), rate yourself a 3 if*

you believe that yours is closer to the leader group or rate yourself a 2 if you believe that yours is closer to the follower.

- *if you believe that yours is the lowest of all, rate yourself a 1.*

Your business characteristics (compared to your 3 major competitors last year)		Much lower			Neutral			Much higher	
1	Proportion of retail customers (to all of your customers)	1	2	3	4	5	6	7	8
2	Proportion of corporate customers (to all of your customers)	1	2	3	4	5	6	7	8
3	Business partnership advantage (e.g. bank or other financial institutions affiliate, business alliance)	1	2	3	4	5	6	7	8
4	Distribution channel advantage (e.g. branch, location-specific expertise, geographic distribution, high-tech channel)	1	2	3	4	5	6	7	8

Characteristics of your firm (your non-life insurance company)

*Please mark ☑ **only 1** description that best describes your firm.*

1. Number of employees in your company (***during this year)***

☐ <= 100 ☐ 101 - 500 ☐ 501 - 1,000 ☐ 1,001 - 2,500 ☐ 2,501 - 5,000 ☐ >= 5,001

2. Firm's ownership structure

☐ Government owned ☐ Privately owned ☐ Public company in Thai Stock Exchange

☐ Joint venture ☐ Foreign owned ☐ Other (Please specify ________________)

3. Location

3.1 Head office location: 3.2 Branch office location:

☐ Bangkok ☐ Other province ☐ Spread around country ☐ Concentrated in some geographic areas

4. Has there been a major strategic change in your company during the last year?

☐ Yes ☐ No

Description of your business (Adapted from Conant, Mokwa & Varadarajan, 1990)[46]

*Please **circle <u>only 1</u>** description that **<u>best</u>** describes your non-life insurance product line division during the **<u>last year</u>**.*

1. ***<u>Product market domain:</u>*** **In comparison to our competitors (i.e. other companies' comparable businesses), the non-life insurance products and related services, which we provide to our customers, are best characterized as:**

   (a) ***Continuously expanding***: Products and services which are more innovative, continually changing. ***(P)***

   (b) ***Carefully adjusted:*** Products and services which are fairly stable in certain markets while innovative in other markets. ***(A)***

   (c) ***Carefully focused***: Products and services which are well focused, relatively stable and consistently defined throughout the market. ***(D)***

   (d) ***Responsive transition:*** Products and services which are in a state of transition, and largely based on responding to opportunities or threats from the marketplace or environment. ***(R)***

2. ***<u>Success posture:</u>*** **In contrast to our competitors (i.e. other companies' comparable businesses), we have an image in the marketplace as a non-life insurance product line division which is:**

   (a) ***Selective:*** Offers fewer, selective products and services which are high in quality. ***(D)***

   (b) ***Carefully adoptive:*** Adopts new ideas and innovations, but only after careful analysis. ***(A)***

   (c) ***Reactive:*** Reacts to opportunities or threats in the marketplace to maintain or enhance our position. ***(R)***

[46] The abbreviations of Miles & Snow's (1978) typology displayed after each answer choice are only shown here for the reader's reference but were not in the real survey.

(d) ***Innovative:*** Has a reputation for being innovative and creative. ***(P)***

3. ***<u>Surveillance:</u>*** **The amount of time our business spends on monitoring changes and trends in the marketplace can best be described as:**

   (a) ***Lengthy***: We are continuously monitoring the marketplace. ***(P)***

   (b) ***Minimal***: We really don't spend much time monitoring the marketplace. ***(D)***

   (c) ***Average***: We spend a reasonable amount of time monitoring the marketplace. ***(A)***

   (d) ***Sporadic***: We sometimes spend a great deal of time and at other times spend little time monitoring the marketplace. ***(R)***

4. ***<u>Growth:</u>*** **In comparison to our competitors (i.e. other companies' comparable businesses), increases or losses in demand which we have experienced are due most probably to:**

   (a) ***Penetration*****:** Our practice of concentrating on more fully developing those markets which we currently serve. ***(D)***

   (b) ***Responding***: Our practice of responding to the pressures of the marketplace by taking few risks. ***(R)***

   (c) ***Product development*****:** Our practice of aggressively entering into new markets with new types of products and services offerings. ***(P)***

   (d) ***Penetration & careful product development*****:** Our practice of assertively penetrating more deeply into markets we currently serve, while adopting new products and services only after a very careful review of their potential. ***(A)***

5. ***<u>Technological goal:</u>*** **One of the most important goals in our business, in comparison to our competitors (i.e. other companies' comparable businesses), is our dedication and commitment to:**

   (a) ***Cost-efficiencies:*** Keep costs under control. ***(D)***

   (b) ***Synergism:*** Analyze our costs and revenues carefully, to keep costs under control and to selectively generate new products and services or enter new markets. ***(A)***

(c) ***Flexibility:*** Insure that the people, resources and equipment required to develop new products and services and new markets are available and accessible. ***(P)***

(d) ***Project completion:*** Make sure that we guard against critical threats by taking whatever action that is necessary. ***(R)***

6. ***Technological breadth:*** **In contrast to our competitors (i.e. other companies' comparable businesses), the competencies (skills) which our managerial employees possess can best be characterized as:**

   (a) ***Analytical***: their skills enable them to both identify trends and then develop new products and services offering or markets. ***(A)***

   (b) ***Specialized***: their skills are concentrated into one, or a few, specific areas. ***(D)***

   (c) ***Broad and entrepreneurial***: their skills are diverse, flexible, and enable change to be created. ***(P)***

   (d) ***Fluid***: their skills are related to the near-term demands of the marketplace. ***(R)***

7. ***Technological buffers:*** **The one thing that protects our business from our competitors (i.e. other companies' comparable businesses) is:**

   (a) ***Synergism:*** We are able to carefully analyze emerging trends and adopt only those which have proven potential. ***(A)***

   (b) ***Expertise:*** We are able to do a limited number of things exceptionally well. ***(D)***

   (c) ***Experiment ability:*** We are able to respond to trends even though they may possess only moderate potential as they arise. ***(R)***

   (d) ***Technical diversity:*** We are able to consistently develop new products and services and new markets. ***(P)***

8. ***<u>Dominant coalition:</u>*** **More so than many of our competitors (i.e. other companies' comparable businesses), our management staff tends to concentrate on:**

(a) ***Finance & production:*** Maintaining a secure financial position through cost and quality control measures. ***(D)***

(b) ***Planning:*** Analyzing opportunities in the marketplace and selecting only those opportunities with proven potential, while protecting a secure financial position. ***(A)***

(c) ***Trouble-shooting:*** Activities or business functions which most need attention given the opportunities or problems we currently confront. ***(R)***

(d) ***Marketing and R&D:*** Developing new products and services and expanding into new markets or market segments. ***(P)***

9. ***<u>Planning:</u>*** **In contrast to many of our competitors (i.e. other companies' comparable businesses), our business prepares for the future by being:**

(a) ***Crisis oriented:*** Identifying the best possible solutions to those problems or challenges which require immediate attention. ***(R)***

(b) ***Opportunity finding:*** Identifying trends and opportunities in the marketplace which can result in the creation of products and services offerings which are new to the non-life insurance industry or which reach new markets. ***(P)***

(c) ***Control dominated:*** Identifying those problems which, if solved, will maintain and then improve our current products and services offering and market position. ***(D)***

(d) ***Comprehensive***: Identifying those trends in the industry which our competitors (i.e. other companies' comparable businesses) have proven possess long-term potential while also solving problems related to our current products and services offering and our current customers' needs. ***(A)***

10. ***Structure:*** **In comparison to our competitors (i.e. other companies' comparable businesses), the structure of our business is:**

(a) ***Functionally oriented:*** Functional in nature (i.e. the whole firm is organized by department-marketing, accounting, personnel, etc. and our non-life insurance product line division is part of one particular function (marketing)). ***(D)***

(b) ***Product oriented:*** Products and services or market oriented (i.e. our business has its own marketing or accounting responsibilities). ***(P)***

(c) ***Matrix oriented:*** Primarily functional (departmental) in nature; however, a product and service or market oriented structure does exist in newer or larger non-life insurance product and related service offering areas. ***(A)***

(d) ***Loose design:*** Continually changing to enable us to meet opportunities and solve problems as they arise. ***(R)***

11. ***Control:*** **Unlike many of our competitors (i.e. other companies' comparable businesses), the procedures our business uses to evaluate our performance are best described as:**

(a) ***Market performance:*** Decentralized and participatory encouraging many organizational members to be involved. ***(P)***

(b) ***Problem handling:*** Heavily oriented toward those reporting requirements which demand immediate attention**.** ***(R)***

(c) ***Centralized:*** Highly centralized and primarily the responsibility of senior management. ***(D)***

(d) ***Multiple methods:*** Centralized in more established product and service areas and more participatory in newer product and service areas. ***(A)***

Strategies of your business unit (your non-life insurance product line division) (Adapted from Zahra & Covin, 1993)

Please rate the extent to which your business has focused on the following business strategy during the ***last year*** *in comparison to your 3 major competitors (i.e. other companies' comparable businesses) by* ***circling*** *the appropriate scale. (Please answer in the same manner as the Characteristics of your business section on page 1)*

Your business strategy (compared to your 3 major competitors last year)		**Much lower**			**Neutral**				**Much higher**
Differentiation strategy									
1	Uniqueness of your products or service or distribution channel in terms of customer value (e.g. design, comfortability, etc.)	1	2	3	4	5	6	7	8
2	Targeting a clearly identified segment	1	2	3	4	5	6	7	8
3	Offering products suitable for high price segments	1	2	3	4	5	6	7	8
4	Offering speciality products tailored to a customer group	1	2	3	4	5	6	7	8
5	Intensity of your advertising	1	2	3	4	5	6	7	8
6	Intensity of your marketing efforts	1	2	3	4	5	6	7	8
7	Emphasis on building strong brand identification	1	2	3	4	5	6	7	8
8	Building a reputation for being first in the industry to try new methods and technologies to create superior products	1	2	3	4	5	6	7	8
9	Your innovation effort	1	2	3	4	5	6	7	8
10	Your new market/product entry (e.g. speed, frequency, amount)	1	2	3	4	5	6	7	8
11	Emphasis on new product development	1	2	3	4	5	6	7	8
12	Developing and utilizing sales force (for better customer service)	1	2	3	4	5	6	7	8

Your business strategy (compared to your 3 major competitors <u>last year</u>)		Much lower			Neutral				Much higher
Cost leadership strategy									
1	Level of capacity utilization both human resource (e.g. actuary, sale agent, claim agent) and operating resource (e.g. insurance operating system, database, office appliance) to provide products and service to customers	1	2	3	4	5	6	7	8
2	Efficiency in securing human resource and operating resource	1	2	3	4	5	6	7	8
3	Offering competitive prices	1	2	3	4	5	6	7	8
4	Emphasis on finding ways to reduce cost	1	2	3	4	5	6	7	8
5	Efficiency of your distribution channels	1	2	3	4	5	6	7	8

Strategic capabilities of your firm (your non-life insurance company)

(Adapted from Desarbo et al., 2005)

Please evaluate how well you believe that your company overall (not just your business) performs the specific capabilities relative to your 3 major competitors during the ***last year*** *by* ***circling*** *the following response scale. (Please answer in the same manner as the Characteristics of your business section on page 1)*

	Your firm's strategic capabilities (compared to your 3 major competitors last year)	**Much lower**			**Neutral**			**Much higher**	
Operation capabilities (Adapted from Desarbo et al.'s (2005) management capabilities)									
1	Integrated logistics systems (e.g. sharing sales or claim service system among your firm's non-life insurance product line divisions)	1	2	3	4	5	6	7	8
2	Cost control capabilities (e.g. cost cutting activities)	1	2	3	4	5	6	7	8
3	Financial management skills (e.g. investment decision, financial leverage decision, budgeting for your non-life insurance company)	1	2	3	4	5	6	7	8
4	Human resource management capabilities (e.g. recruitment, improvement, motivation, retention)	1	2	3	4	5	6	7	8
5	Accuracy of profitability and revenue forecasting (e.g. good risk selection, and underwriting & reinsurance policy (Risk Management))	1	2	3	4	5	6	7	8
6	Marketing planning process	1	2	3	4	5	6	7	8
R&D capabilities (Adapted from Desarbo et al.'s (2005) technology capabilities)									
1	New product development capabilities (e.g. actuarial department)	1	2	3	4	5	6	7	8
2	Manufacturing processes (e.g. flexibility, speed of policy issuance)	1	2	3	4	5	6	7	8
3	Technology development capabilities (e.g. licensed actuary)	1	2	3	4	5	6	7	8
4	Ability of predicting technological changes (e.g. product innovation) in the non-life insurance industry	1	2	3	4	5	6	7	8
5	Production facilities (e.g. back office to support policy issuance)	1	2	3	4	5	6	7	8
6	Quality control skills (e.g. after-sale service, claim service quality control)	1	2	3	4	5	6	7	8

	Your firm's strategic capabilities (compared to your 3 major competitors <u>last year</u>)	Much lower			Neutral				Much higher
MIS capabilities (Adapted from Desarbo et al.'s (2005) information technology capabilities)									
1	Information technology systems for new product development projects	1	2	3	4	5	6	7	8
2	Information technology systems for facilitating cross-functional integration	1	2	3	4	5	6	7	8
3	Information technology systems for facilitating technology knowledge creation	1	2	3	4	5	6	7	8
4	Information technology systems for facilitating market knowledge creation	1	2	3	4	5	6	7	8
5	Information technology systems for internal communication (e.g. across different departments, across different levels of the organization)	1	2	3	4	5	6	7	8
6	Information technology systems for external communication (e.g. reinsurer (suppliers), customers, broker & agent (channel members))	1	2	3	4	5	6	7	8
Sale & distribution capabilities (Adapted from Desarbo et al.'s (2005) market linking capabilities)									
1	Market sensing capabilities (e.g. sense changing of customer need)	1	2	3	4	5	6	7	8
2	Customer-linking (i.e. creating and managing durable customer relationships) capabilities	1	2	3	4	5	6	7	8
3	Capabilities of creating durable relationship with your suppliers (i.e. reinsurer)	1	2	3	4	5	6	7	8
4	Ability to retain customers	1	2	3	4	5	6	7	8
5	Channel-bonding capabilities (i.e. creating a durable relationship with channel members such as brokers, agents)	1	2	3	4	5	6	7	8
6	Relationships with channel members (e.g. brokers, agents)	1	2	3	4	5	6	7	8
Marketing capabilities (Adapted from Desarbo et al.'s (2005) market capabilities)									
1	Knowledge of customers	1	2	3	4	5	6	7	8
2	Knowledge of competitors	1	2	3	4	5	6	7	8
3	Integration of marketing activities	1	2	3	4	5	6	7	8
4	Skill to segment and target markets	1	2	3	4	5	6	7	8
5	Effectiveness of pricing programs	1	2	3	4	5	6	7	8
6	Effectiveness of advertising programs	1	2	3	4	5	6	7	8

Performance measures of your business unit (your non-life insurance product line division) (Adapted from Desarbo et al., 2005)

*Please rate how well your business unit has performed relative to **all** other competitors (i.e. non-life insurance companies' comparable product line division) in the principal served market segment **during this year** by **circling** the appropriate scale.*

***Example**: If you believe that your net written premium growth is greater than that of approximately 45% of all competitors in your principal served market segment, rate yourself a 5 for sales growth.*

Your business performance measurement scale relative to all other competitors during this year		0–10 %	11–20 %	21–30 %	31–40 %	41–50 %	51–60 %	61–70 %	71–80 %	81–90 %	91–100 %
Input efficiency											
1	Expense ratio (including amounts reimbursed by reinsurance) (equivalent to overhead cost ratio) of your non-life insurance product line	1	2	3	4	5	6	7	8	9	10
Output efficiency											
1	Loss ratio (equivalent to gross profit margin without concerning investment activities) of your non-life insurance products line	1	2	3	4	5	6	7	8	9	10
2	Investment Yield (Profitability of your investment activity)	1	2	3	4	5	6	7	8	9	10
Effectiveness											
1	Net written premium (after reinsurance costs) (equivalent to sales) growth	1	2	3	4	5	6	7	8	9	10
2	Relative market shares	1	2	3	4	5	6	7	8	9	10
Adaptability											
1	Number of your new non-life insurance products offered to the market in relation to those of competitors within the past year	1	2	3	4	5	6	7	8	9	10
2	Percentage of net written premium (after reinsurance costs) (equivalent to sales) accounted for by new non-life insurance product introduced to market within the past year	1	2	3	4	5	6	7	8	9	10
Overall performance											
1	Combined ratio (included amounts reimbursed by reinsurance) (equivalent to ROS without concerning investment activities)	1	2	3	4	5	6	7	8	9	10
2	Return on Equity (ROE) of your non-life insurance products line (include investment income)	1	2	3	4	5	6	7	8	9	10

About you

Please mark ☑ the description that best describes you.

1. ***Position:***

☐ CEO

☐ Head of non-life insurance product line (please specify)

☐ Fire ☐ Marine & transportation ☐ Automobile ☐ Miscellaneous

☐ Head of Marketing Department

☐ Head of Strategy Department

☐ Head of Actuary Department

☐ Other (Please specify____)

2. ***Working Experience:***

Working Experience		(0 -1 year)	(1-5 years)	(6-10 years)	(11-20 years)	(21-30 years)	(>30 years)
1	Within the Thai non-life insurance industry	1	2	3	4	5	6
2	Within your firm	1	2	3	4	5	6
3	Within your current position	1	2	3	4	5	6

3. ***Background (expert area):***

☐ Actuary ☐ Finance ☐ Accounting ☐ Marketing (Sales)

☐ Law ☐ Management ☐ Other (Please specify________________________)

4. Follow-up interview

We would like to conduct some interviews following this survey to understand your business even better. Would you be available for an interview in principle?

- ☐ Yes (we will contact you)
- ☐ No, I do not want to participate in an interview

Further comments:

******Thank you very much for taking time to complete this questionnaire.******

13.2 Operationalization of potential causal conditions

I separate potential causal conditions into two groups depending on the related level of organization.

First, potential causal conditions of the business unit level could be used as another explainable causal condition to combine mainly with GOC in the fsQCA as well as the test for complementarity if there are many counterfactual cases or if the interpretation raises any concern for other causal conditions.

In this regard, there are four potential causal conditions, asking respondents to evaluate their business unit's 1) proportion of retail customers (to all of their customers), 2) proportion of corporate customers (to all of their customers), 3) business partnership advantage (e.g. bank or other financial institution affiliation, business alliance), and 4) distribution channel advantage (e.g. branch, location-specific expertise, geographic distribution, high-tech channel) relative to their competitors on an eight-point Likert-type scale. Corresponding to the previous calibration rule, full membership (1) is assigned to a business unit that has an item score for any of these potential causal conditions of greater than or equal to quartile 3 of the observed dataset, meaning that a business unit that is above 75% of the other competitors in the industry in a particular potential causal condition will have a full membership status or that potential causal condition. The most ambiguous point (0.5) is a business unit that has an item score for any of these potential causal conditions equal to the median, meaning that that business unit's potential causal condition is above half of competitors and at the same time below half of the other competitors in the industry, therefore making it the most difficult to identify whether it is more in or more out of the set of a high level of that potential causal condition. Full non-membership (0) is assigned to a business unit that has an item score for any of these potential causal conditions less than or equal to quartile 1, meaning that a business unit that is below 75% of the other competitors in the industry in a particular potential causal condition will have a full non-membership status for that potential causal condition. Again, if there is parity between quartile 3 or quartile 1 and quartile 2 in the collected data, the observed gap (big shift) shown in such data will be utilized as a substitute for that cut-off point.

Secondly, potential causal conditions at the firm level could be used as another explainable causal condition to combine with FCs in the fsQCA as well as the test for complementarity if there are many counterfactual cases or if the interpretation raises any concern for other causal conditions.

In this regard, there are four potential causal conditions, asking respondents to evaluate their firm's 1) number of employees, 2) ownership structure (comprising government owned, privately owned, public company on Thai Stock Exchange, joint venture, foreign owned, and other), 3) head office & branch office location (either spread around country or concentrated in some geographic areas), and 4) major strategic change during the last year (either yes or no). Since these questions are not in relative terms, the calibration rules are different from the previous section.

For the number of employees, I use the observed gap (as shown in Table 13-1) to set three anchor points for calibration. The gap observed has been widely used in prior fsQCA research (eg. Crilly, 2011). The full membership (1) of a high number of employees (big firm) is set at "1,001 - 2,500 persons" or more (survey coding 4). The ambiguous point (0.5) is set between "101 - 500 persons" and "501 - 1,000 persons" (survey coding 2.5). This is because these two answers have the two most frequently observed cases. Moreover, by doing this researcher can avoid the use of a precise 0.5 membership score for causal conditions, which is difficult to analyze, as suggested by Ragin (2008). Finally, the full non-membership (0) of a high number of employees (big firm) is set at "<= 100 persons" or less (survey coding 1).

Table 13-1: Frequency of observed cases for "Number of employee" question

Possible answer for number of employees	Survey coding	Frequency of observed cases	Percentage	Cumulative frequency	Cumulative Percentage
<= 100 persons	1	12	11.21%	12	11.21%
101 – 500 persons	2	54	50.47%	66	61.68%
501 - 1,000 persons	3	33	30.84%	99	92.52%
1,001 - 2,500 persons	4	4	3.74%	103	96.26%
2,501 - 5,000 persons	5	4	3.74%	107	100.00%
>= 5,001 persons	6	0	0.00%	107	100.00%

As for the rest of the potential causal conditions that ask respondents to select a particular ownership structure and select either yes or no for each subsequent question, the calibration rule will be changed from fuzzy set (continuous membership score) to crisp set (either 0 for full non-membership or 1 for full membership). This is similar to the dummy variable in traditional quantitative analysis. Hence, the full membership (1) of each subsequent question in the potential causal conditions of the firm-level section will be survey coding 1, and the full non-membership (0) will be survey coding 2. Note that for Question 3 asking about head office location, since all firms (100% of observed cases) have head offices located in Bangkok, there is no need to take this question into account.

The summary of potential causal conditions, their measurement scales and related calibration rules are provided in Table 13-2.

Table 13-2: Summary table of potential causal conditions, their measurement scales and related calibration rules

Construct		Operation of construct and/or proxy of measurement	Calibration 3 anchor points		
			0	**0.5**	**1**
Potential causal conditions	For business unit level	Proportion of retail customers (to all of your customers)	Q1	Q2	Q3
		Proportion of corporate customers (to all of your customers)	Q1	Q2	Q3
		Business partnership advantage (e.g. bank or other financial institution affiliation, business alliance)	Q1	Q2	Q3
		Distribution channel advantage (e.g. branch, location- specific expertise, geographic distribution, high-tech channel)	Q1	Q2	Q3
	For firm level	Number of employees in your company (***<u>during this year)</u>***	1	2.5	4
		Firm's ownership structure			
		• Government owned	1	N/A	2
		• Privately owned	1	N/A	2
		• Public company in Thai Stock Exchange	1	N/A	2
		• Joint venture	1	N/A	2
		• Foreign owned	1	N/A	2
		Location: Branch office location	1	N/A	2
		Has there been a major strategic change in your company during the last year?	1	N/A	2

13.3 Details of M&As and their potential in Thailand

Over the last two decades, there have been five successful M&As grouped according to the final firms as follows.

In 2009, Ace INA Overseas Insurance (Thailand) merged with Combined Insurance (Thailand) as they have the same major shareholder, Ace Group Insurance Companies Worldwide. This transaction was settled to follow the OIC's "one major shareholder, one brand" policy.

In 2008, Muang Thai Insurance PCL merged with Phatra Insurance, a firm owned by the same wealthy family and specializing in non-motor insurance, which best matched the needs of Muang Thai Insurance PCL, which has motor insurance as its flagship.

In 2006 and 2007, Navakij Insurance took over International Assurance, Thai Commercial Insurance and Ocean Insurance to increase its market share. This company is still looking for new deals for market share expansion and synergy possibilities.

In 2001 and 2004, LMG Insurance acquired Narai International Insurance and Khoom Khao Insurance to gain licences and presence in the Thai insurance market and to increase its market size.

In 1990 AXA Insurance PCL bought Guardian Insurance (Thai) following the global acquisition of the Guardian Royal Exchange group by AXA S.A. They are still looking for new deals for market share expansion.

Furthermore, there are four groups of insurance firms that have the same major shareholder and are preparing for their M&A to correspond with the OIC's "one major shareholder, one brand" policy: 1) Ayudhaya Insurance, BT Insurance and Allianz C.P. General Insurance, 2) IAG Insurance and Safety Insurance, 3) Thanachart Insurance and Siam City Insurance, 4) MSIG Insurance, Aioi Bangkok Insurance, and Mitsui Sumitomo Insurance.

In addition, Deves Insurance, Siam Commercial Samaggi Insurance and Sompo Japan Insurance are likely to undergo an M&A in the near future owing to the close coordination between them.

13.4 Example of the analytical process

In this section, I will show the whole process of the test for H1a: GOC-IE. The subsequent 55 tests follow the same steps, rules and conditions as this one but, with a view to saving space, the process for these tests will not be reported. The process comprises three main steps as follows:

1. Analysis of necessary conditions

Following QCA good practice suggested by Schneider and Wagemann (2012), I separately conduct necessary condition analysis before conducting sufficiency condition analysis to ensure that a statement of necessity is not automatically inferred from the results of the sufficiency analysis.

Schneider and Wagemann's (2012: 278) recommended threshold consistency value of 0.9 for a necessary condition is adopted. I also test for a trivial necessary condition by calculating the relevance of necessity ratio (Schneider & Wagemann, 2012: 236) ranging between 0 (meaning x is a constant) and 1, for which a low value indicates low relevance (trivialness) while a high value indicates relevance (non-trivialness). Essentially, this test checks whether: 1) the causal condition is much larger than the outcome (relation between size of x and y), making it irrelevant as a good predictor of the outcome; and 2) the causal condition is close to the constant (relation between size of x and ~x), resulting in it being a superset of any outcome (either y or ~y), also known as a simultaneous subset relation. I will declare a particular condition as a necessity only if it passes both the 0.9 consistency threshold and the trivialness test.

The necessity test results for the occurrence of ie are as follows:

	p	~p	a	~a	d	~d	r	~r	dif	~dif	lc	~lc
Consistency	0.11	**0.94**	0.65	0.48	0.21	0.86	0.02	**0.99**	0.47	0.63	0.47	0.64
Coverage	0.65	0.46	0.50	0.53	0.51	0.47	0.71	0.46	0.42	0.57	0.44	0.57

Both ~p and ~r have high consistency (> 0.9), supporting that they are necessary to (or a superset of) the occurrence of ie (which is also shown in the plot under the diagonal in the xy plot of Figure 13-1). However, to be certain of their relevance, I calculate the relevance of necessity ratio (Schneider & Wagemann, 2012: 236), and find that both have very low scores of 0.133353 for ~p and 0.027487 for ~r. Thus, both are trivial necessary conditions for outcome ie (which is also shown in the low coverage value and the concentrated plot at the far right under the diagonal in the xy plot of Figure 13-1). Since both have the same distribution characteristics, I present only that for ~p.

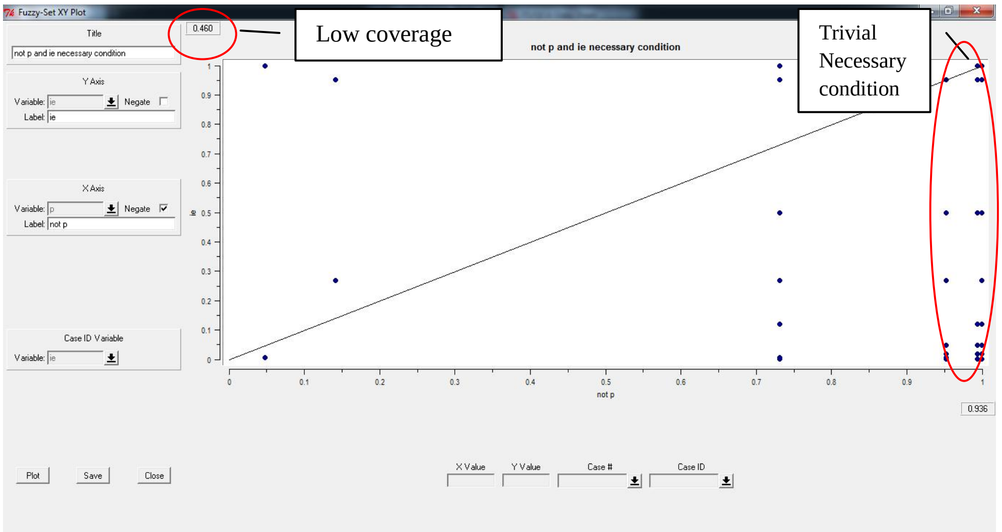


Figure 13-1: xy plot for ~p and ~r with ie as part of the necessary condition analysis

Moreover, in addition to testing for the occurrence of the outcome, I also test for the non-occurrence of the outcome to be even more certain of the trivialness. If a particular condition is shown as necessary in both tests, it is more likely that it is a trivial necessary condition because it is close to constant.

The necessary test for the non-occurrence of ie (~ie) is as follows:

	p	~p	a	~a	d	~d	r	~r	dif	~dif	lc	~lc
Consistency	0.09	**0.95**	0.65	0.46	0.21	0.84	0.02	**0.99**	0.60	0.48	0.59	0.50
Coverage	0.62	0.56	0.60	0.61	0.64	0.56	0.81	0.55	0.66	0.52	0.67	0.53

Both ~p and ~r have a high consistency (> 0.9), supporting that they are necessary to (or a superset of) the non-occurrence of ie (which is also shown in the plot under the diagonal in the xy plot of Figure 13-2). However, since both have a very low relevance of necessity ratio (Schneider & Wagemann, 2012: 236), of 0.159904 for ~p and 0.033017 for ~r, they are trivial necessary conditions for outcome ~ie (which is also shown in the low coverage value and the concentrated plot in the far right under the diagonal in the xy plot of Figure 13-2). This situation helps reconfirm that ~p and ~r are trivial necessary conditions because they are close to constant, resulting in their being a superset of both ie and ~ie. This is due to the high skew toward non-membership of both p and r, as mentioned earlier in Section 7.8.1 (page 191).

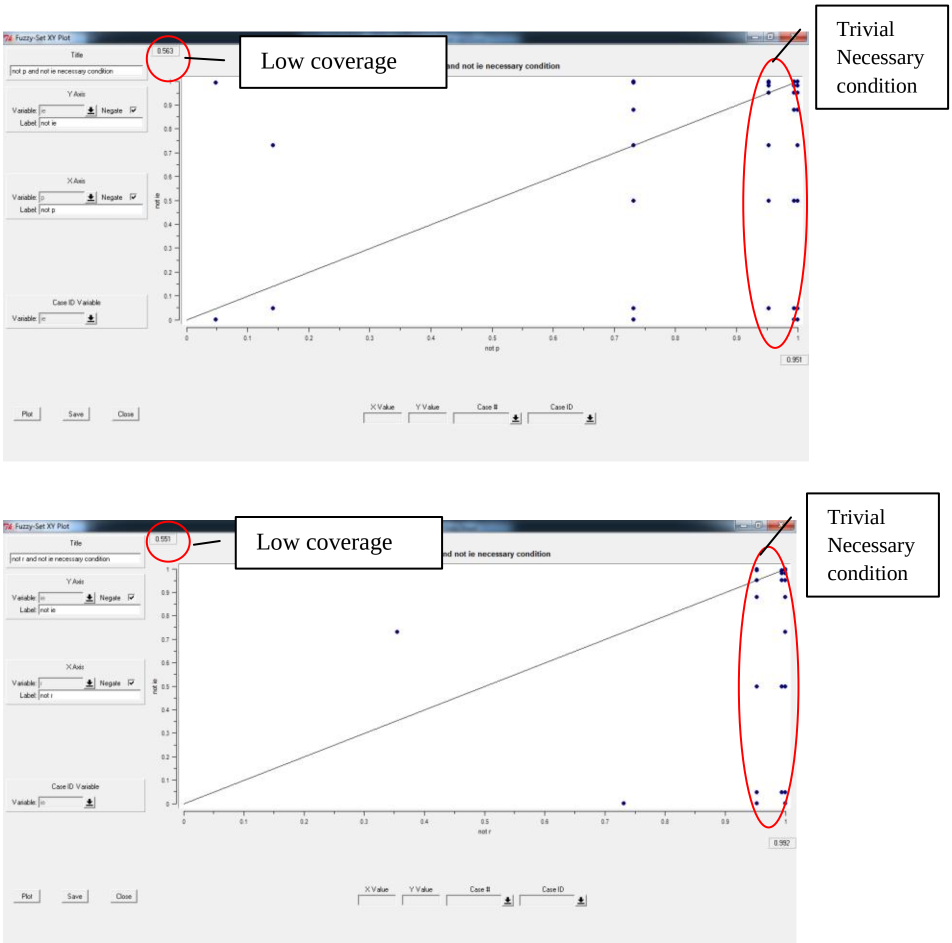


Figure 13-2: xy plots for ~p and ~r with ~ie as part of the necessary condition analysis

In summary, no necessary condition is exhibited in the test for H1a: GOC-IE. I find only two trivial necessary conditions, ~p and ~r, which should not be mistakenly inferred to be necessary conditions from the results of a sufficiency analysis.

2. Truth table analysis for sufficiency condition

To create a truth table, I set ie as an outcome with the remaining factors (p, a, d, r, dif, l) present (not absent according to previous theoretically-grounded assumptions) as causal conditions.

Then, adopting Schneider and Wagemann's (2012: 200) recommendation of conducting enhanced standard analysis (ESA) rather than standard analysis (SA) in order to avoid the risk of producing results (both most parsimonious and intermediate solutions) based on untenable assumptions (implausible or contradictory assumptions), I code "0" in the ie column for 24 rows containing impossible logical remainders. These comprise 20 rows that have "1" in three or four of any of p, a, d or r, because these combinations cannot exist according to the utilized operationalization of Miles and Snow's (1978) typologies, in which only two characters may be simultaneously shown as dominant characters; and 4 rows that have "1" in both p and d, because these combinations contradict the definition by having strong characters of both prospector and defender simultaneously but not exhibiting a strong character of analyzer. This ensures that these combinations of causal conditions will not be used in the Boolean minimization (simplification) process for both the most parsimonious and the intermediate solutions. (For H3 and H4 tests which have either one or two FCs as part of causal conditions, the total numbers of impossible logical remainders are covered by 48 and 96 rows respectively.)

As suggested by Ragin (2000), I set the minimum acceptable solution frequency at 1 by deleting all other logical remainders (any row for which the number of observed data is less than 1, except the impossible logical remainders in the previous step) and I set the lowest acceptable consistency for solutions at > 0.7 by sorting the raw consistencies into decending order and coding "1" for any row that has a raw consistency greater than 0.7. These two criteria are applied to all tests in this research for purposes of comparability.

There is a supporting reason for using 0.7 as the consistency threshold for this research. Ragin (2000: 109) originally asserts that "it is possible to assess the *quasi-sufficiency* of causal combinations using linguistic qualifiers such as 'more often than not' (0.5), 'usually' (0.65), and 'almost always' (0.8)". Later, he starts to recommend a minimum threshold of 0.75 (Ragin, 2006, 2008). However, the threshold frequently employed in Boolean comparative analysis studies is only 0.65 (Grandori & Furnari, 2008). This is probably because social science data are far from perfectly consistent and, most importantly, if the consistency threshold is set too high (above the raw consistency level displayed in all observed data), the truth table analysis cannot be conducted further as all observed data will be considered to be inconsistent according to this conservative threshold. This is also the case for the current study. The highest raw consistency levels of the observed data of most of the 56 tests are lower than 0.75. Therefore, to make all tests computable and also comparable, I lower the threshold to 0.7, which is the highest level possible that is achieved by all tests.

To run a standard analysis, I select ~p*a*~r*diff*~lc and ~p*a*~d*~diff*lc as *prime implicants* that are consistent with the proposed hypothesis. Prime implicants are product terms that cover many primitive Boolean expressions using minimization rules to reduce the truth table until no further simplification is possible. Prime implicants must be included in the solution. However, there are often more reduced prime implicants than are needed to cover all of the original primitive expression; therefore, the user has the option to choose from those that are "logically tied" based on theoretical and substantive knowledge (Ragin, 2006: 64). Again, further truth table analysis cannot be conducted without the selection of sufficient prime implicants. Currently, there is no agreed rule for selecting prime implicants other than basing the choice on relevant theoretical and substantive knowledge. Therefore, for consistency within this research, my rules for selecting prime implicants for subsequent tests are as follows:

1. The selected terms must be as consistent as possible with the proposed hypothesis in terms of the presence and absence of the proposed causal condition (select prime implicants with a proposed condition being present, or without a proposed condition being absent, or with more proposed conditions present than absent).
2. If there are no terms having a proposed condition both present and absent:
    2.1. the selected terms must have other conditions that can be theoretically inferred to support the occurrence of the outcome (second-best explanation). For example, apart from product design and R&D, marketing may theoretically be inferred to support the occurrence of output efficiency (profit margin) because product differentiation may also come from perception, not just from product innovation.
    2.2. selected terms that contain trivial necessary conditions are preferred because, although less relevant, they are still necessary conditions that lead to the outcome.
3. For testing of hypotheses that have more than one proposed condition and for which the prime implicants display many alternatives with different proposed conditions, all will be selected to give the same weight to each proposed condition, supporting that one of any proposed condition is equally sufficient to lead to the outcome.

Once prime implicants have been selected, I then select “lc” to be present, which should contribute to ie (as in the proposed hypothesis), for the intermediate solution.

The resulting truth table as computed by the software is provided below.

p	a	d	r	dif	lc	Number of cases	ie	raw consist.
1	1	1	1	1	1	0	0	1
1	1	1	1	1	0	0	0	1
1	1	1	1	0	1	0	0	1
1	1	1	1	0	0	0	0	1
1	0	1	1	1	1	0	0	1
1	0	1	1	1	0	0	0	1
1	0	1	1	0	1	0	0	1
1	0	1	1	0	0	0	0	1
0	1	1	1	1	0	0	0	1
0	1	1	1	1	1	0	0	1
0	1	1	1	0	0	0	0	1
0	1	1	1	0	1	0	0	1
1	0	1	0	0	0	0	0	0.884519
1	0	1	0	1	0	0	0	0.841738
1	1	0	1	1	0	0	0	0.837137
1	1	0	1	1	1	0	0	0.835604
1	1	0	1	0	0	0	0	0.816455
1	1	1	0	0	0	0	0	0.815924
1	1	0	1	0	1	0	0	0.814506
1	0	1	0	1	1	0	0	0.809141
1	0	1	0	0	1	0	0	0.793854
1	1	1	0	0	1	0	0	0.782308
1	1	1	0	1	0	0	0	0.775011
1	1	1	0	1	1	0	0	0.763873
0	**0**	**0**	**0**	**0**	**0**	**7**	**1**	**0.724529**

p	a	d	r	dif	lc	Number of cases	ie	raw consist.
0	**1**	**0**	**0**	**0**	**1**	**5**	**1**	**0.713514**
0	**1**	**0**	**0**	**1**	**0**	**4**	**1**	**0.704821**
0	0	0	1	1	0	1	0	0.698678
0	1	1	0	0	0	2	0	0.675603
0	1	0	0	0	0	18	0	0.616515
1	0	0	0	1	1	4	0	0.601415
0	0	0	0	0	1	1	0	0.590736
0	0	1	0	0	0	10	0	0.573731
0	0	1	0	1	0	1	0	0.571207
0	0	0	0	1	0	4	0	0.548607
0	0	1	0	0	1	2	0	0.530728
0	1	1	0	0	1	3	0	0.475697
0	1	0	0	1	1	26	0	0.45831
0	0	0	0	1	1	6	0	0.440544

The three sufficiency solutions as computed by the software are as follows:

Model: ie = f(p, a, d, r, dif, lc)

--- COMPLEX SOLUTION ---

	raw coverage	unique coverage	consistency
~p*~a*~d*~r*~dif*~lc	0.229618	0.137127	0.724529
~p*a*~d*~r*dif*~lc	0.183706	0.069850	0.704821
~p*a*~d*~r*~dif*lc	0.209680	0.107350	0.713514

solution coverage: 0.437901 solution consistency: 0.718015

--- PARSIMONIOUS SOLUTION ---

	raw coverage	unique coverage	consistency
~a*~d*~dif*~lc	0.232887	0.140397	0.726257
~p*a*~r*dif*~lc	0.183881	0.070024	0.705018
~p*a*~d*~dif*lc	0.209680	0.107350	0.713514

solution coverage: 0.441345 solution consistency: 0.719038

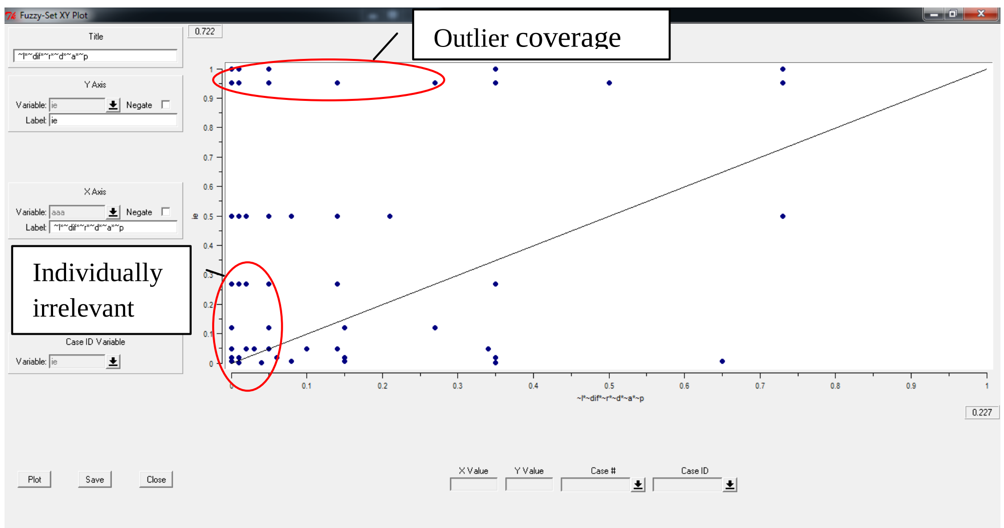
--- INTERMEDIATE SOLUTION ---

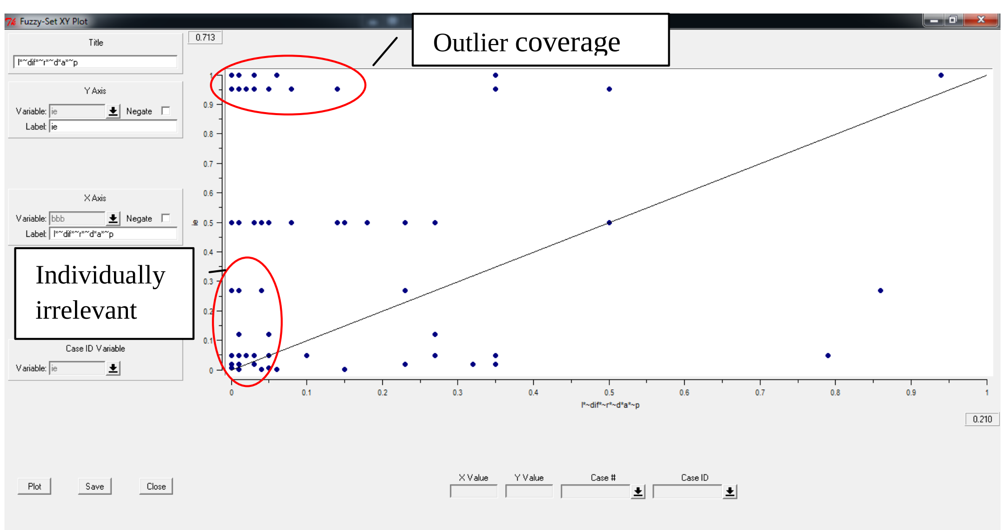
Assumptions: lc (present)

	raw coverage	unique coverage	consistency
~lc*~dif*~r*~d*~a*~p	0.229618	0.137127	0.724529
lc*~dif*~r*~d*a*~p	0.209680	0.107350	0.713514
~lc*dif*~r*~d*a*~p	0.183706	0.069850	0.704821

solution coverage: 0.437901 solution consistency: 0.718015

I then plot the cases' membership scores for each intermediate solution path and their ie in an xy plot to discern the distribution of the covered cases (shown in the area above the diagonal line) in Figure 13-3. However, apart from highly consistent cases (shown in the upper right corner), I also observe a similar pattern of some *outlier coverage* cases (which have a low membership score for a solution path but a high membership score for an outcome, meaning they are outliers that still cover the outcome) and some *individually irrelevant* cases (which have a low membership score for both a solution path and an outcome, and are irrelevant to, albeit not against, the sufficiency analysis).





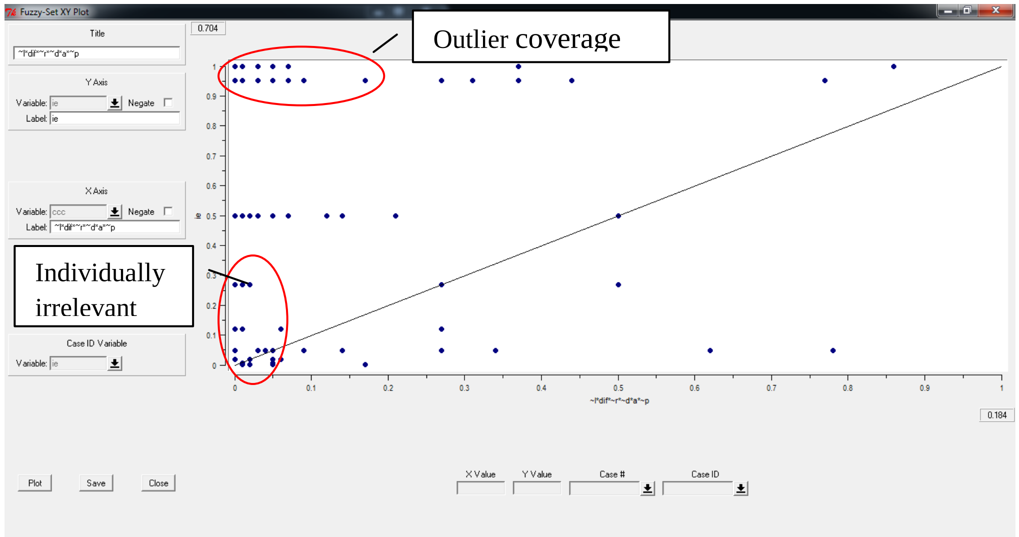


Figure 13-3: xy plots for each intermediate solution and ie

3. Subset/superset analysis of my hypotheses and the solutions for hypothesis testing

Although Ragin (1987: 118-121) and Schneider and Wagemann (2012: 297) suggest an approach to evaluating theory using a set-theoretic method (hypothesis testing, which is a deductive approach in a positivist paradigm), it has not been frequently used in the literature so far. This is probably because fsQCA was originally designed as an inductive reasoning tool, aimed at inferring general principles or rules from specific facts. Hence, like those of other qualitative research tools, fsQCA's hypotheses are grounded in the data once the data have been collected and analyzed. Therefore, previous fsQCA researchers have tended not to adopt a deductive approach, though the number doing so is growing (e.g. Grandori & Furnari, 2008; Fiss, 2011). Based on post-positivism, which aims to improve explanatory power by modifying protective belt rather than the hard core, my research also attempts to follow the route suggested by Ragin (1987: 118-121) and Schneider and Wagemann, (2012: 297) that hypotheses based on theory can be evaluated with a set-theoretic method by creating four intersections of the Boolean expression describing the hypotheses (h) and the empirical solution (s), resulting in four sub-tests within one hypothesis test, as follows.

T1: $H \cdot S \subset Y$: Cases in this intersection indicate the part of the hypothesis that is supported by empirical evidence. In other words, they are cases which the hypothesis predicts to be most likely to generate the outcome and for which the solution path does identify (cover) the outcome, helping to confirm the hypothesis. Therefore, the higher the consistency level of this intersection, the higher the reliability of the hypothesis.

T2: $\sim H \cdot S \subset Y$: Cases in this intersection indicate an overlap between the empirical findings that generate the outcome and cases that are not expected by the hypothesis. In effect, these cases show one form of contradiction between the hypothesis and the solution, which is a false negative or type II error. Hence, the higher the consistency level of this intersection, the stronger the support for extending the hypothesis. These discovered least likely cases suggest extension of the existing hypothesis, possibly by the addition of more causal conditions of interest (e.g. GOCs) which are shown in the solution but not yet in the hypothesis, or by referring back to these questionable data (within-case analysis) and looking for commonality among them, which may help explain their variance from the existing hypothesis.

T3: $H \cdot \sim S \subset \sim Y$: This intersection indicates cases which are predicted by the hypothesis to generate the outcome but which the solution does not capture. In effect, these cases show another form of contradiction between hypothesis and solution, which is a false positive or type I error. These unconfirmed most likely cases suggest a delimitation of the existing hypothesis. Therefore, the higher the consistency level of this intersection, the higher the need to delimit the hypothesis by dropping that hypothesis.

T4: $\sim H \cdot \sim S \subset Y$: This intersection indicates cases which are neither predicted by the hypothesis nor covered by the solution findings, yet display the outcome. This is because there is an alternative condition that better explains the outcome than do the conditions tested in the current analysis. The discovery of these most likely cases suggests extension of the existing hypothesis. Thus, the higher the consistency level of this intersection, the greater the need to extend both hypothesis and solution (empirical model) by including the hitherto overlooked conditions (which would possibly be other constructs or other GOCs and/or FCs that are not shown in both hypothesis and solution).

For all four hypothesis tests above, as for the consistency level, the higher the coverage level of the concerned intersection, the stronger the empirical importance supporting its argument.

For clarification, all possible intersections are displayed in Table 13-3 in which, apart from permutation of the presence of the hypothesis and solution, the occurrence of Y is another variation. Only those in **bold** are relevant intersections, which are also presented in Venn diagram format in Figure 13-4.

Table 13-3: Intersection of hypothesis (H) and solution path (S) with types of cases

Empirical solution / Hypothesis	Outcome predicted by solution (S) Y: covered cases ~Y: inconsistent cases	Outcome not predicted by solution (~S) Y: uncovered cases ~Y: consistent cases
Outcome expected by hypothesis (H) most likely cases	**T1) H•S** **Y: covered most likely cases** ~Y: inconsistent most likely cases	**T3) H•~S** Y: uncovered most likely cases **~Y: consistent most likely cases**
Outcome not expected by hypothesis (~H) least likely cases	**T2) ~H•S** **Y: covered least likely cases** ~Y: inconsistent least likely cases	**T4) ~H•~S** **Y: uncovered least likely cases** ~Y: consistent least likely cases

Adapted from Schneider & Wagemann (2012: 301)

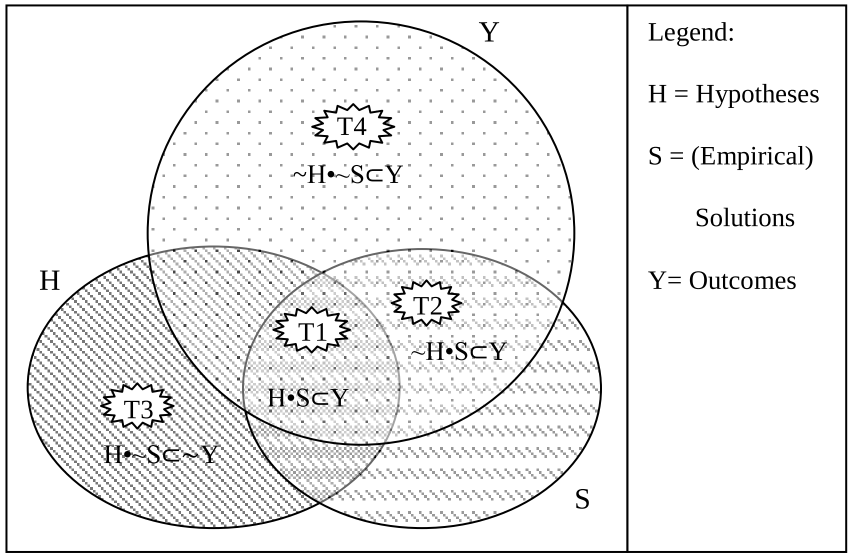


Figure 13-4: Possible intersections between hypothesis (h), empirical solution (s) and outcome (y)

(also provided in looseleaf glossary)

The results of the four sub-tests for one hypothesis test mentioned above for H1a (setting d·lc as h, each solution obtained earlier as s1, s2 and s3, and ie as y) are as follows:

****

SUBSET/SUPERSET ANALYSIS for T1 (h·s·ie)

****

	Consistency	Raw coverage
h·s1	0.539667	0.043730
h·s2	0.545450	0.043524
h·s3	0.622072	0.036555

Since the consistency levels of h·s1, h·s2, and h·s3 as a subset of ie are not very high, support for this hypothesis (H1a) is quite modest. Moreover, their very low coverages mean that this hypothesis explains roughly 4% of ie. The xy plots for each h·s expression are shown in Figure 13-5.

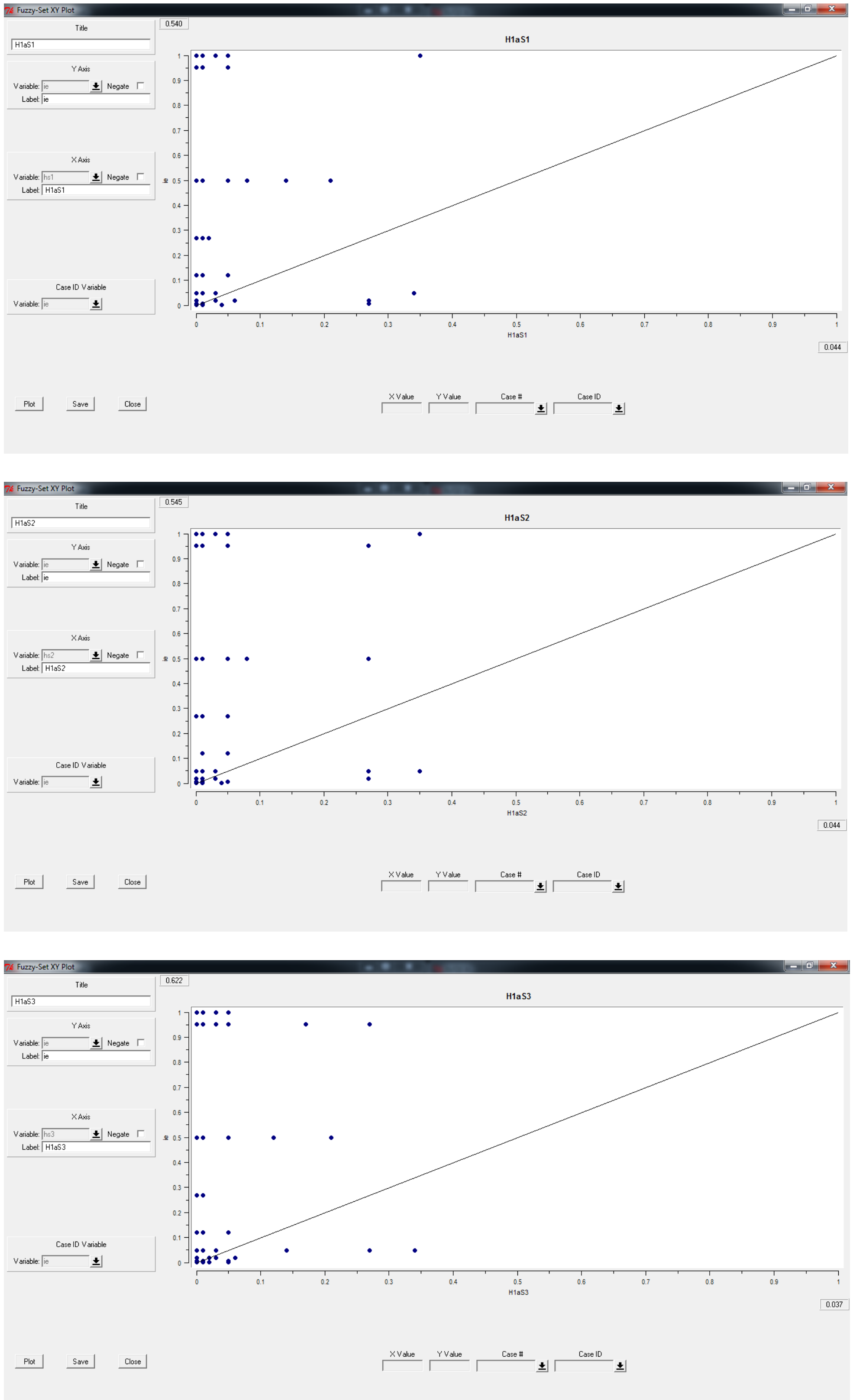


Figure 13-5: xy plots for each h's expression and ie

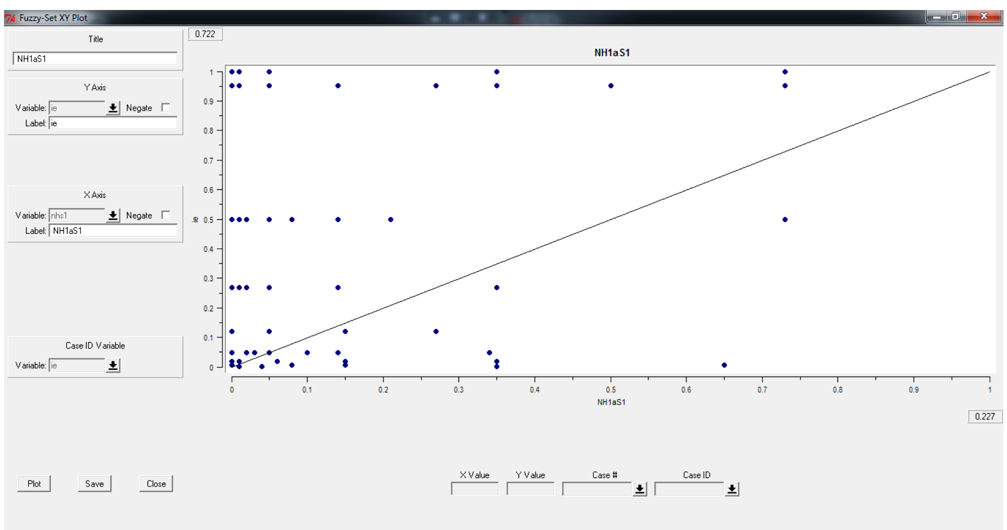
****

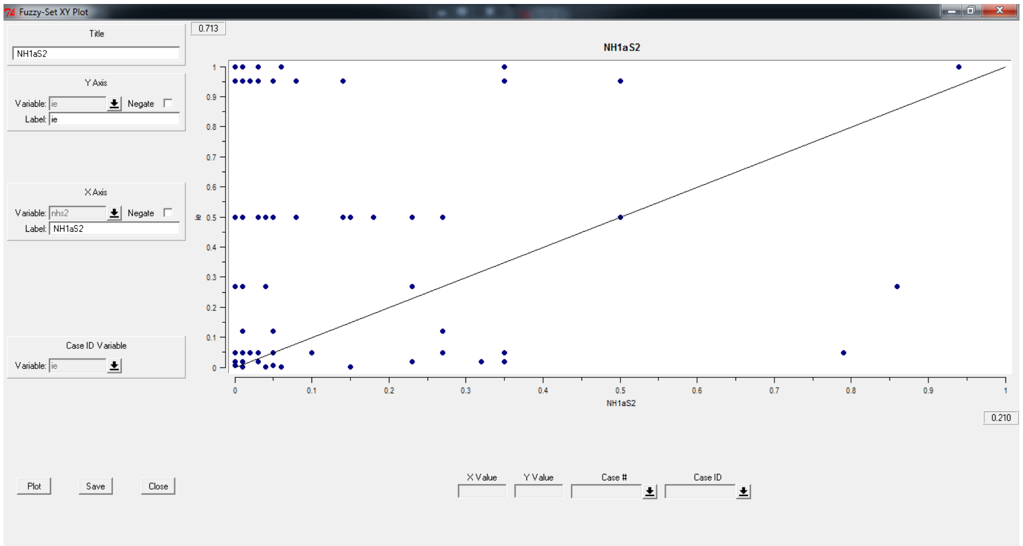
SUBSET/SUPERSET ANALYSIS T2 (~h·s·ie)

****

	Consistency	Raw coverage
~h·s1	0.722497	0.227479
~h·s2	0.713185	0.210136
~h·s3	0.703511	0.183932

The high consistency levels of ~h·s as a subset of ie provide strong support that there is room for extending H1a (possibly by adding FC as another causal condition). The moderate coverage levels show that extending H1a will explain ie roughly 20% more than the current H1a. The xy plots for each ~h·s expression are provided in Figure 13-6.





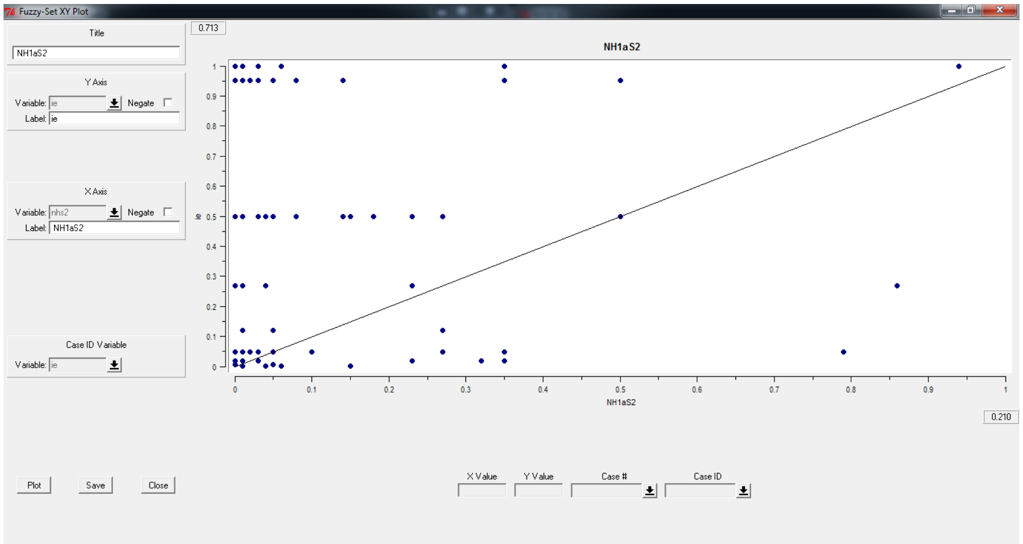


Figure 13-6: xy plots for each ~h·s expression and ie

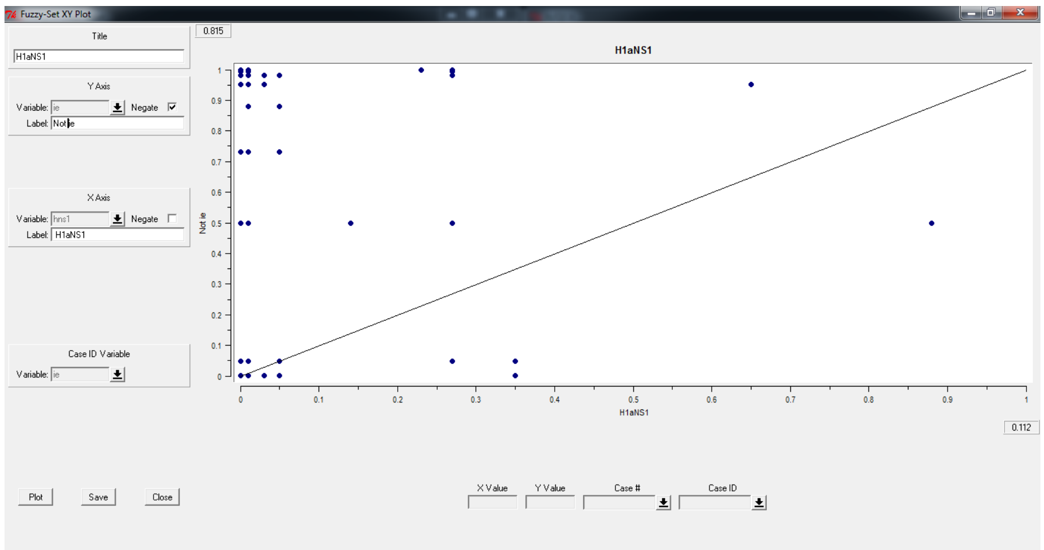
****

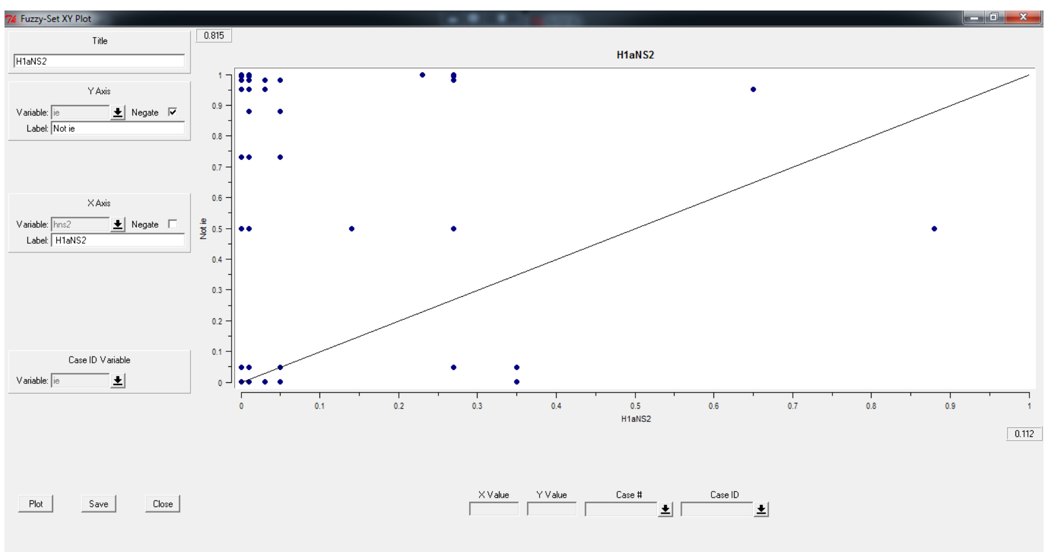
SUBSET/SUPERSET ANALYSIS T3 (h·~s·~ie)

****

	Consistency	Raw coverage
h·~s1	0.814957	0.112421
h·~s2	0.814957	0.112421
h·~s3	0.814957	0.112421

The high consistency levels of h·~s as a sufficient condition for ~ie support the need to delimit H1a by dropping it because they reveal the proportion of false positives or type I errors of H1a. However, the low coverage levels mean that the need is not too pressing. The xy plots for each h·~s expression are displayed in Figure 13-7.





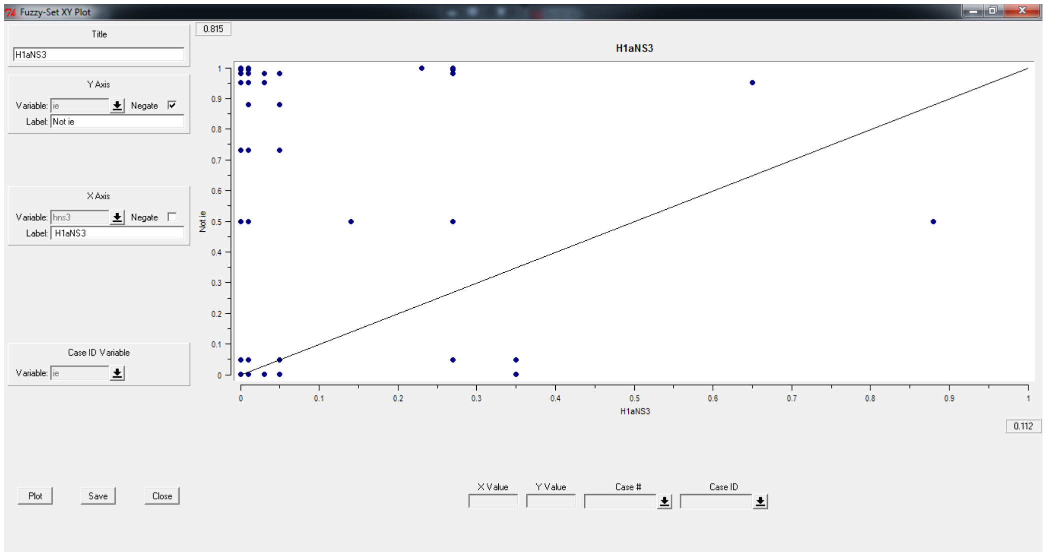


Figure 13-7: xy plots for each h·~s expression and ~ie

****

SUBSET/SUPERSET ANALYSIS T4 (~h·~s·ie)

****

	Consistency	Raw coverage
~h·~s1	0.463812	0.837649
~h·~s2	0.478831	0.873858
~h·~s3	0.485383	0.891719

The moderate consistency levels of ~h·~s as a sufficient condition for ie suggest that there is little need to add more conditions to H1a to improve consistency. However, the empirical model strongly supports the need to extend both H and S by including hitherto overlooked conditions (possibly by adding FCs as proposed in H2a) to improve empirical coverage. The xy plots for each ~h·~s expression are presented in Figure 13-8.

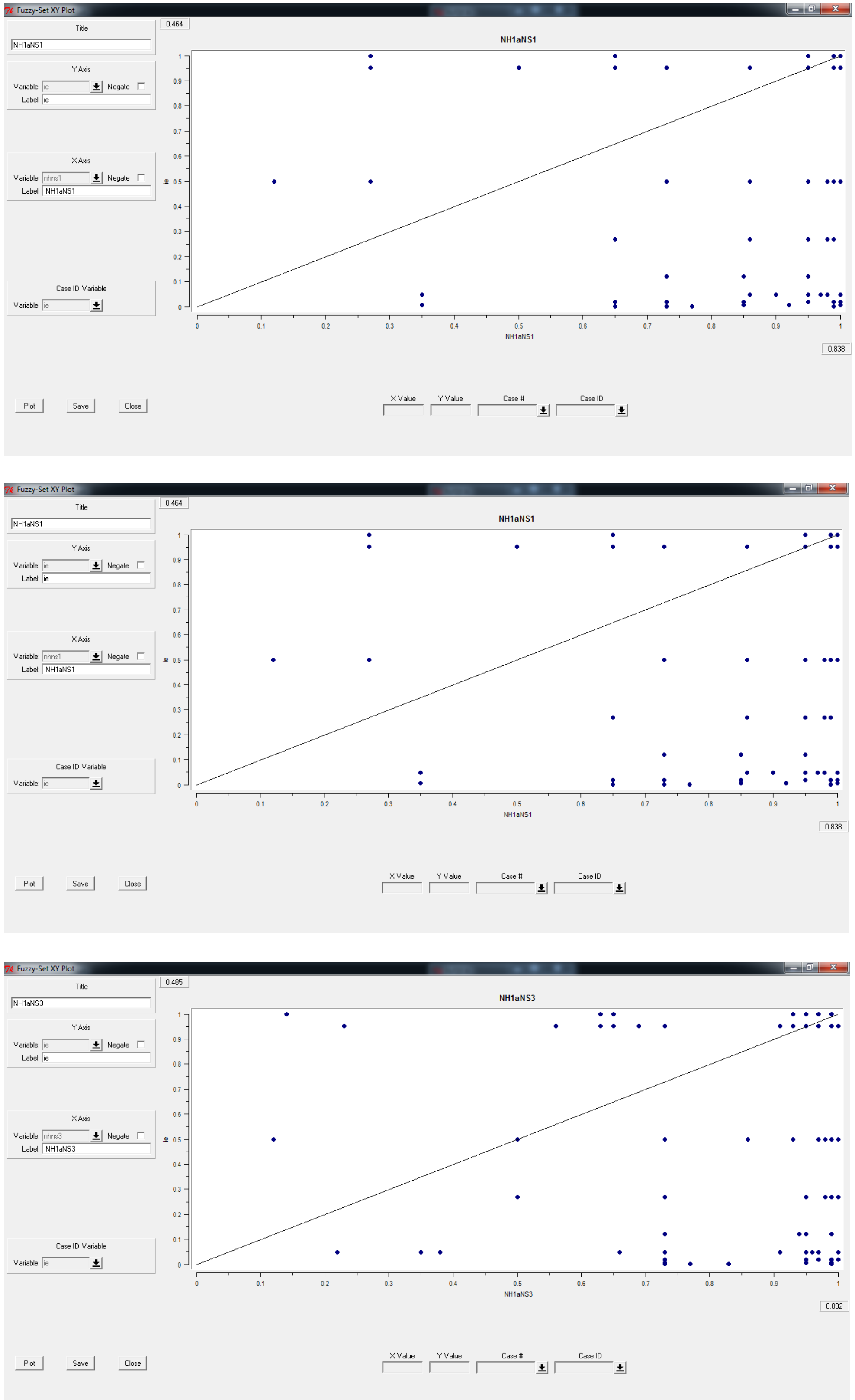


Figure 13-8: xy plots for each ~h·~s expression and ~ie

To compare the consistency and raw coverage of the solution paths, it is more intuitive to consider each parameter separately in Venn diagrams, as shown in Figure 13-9 and Figure 13-10, since the size of each intersection represents its parameter level based on different denominators. Also note that all raw coverages need not be added up into one because fsQCA, rather than csQCA, is used in this research. Clearly, all solution paths have a low consistency for T1 and a high consistency for both T2 and T3, suggesting that H1a is very weakly supported, at best. The empirical importance of T4 for all solution paths, as shown in their high raw coverage, also suggests that both H1a and the empirical solution rarely explain input efficiency.

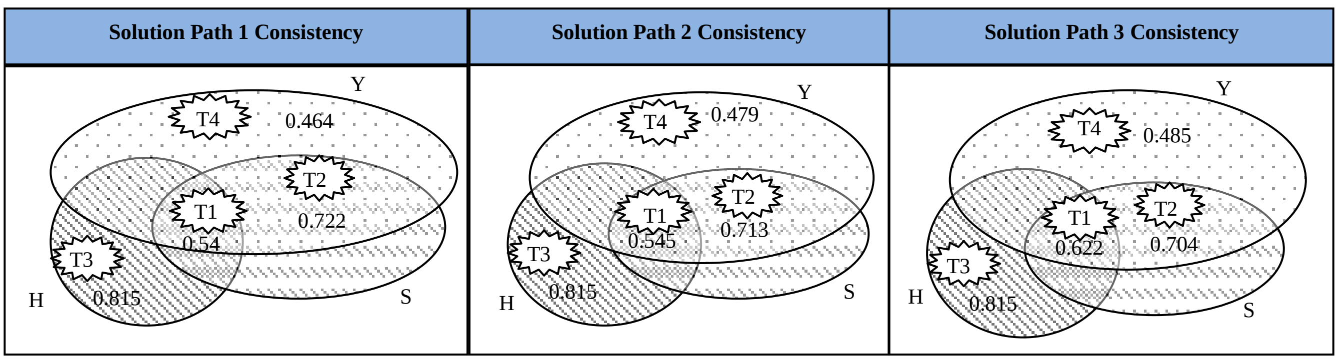


Figure 13-9: Venn diagrams of each solution path of H1a analysis showing consistency

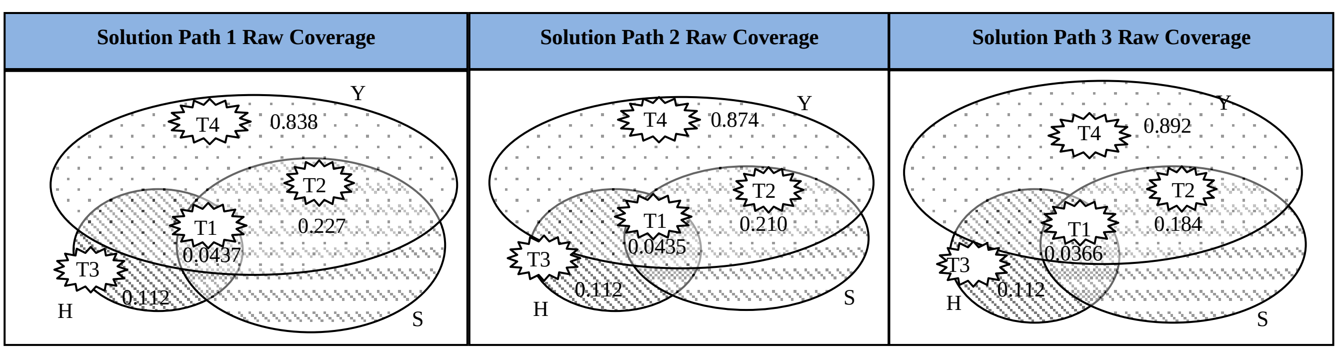


Figure 13-10: Venn diagrams of each solution path of H1a analysis showing raw coverage

Obviously, the hypothesis testing of this set-theoretic approach is quite different from that of traditional quantitative research, which focuses on either rejecting or not rejecting a null hypothesis. Rather than attempting to falsify a hypothesis completely, creating these four different intersections helps identify an area for hypothesis improvement by either increasing or decreasing its parsimony because it shows the parts of the hypothesis that are inconsistent with the empirical findings. Such intersections identify cases for more detailed further study in the next round of the back-and-forth procedure between ideas and evidence to reformulate the current hypothesis (Schneider & Wagemann, 2012).

Nevertheless, since my research objective is to respond to an attempt to falsify the ability of GOC to explain performance, as well as to test for a potential improvement to the explanation via complimentarity, it is necessary to be able to judge each hypothesis decisively. Moreover, for each hypothesis, I examine performance in both surveyed and financial data and most have two measurements, resulting in 56 tests in total. Thus, it is essential to set criteria to summarize the test results for each hypothesis.

Therefore, I decide to propose an additional criterion to make use of the aforementioned previous approach (Ragin, 1987: 118-121; Schneider & Wagemann, 2012: 297) in providing a decisive and summarized result for hypothesis validity in accordance with that of traditional quantitative research (whether or not to reject a hypothesis and, if not, how strongly the hypothesis is supported) based on the idea that a hypothesis is supported if the characteristics proposed by the hypothesis significantly match the empirical solution from sufficiency analysis for generating a high level of outcome of concern and, if any contradictory cases exist, they should be less relevant to creating the outcome than consistent ones (or else the level of support for the hypothesis is reduced accordingly). To do this, my underlying arguments are as follows.

Firstly, all four sub-tests (intersections) within one hypothesis test must be considered in combination because each represents a different area to either support or challenge the hypothesis of concern.

Secondly, since the main objective of this study is to decide whether the proposed hypothesis is rejected, not whether it can be further improved, T1 and T3 are more important than T2 and T4. The former two tell us whether the hypothesis is supported by the empirical solution (T1) and whether type I errors occur (T3), while the latter two tell us whether type II errors occur (T2) and whether both hypothesis and empirical solution can be further improved (T4). In other words, the latter two still challenge the hypothesis, but to a lesser extent.

Thirdly, it is necessary to take the coverage level as well as the consistency level into consideration because the coverage level suggests the empirical importance (relevance) of the argument of each sub-test. For instance, a hypothesis is not necessarily totally wrong if the result shows high consistency in both T1 (which supports the hypothesis) and T3 (which challenges the hypothesis) because only cases covered in the intersection in T3 (in which the size of the coverage level is shown as a percentage of ~Y) are questionable, while the intersection in T1 (in which the size of the coverage level is shown as a percentage of Y) still shows that the outcome supports the hypothesis. Thus, if T3's coverage is low, we can still trust the proposed hypothesis because only a few special cases are not covered by the hypothesis. Note that, although the sub-tests show only raw coverage (not unique coverage), an overlap area does not exist because each refers to a different area. However, T3's coverage cannot be compared directly with those of the others as it is based on a different concerned outcome (~Y). The comparison technique will be mentioned later.

Building on the aforementioned arguments, I propose criteria to infer whether to prove or disprove a particular hypothesis by applying "process tracing" (George & Bennett, 2005; Bennett, 2006, 2008; Collier, 2011) – a set of procedures for the systematic analysis of diagnostic evidence, which are understood as part of a temporal sequence of events, with the goal of achieving and refining causal inference, thus having distinctive probative value in supporting or overturning an explanatory hypothesis (Collier, 2010, 2011).

This initiative is supported by Blatter (2012: 3), who suggests that process tracing is "especially suited to complement" QCA because both share the same concepts of "configurational thinking", necessity and sufficiency. In addition, Mahoney's (2012) argument for process tracing, that the frequency (rarity) of the condition that is necessary or sufficient for the hypothesis to be valid (the strength of the probabilistic generalization) is directly related to the "difficulty" of passing the test, which in turn translates into different levels of hypothesis validity, matches well with my goal to provide a finer-grained support for the hypothesis by considering coverage after consistency.

The basic ideas of process tracing can be summarized in four empirical tests, which evaluate the evidence in distinctive ways with corresponding implications for rival hypotheses depending on two criteria: whether passing the test is necessary and/or sufficient for establishing a causal connection. This notion is summarized in Table 13-4. (See Collier (2011) for details.)

Table 13-4: Process tracing tests for causal inference

Adapted from Collier (2011: 825), who builds on Van Evera (1997: 31-32) and Bennett (2010: 210)

		Sufficient for affirming causal inference	
		No	***Yes***
Necessary for affirming causal inference	***No***	**1. Straw-in-the-Wind**	**3. Smoking-Gun**
		a) **Passing**: Affirms relevance of hypothesis, but does not confirm it.	a) **Passing**: Confirms hypothesis.
		b) **Failing**: Hypothesis is not eliminated, but is slightly weakened.	b) **Failing**: Hypothesis is not eliminated, but is somewhat weakened.
		c) **Implications for rival hypotheses**: **Passing**: Slightly weakens them. **Failing**: Slightly strengthens them.	c) **Implications for rival hypotheses**: **Passing**: Substantially weakens them. **Failing**: Somewhat strengthens them.
	Yes	**2. Hoop**	**4. Doubly Decisive**
		a) **Passing**: Affirms relevance of hypothesis, but does not confirm it.	a) **Passing**: Confirms hypothesis and eliminates others.
		b) **Failing**: Eliminates hypothesis.	b) **Failing**: Eliminates hypothesis.
		c) **Implications for rival hypotheses**: **Passing**: Somewhat weakens them. **Failing**: Somewhat strengthens them.	c) **Implications for rival hypotheses**: **Passing**: Eliminates them. **Failing**: Substantially strengthens them.

Building upon this, to judge the validity of the hypothesis, I propose a series of eight tests (Figure 13-11 shows this process in a flowchart.), comprising one Straw-in-the-Wind test (shown in single thin line diamond), four Hoop tests (shown in double line diamond), and three Smoking-Gun tests (shown in single bold line diamond), in which subsequent tests are built on the results of the preceding ones. The details are as follows.

1. A Hoop test for a statement that a "solution path is *not* unreliable" is whether the consistency of the solution path from the sufficiency analysis is greater than 0.7 (the consistency threshold of this research). Those that fail this test will not be considered for further hypothesis testing because they do not have an acceptable reliability to generate a meaningful hypothesis test result.
2. A Hoop test for a statement that a "hypothesis is *not* rejected" is whether the consistency of T1 is greater than 0.7. It is suggested that those that fail this test have a below acceptable proportion of observed cases supporting that the hypothesis matches the

solution path in terms of outcome generation. Thus, such a hypothesis must be rejected (red).

3. A Smoking-Gun test for a statement that a "hypothesis is strongly supported" is whether the consistency of all of T2, T3 and T4 is less than or equal to 0.7. It is suggested that those that pass this test have no significant contradictory evidence, suggesting a strong support classification (green).
4. A Straw-in-the-Wind test, which cannot prove anything by itself but is beneficial for subsequent tests, is whether the consistency of T3 is less than or equal to 0.7. Since T3 represents a type I error, the lower the consistency, the higher the level of support for the hypothesis.
5. A Hoop test for a statement that a "hypothesis is *not* weakly supported" is whether the absolute value of coverage (actual number of cases) of T1 is greater than that of T3. It is suggested that for those that fail this test their type I errors are relatively larger than their supporting cases; hence, this is significant and suggests a weak support classification (yellow). T1's and T3's coverage cannot be compared directly because the former is calculated against Y, whereas the latter is calculated against ~Y. The adjustment for comparison is based on the calibration criteria of all performance measurements. In this regard, I use quartile 1 of the dataset (top 25 companies in term of revenue) as the anchor point for fully out of the group of high performance (Y, membership score = 0) to prevent all performance data from skewing toward high membership; thus, the range for ~Y is smaller, from percentile 0 to percentile 25, while the range for Y is larger, from percentile 25 to percentile 100. Consequently, the proportion of the number of observations of ~Y to Y for this research is 1 to 3 (which adds up to four portions). Hence, T3 coverage, which is based on ~Y, must be divided by three to be comparable with T1 coverage, which is based on Y.

6. A Smoking-Gun test for a statement that a "hypothesis is supported" is whether the consistency of T4 is less than or equal to 0.7. It is suggested that those that pass this test have no significant error term that cannot be captured by the current analysis, suggesting a support classification (blue).
7. A Hoop test for a statement that a "hypothesis is *not* weakly supported" is whether the consistency of T2 is greater than 0.7. It is suggested that those that fail this test have a significant area of improvement displayed in the solution path, suggesting a weak support classification (yellow).
8. A Smoking-Gun test for a statement that a "hypothesis is supported" is whether the coverage of T2 is greater than that of T4. It is suggested that those that pass this test have type II errors larger than the error terms that cannot be captured by the current analysis, suggesting a support classification (blue). Conversely, for those that fail this test the error term is quite significant and significantly challenges the hypothesis, suggesting a weak support classification (yellow). Regarding comparison, since coverage of both T2 and T4 are calculated against Y, they can be compared directly.

Once hypothesis validity classification has been conducted for each significant solution path within a hypothesis test, the unique coverage of the solution paths (from sufficiency analysis) that share the same hypothesis validity classification will be added up to show the significant level of all paths within the same validity category. Using unique coverage is appropriate since it avoids the problem of overlapping paths and is also comparable. (However, this technique cannot capture the coverage of the overlap area; thus, only solution paths within the same sufficiency analysis can be compared.) Lastly, the group of the same hypothesis validity category that has the maximum sum of unique coverage will be represented as the overall validity result of the hypothesis.

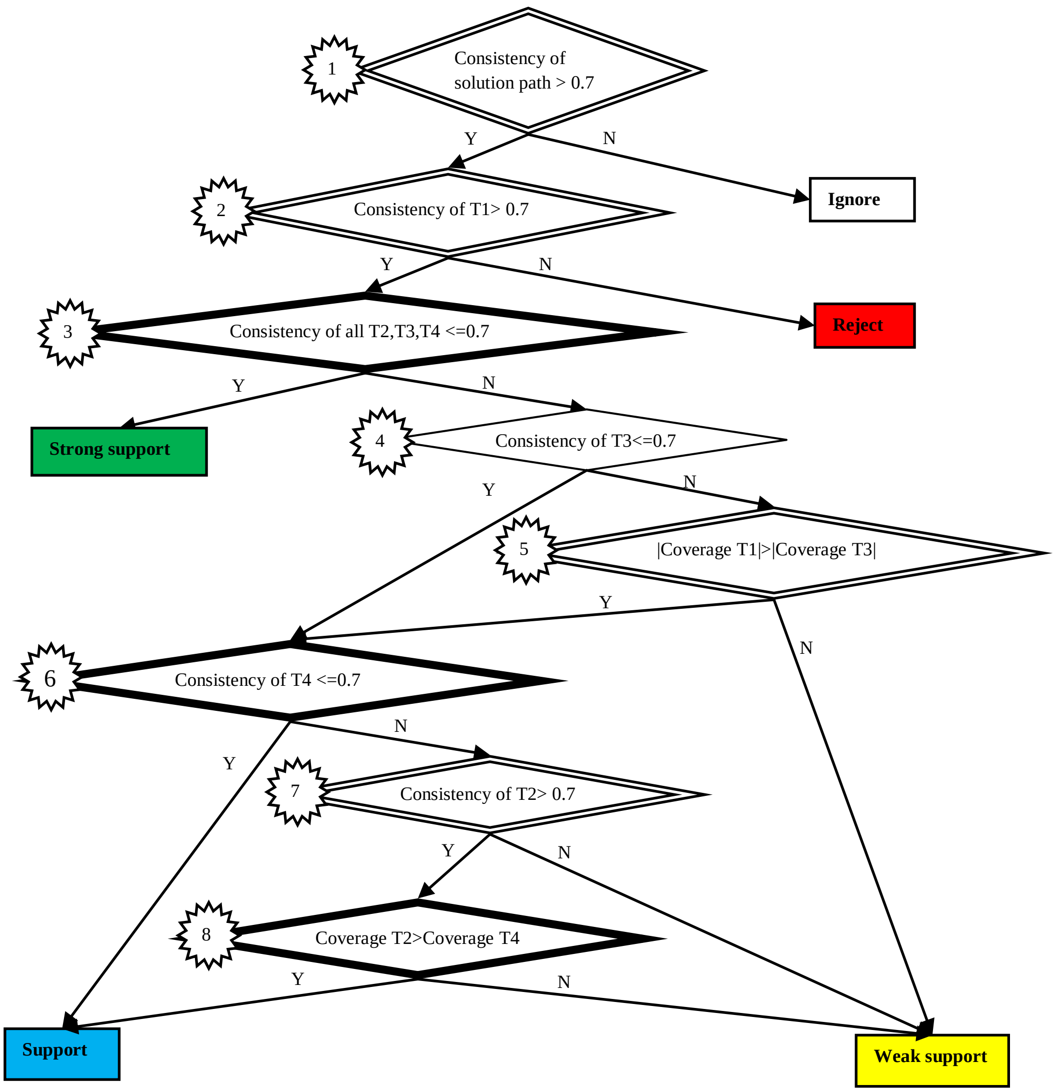


Figure 13-11: Flow chart of process tracing for hypothesis validity classification

(also provided in looseleaf glossary)

13.5 Frequency table for each research construct

Survey data

Generic organizational configuration

```
p          |      f    Pct
----------------+------------------
0.000123395   |     27   25.2
0.000911051   |     28   26.2
0.006692851   |     20   18.7
0.047425873   |     14   13.1
0.268941421   |     14   13.1
0.858148935   |      2    1.9
0.952574127   |      2    1.9
----------------+------------------
Total        |    107
Missing      |      0
```

```
a          |      f    Pct
----------------+------------------
0.000123395   |      1    0.9
0.006692851   |     12   11.2
0.047425873   |      9    8.4
0.268941421   |     19   17.8
0.645656306   |     16   15.0
0.858148935   |     13   12.1
0.952574127   |     19   17.8
0.985225968   |      9    8.4
0.995503727   |      5    4.7
0.99864148    |      3    2.8
0.999590433   |      1    0.9
----------------+------------------
Total        |    107
Missing      |      0
```

```
d          |      f    Pct
----------------+------------------
0.000123395   |     18   16.8
0.000911051   |     15   14.0
0.006692851   |     23   21.5
0.047425873   |     20   18.7
0.268941421   |     13   12.1
0.645656306   |      7    6.5
0.858148935   |      2    1.9
0.952574127   |      7    6.5
0.985225968   |      1    0.9
0.995503727   |      1    0.9
----------------+------------------
Total        |    107
Missing      |      0
```

```
r          |      f    Pct
----------------+------------------
0.000123395   |     34   31.8
0.000911051   |     39   36.4
0.006692851   |     21   19.6
0.047425873   |     11   10.3
0.268941421   |      1    0.9
0.645656306   |      1    0.9
----------------+------------------
Total        |    107
Missing      |      0
```

```
dif        |      f    Pct
----------------+------------------
4.9522E-05    |      1    0.9
0.000140584   |      1    0.9
0.000182479   |      1    0.9
0.00030743    |      2    1.9
0.000399025   |      1    0.9
0.001132032   |      1    0.9
0.001468947   |      2    1.9
0.004159216   |      1    0.9
0.00539222    |      1    0.9
0.006988185   |      1    0.9
0.009052217   |      3    2.8
0.011718687   |      7    6.5
0.015158593   |      2    1.9
0.025279083   |      1    0.9
0.032568333   |      1    0.9
```

0.041869162	1	0.9
0.053678734	1	0.9
0.068580875	3	2.8
0.087238722	5	4.7
0.110371057	1	0.9
0.138705088	4	3.7
0.17289926	3	2.8
0.260479419	1	0.9
0.313757925	1	0.9
0.372445657	2	1.9
0.435149962	4	3.7
0.5	6	5.6
0.622459331	2	1.9
0.679178699	1	0.9
0.731058579	3	2.8
0.777299861	1	0.9
0.817574476	1	0.9
0.851952802	5	4.7
0.904650535	1	0.9
0.92414182	3	2.8
0.93991335	2	1.9
0.952574127	4	3.7
0.962673113	3	2.8
0.970687769	2	1.9
0.97702263	1	0.9
0.98201379	1	0.9
0.985936373	5	4.7
0.989013057	1	0.9
0.991422515	2	1.9
0.993307149	5	4.7
0.995929862	1	0.9
0.997527377	1	0.9
0.998498818	2	1.9
0.999088949	1	0.9
0.999447221	1	0.9
Total	107	
Missing	0	

lc	f	Pct
0.000746029	3	2.8
0.00135852	3	2.8
0.002472623	1	0.9
0.004496273	1	0.9
0.008162571	4	3.7
0.014774032	5	4.7
0.026596994	7	6.5
0.047425873	5	4.7
0.083172696	2	1.9
0.141851065	8	7.5
0.231475217	7	6.5
0.354343694	7	6.5
0.5	7	6.5
0.660756369	6	5.6
0.791391473	7	6.5
0.880797078	2	1.9
0.935030831	5	4.7
0.965554804	5	4.7
0.98201379	9	8.4
0.990684041	4	3.7
0.995195247	2	1.9
0.997527377	5	4.7
0.999347035	1	0.9
0.99966465	1	0.9
Total	107	
Missing	0	

Functional capabilities

op	f	Pct
0.000279615	1	0.9
0.00143457	8	7.5
0.002472623	1	0.9
0.00732514	3	2.8
0.012571939	1	0.9
0.021495499	7	6.5
0.036518747	6	5.6
0.061383107	2	1.9
0.101395146	5	4.7
0.162960471	4	3.7
0.251447129	4	3.7
0.366919631	4	3.7

0.5 | 10 9.3
0.645656306 | 4 3.7
0.768524783 | 5 4.7
0.858148935 | 8 7.5
0.916827304 | 5 4.7
0.952574127 | 3 2.8
0.973403006 | 6 5.6
0.985225968 | 1 0.9
0.995503727 | 5 4.7
0.997527377 | 1 0.9
0.99864148 | 7 6.5
0.999253971 | 5 4.7
0.999775183 | 1 0.9
----------------+------------------
Total | 107
Missing | 0

rd | f Pct
----------------+------------------
0.000552779 | 1 0.9
0.000804086 | 5 4.7
0.001700722 | 3 2.8
0.002472623 | 4 3.7
0.003593603 | 1 0.9
0.005220126 | 4 3.7
0.007577241 | 4 3.7
0.010986943 | 1 0.9
0.015906392 | 1 0.9
0.02297737 | 1 0.9
0.033085978 | 2 1.9
0.067546691 | 1 0.9
0.095349465 | 1 0.9
0.13296424 | 2 1.9
0.182425524 | 1 0.9
0.245085013 | 5 4.7
0.320821301 | 7 6.5
0.4073334 | 7 6.5
0.5 | 3 2.8
0.645656306 | 3 2.8
0.768524783 | 5 4.7
0.858148935 | 5 4.7
0.916827304 | 9 8.4
0.952574127 | 5 4.7
0.973403006 | 10 9.3
0.985225968 | 1 0.9
0.991837429 | 5 4.7
0.995503727 | 6 5.6
0.997527377 | 4 3.7
----------------+------------------
Total | 107
Missing | 0

mis | f Pct
----------------+------------------
6.14417E-06 | 1 0.9
1.11954E-05 | 1 0.9
0.000123395 | 4 3.7
0.000224817 | 4 3.7
0.000409567 | 1 0.9
0.000746029 | 1 0.9
0.00135852 | 5 4.7
0.004496273 | 1 0.9
0.008162571 | 1 0.9
0.014774032 | 7 6.5
0.047425873 | 5 4.7
0.083172696 | 3 2.8
0.141851065 | 10 9.3
0.231475217 | 4 3.7
0.354343694 | 4 3.7
0.5 | 5 4.7
0.660756369 | 1 0.9
0.791391473 | 4 3.7
0.880797078 | 5 4.7
0.935030831 | 13 12.1
0.965554804 | 4 3.7
0.98201379 | 1 0.9
0.990684041 | 1 0.9
0.995195247 | 1 0.9
0.997527377 | 1 0.9
0.998728984 | 2 1.9
0.999347035 | 1 0.9
0.99966465 | 4 3.7
0.999827797 | 7 6.5
0.999954602 | 5 4.7

Total	107	
Missing	0	

sd	f	Pct
3.71689E-05	1	0.9
0.000409567	2	1.9
0.000746029	2	1.9
0.004496273	2	1.9
0.008162571	5	4.7
0.014774032	8	7.5
0.026596994	4	3.7
0.047425873	6	5.6
0.083172696	6	5.6
0.141851065	7	6.5
0.231475217	1	0.9
0.354343694	9	8.4
0.5	1	0.9
0.731058579	3	2.8
0.817574476	2	1.9
0.880797078	13	12.1
0.92414182	4	3.7
0.952574127	7	6.5
0.970687769	13	12.1
0.98201379	5	4.7
0.989013057	5	4.7
0.993307149	1	0.9

Total	107	
Missing	0	

mkt	f	Pct
1.30071E-05	1	0.9
5.82913E-05	4	3.7
0.00026119	4	3.7
0.000552779	1	0.9
0.00116951	1	0.9
0.005220126	6	5.6
0.010986943	1	0.9
0.02297737	3	2.8
0.047425873	12	11.2
0.095349465	1	0.9
0.182425524	6	5.6
0.320821301	7	6.5
0.5	9	8.4
0.645656306	2	1.9
0.768524783	1	0.9
0.858148935	1	0.9
0.916827304	7	6.5
0.952574127	22	20.6
0.973403006	2	1.9
0.985225968	3	2.8
0.991837429	5	4.7
0.995503727	5	4.7
0.997527377	1	0.9
0.99864148	1	0.9
0.999253971	1	0.9
Total	107	
Missing	0	

Performance dimensions

ie	f	Pct
0.000911051	2	1.9
0.002472623	3	2.8
0.006692851	4	3.7
0.01798621	8	7.5
0.047425873	15	14.0
0.119202922	8	7.5
0.268941421	12	11.2
0.5	21	19.6
0.952574127	22	20.6
0.997527377	12	11.2
Total	107	
Missing	0	

oe1	f	Pct
0.000552779	2	1.9
0.002472623	1	0.9

0.010986943	13	12.1
0.047425873	14	13.1
0.182425524	9	8.4
0.5	26	24.3
0.817574476	10	9.3
0.952574127	15	14.0
0.989013057	11	10.3
0.997527377	6	5.6
Total	107	
Missing	0	

oe2	f	Pct
0.047425873	24	22.4
0.095349465	4	3.7
0.182425524	8	7.5
0.320821301	13	12.1
0.5	34	31.8
0.817574476	4	3.7
0.952574127	8	7.5
0.989013057	5	4.7
0.997527377	5	4.7
0.999447221	2	1.9
Total	107	
Missing	0	

ef1	f	Pct
0.01798621	9	8.4
0.047425873	22	20.6
0.119202922	10	9.3
0.268941421	6	5.6
0.5	25	23.4
0.817574476	6	5.6
0.952574127	10	9.3
0.989013057	7	6.5
0.997527377	4	3.7
0.999447221	8	7.5
Total	107	
Missing	0	

ef2	f	Pct
0.006692851	17	15.9
0.01798621	7	6.5
0.047425873	9	8.4
0.119202922	8	7.5
0.268941421	9	8.4
0.5	8	7.5
0.731058579	3	2.8
0.880797078	11	10.3
0.952574127	18	16.8
0.98201379	17	15.9
Total	107	
Missing	0	

ad1	f	Pct
0.047425873	34	31.8
0.182425524	13	12.1
0.5	11	10.3
0.768524783	8	7.5
0.916827304	14	13.1
0.973403006	17	15.9
0.991837429	1	0.9
0.997527377	3	2.8
0.999253971	3	2.8
0.999775183	3	2.8
Total	107	
Missing	0	

ad2	f	Pct
0.047425873	51	47.7
0.5	16	15.0
0.817574476	12	11.2
0.952574127	6	5.6
0.989013057	10	9.3
0.997527377	7	6.5

0.999447221	|	2	1.9
0.999876605	|	1	0.9
0.999972464	|	1	0.9
0.999993856	|	1	0.9

----------------+------------------

Total | 107

Missing | 0

oa1	|	f	Pct
0.000552779	|	2	1.9
0.002472623	|	8	7.5
0.010986943	|	11	10.3
0.047425873	|	9	8.4
0.182425524	|	10	9.3
0.5	|	22	20.6
0.817574476	|	11	10.3
0.952574127	|	8	7.5
0.989013057	|	16	15.0
0.997527377	|	10	9.3

----------------+------------------

Total | 107

Missing | 0

oa2	|	f	Pct
6.14417E-06	|	7	6.5
0.000123395	|	8	7.5
0.002472623	|	9	8.4
0.047425873	|	9	8.4
0.5	|	26	24.3
0.817574476	|	6	5.6
0.952574127	|	16	15.0
0.989013057	|	7	6.5
0.997527377	|	16	15.0
0.999447221	|	3	2.8

----------------+------------------

Total | 107

Missing | 0

Financial data

Performance dimensions

ief	f	Pct
0	3	2.8
8.55072E-12	1	0.9
1.19655E-09	1	0.9
6.57311E-08	1	0.9
2.02352E-06	1	0.9
3.20942E-05	1	0.9
0.000163892	1	0.9
0.000182337	1	0.9
0.000257386	1	0.9
0.001679644	1	0.9
0.002460015	1	0.9
0.003861766	1	0.9
0.006770865	1	0.9
0.011142296	1	0.9
0.011290818	1	0.9
0.012514598	1	0.9
0.013619928	1	0.9
0.031589568	1	0.9
0.035034917	1	0.9
0.036172449	1	0.9
0.041235498	1	0.9
0.041371538	1	0.9
0.044191408	1	0.9
0.04628564	1	0.9
0.047425873	2	1.9
0.054316003	1	0.9
0.06889686	1	0.9
0.083209156	1	0.9
0.089820164	1	0.9
0.114646846	1	0.9
0.124143525	1	0.9
0.128751882	1	0.9
0.146292631	1	0.9
0.192334649	1	0.9
0.198910296	1	0.9
0.221788306	1	0.9
0.225013103	1	0.9
0.236675135	1	0.9
0.253192619	1	0.9
0.260699438	1	0.9
0.263184343	1	0.9
0.30336998	1	0.9
0.320564686	1	0.9
0.341444967	1	0.9
0.351087962	1	0.9
0.367827757	1	0.9
0.45403191	1	0.9
0.466186515	1	0.9
0.5	3	2.8
0.541151309	1	0.9
0.559382507	1	0.9
0.58107316	1	0.9
0.626227677	1	0.9
0.680797806	1	0.9
0.700319964	1	0.9
0.723372674	1	0.9
0.729687851	1	0.9
0.730751453	1	0.9
0.73142017	1	0.9
0.784023475	1	0.9
0.795535932	1	0.9
0.807138223	1	0.9
0.852791227	1	0.9
0.86746469	1	0.9
0.867679573	1	0.9
0.877885741	1	0.9
0.8778979	1	0.9
0.902311021	1	0.9
0.913669943	1	0.9
0.920724592	1	0.9
0.938209615	1	0.9
0.941513892	1	0.9
0.951927406	1	0.9
0.952574127	3	2.8
0.958052658	1	0.9
0.970992543	1	0.9
0.979721826	1	0.9
0.981777445	1	0.9
0.983026893	1	0.9
0.983106724	1	0.9

0.987653719 | 1 0.9

0.989760825 | 1 0.9

0.991722331 | 1 0.9

0.992546994 | 1 0.9

0.995645276 | 1 0.9

0.997235935 | 1 0.9

0.997749244 | 1 0.9

0.999016583 | 1 0.9

0.999661898 | 1 0.9

0.999747107 | 1 0.9

0.999824725 | 1 0.9

0.999922984 | 1 0.9

0.999926882 | 1 0.9

0.999975417 | 1 0.9

0.999983095 | 1 0.9

0.999994608 | 1 0.9

0.999999957 | 1 0.9

0.999999998 | 1 0.9

1 | 2 1.9

----------------+------------------

Total | 107

Missing | 0

oe1f | f Pct

----------------+------------------

0 | 6 5.6

2.77001E-13 | 1 0.9

2.23597E-09 | 1 0.9

2.25373E-08 | 1 0.9

5.74142E-07 | 1 0.9

6.64494E-07 | 1 0.9

1.00752E-06 | 1 0.9

5.99695E-06 | 1 0.9

1.25159E-05 | 1 0.9

5.43769E-05 | 1 0.9

0.000153306 | 1 0.9

0.000288259 | 1 0.9

0.002721992 | 1 0.9

0.013387822 | 1 0.9

0.014672239 | 1 0.9

0.015624525 | 1 0.9

0.019268047 | 1 0.9

0.027198668 | 1 0.9

0.028732435 | 1 0.9

0.034797653 | 1 0.9

0.047425873 | 3 2.8

0.089011251 | 1 0.9

0.130911968 | 1 0.9

0.154456328 | 1 0.9

0.155206487 | 1 0.9

0.198988946 | 1 0.9

0.200630183 | 1 0.9

0.214018288 | 1 0.9

0.215617931 | 1 0.9

0.244958679 | 1 0.9

0.258892201 | 1 0.9

0.283433612 | 1 0.9

0.304154242 | 1 0.9

0.305831096 | 1 0.9

0.31210953 | 1 0.9

0.312852627 | 1 0.9

0.329521705 | 1 0.9

0.356060339 | 1 0.9

0.369805355 | 1 0.9

0.384335768 | 1 0.9

0.414362294 | 1 0.9

0.423575753 | 1 0.9

0.468535419 | 1 0.9

0.469766134 | 1 0.9

0.474223691 | 1 0.9

0.5 | 4 3.7

0.518304445 | 1 0.9

0.555691053 | 1 0.9

0.569618167 | 1 0.9

0.663457684 | 1 0.9

0.694560196 | 1 0.9

0.70978547 | 1 0.9

0.743714424 | 1 0.9

0.784162554 | 1 0.9

0.808222337 | 1 0.9

0.817514181 | 1 0.9

0.832486521 | 1 0.9

0.835713834 | 1 0.9

0.876452016 | 1 0.9

0.876618467	1	0.9
0.891542193	1	0.9
0.893949844	1	0.9
0.90990826	1	0.9
0.930414848	1	0.9
0.933644425	1	0.9
0.936560644	1	0.9
0.946579947	1	0.9
0.949001675	1	0.9
0.951844441	1	0.9
0.952574127	3	2.8
0.958798769	1	0.9
0.960385668	1	0.9
0.966298555	1	0.9
0.96811248	1	0.9
0.969145355	1	0.9
0.972292499	1	0.9
0.982996836	1	0.9
0.986044519	1	0.9
0.987726571	1	0.9
0.98792613	1	0.9
0.99096273	1	0.9
0.994847872	1	0.9
0.998545942	1	0.9
0.999374734	1	0.9
0.999607926	1	0.9
0.999664376	1	0.9
0.999702518	1	0.9
0.999863943	1	0.9
0.999915632	1	0.9
0.999929841	1	0.9
0.999948111	1	0.9
0.999999871	1	0.9
0.999999946	1	0.9
1	2	1.9
Total	107	
Missing	0	

oe2f	f	Pct
1.33873E-07	1	0.9
1.02334E-06	1	0.9
3.72318E-06	1	0.9
1.36511E-05	1	0.9
0.001742386	1	0.9
0.00443532	1	0.9
0.005008441	1	0.9
0.005631881	1	0.9
0.008141778	1	0.9
0.008333964	1	0.9
0.00979091	1	0.9
0.011641096	1	0.9
0.015848087	1	0.9
0.021994705	1	0.9
0.023234468	1	0.9
0.025812192	1	0.9
0.027354976	1	0.9
0.029094373	1	0.9
0.031084611	1	0.9
0.032721325	1	0.9
0.03422951	1	0.9
0.035943225	1	0.9
0.03894527	1	0.9
0.039021669	1	0.9
0.041617159	1	0.9
0.044562726	1	0.9
0.047425873	3	2.8
0.050463262	1	0.9
0.05056765	1	0.9
0.058883842	1	0.9
0.070694303	1	0.9
0.085668349	1	0.9
0.088733458	1	0.9
0.099839917	1	0.9
0.10377324	1	0.9
0.104158344	1	0.9
0.12269734	1	0.9
0.140973343	1	0.9
0.145008672	1	0.9
0.170008377	1	0.9
0.176632526	1	0.9
0.185062514	1	0.9
0.303046883	1	0.9

0.30974555	1	0.9
0.32477905	1	0.9
0.351701521	1	0.9
0.362217851	1	0.9
0.409313043	1	0.9
0.41510901	1	0.9
0.488456524	1	0.9
0.492026911	1	0.9
0.5	4	3.7
0.506463383	1	0.9
0.578106893	1	0.9
0.597556903	1	0.9
0.642520916	1	0.9
0.649670937	1	0.9
0.676314603	1	0.9
0.706765339	1	0.9
0.726389532	1	0.9
0.737685835	1	0.9
0.763854259	1	0.9
0.780399254	1	0.9
0.812032761	1	0.9
0.815910932	1	0.9
0.843897048	1	0.9
0.904497966	1	0.9
0.911386894	1	0.9
0.91178395	1	0.9
0.912234503	1	0.9
0.913155009	1	0.9
0.924847425	1	0.9
0.925786161	1	0.9
0.938186419	1	0.9
0.952554011	1	0.9
0.952574127	3	2.8
0.959705831	1	0.9
0.963167609	1	0.9
0.970398782	1	0.9
0.9758338	1	0.9
0.976157174	1	0.9
0.981667884	1	0.9
0.98487598	1	0.9
0.985183379	1	0.9
0.985540108	1	0.9
0.989705266	1	0.9
0.99095966	1	0.9
0.99427961	1	0.9
0.99653202	1	0.9
0.996823509	1	0.9
0.998640467	1	0.9
0.999726654	1	0.9
0.999804155	1	0.9
0.999835994	1	0.9
0.999927325	1	0.9
0.999987038	1	0.9
0.99999985	1	0.9
0.999999966	1	0.9
1	2	1.9
Total	107	
Missing	0	

ef1f	f	Pct
3.87564E-09	1	0.9
7.81582E-09	1	0.9
2.06363E-07	1	0.9
6.17524E-07	1	0.9
6.02E-05	1	0.9
0.000157725	1	0.9
0.000164536	1	0.9
0.000194556	1	0.9
0.000288765	1	0.9
0.000522909	1	0.9
0.001408121	1	0.9
0.00531424	1	0.9
0.013343317	1	0.9
0.013576275	1	0.9
0.013669672	1	0.9
0.021078902	1	0.9
0.021897951	1	0.9
0.025328423	1	0.9
0.040960159	1	0.9
0.047425873	3	2.8
0.051656595	1	0.9
0.073602699	1	0.9

0.118806769	1	0.9
0.212667536	1	0.9
0.260791573	1	0.9
0.279249574	1	0.9
0.288474929	1	0.9
0.289475838	1	0.9
0.321411058	1	0.9
0.321708135	1	0.9
0.327795992	1	0.9
0.340379028	1	0.9
0.352016901	1	0.9
0.37795547	1	0.9
0.44507701	1	0.9
0.467146139	1	0.9
0.470159938	1	0.9
0.5	2	1.9
0.505357169	1	0.9
0.505498455	1	0.9
0.505808356	1	0.9
0.50645269	1	0.9
0.506838318	1	0.9
0.508179601	1	0.9
0.508556542	1	0.9
0.511138838	1	0.9
0.512613139	1	0.9
0.514716708	1	0.9
0.517666219	1	0.9
0.521824959	1	0.9
0.535185084	1	0.9
0.535877535	1	0.9
0.538596864	1	0.9
0.544043681	1	0.9
0.585314273	1	0.9
0.602312289	1	0.9
0.607187229	1	0.9
0.620583804	1	0.9
0.622459331	1	0.9
0.637944283	1	0.9
0.640631686	1	0.9
0.655323095	1	0.9
0.656936305	1	0.9
0.662915659	1	0.9
0.673177152	1	0.9
0.685766156	1	0.9
0.711872958	1	0.9
0.716028771	1	0.9
0.725198976	1	0.9
0.726345051	1	0.9
0.7281355	1	0.9
0.729029703	1	0.9
0.729277432	1	0.9
0.731020071	1	0.9
0.731026332	1	0.9
0.732963629	1	0.9
0.73369829	1	0.9
0.808946352	1	0.9
0.862937767	1	0.9
0.897202535	1	0.9
0.927996148	1	0.9
0.932677426	1	0.9
0.952574127	3	2.8
0.958856685	1	0.9
0.964715181	1	0.9
0.969207302	1	0.9
0.987358276	1	0.9
0.990084316	1	0.9
0.990765633	1	0.9
0.990880106	1	0.9
0.994497015	1	0.9
0.996266316	1	0.9
0.996706207	1	0.9
0.998619168	1	0.9
0.998681875	1	0.9
0.999993692	1	0.9
0.999996771	1	0.9
0.999997425	1	0.9
0.999999986	1	0.9
1	3	2.8

----------------+------------------

Total	107
Missing	0

ef2f	f	Pct

----------------+------------------

0.001227844	1	0.9	0.045493974	1	0.9	0.667720262	1	0.9
0.001358728	1	0.9	0.047425873	3	2.8	0.668261568	1	0.9
0.001803336	1	0.9	0.049184732	1	0.9	0.702278814	1	0.9
0.002354414	1	0.9	0.051562068	1	0.9	0.739517366	1	0.9
0.002593044	1	0.9	0.0539046	1	0.9	0.766103366	1	0.9
0.004161291	1	0.9	0.054590437	1	0.9	0.772120486	1	0.9
0.004482052	1	0.9	0.070565824	1	0.9	0.786851236	1	0.9
0.005705164	1	0.9	0.074302564	1	0.9	0.803629478	1	0.9
0.010072019	1	0.9	0.089143743	1	0.9	0.8038933	1	0.9
0.013425023	1	0.9	0.099778441	1	0.9	0.805645968	1	0.9
0.014087279	1	0.9	0.102629976	1	0.9	0.833110644	1	0.9
0.015868685	1	0.9	0.107643467	1	0.9	0.855409644	1	0.9
0.016268341	1	0.9	0.114646191	1	0.9	0.859805966	1	0.9
0.016477252	1	0.9	0.162732374	1	0.9	0.875207937	1	0.9
0.018568172	1	0.9	0.196897993	1	0.9	0.891753575	1	0.9
0.019264894	1	0.9	0.201856395	1	0.9	0.934543993	1	0.9
0.02180904	1	0.9	0.20842486	1	0.9	0.952072095	1	0.9
0.024659855	1	0.9	0.245269759	1	0.9	0.952574127	3	2.8
0.026349662	1	0.9	0.374088489	1	0.9	0.953071159	1	0.9
0.028391672	1	0.9	0.376839156	1	0.9	0.953389629	1	0.9
0.030724863	1	0.9	0.407426495	1	0.9	0.953602023	1	0.9
0.030933971	1	0.9	0.5	4	3.7	0.95524171	1	0.9
0.03333424	1	0.9	0.500308719	1	0.9	0.970213563	1	0.9
0.036094358	1	0.9	0.503299448	1	0.9	0.972433016	1	0.9
0.039505613	1	0.9	0.518539016	1	0.9	0.992269532	1	0.9
0.041309645	1	0.9	0.523577478	1	0.9	0.99362065	1	0.9
0.042493756	1	0.9	0.563285764	1	0.9	0.9947702	1	0.9
0.04360622	1	0.9	0.58707746	1	0.9	0.997675764	1	0.9

0.998696759 | 1 0.9
0.998861677 | 1 0.9
0.999067579 | 1 0.9
0.999434417 | 1 0.9
0.999878885 | 1 0.9
0.999885729 | 1 0.9
0.999889826 | 1 0.9
0.999978595 | 1 0.9
0.999988079 | 1 0.9
0.999993463 | 1 0.9
0.999995861 | 1 0.9
0.999997372 | 1 0.9
0.999998924 | 1 0.9
0.999999995 | 1 0.9
1 | 2 1.9
----------------+------------------
Total | 107
Missing | 0

oa1f | f Pct
----------------+------------------
0 | 4 3.7
1.01363E-13 | 1 0.9
2.33114E-13 | 1 0.9
2.16883E-11 | 1 0.9
2.80242E-09 | 1 0.9
1.80288E-05 | 1 0.9
8.60329E-05 | 1 0.9
0.00014106 | 1 0.9
0.000508765 | 1 0.9
0.001051903 | 1 0.9
0.003722288 | 1 0.9
0.004459032 | 1 0.9
0.004649811 | 1 0.9
0.005030277 | 1 0.9
0.011711421 | 1 0.9
0.011987401 | 1 0.9
0.016689791 | 1 0.9
0.020541694 | 1 0.9
0.021823117 | 1 0.9
0.022630466 | 1 0.9
0.025239379 | 1 0.9
0.026265397 | 1 0.9
0.028094469 | 1 0.9
0.047425873 | 3 2.8
0.051546082 | 1 0.9
0.051726516 | 1 0.9
0.05602527 | 1 0.9
0.069489616 | 1 0.9
0.083534703 | 1 0.9
0.089376093 | 1 0.9
0.121286014 | 1 0.9
0.12341781 | 1 0.9
0.127430344 | 1 0.9
0.158609491 | 1 0.9
0.169723109 | 1 0.9
0.172442654 | 1 0.9
0.2441035 | 1 0.9
0.278477679 | 1 0.9
0.311972887 | 1 0.9
0.325165721 | 1 0.9
0.333426357 | 1 0.9
0.443048552 | 1 0.9
0.448113741 | 1 0.9
0.46159373 | 1 0.9
0.46205898 | 1 0.9
0.467716084 | 1 0.9
0.4891194 | 1 0.9
0.5 | 4 3.7
0.503699897 | 1 0.9
0.52589852 | 1 0.9
0.532258947 | 1 0.9
0.578012754 | 1 0.9
0.595200844 | 1 0.9
0.629318526 | 1 0.9
0.667278733 | 1 0.9
0.725182476 | 1 0.9
0.735080658 | 1 0.9
0.743081677 | 1 0.9
0.753487307 | 1 0.9
0.755155744 | 1 0.9
0.764762967 | 1 0.9
0.828667062 | 1 0.9
0.849016171 | 1 0.9

0.867979938	1	0.9
0.88154096	1	0.9
0.903131344	1	0.9
0.906562469	1	0.9
0.909990236	1	0.9
0.937621891	1	0.9
0.940430241	1	0.9
0.949434589	1	0.9
0.952574127	2	1.9
0.962341496	1	0.9
0.963442657	1	0.9
0.968908244	1	0.9
0.981179619	1	0.9
0.98135405	1	0.9
0.983772401	1	0.9
0.983930526	1	0.9
0.984266984	1	0.9
0.985486735	1	0.9
0.988491097	1	0.9
0.98935224	1	0.9
0.989752283	1	0.9
0.99215439	1	0.9
0.995058559	1	0.9
0.997075194	1	0.9
0.9999145	1	0.9
0.999928145	1	0.9
0.999944226	1	0.9
0.99998503	1	0.9
0.999997488	1	0.9
0.999998323	1	0.9
0.999999429	1	0.9
0.999999577	1	0.9
1	3	2.8
Total	107	
Missing	0	

oa2f	f	Pct
0	9	8.4
2.26E-40	1	0.9
1.06125E-29	1	0.9
1.92111E-29	1	0.9
1.98217E-29	1	0.9
5.47071E-17	1	0.9
1.78275E-11	1	0.9
1.32395E-10	1	0.9
3.07198E-06	1	0.9
2.52295E-05	1	0.9
0.000106716	1	0.9
0.000142474	1	0.9
0.00016679	1	0.9
0.000438447	1	0.9
0.000762127	1	0.9
0.001983688	1	0.9
0.002942709	1	0.9
0.007881305	1	0.9
0.009248727	1	0.9
0.017030401	1	0.9
0.018020127	1	0.9
0.023550579	1	0.9
0.023727391	1	0.9
0.03900432	1	0.9
0.039612895	1	0.9
0.057556848	1	0.9
0.061823482	1	0.9
0.125162873	1	0.9
0.136001905	1	0.9
0.159098109	1	0.9
0.177184925	1	0.9
0.191447046	1	0.9
0.221420667	1	0.9
0.230992602	1	0.9
0.242022194	1	0.9
0.257093162	1	0.9
0.269895885	1	0.9
0.294092216	1	0.9
0.326321134	1	0.9
0.333479237	1	0.9
0.349492725	1	0.9
0.36435558	1	0.9
0.371557007	1	0.9
0.374655544	1	0.9
0.443813211	1	0.9

0.496975373	1	0.9
0.5	4	3.7
0.654497631	1	0.9
0.67313883	1	0.9
0.677792743	1	0.9
0.73077114	1	0.9
0.739850069	1	0.9
0.760655131	1	0.9
0.778267715	1	0.9
0.780764393	1	0.9
0.783561433	1	0.9
0.79802376	1	0.9
0.814324124	1	0.9
0.814331977	1	0.9
0.823444018	1	0.9
0.847940078	1	0.9
0.862371746	1	0.9
0.864730583	1	0.9
0.879045315	1	0.9
0.886921216	1	0.9
0.891374804	1	0.9
0.905432226	1	0.9
0.922016748	1	0.9
0.928686764	1	0.9
0.92990314	1	0.9
0.950917051	1	0.9
0.952574127	1	0.9
0.954177954	1	0.9
0.961959142	1	0.9
0.968729506	1	0.9
0.971527495	1	0.9
0.972768746	1	0.9
0.980980169	1	0.9
0.984263238	1	0.9
0.9882627	1	0.9
0.994629772	1	0.9
0.994931197	1	0.9
0.998458318	1	0.9
0.99861084	1	0.9
0.999009831	1	0.9
0.999918479	1	0.9
0.999980751	1	0.9
0.999992976	1	0.9
0.999995544	1	0.9
0.999999982	1	0.9
0.999999992	1	0.9
1	5	4.7
Total	107	
Missing	0	