The Development of Customised Support Framework to Guide Tailored Support for Business Incubators

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A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Engineering

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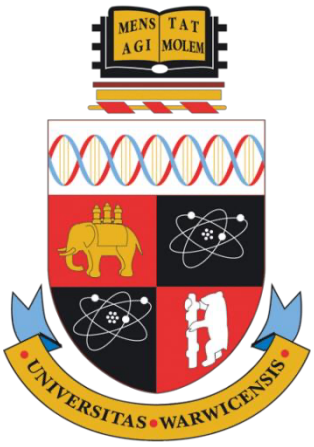
February 2022



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Acknowledgement

This challenging but rewarding four-year journey has involved so many people in my life which I could not enumerate them all. I would not have succeeded this far without their encouragement and advice.

First and foremost, I would like to express my deepest appreciation to my supervisors, Prof. Jay Bal and Dr Xiao Ma, for their invaluable support, thoughtful feedbacks and wholeheartedly encouragement throughout my PhD journey. Thank you for offering me grateful opportunities to learn from hands-on experience. Both of you have inspired me to think outside the box and consider things from different angles. Not only from an academic standpoint, but also as an entrepreneur. I am forever grateful for the trust that both of you have placed on me and have never given up on me, even when things are difficult. It is my honor to work with both of you.

I would like to thank my colleagues in my research group – Yihan, Dal and Georgi for your great support and for sharing your practical experiences with me, which has helped me develop a more in-depth understanding of how to make my research more practical. I am grateful to Nina, Yingchao, Ekkarin, Yunqi and Andy for making my every day at the office livelier and more enjoyable.

I would like to express my sincere gratitude to all my friends, Prang, Ta, Gloy, Rom, Fluke, Bo, Bean, Mami, Natt, Teety, Yam, Gabj, Cash, Aof, Yuki, Charlie, Ping and Gik, for love, mentally support, and encouragement. Thanks to Aae for always understanding, soothing me and being there for me. Pui, I am so grateful. You always reminded me of why I started this journey and has been there for me since the beginning. Thank you, all my friends. The list will be long if I could have named everyone.

I am grateful to my best partner, Taechit, who has always been by my side through thick and thin. You have always stay positive and make everything possible. With you, I have accomplished many goals throughout my PhD journey and without you, there is no way I could have this much happiness in my life.

I would like to acknowledge the love and support of my family. Thank you for always trusting me, being there for me no matter what decision I made. Pursuing my PhD journey in the UK, I have exchanged with significantly less quality times with them. Thanks to my parents, Kwanchai and Kanchana, my brothers, my cousin Sally, aunts, and uncles for always being understanding, encouraging, and believing in me even when I did not believe in myself. You all are awesome.

Last but not least, I would like to thank myself for not giving up. I often forget to appreciate my own passion, my endurance and my patience that drive me to keep going. This has been the most challenging journey, not only about pursuing PhD, but also about my self-awareness, to be able to deeply understand myself and learn how to cope with any uncertainties, unknown circumstances, and emotional journey. And most of all, try to do everything with all my efforts and be kind to myself.

Declaration

I declare that this thesis is the original work and has not been submitted in whole or in part in any previous application for a degree qualification at this or any other university.

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Abstract

Lack of skills and poor team management are found to be critical reasons for start-up failure. Even though incubators play a vital role in improving team capabilities, the failure rates for new businesses are still largely unaffected. Academics have postulated that this is because incubators may offer support that does not align with the real needs of start-ups. Prominent scholars suggest that different start-ups have different support needs due to their capability and current state of the team. Tailored support for start-ups, offered by incubators, was found to be an essential contributor to start-up achievement. However, research on developing a customised support framework for business incubators has received much less attention in the existing research studies.

The purpose of this study is, therefore, to propose an Incubator Customised Support framework that helps diagnose the team and skills gap at the current stage of a start-up's journey. This was achieved through three key phases. Firstly, from the relevant current literature on best practices for start-ups, a conceptual framework that captures the stages, distinct key achievements, processes, critical skills and team effectiveness factors needed within each development stage was synthesised. Secondly, through semi-structured interviews and observations conducted with 13 incubators located internationally, the conceptual framework was tested and refined to produce a framework that incorporated and addressed current practice issues. This was labelled, the ICS Framework. Finally, this study then investigated how the international ICS framework can be modified to suit different start-up ecosystems, taking Thailand as a case example, through a series of semi-structured interviews with 16 Thai incubators.

The research findings suggest that the ICS Framework could adapt directly to a local international context, as the critical processes, achievement, and overall team development factors are consistent. However, this does require some adaptation as the priority within crucial team development factors can vary depending on the start-up's background, and the strength of the start-up ecosystem in a particular country. This study found a possible correlation between the findings from the semi-structured interviews at sample Thai incubators and the start-up ecosystem performance data supplied by the Start-up Genome report. The findings from Thai incubator correlate with the Genome report emphasis on the level of "global market reach" capability, funding structure and previous start-up experience with practice at Thai incubators. This correlation could simplify the adaption of the international ICS Framework into any local context radically.

This study contributes to the advancement of business incubator research. It has formulated a novel Incubator Customised Support framework that can be used to guide incubators in assessing start-ups' support needs, and a means to tailor their support, based on multi-factor assessment of critical skills and team effectiveness factors importance weightings, at each stage of a start-up journey. A key factor through the factor weightings is knowing what the key ability is required to proceed to the next stage. This study proposes that national versions of the ICS framework could be created using updated "Start-up Genome data", as demonstrated by the Thai modification demonstrated in this research. However, this approach needs further research to be more comprehensively validated.

Chapter One: Introduction

1.0 Introduction

Approximately 660,000 new start-ups are registered in the UK every year, according to the Telegraph (2019); however, 20% do not survive the first year, and 60% go bust within three years. The data from the United States Bureau of Labor Statistics Business Employment Dynamics (2019), reveal that the failure rate of new businesses is 20% within the first years of operation. This failure rate rises to 50% by the end of year five and approaches 70% by the end of year ten.

CB Insights (2021) has conducted analysis of the main reasons that start-ups fail over the years, though there is rarely one single reason for failure. There are a few common key symptoms that lead to the fall of such start-ups:

1. Ran out of cash/failed to raise new capital
2. No market needs
3. Got outcompeted
4. Flawed Business Model
5. Regulatory/Legal challenges
6. Pricing/cost issues
7. Not the right team
8. Product Mistimed
9. Poor product
10. Disharmony among team/investors
11. Pivot gone bad
12. Burned out/lack of passion.

There are similar reasons identified by researchers in the literature. Hoffman and Radojevich-Kelly (2012) found that a key cause of failure was products not meeting market needs sufficiently. This indicates an inability to conduct and react to early market feedback. It is

possible that the inability was caused by the founders' overly emotional investment into the idea, therefore, ignored or rejected the feedback. Research in this space suggested that this is more likely a result of insufficient entrepreneurial skills and knowledge (Thom, 2016; Diakanastasi et al., 2018).

The skill and knowledge gap are then exploited by organisations such as business incubators, who are established to help start-ups address such gaps. Incubators try to involve in new ventures by offering a supporting infrastructure, business skills development and market reach development (Li et al., 2020; Mahmood et al., 2017; Stal et al., 2016). While the number of business incubators has increased, namely, services to facilitate startups to address the gaps have been made more available, the failure rates for new businesses are still largely unaffected. Schwartz (2012) and Ratinho, Harms, and Groen (2010) and Van Weele et al. (2017) postulated that this may be because incubators may offer generally applicable support to the "mass" that does not align with the real needs of individual start-ups. Many studies suggest providing more customised support to increase flexibility and tailor to specific needs. Van Weele et al. (2017) and Lai and Lin (2015) suggest that incubators should focus on mentoring to identify the specific needs of their incubator start-ups. Prominent scholars (Mrkajic, 2017; Monsson and Jørgensen, 2014; van Weele et al., 2019) suggest that different start-ups have different support needs due to their capability and current state of the team; thus, a customised approach should be more effective. Tailored support for start-ups, offered by incubators, was found to be an essential contributor to start-up achievement (Vanderstraeten et al., 2016; Mas-Verdú et al., 2014).

Many studies such as those by Monsson and Jørgensen (2014), van Weele et al. (2019) suggest that incubators should *assess the characteristics* of a start-up to *customise support* to fit their needs. From a review of the extant literature on business incubators and customised support strategy, research studies such as Klaasa et al. (2019), Mrkajic (2017), and van Weele et al. (2017) proposed different customisation criteria based on a single dimension: the stage of business development. Others such as Monsson and Jørgensen (2014), van Weele et al. (2019) suggest focusing resources on the attributes of start-up teams such as relevant experience, motivation to run a business and team commitment. This assumes that start-up performance is

dominated by the characteristics of the founding team, an opinion that that is shared with many investors. The skills oriented viewpoint has been further debated in two streams – skills for team members and team effectiveness among team members. Factors from both streams can be used to guide tailored support, as these two streams may both underpin start-up team development and are the primary offering of business incubators to improve start-up performance (Bone et al., 2019; Li et al., 2020; Hoffman and Radojevich-Kelly, 2012; Peña, 2004).

These divergent viewpoints suggest that neither the business development stage nor entrepreneurs' team characteristics alone, may accurately assess the real support needs for each start-up team. Logically, it also presents an argument to consider both of these dimensions.

For this reason, the aim of this study is:

- To investigate start-up development processes with relevant crucial factors in skills and team effectiveness, so as to inform business incubators to tailor support for start-up businesses.

The intention is that the knowledge gained from the research findings from this study would be beneficial to incubator practitioners and policymakers to help increase not only new venture development success, but also provide a more resource efficient approach that enhances the survival of the incubators themselves.

This introductory chapter provides an overview of the thesis and the foundations of the study and is organised into six sections.

- Section 1.1 discusses the background knowledge required to define the research settings for this study and describes the definition of business incubators and start-ups adopted in order to contextualise the study.
- Section 1.2 justifies the reasons for this study. The researcher’s personal motivation and the knowledge gaps in the literature that this research study aims to address are discussed.

- Section 1.3 articulates the research question and the set of objectives to address the research question.
- Section 1.4 explains the selected research approach to address the research question and objectives.
- Section 1.5 discusses the intended contributions the thesis will offer.
- Section 1.6 provides an overall structure of the thesis to address the research question.

1.1 Background of the study

From the World Economic Forum (2014), 'Encouragement of entrepreneurship' is the key strategy called for reducing unemployment and stimulating economic growth. The report from the G20 Leaders' Communique (2014) and OECD council meeting (2017) both promoted that founding and growing new business contribute more to economic development in a country, than do large corporations. As a result, governments in many countries have established formal policies to foster innovation, job creation and talent retention through the establishment of new start-ups. The attention is focused on promoting new venture creation. However, the start-up Genome report (2021) reveals that start-up success in terms of the number of exits remains unsatisfactory across many different countries. The report investigated 100 emerging ecosystems and discovered that more than 70% of them need to be improved. This is consistent with data from the United States Bureau of Labor Statistics Business Employment Dynamics (2019), which showed that the failure rate of new businesses does not appear to be decreasing compared to their 2015 report.

It may be explained by the fact that starting a new business without experience or assistance is not easy, given the high level of competition and dynamic environment requires a wide range of skills and knowledge. A few critical challenges for a start-up can be explained by its definition. For example:

Ries (2009) defines start-ups with a highlight of the founders and its uncertainty:

> "A start-up is a **human institution** designed to create a new product or service under condition of **extreme uncertainty**"

Blank and Dorf (2013) see it as a short-term venture trying to find a long-term future:

> "A start-up is a **temporary organisation in search** of a scalable, repeatable, profitable business model"

"Human institution" and "temporary organisation" both highlight that a startup is a form of organisation, created and led by **entrepreneurial teams**. As defined by Schjoedt and Kraus (2009), they are:

> *Two or more persons who have an interest, both financial and otherwise, and commitment to a venture's future and success; whose work is interdependent in the pursuit of common goals and venture success; who are considered to be at the executive level with executive responsibility in the early phases of the venture, including founding and pre-start-up; and who are seen as a social entity by themselves and by others.*

An abundance of literature (Diakanastasi et al., 2018) refers to the same concept with a variety of terms such as start-up, start-up teams, entrepreneurial teams, founding teams, entrepreneurs, and new venture teams, etc. interchangeably. This is also an indication that very few start-ups are purely single person ventures. In fact, some incubators refuse to even accept start-ups with a single founder into their support programs. In a recent study, by Steward (2021) showed that the performance of start-up teams in the United States, outperformed ventures by solopreneurs by 163% to the first round of fundraising. According to Y Combinator, a leading start-up accelerator in the United States of America (USA), approximately only ten percent of their selected start-up cohorts are founded by a single person. Thus, when evaluating start-ups, most experts agree it is critical to consider the "team" dimension (Mrkajic, 2017; Miller and Bound, 2011). Therefore, this study focuses mostly on start-up "team" development rather than the

individual founders. The empirical investigation undertaken in this study also found that in its incubator cohort, selection and progress critical assessment criteria are based on the start-up team operations rather than the actual business idea (see discussion in Section 5.2).

In order to support these entrepreneurs in achieving a higher success rate, a key strategy by policymakers is to foster a start-up ecosystem through the establishment of business incubators (OECD, 2019). Echoing these policies, many large companies also developed or established their own incubators (Tesco, John Lewis, NatWest) to assist with immediate industry issues and access to expertise. Many research studies (Theodoraki, 2020; Mian et al., 2016; Baraldi et al., 2016) indicated that business incubators have emerged as a significant component of the modern entrepreneurial ecosystem, assisting new venture growth through many metrics. While establishing new start-ups is one of the challenges, it is even more difficult to assist existing start-ups to grow in order to create and sustain jobs. Identifying the factors that contribute to an incubator strategy to help start-ups at various stages of new venture creation is thus the starting point for this research study.

The following subsections provide more background information for this study. The discussions provide context on why this research area is worth investigating. The discussions are organised into three subsections:

- Section 1.1.1 introduces business incubators as a context for this study and discusses why business incubator plays a critical role in entrepreneurship ecosystems.
- Section 1.1.2 discusses why incubators need to provide a customised support strategy for start-ups, and the existing customised incubation models.
- Section 1.1.3 discusses the significance of the start-up team development factors that incubators could use to assess start-up needs.

1.1.1 Business incubator

Business incubators have grown to try and reduce the failure rate of new start-ups using a mix of support measures driven by public and private interests. The definition of ‘business

incubator' used in this study is a definition derived from the systematic literature review on business incubators of Hausberg and Korreck (2018):

> *Business Incubators are business-incubating organizations that support the establishment and growth of new businesses with tangible (e.g. space, shared equipment and administrative services) and intangible (e.g. knowledge, network access) resources during a flexible period and are funded by a sponsor (e.g. government or corporation) and/or fund themselves taking rent (or less frequently equity) from incubatees.*

Using a broad term of 'business incubator' in this study allows the researcher to investigate various dimensions and support for different types of incubators, including accelerators. Thus, this study used the terms' incubator' and 'accelerator' interchangeably and explore support actions addressing the full journey. However, an incubator is the focused context of this study because an incubator is where new ventures are nurtured and developed; as such, it encompasses the venture creation process along the entrepreneur journey. Previous research studies such as Ensley and Hmieleski (2005), Phan et al. (2005) and Diakanastasi et al. (2018) also used an incubator context to study an entrepreneurial team's development and team dynamics.

The resources provided by incubators have developed through evolution and cover both tangible and intangible resources (Aerts et al. 2007; Bruneel et al. 2012; Van Were et al., 2019). Bruneel et al. (2012) highlighted three key values offered by business incubators:

1. Economies of scale of shared infrastructure and resources
2. Business capability development
3. Business reach development

The original concept of business incubators is based primarily on physical workspace and shared facilities. Dating back to the 1950s, Charles Mancuso founded the first business incubator at the Industrial Centre in New York, United States. The original purpose for Charles

Mancuso was to renovate an unoccupied building to generate revenue through renting space to small business owners (Kilcrease, 2012) and adding value to small business owners through the economies of scale associated with leveraging shared resources and lowered overhead costs. Monsson and Jørgensen (2014) investigated the perceived benefits for startups from incubators support. They found that businesses that operated for several years praised the incubator's office facilities more than the early-stage entrepreneurs. This is still a common business model for incubators: Generate revenue by charging a rental fee (Bruneel et al., 2012). However, this offer cannot improve the start-up performance as the support contributes to only one customer value and benefits established businesses more than start-ups.

The more recent generation of incubators goes beyond office space and shared facilities by focusing on knowledge-based services and capability development in order to accelerate the learning curves of new businesses (Smilor, 1987; Campbell et al.,1985, European Commission, 2002; Bruneel et al., 2012). Inexperienced entrepreneurs typically lack business experience and management skills, limiting their chances of survival. Many research studies on the role of business incubators (Bone et al., 2019; Li et al., 2020; Hoffman and Radojevich-Kelly, 2012; Peña, 2004) found that incubators play an important role in developing essential skills and team development through training, consulting, mentoring, access to cutting-edge technology and business information. The survey with entrepreneurs conducted by Mahmood et al. (2017) confirms Peña's (2004) findings that customised skills training via consulting and mentoring is the most critical support provided by incubators and significantly impacts firm growth.

Incubators can increase start-ups' chances of developing a market by providing accessibility to a wide range of resources and networks, including potential suppliers, customers, partners, investors, other entrepreneurs, and experts (McAdam and McAdam, 2006; Bruneel et al., 2012). By facilitating access to networks, new start-ups could overcome resource scarcity. Lack of experienced management teams, specific capabilities and financial resources impedes the development and subsequent growth of start-up companies.

The later model of the incubator, known as an accelerator, adapted the mechanism of business incubators by providing fixed duration support (three to six months) with intensive education,

mentoring support and access to investors and start-up ecosystems (Miller and Bound, 2011; Clarysee et al., 2015; Cohen et al., 2019). With their limited-time support, accelerator involves start-ups at the specific development stage rather than nurturing overall venture creation. The more specific objective of the accelerator is to accelerate business growth. The investigation of Pauwels et al. (2016) found that the distinction from incubators is the entry selection process, which is highly competitive with a well-defined set of admission criteria, such as start-ups with a proven business model. This is a consequence of the limited number of start-ups per batch and sometimes an offer funding to support the start-ups. This model is usually driven by investors, venture capital or corporate funding.

Y-Combinator is the most well-known and the first accelerator of this type. It was established by the experienced entrepreneurs. Even though there are many claims of successful fundraising from accelerator graduates, their efficacy in increasing start-ups' survival and success rates is unproven. One criticism is that they have a selection bias as a result of their highly selective criteria for accepting 'the winner' to the program. It could be argued that the nascent entrepreneurs or underperforming teams that require assistance are not accepted. The mechanism employed in accelerator are found to focus on intensive skill training through business idea validation following fast experimental loops (Dempwolf et al., 2014). However, the extent to which these methods are integrated into the incubation process to improve new entrepreneurs' chances of survival remains underexplored.

1.1.2 The importance of customised support

The start-up Genome report (2021) found, from an investigation of 100 emerging ecosystems, that the start-up success rate as measured by the number of exits remains unsatisfactory. According to the report, the countries ranked below 50, for example Vietnam, Kenya, Greece, South Africa, some cities in China must improve their start-up performance in market reach and talents. The survival rate of start-ups tends to remain relatively low compared to the increasing number of business incubators. For example, the NESTA report (Bone et al., 2017) reveal that the number of incubators in the UK is increased by 50% after 2011. Incomplete data from the National Business Innovation Association reveal that there are more than 7,000 business incubators and accelerators around the world. However, such rapidly increasing

number of incubators, supporting an increasing number of new entrepreneurs has achieved little or no increase in overall start-up survival rates (Muriithi et al., 2018).

Hence, we are not sure if current incubation models are, or are not, effective (Schwartz, 2012; Ratinho, Harms, and Groen, 2010) and to what extent these measures reflect the quality/effectiveness of the start-up support provided by incubators. While research studies such as Şehitoğlu and Özdemir (2013) demonstrated that start-ups in incubators perform significantly better than start-ups that do not join an incubator, Schwartz, (2012) found no difference in long-term success rates between incubated and non-incubated start-ups. Ratinho, Harms, and Groen (2010) surveyed incubated start-ups in six European countries to ascertain the types of business support available to assist start-ups in overcoming start-up development obstacles. Their findings conclude that incubators cannot competently assist their incubatees with developmental issues.

Some studies (van Weele et al., 2017; Lai and Lin, 2015; Bruneel et al., 2012) claim that incubators do not know how to identify the right assistance to a particular start-up team, resulting in a mismatch between the incubator's support and the real needs of the start-ups. Many incubators provide cohort-based support, in which batches of start-ups received the same support at the same time during their incubation journey. This may be a key factor in poor long-term survival rates of start-ups. It is self-evident that different start-ups have specific needs and resource gaps. The entrepreneurs' needs may be influenced by various factors, including their business's stage of development, industry, team experience, team skills, and team dynamic (Vanderstraeten et al., 2016; van Weele et al., 2019). Additionally, start-ups are comprised of multiple individuals with distinct motives and skills; thus, the support requirements for each team are more diverse (Diakanastasi et al., 2018).

For this reason, a one-size-fits-all approach may not be the most appropriate strategy (Mrkajic, 2017; Mas-Verdu et al., 2014; Monsson and Jørgensen, 2014; Weele et al., 2016) for actual start-ups though it can make the incubator numbers and success measures look good. There is a more additional personal mentoring mechanism which could help address these concerns. Many incubators also provide access to a network of mentors. However, it was discovered

through this study's interview findings that incubators lack a systematic process and framework to allow matchmaking between entrepreneurial teams and mentors. Thus, the quality of guidance provided by incubator staff members and external mentors may be inconsistent, depending on an individual's judgement. While many incubators promise customised support to their cohort, in practice, due to a lack of expert resources, these are often standard courses.

One way to increase incubator support effectiveness is to provide the right intervention at the right stage to the specific needs of a start-ups. Many research studies suggested that providing customised support could potentially increase the start-up survival success rate of business incubators because it addresses the challenge of distinct needs among start-up teams. (Peter et al., 2004; Mas-Verdu et al., 2014; Monsson et al., 2016; Pauwels et al., 2016; Mrkajic, 2017; Klaasa et al., 2019; Vanderstraeten et al., 2016). Two key areas emerged through research to identify the specific needs from start-ups and subsequently enabled customised support strategy:

- The stage of business development (Lai and Lin, 2015; Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017; Livieratos and Siemos, 2020).
- Entrepreneurial characteristics (van Weele et al., 2019; Monsson and Jørgensen, 2014).

1.1.2.1 Customised support based on start-up development stages

Key studies (Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017; McAdam and McAdam, 2008) identified that the stage of development of the start-up is critical for developing the support strategy because it serves as a road map for a start-ups journey. This allows the incubator to evaluate the critical activities and challenges that start-ups may face, in order to design the range of supports available to their incubatees. Research studies (Lai and Lin, 2015; Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017) do not use a commonly agreed development stages framework, for supporting a customised incubation model. Lai and Lin (2015) suggest general support topics in particular for start-ups who have been in incubators for more than years. Mrkajic (2017), Monsson and Jørgensen (2014) also discussed the specific development stage in general terms. Hence, the methodology they used to classify the start-up development stages cannot be easily replicated. Klaasa et al. (2019) based their proposed

models on Salamzadeh and Kawamorita Kesim's (2015) development stage. Their model consists of three stages, as shown in Figure 1.1.

- Bootstrapping stage: this stage is characterised by idea initiation
- Seed stage: this stage is characterised by prototype development and market entry.
- Creation stage: this stage is characterised by generating more revenues and growth.

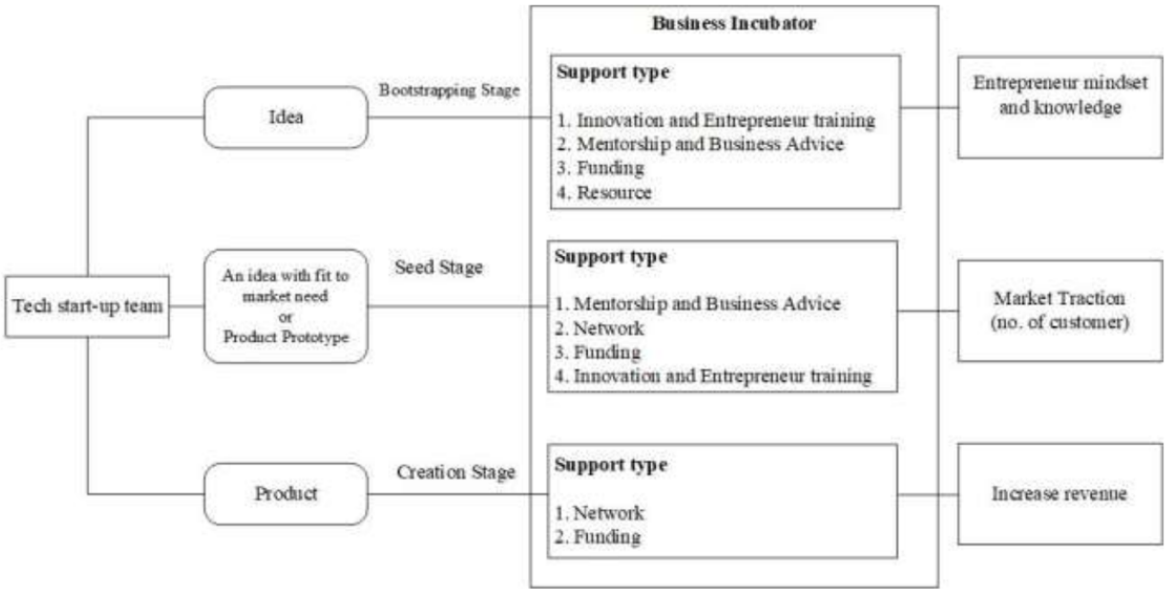

Figure 1.1: Business incubation model for each stage of a start-up (Klaasa et al., 2019)

Their recommendations can form a consistent basis for business incubators to address an entrepreneurs' heterogeneous needs at the different development stages:

- Nascent entrepreneurs and/or start-ups with an initial idea require infrastructure, human resources, and technology to overcome resource scarcity challenges. More importantly, they need business capability and entrepreneurial mindset development through training.
- Start-up with product adoption or later-stage entrepreneurs require market reach development, project management capabilities such as business planning, financial planning, and brand development strategy.

Additionally, a more recent empirical study by Livieratos and Siemos (2020) proposed a three-stage model (Figure 1.2). The model was derived from the real practices of the business accelerator of the National and Kapodistrian University of Athens. Unlike the model of Klaasa et al. (2019), Livieratos and Siemos's (2020) model examines the processes and deliverable that accelerator offers to their start-ups and adds to other studies in terms of identified critical activities through which incubators can diagnose the current status and guide start-ups. This was however derived from a single case study; thus, further empirical studies are required for model validation.

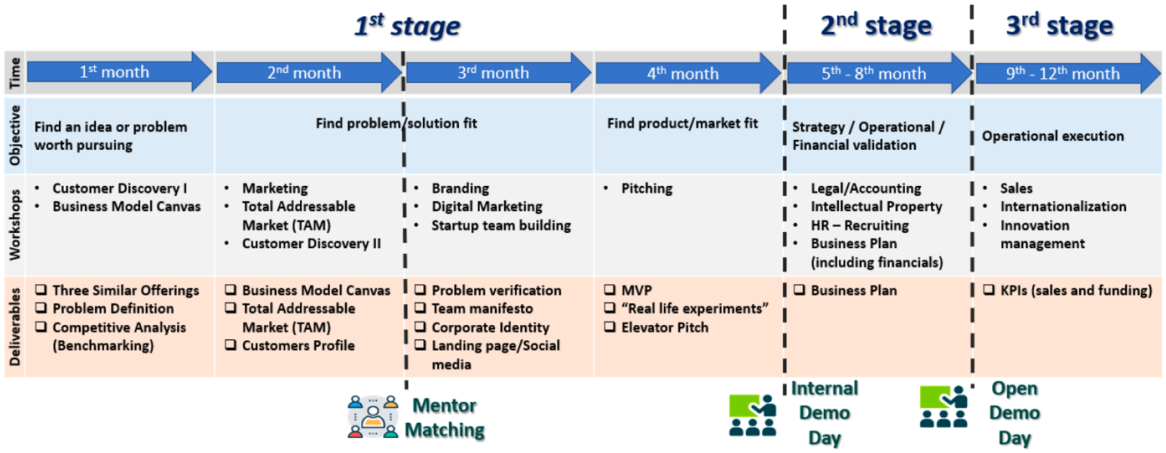

Figure 1.2: The multistage accelerator program (Livieratos and Siemos, 2020)

Though the stage of development informs the classification of support needs that incubators should prioritise, evaluating start-ups' needs based on their development stage alone can be insufficient to tailor their actual necessary support. The stages of development used in their studies neglect the iterative nature of start-up development. Also, the prominent start-up development methodologies such as Lean Start-up of Ries (2009), Customer Development Model of Blank and Dorf (2013), and Design Thinking were not incorporated into their investigation. Thus, there seems to be a key limitation with the current studies on customised support that this study aims to address. To design the customised support strategy, the critical activities during the entrepreneurial journey must be clearly understood and identified to align with best practice start-up development methods.

1.1.2.1 Customised support based on characteristics of start-up

Another research thread suggests that the characteristics of the founding team drive start-up performance. Van Weele et al. (2019), Monsson and Jørgensen (2014), and Mas-Verdu et al. (2015) investigate the heterogeneous needs of entrepreneurs and suggest incubators customise support based on the *characteristics of entrepreneurs*. Monsson and Jørgensen (2014) suggest assessing the characteristics of start-up founders and teams during the evaluation processes. While they consider a variety of snapshot characteristics in their classification, they do not accurately reflect the actual need as the weightings for the needed characteristics change during the journey. Their findings identify the following characteristics that influence the support needs for start-ups:

- Commitment to the business, whether full-time or part-time
- Employee and self-payment
- Effectual logic
- Industry experience
- Start-up experience
- Motivation in running the business
- Entrepreneurial activities such as Business plan preparation, hire employees
- Business sizes
- Business sectors

These prior research studies are primarily orientated from the perspective of the start-ups and focus on how they perceived the support value. It could be argued that it is inappropriate to consider them only from the perspective of start-ups, as entrepreneurs may be unaware of what they require to improve their performance. The investigation of Van Weele et al. (2017) explored the difference between an incubator's observation of start-up needs, and the need identified by entrepreneurs themselves. This work shows a need to investigate the critical factors that affect a start-up needs from an incubators' perspective, to assist in resource management at incubators. Shortage of skilled resource is a common feature among incubators around the world.

1.1.3 The importance of start-up team development factor

Many prior studies such as Mrkajic (2017), Lai and Lin (2015), Klaasa et al. (2019), Mahmood et al. (2017) suggested that incubator should focus on start-up capability development as this significantly impacts on the firm's growth. Particularly, early-stage entrepreneurs require business capability development via training, as they frequently lack business skills. Other research studies (Schjoedt and Kraus, 2009; Diakanastasi et al., 2018) suggest that the determinants of entrepreneurial team performance depend on both internal team factors and the external environment. Start-ups have to search for a working business model under the condition of extreme uncertainty (Ries, 2009; Blank and Dorf, 2013). However, it is arguable that this depends on how the team interprets and manages external factors internally (Schjoedt and Kraus, 2009).

For a start-up to be functionally competent, it can maximise heterogeneity of skills through effective collaboration, either internally or externally, to carry out key activities in the development journey (Cantu et al., 2018). Diakanastasi et al. (2018) investigated the venture creation process of a start-up team and suggested that a start-up must acquire the necessary skills and maintain the team collaboration as an unbalance in these factors can lead to team collapse in the business development stage. Their findings are that the factors affecting team performance vary according to the business developmental stage. Geibel and Manickam (2016) analysed the critical factors affecting the success of start-ups in USA and Germany. Their investigations were that the start-ups need to build strong founding teams with complimentary skills and work cultures. However, as discussed in Section 1.1.2, existing customised support guiding frameworks were proposed based on characteristics of entrepreneurs and the start-up development stage, rather than the skills and start-up team's effectiveness.

The literature studies on skills and team effectiveness are mostly in a different research domain, though the findings from recent studies that examine the factors affecting start-up performance find that both factors contribute to start-up survival. For example, the insights from interviewing with the top accelerators such as TechStars, Capital factory, Lunchbox digital, conducted by Hoffman and Radojevich-Kelly (2012), reveals that the obstacles to the success of start-ups are related to a misunderstanding of the target market, lack of the necessary skills

and knowledge and an unwillingness to adapt their idea to match the market need. Start-ups may be unaware of critical activities and requirements at their current stage of progress, leading to a higher chance of failure. There is value in combining research from the two research streams.

1.1.3.1 Skill

Entrepreneurs require various skills to conduct activities at a high level of quality in new venture development. For example, Scaringella's (2017) study suggests that a start-up requires strategic thinking skills to evaluate customer feedback and resource management. The comprehensive literature review of Thom (2016) found that a lack of skills is one of the major reasons for business failure. Vliamos and Tzeremes (2011) conducted questionnaires with start-ups to identify the factors influencing the entrepreneurial process and found that skills significantly affect entrepreneur behaviour and the venture creation process. Additionally, Kunene's (2008) study found that businesses that survive more than three years receive a higher amount of significant critical skills training than a less successful one.

Though there are exhaustive literature studies on the crucial business skills for entrepreneurs (Thom, 2016; Hatthakijphong and Ting, 2019; de Wolf and Schoorlemmer, 2007; Abdullah and Hadi, 2018), the empirical evidence regarding the effect of critical skills on the entrepreneurial process is limited (Chell, 2013), particularly from the perspectives of incubator specialists. Formulating a link between theories and complex reality is the ultimate challenge in this context, particularly the reality of incubators, who engage with both high- and low-performing teams; and could identify the factors that differentiate them and influence the team's performance. Sullivan (2000), Kunene (2008), and Chell (2013) suggested that entrepreneurs require specific skills at a different stage of the business development journey, though only a few of studies have attempted to empirically investigate the critical skills at different business stages, particularly from the perspective of business incubators. This leads a major trait for this research to establish a framework in regulating critical skills required at various stages.

1.1.3.2 Team effectiveness

With a collection of required skills, start-ups teams then need to work as a team to exchange information, brainstorm ideas, and take responsibility for different aspects of the start-up structure and operations. Steward (2021) shows that start-up teams in the USA outperformed solopreneurs by 163% in the first round of fundraising. In order to successfully launch a business, start-up teams must effectively collaborate towards a common goal, and teamwork is an essential factor driving business innovation (Pearch and Ensley, 2004).

Many research studies have identified that lack of collaboration, improper leadership and different motivations could lead to the team collapse (Diakanastasi et al., 2018). However, prominent team effectiveness models such as Salas et al. (2005) and Hoegl and Gemuenden (2001) tends to be overlooked in the research studies of team dynamics in entrepreneurship and venture development. In the study of Diakanastasi et al. (2018), they identified the impact of team effectiveness without using team effectiveness models. Though the factors considered are similar to those suggested by the team effectiveness model of Salas et al. (2005), other factors such as team monitoring and feedback are not considered in their study. There may be other team effectiveness factors influencing the success of venture development that were not identified in the research studies. Also, there are research gaps in using team effectiveness models to investigate the factors influencing the venture development process.

From the review, the author concludes that start-ups need to acquire the necessary skills and ensure their heterogeneity in human capital in order to be competent in undertaking the critical activities during their entrepreneurial journey. Also, it is crucial to maintain team homogeneity to function together effectively (Schjoedt and Kraus, 2009).

Understanding the current status of the team, the quality of interaction and the collaboration within the team (Hoegl and Gemuenden, 2001) can be critical for effective incubation support in developing a winning start-up team. This study proposes that a business incubator needs to prioritise entrepreneurial team development and identify what skills and team effectiveness factors are crucial at which stage, in order to better align the support strategy to support start-up progress to the next development stage in the overall journey. This study proposes a

framework for addressing the issue of creating an incubator support strategy in order to create a better tailored support strategy. For incubators, better support strategies may increase the success rate of start-ups and thus support economic development.

1.2 Motivation for the study

This section discusses the primary reasons for conducting this research, including the author's personal motivation and the knowledge gaps in the existing body of knowledge that this study will address.

1.2.1 Personal motivation

The author was motivated to conduct this research study for two main reasons. Firstly, the researcher has experience attempting to establish new businesses prior to pursuing the research, and thus had good insight on the start-up journey and its skill requirements. Many obstacles arose during the entrepreneurial journey of the author. The author discovered that it is not as straightforward as recounted by successful start-up business owners, even more so in this intense competition era. The chance to access business incubation programs is limited by intense start-up competition due to the limited resources and capacity of local incubators. The number of incubators in Thailand was also limited at that time. Most business incubators select start-ups using the "pick a winner" strategy, which is very challenging for entrepreneurs, especially those who start from an idea. The author was accepted into one of the business incubation programs; however, it was not a good experience due to the fact that the team did not get the proper support. Also, the author did not know what "I did not know" regarding start-up development.

The second reason was that subsequent work experience by the author is to work in Thailand's business incubators. The Thai entrepreneurial ecosystem has presented a shift of incubation mechanism due to localised contextual changes. This has intrigued the author to pursue this study to identify how local entrepreneurial ecosystem context may change the specific need from start-up teams, and in turn, how local incubators should react. More importantly, can this localisation be generalised in order guide incubators to respond to local context.

1.2.2 Research gap: shortage of research studies in customised support framework

While the role of business incubators and incubation processes in supporting start-ups are well understood (McAdam and McAdam, 2006; Bruneel et al., 2012; Ratinho, Harms, and Groen, 2010), developing a customised support framework for business incubators has received much less attention in the existing research studies (Van Weele et al., 2019). There is a growing need for a guiding framework for both practical and theoretical reasons. Practically, the framework can help improve the quality and reduce the inconsistency of customised support, in the hope of improving the success rate of both incubators and start-ups they support. It should guide how incubators can prioritise and align their support strategy to achieve key milestones. Theoretically, there is a need for researching and understanding an incubator customised support framework driven by the start-up team development perspective. This is a fairly accepted premise in the start-up investment industry: fund the people and not the idea. The following summarises the main limitations in the existing literature on incubator customised support for start-up team development that this study seeks to address:

(1) A single dimension and discrete assessment of start-up need

From the discussion in Section 1.1.2, previous studies (Lai and Lin, 2015; Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017) proposed a customised support strategy based on single dimensions. The majority of studies identified that the stage of development is critical for developing the support strategy. It serves as a road map for start-ups, allowing the incubator to understand the challenges and critical activities that start-ups need to address to be able to design the range of supports their incubatees need (Beverland and Lockshin, 2001; Hoy, 2006; McAdam and McAdam, 2008; Klaasa et al., 2019). Others such as Van Weele et al. (2019), Monsson and Jørgensen, and Mas-Verdu et al. (2014) investigated the heterogeneous needs of entrepreneurs and suggest that incubators customise support based on the characteristics of entrepreneur team such as start-up experience, motivation in running the business, knowledge of the business sectors.

The concept of providing customised support is based on assessing snapshot characteristics of start-ups such as business development stage, entrepreneurial logic and entrepreneurial

experience during the screening and monitoring process in order to tailor to start-ups' needs (Monsson and Jørgensen, 2014). However, evaluating a start-ups' needs based on either their development stage or entrepreneurial team characteristics alone without considering the varying needed characteristics during the journey may be insufficient. A start-ups journey is undertaken in a complex and unpredictable environment, team members may leave or join, new competitors may arise. Without considering these variations and their impact on the required skills and processes along the entrepreneurial journey may lead to a false customised support strategy by incubators.

(2) Start-up development processes in the incubators.

Discussed in Section 1.1.2, the start-up stage of development is considered a critical factor influencing customised support frameworks (Lai and Lin, 2015; Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017; McAdam and McAdam, 2008) because each stage guides the incubators in identifying specific milestones and processes that correlate with the start-ups' growing ability (van Weele et al., 2017). However, prominent start-up development methodologies such as the Lean Start-up (Ries, 2009), the Customer Development Model of Blank and Dorf (2013), and the Design Thinking (Plattner et al., 2009) are usually not used to guide the assessment and investigation of incubator customised support. These methods and concepts are suggested by many thought leaders in the start-up community and have received much attention in academia (Silva et al., 2020). An empirical investigation by Livieratos and Siemos (2020) revealed that accelerators can employ these methodologies, and they suggested further validation as their conclusions derive from a single case study. Thus, there is some support to incorporate these at the foundation of an incubator customised support framework, as attempted in this research. These methodologies suggest and incorporate milestones that would allow incubators to better tailor their support. More precisely focused on individual start-up needs in a more resource efficient way – better identifying which start-up needs what support, to develop what skills, at what stage of their journey.

(3) Lack of the synthesis between customised support, skill and team effectiveness models.

From the discussions in section 1.1.3, lack of skills and poor team management are found to be critical reasons for start-up failure. Many research studies have been conducted to identify the crucial skills for entrepreneurs, though prominent team effectiveness models such as Salas et al. (2005) and Hoegl and Gemuenden (2001) tend to be overlooked in the research studies on entrepreneurial team dynamics and venture development. This suggests an avenue to synthesise learning from both literature domains to enhance the support mechanisms of business incubators. Incubators can play a critical role in improving team capabilities (Bergek and Normann, 2008; Hackett and Dilt, 2004; Costa-David, Malan and Lalkaka, 2002).

More recent studies (van Weele et al., 2017; Lai and Lin, 2015; Livieratos and Siemos, 2020) suggest incubators provide customised support to increase their effectiveness and start-up success rates. Synthesising team development factors (skills and team effectiveness) into a guide on tailored support will allow the incubators to evaluate the cognitive, affective and behavioural state of the team, as well as the quality of interaction and collaboration within the team (Hoegl and Gemuenden, 2001). Once benchmarked these can be improved through training (Chell, 2013; Smith, 2006).

(4) Limited investigation of the variation in significance of the skills and team effectiveness factor across different development stages

Even though the start-up stage of development is a critical factor affecting the heterogenous skill needs of the start-up team, the research studies investigating their impact variation at different stages of the business development process have received less attention. Sullivan (2000), Kunene (2008), and Chell (2013) suggested that entrepreneurs need specific skills at different stages of business development, but only a few studies have attempted to empirically investigate the critical skills at different business stages, particularly from the perspective of business incubators. Diakanastasi et al. (2018) suggest investigating how team performance factors vary according to developmental stage. Additionally, as discussed in section 1.1.3, there are research gaps in using team effectiveness models to investigate the factors influencing the venture development process and how their significance varies according to the start-up

stage of achievement. Identifying these factors could help incubators prioritise support and better allocate resources to start-ups in need.

(5) Research conducted from the perspective of start-ups rather than incubators.

The prior research studies in incubator customised support framework (Van Weele et al., 2019; Monsson and Jørgensen, 2014; Mas-Verdu et al., 2015), skills (Hatthakijphong and Ting, 2019; de Wolf and Schoorlemmer, 2007; Kunene, 2008; Abdullah and Hadi, 2018), team effectiveness (Strode, 2015; Weimar et al., 2013; Salas et al., 2005) are primarily from the viewpoint of start-ups to identify what start-up needs, perceived benefit of support or what could improve an incubators' offering. However, start-ups may be unaware of what they require to improve their performance. Van Weele et al. (2017) and Bone et al. (2019) found that the need identified by entrepreneurs are distinct from the incubator evaluation. Thus, investigating from an incubator perspective, who have engaged with high and low performing teams, may contribute new insights to the literature on how incubators may provide better support.

1.3 Research questions and objectives

This research study addresses the gaps discussed in Section 1.2.2. Thus, the overarching research question of this study is set as:

How can the customised support service be designed for start-up business incubator?

The main objective of this study is to develop a conceptual framework for guiding customised support for start-ups in Business Incubators. This objective was broken down into four sub-objectives, as follows:

(1) To evaluate a representative selection of start-up development methodologies that are both recognised by the research community and adopted by business incubators with proven impact.

(2) To critically review how key constructs have affected a start-ups performance along their development journey, in particular essential skills and team effectiveness factors in the literature.
(3) To contrast literature with practice, and to inform the design of a conceptual framework to assess and guide customised support mechanisms for business incubators.
(4) To empirically assess, iteratively develop and validate the conceptual framework designed.

1.4 Research methodology

The study employs qualitative research, applying an abductive approach: conducting real-life observations supported by interviews with incubators across international locations. The purpose was to derive a customised framework to support start-ups from the viewpoint of the incubators through a process of theory matching. The empirical data collection to support this process was divided into two phases:

- The first data collection investigated different support practices to guide the derivation and refinement of an incubator customised support framework based on real practice. This augments and validates a framework synthesised from the literature review described in Chapters Two and Three. The primary data was collected from thirteen business incubators with different types of sponsorship support and international locations. As discussed in section 1.1.1, this study uses the broad term of business incubators to cover different types of actual business incubation models; thus, it allows the research to gain insights from the various aspects that contribute to the business incubation landscape. The outcome of this phase was a refined conceptual framework. The author labeled this as the Incubator Customised Support (ICS) framework.
- The second phase of data collection was conducted through interviews with sixteen incubators in Thailand in order to validate the ICS framework from international contexts. The purpose of this phase is to assess whether the framework derived from international contexts is applicable to Thai incubator practices and suggest a potential framework adaptation to local economic and social environments.

1.5 The contribution of the study

This study makes contributions to academic knowledge and the design of real-world incubator start-up support practices. This study proposes a four-stage framework that covers an entrepreneurial journey derived from a review of prominent and current start-up development methodologies, empirically test and refined through the investigation of 29 business incubators across international locations.

This research contributes to the theory by incorporating resource-based view theory into start-up development methodology. This application of the resource-based view perspective emphasises how incubators could prioritise their support to help start-ups gain a competitive advantage in order to achieve critical milestones at each stage of start-up development. Underpinned by the resource-based view, not all resources are sources of competitive advantage. The four-stage framework enables incubators to analyse the resources and skills needs, guide critical activities and provide the right support to address start-ups' challenges.

Also, this study makes contributions to the legitimacy theory by offering a new perspective and framework of how incubators could help new ventures establish legitimacy through the skills and team development to acquire more crucial resources from other stakeholders. Through the use of this framework, it helps incubators identify the resources gap to improve their start-up capability in achieving the goal; thus, the legitimacy of start-ups is enhanced by increasing the confidence of stakeholders.

The study extends the contribution to theory by introducing the skill and team effectiveness models to address the current gap in methods for assessing start-up support need for incubator offering or wanting to offer a customised support strategy. Combining these two bodies of literature enhances the tools for assessing the current state of a start-up. The application of skills and team effectiveness constructs expands the research focus into an analysis of the crucial skills and team effectiveness factors that start-ups are required to achieve in order to proceed to the next development stage. These also serve as theoretical and analytical foundations for achieving the research objectives.

This research further explores the varying significance of each factor across the start-up development stage from the perspectives of incubators. The findings reveal the variation of the importance of these factors over four stages of business development.

Finally, this study contributes to practice as the derived framework guides incubators on how to assess the degree of team capability and configure the startup support for start-ups using team development factors for each development stage. It can also serve as part of a start-up recruitment method when evaluating applications from start-ups into their program. This study makes managerial recommendations to incubator practitioners and policymakers, particularly for Thailand, regarding the key constructs to consider in designing the support strategy for enhanced start-up development.

1.6 Structure of thesis

This thesis is divided into seven chapters. The structure of this thesis is presented in Figure 1.3. The remaining chapters of this thesis are

Chapter Two evaluates a representative selection of start-up development methodologies recognised by the research community and discusses their adoption impact by business incubators in order to derive the stage of start-up development underpinned the incubator customised support framework.

Chapter Three discusses the findings from a review of literature, regarding crucial skills and factors of team effectiveness. The chapter investigates the impact of these constructs on start-up performance along their entrepreneurial journey, which business incubators should assess and promote during their business incubation program.

Chapter Four explains and justifies the selected research approach of the study toward collecting, analysing, and interpreting social phenomena. It discussed how the framework was derived and validated.

Chapter Five discusses the interview analysis of thirteen business incubators across international locations to test and refine the conceptual framework derived from the literature. It explains and compares existing start-up methodologies employed in the incubator sample in this study to augment a framework for business incubators based on real practice. The crucial team development factors identified by incubators are determined and synthesised to derive the incubator customised support framework to guides how business incubators can assess the needs of start-ups to make business progress at key stages and provide timely customised support to them.

Chapter Six discusses the findings of ICS framework validation and how the international ICS framework needs to be modified to suit different start-up ecosystem. Thai context is chosen to investigate the generalisation of the derived framework from global context. The chapter then discusses the key factors that incubator practitioners and policymakers should take a particular consideration when designing the support for start-up development.

Chapter Seven concludes the achievements of this study in relation to the research question and the contributions of the study. Finally, this chapter discusses the study's limitations and makes recommendations for future research.

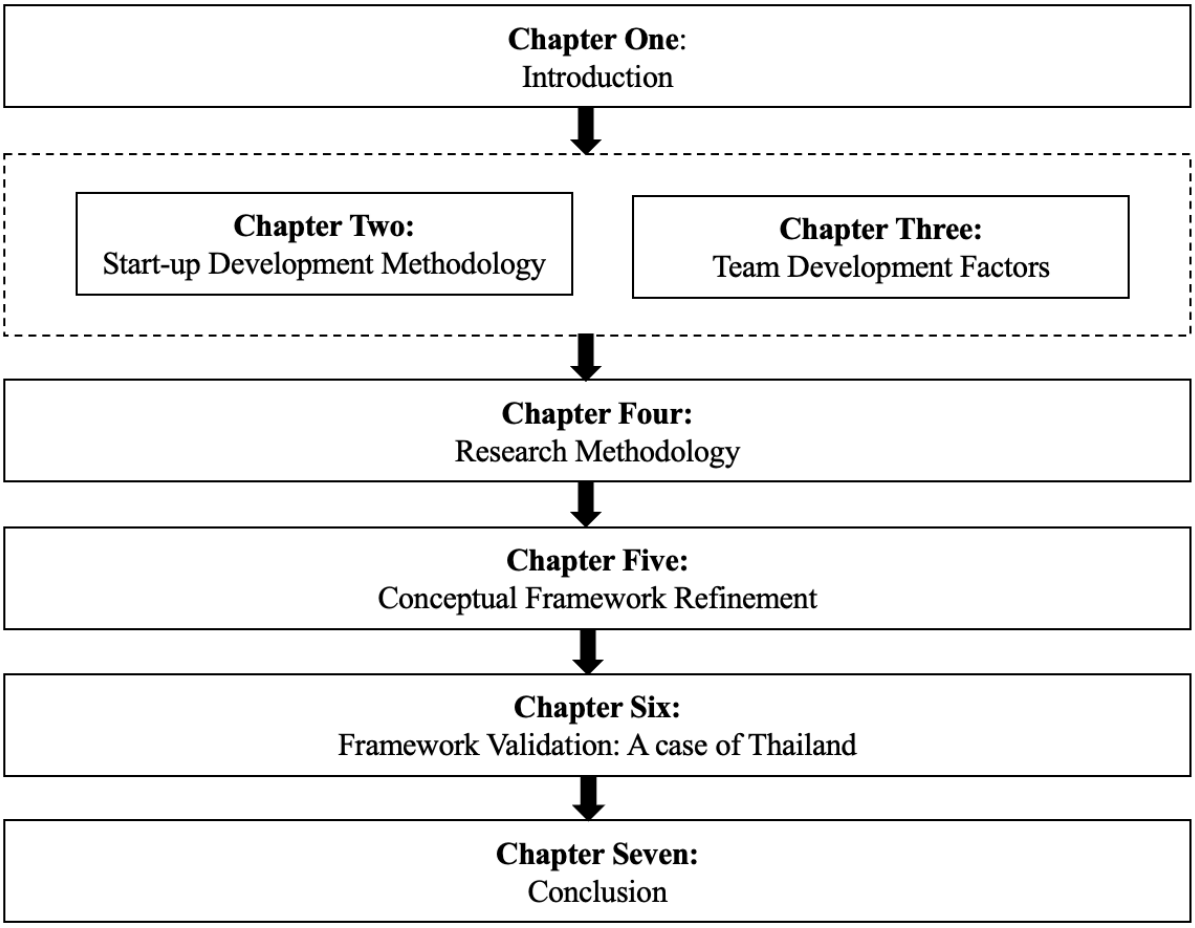

Figure 1.3: Structure of the thesis

Chapter Two: Start-up Development Methodology

2.0 Introduction

An intriguing finding of why so many start-ups fail relates to the entrepreneurs' management of their idea and business throughout the development process. Hoffman and Radojevich-Kelly (2012) developed insights from interviews with leading accelerators such as TechStars, Capital Factory, and Digital Lunchbox that revealed the main barriers to start-up success are related to development process, challenges such as misunderstanding the target market, the inexperience of the entrepreneurial team, and an unwillingness to pivot. Marmer et al. (2012) studied high growth start-ups and found that the most common reason for a start-up's underperformance is a premature attempt at scaling. These insights reveal a lack of experience in the founders which could be addressed by suitable training and mentoring. To speed up progress and increase success rates, business incubators need to identify the start-ups “experience” need, as well as the necessary training to address these key needs.

As discussed in Section 1.1.2, the stage of business development is the critical factor in identifying start-ups' needs. This chapter reviews the relevant literature through an investigation of recent research studies related to start-up development methodologies that underpin the incubation process. These reviews support a framework of the key stages for a successful start-up business and the development of a pre-defined data coding for primary data collection. The resulting objectives are discussed in three sections.

- Section 2.1 investigates the issues in the development process which may cause start-up failure.
- Section 2.2 reviews, critiques and compares prominent start-up development concepts and their methodologies. The defined processes and the measure of success that start-ups have to achieve at each stage are reviewed. The findings from the comparison lay the foundation for the conceptual framework developed in this research.
- Section 2.3 justifies and proposes the conceptual framework developed from the literature review.

2.1 Flaws in business development process

A number of research studies (Giardino et al., 2015; Scargingella, 2017; Krishna et al., 2016; Bocken, 2015) have been conducted to investigate why so many start-ups fail. From these studies, one of the key reasons for start-up failure is a lack of critical business skills and knowledge in the founders or core team. Research studies that investigate which skills are crucial for start-up success are discussed in Chapter Three. Another important issue, identified by scholars, are failings in the business development process, as in research studies by Hoffman and Radojevich-Kelly (2012), Ries (2009) and Blank and Dorf (2013).

This study draws on the resource-based view theory to identify critical resources for start-ups in the development process. Resource-based view offers an advantage in analysing and managing tangible and intangible resources of the firm to achieve competitive advantages (Barney, 1991; Madhani, 2014). From the resource-based view perspective, incubators can provide resources or accessibility to resources through the incubator's network to help start-ups address the liability of newness (van Weele et al., 2017). Thus, incubators need to understand these business development issues in order to align their support approach with the start-up methodology they employ—these guide incubators in assisting start-ups to overcome hurdles in the development process.

The Start-up Genome Report (Marmer et al., 2012), analysed the data from more than 650 start-ups to identify the start-up decisions that contributes to success. They found that start-ups that follow Lean start-up development, such as proposed by Steve Blank and Eric Ries, achieve higher fundraising and user growth figures. The report found that start-ups that evaluate customer feedback, have tracking metrics, and undertake pivots, have a 7x growth rate compared to companies that do not, and are less likely to attempt scaleup prematurely. From the literature, three key reasons for start-up failures whilst searching for successful business operation were:

(1) Premature scaling

Marmer et al. (2011) analysed 3,200 start-ups and identified that the most common reason for a start-up's underperformance or failure was premature scaling. “Premature” scaling refers to the inconsistency between five dimensions:

1. Customer
2. Product
3. Team
4. Financial
5. Business model

Examples of Premature scaling are:

- Developing a product without testing the problem/solution fit.
- Executing without regular feedback loops.
- Failure to adapt the business model in response to changing market conditions.
- Recruiting specialists on the team before they are needed.

Marmer et al. (2012) suggested that Incubators should assess start-up(s) by the key stage milestones to identify their current state situation and offer resources according to their specific needs. Hence, the incubation methods are required to align with the key milestones in order to help start-ups from premature scaling.

(2) Focusing on a conventional business plan

Ries (2009) and Blank & Dorf (2013) observed that low performance start-ups use inappropriate management models to develop the new businesses. Large organisations and start-ups operate their businesses in distinctly different ways, due to the level of resource available. Large companies typically operate in a known environment and have a large variety of resources available to develop new products or to expand into a new market. For Ries

(2009), a start-up is a small group of people that are searching for a business model in an uncertain environment.

Inherently start-ups are in a dynamic environment, fraught with uncertainty and many unfounded assumptions. Large companies usually benefit from a proven plan based on stable conditions and financial forecasts for at least a year in the future. In contrast, start-ups operate in an unknown environment, where they must discover a successful business model in a large search space with many non-optimal solutions (local maxima in the search space). Honig and Hopp (2016) using data on 1,088 nascent entrepreneurs from the Second Panel Study of Entrepreneurial Dynamic (PSED II) data set found that businesses that initially adopt Lean Start-up practices and pivot their business models are more successful than businesses that "fall in love with a solution". Lean Start-Up itself is a "Plan, Try, Measure, Pivot" circular process.

(3) Adhering to a conventional linear model of product development

Some start-ups may place a greater emphasis on their product development and on how to market the finished product, rather than focusing on understanding the customers true needs. Start-ups who primarily focus on commercialising new products, often adopt the traditional product development model, a sequential, linear process. The development cycle can be quite long before getting customer feedback. Blank and Dorf (2013) refer to the four stages of the product development model as illustrated in Figure 2.1. This traditional product development model is divided into four stages: concept development, product development, alpha/beta testing, and customer launch. This is a product-centric approach and interaction with customers often only occurs in the later stages in the model.

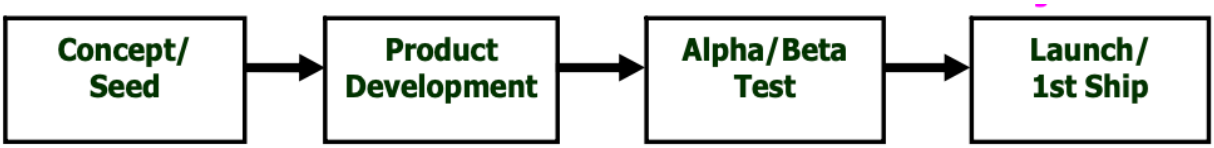

Figure 2.1: Traditional product development model (Blank and Dorf, 2013)

The main purpose of marketing and sales teams is to design and conduct customer development strategies; thus, they often focus on generating revenue after product launch. These traditional processes can result in inappropriate marketing and sales investment to launch and sell a product with an unproven customer need. Blank and Dorf (2013) also suggest that the linear process of a traditional product development roadmap is more suited to an established business in a stable market. Blank and Dorf (2013) argue that the traditional product development approach is flawed in fast changing environments because the model is less flexible and often interpreted differently by sales and marketing teams.

In the start-up environment, where most variables are unknown, it is risky to assume that the founders understand who the customers are, what are the customers' needs, and what solution to build. This critical stage is not easy but is the focus for more customer driven business design approaches underpinned by design thinking methodologies. It is a truism that customers usually do not know what they want, or even know what is possible. Ries (2009) proposed that the development processes should be flexible and allow start-ups to reflect and respond to early feedback when they develop new products or services in uncertain conditions.

Software development teams are often compared to start-ups because both types of teams operate in a similar environment and employ similar development methodologies. Casteren (2017) compared the methodologies employed in software development projects, the waterfall model and agile methods to validate that a linear model may be inappropriate for a project where the requirements are not well defined or understood. This can result in an increase in overhead costs due to the expense of slow iteration. The waterfall model, depicted in Figure 2.2, is a linear development model used in software development projects that is similar to the traditional product development model (Figure 2.1).

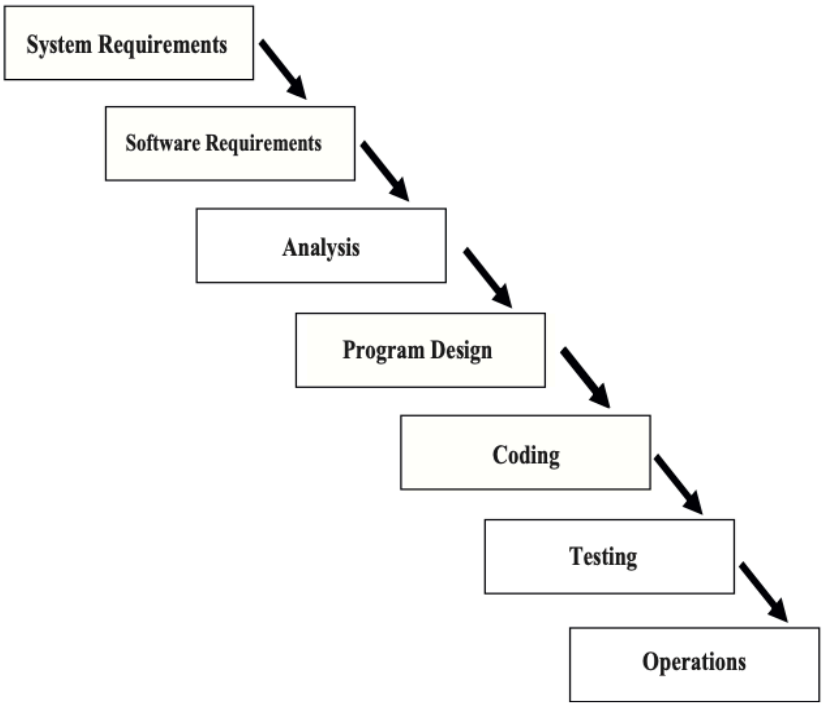

Figure 2.2: Waterfall model (Casteren, 2017)

Software development project, using an agile iterative methodology (see Figure 2.3), are claimed to be more effective. For Flowler and Highsmith (2001), defined an agile manifesto:

- Individuals and Interactions, over Processes and Tools.
- Working software, over comprehensive documentation.
- Customer collaboration, over contract negotiation.
- Responding to change, over following a plan.

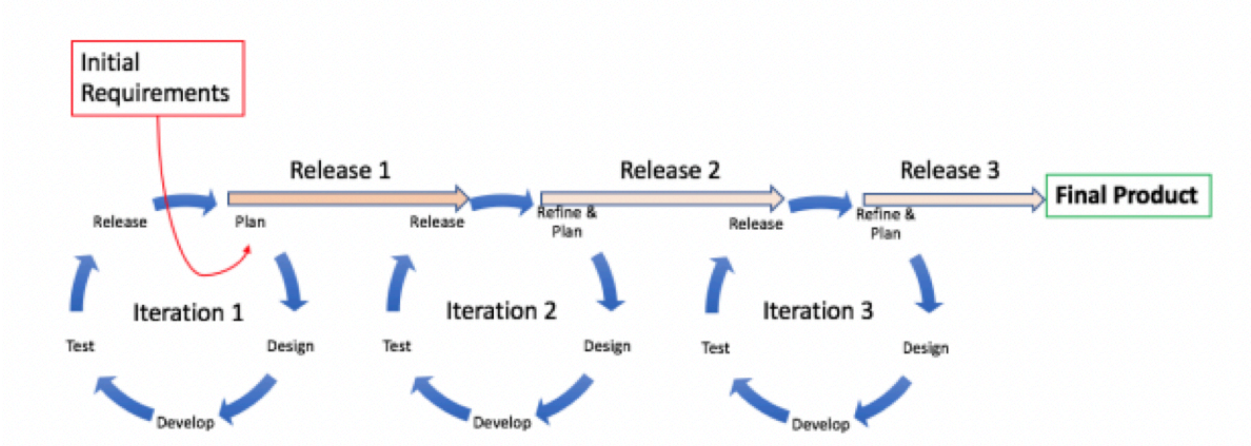

Figure 2.3: Agile Development methodology (Veiga, 2017)

A Standish Group study (2015) reported that software development projects employing agile methodologies achieve more successful outcomes than waterfall approaches. Their findings are supported by survey data from more than 10,000 software projects between 2011 and 2015. Additionally, Mohamed and Darwich (2019) compared and analysed suitable methodologies to develop and implement customer relationship management software. They found that agile is a more appropriate methodology because it creates interaction between the development team and target users to identify requirements and undertake continuous improvement. They claim that it is easier to spot the problems and find solutions throughout the development period, while the waterfall method does not allow this visibility.

In summary, traditional product development is consistent with a product-centric approach, in which the company prioritises developing the best new product over understanding customer needs. This approach can work well in stable environments, with slow technology and societal change. The external input is determined and evaluated at the end of the process, which take time and effort to rectify if there is a flaw. The iterative process of agile methodology benefits start-up development by allowing start-ups to develop an MVP, receive external feedback and make adjustments throughout the development process. It is focused on addressing the main problems that start-ups face – a lack of experience in and of an unknown environment.

The flexibility of the agile methodology is required for developing a business model in a start-up environment where little is known, and everything is uncertain. Start-ups, before they

develop and launch a product, must first create distinct value proposition(s) targeted at the customer segment chosen and that distinguishes them from the competition (Osterwalder et al., 2010; Afuah and Tucci, 2001). Stoppel and Roth (2016) found that a customer-centric approach assists the company in designing a pricing scheme that is more aligned with customer values and builds the relationship between the customer and the company.

These and other flaws in the Business Start-up process that have resulted in poor success rates have driven the development, testing and advocation of a number of new approaches. Underpinned by resource-based view theory, not all the resources are the sources of competitive advantages. Thus, incubators require to prioritise critical activities, clearly identify start-ups' needs, and provide the right support to address start-ups' challenges. The author suggests that elements of these approaches could be synthesised to generate a framework better suited to the complex, interconnected and rapidly changing world that we live in and that start-ups need to survive and thrive in. Section 2.2 reviews recent start-up development principles and methodologies in a comparative study:

- The Customer Development Model
- The Lean Start-up
- The Design Thinking approach

The purpose of the study is to identify commonalities, differences and omissions, an understanding of which could contribute to an enhanced methodology focused on assessing and supporting start-ups from the perspective of an Incubator.

2.2 The review of Start-up development methodologies

Key scholars regarding incubation process models that focus on the business development strategy such as Cater and Jones-Evans (2000), Balan (2002) happened before 2010. These models do not fully address the issues in product development, as discussed in section 2.1. For example, Cater and Jones-Evans (2000) propose five stages of venture creation support:

- Idea formulation
- Opportunity
- Recognition
- Pre-start-up planning & preparation
- Market entry
- Developing network

Their model considers the incubator's activities rather than the needs of the actual entrepreneurial process. The model of Balan (2002) also includes activities, though they mainly focus on the business model and plan development, without considering product testing and pivot. Klaasa et al. (2019) proposed a customised incubation model according to three stages of Salamzadeh and Kawamorita Kesim's (2015) development stage. Their development model mainly relies on fundraising activities rather than venture creation processes.

The more recent studies of Livieratos and Siemos (2020) proposed incubation model aligned with the prominent start-up development processes, Customer Development Model of Blank and Dorf (2013). The model was derived from the real practices of the business accelerator of the National and Kapodistrian University of Athens. Livieratos and Siemos's (2020) model examines the processes and deliverable that accelerator offers to their start-ups and adds to other studies in terms of identified critical activities through which incubators can diagnose the current status and guide start-ups. This was however derived from a single case study; thus, further empirical studies are required for model validation.

Thus, the author's investigation of recent development methodologies suggested by thought leaders in the product/software design and the start-up community, contribute synthesised current thinking to the incubator operations literature.

Firstly, the study investigated the prominent start-up development methodologies that build on key start-up principles (Customer Development, Lean Start-up, Design Thinking) in order to identify the critical activities from the key challenges that start-ups face during business development. By incorporating resource-based view, it enables incubators to prioiritise key

resources for start-ups at each stage of business development. Each approach can offer distinct benefits to Incubators in terms of how to assist start-ups in establishing a sustainable business.

The following subsections are organised around two discussions to compare the three start-up methodologies identified, which are their adoption impact by business incubators and the underlying principles of the methodology with their process models.

2.2.1 Underlying principles of the methodologies

The principle of the Customer Development Model (Blank, 2007), the Lean Start-up (Ries, 2009), and Design Thinking (Patter et al., 2009) approaches are worth comparing to appreciate the distinctions between them as all have influenced incubators and start-up processes. Though these concepts are over 10 years old, their adoption and common usage is much more recent maybe less that 5 years. The three approaches have distinct principles, though they also share underlying concepts, which are discussed later in this section.

Both practical and theoretical considerations underpin the choice of the start-up principle. In practice, these methodologies adopted the agile principle (iterative) that allows start-ups to overcome the flaws in customer understanding. Leading accelerators in Silicon Valley, such as Y Combinator and Google Ventures have incorporated these methodologies into their incubation programs (Miller and Bound, 2011; Marmer et al., 2012). Also, these methods were found to be used in incubation programs in developing and developed countries across the world, such as in Indonesia (Naratama and Windasaari, 2019), Greece (Livieratos and Siemos, 2020) and Sweden (Mansoori et al., 2019).

A comprehensive literature review by Silva et al. (2020) revealed that these three methodologies are growing in popularity and increasingly tested in terms of their impact on new venture development by both scholars and business practitioners. Silva et al.'s (2020) review finds that the number of publications per years pertaining to these three methodologies increased 90% since 2013. The topic has been researched and published in journals from various fields, including entrepreneurship, innovation, business, and management (e.g. Technovation, Small Business Economics, Industrial Marketing Management and

International Journal of Entrepreneurial Behavior & Research). This section begins by introducing and critiquing each principle (Sections 2.2.1.1, 2.2.1.2, and 2.2.1.3), followed by comparing these three principles in Section 2.2.1.4.

2.2.1.1 Lean Start-up principle

Eric Ries (2009) introduced the Lean Start-up methodology, focused on a customer-oriented combination of Lean and Agile methodologies. This approach focuses on applying an experimental, iterative process that encourages start-ups to validate their idea by testing with real customers and partners during the business model development process. The Lean principle originated through a Japanese lean manufacturing philosophy, aiming to eliminate waste throughout the process, and it came with a number of tools and philosophies.

Ries (2009) suggests incorporating a lean concept into start-up business development aimed at minimising the waste associated with the uncertainty in solution development. The Lean Start-up approach aims to reduce the time required for product and business development by encouraging start-ups to develop the minimum viable product (MVP) to get customer feedback through a continuous learning loop called 'Build-Measure-Learn' illustrated in Figure 2.4. A Lean Start-up's objective is to maintain a constant feedback loop with customers throughout the product development cycle. The methodology assists in value proposition development, customer segment identification and channel effectiveness due to its emphasis on an experiment based iterative processes rather than traditional linear business planning.

Accordingly, many start-up methodologies use this principle in their processes. Examples include the Customer Development Model of Blank and Dorf (2013), the Running Lean of Maurya (2012) and Lean Design Thinking of Muller and Thoring (2013).

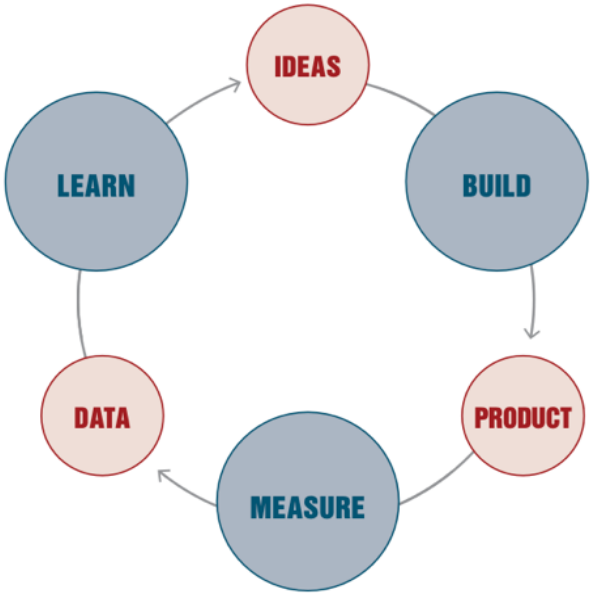

Figure 2.4: Lean start-up principle (Ries, 2009)

2.2.1.2 Customer Development

Steve Blank firstly introduced the Four Steps to the Epiphany (2003) based on his experiences at Silicon Valley and later worked with colleague to extend the model to the Customer Development Model (Blank and Dorf, 2013) to guide start-ups in establishing a scalable business model (See Figure 2.5). This section focuses on the principle of Four Steps to the Epiphany (2003). The latest Customer Development Model is discussed in Section 2.2.2.2.

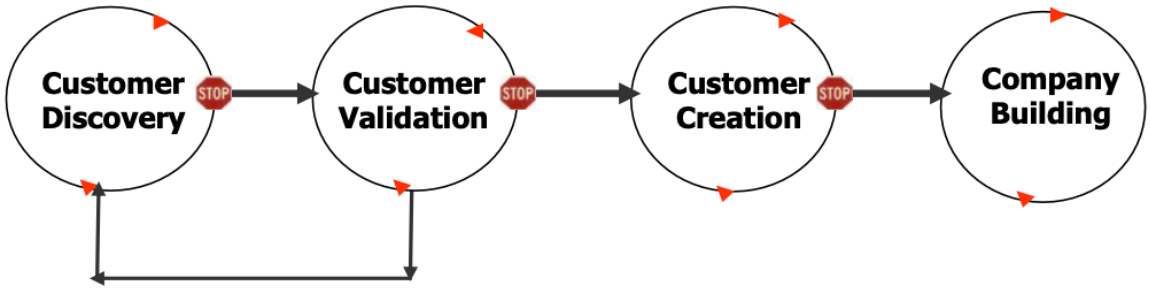

Figure 2.5: The Customer Development Model (Blank, 2007)

Blank and Dorf (2013) claim that the Customer Development Model was developed to be a parallel model for the Product Development model rather than replacing it. As discussed in

Section 2.1, start-ups often focus exclusively on product development; this often results in failure. Some start-ups may employ a product development metric to drive their marketing and sales activities. These traditional processes can result in inappropriate marketing and sales investment to launch and sell a product with an unproven customer need. In line with Maurya (2012), factors like "falling in love with a solution" are cited as the key reason for start-up failure or through a failure to engage with real customers. The Product Development model is focused on bringing a product to market and acquiring the first customers.

Conversely, the Customer Development Model prioritises learning about customers and their problems as early in the development process as possible, before developing a product. The core concepts of the model are based on:

- 'Getting out of the building' to talk to customers and get real insights.
- Test and validate the business model assumption with the potential customers to prove that the market exists for the idea. Their model emphasises the Business Model Canvas of Osterwalder et al. (2009) as a framework to capture assumptions in the customer development process. Start-ups are organisations in search of a repeatable and scalable business model. For Osterwalder et al. (2009), the business model describes "the rationale of how an organisation creates, delivers, and captures value".
- An iterative process ingrained in the model. The Customer Development Model encourages start-ups to develop a solution by incorporating stakeholder feedback in order to determine whether to 'pivot' to a new model if the feedback demonstrates false assumptions after testing.

2.2.1.3 Design Thinking

Design Thinking is the critical concept assisting in developing innovative solutions to existing problem (Plattner et al., 2009). Design Thinking was originally developed in the late 1990s by the design consultancy IDEO (Kelley and Littman, 2001). It was an industrial design methodology that focuses on eliciting better insight on user needs and has been widely used in architecture and in design schools. A comprehensive literature review by Micheli et al. (2019) reveals that the number of published papers regarding Design Thinking has been increasing

100% since 2005 as it has increasingly gained acceptance among academics, practitioners and the start-up community.

Design Thinking was introduced to implement in software development and start-ups. For example, Hildenbrand and Meyer (2012), Lindberg et al. (2011) suggest using Design Thinking in the software development team to encourage more team collaboration and improve idea generation in product development. Mueller and Thoring (2012) encourage Design Thinking at the beginning of the entrepreneurial journey to assist in understanding customers. This methodology can help focus start-up development on real market needs and help overcome the flaws in the development process discussed in Section 2.1.

As illustrated in Figure 2.6, Design Thinking is defined as a series of five crucial steps, each of which may refer to a subsequent execution step. The detailed processes of each step are discussed in Section 2.2.2.3.

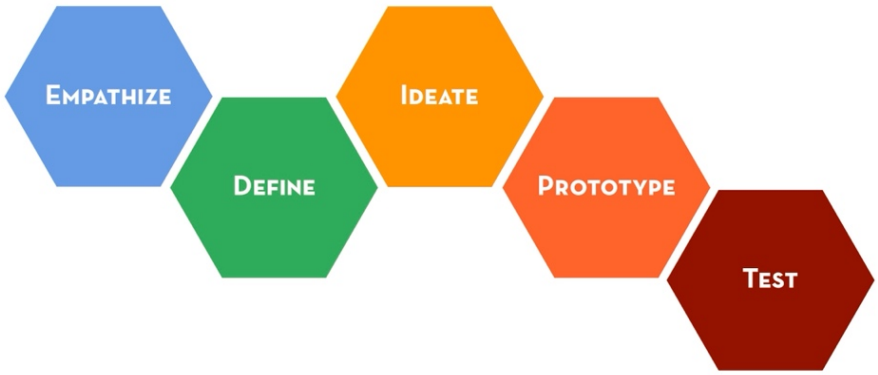

Figure 2.6: Design Thinking approach (Plattner et al., 2009)

There are several approaches of Design Thinking suggested by Brown (2009), Plattner et al. (2009), Stanford Design School (2010), though they share similarities in core concept (Seidel and Fixson, 2013):

- Emphasise a user-focused strategy to develop innovative solutions.
- Conducting ethnography research in order to gain a better understanding of people's actual needs and behaviours (User empathy).
- The use of tools and techniques to capture and identify user's insights gained from ethnography research such as personas, user journey map, brainstorming, prototyping.
- Experimentation in order to gain and test customer feedback on ideas and concept.

Design Thinking is consistent with Lean Start-up in terms of objective of fostering innovation. Both approaches focus on customers or users in order to identify users' need and create appropriate solutions. Similar to the Lean Start-up, Design Thinking employs extensive user research, feedback loops, and iterative cycles.

2.2.1.4 Comparative review of the key principles

This section compares the principles to identify the advantages of each approach, in the context of incubator support, as foundations for the conceptual framework developed in this study. Table 2.1 compares the key characteristics of each approach. This comparison reveals that three principles share the following commonalities:

- Pivot/Iterations: embracing the iterative process.
- User-centric approach: early customer/user engagement to obtain the insights.
- Problem focus, as opposed to a solution focus.
- Experimental, learning.

Table 2.1: A comparison of three principles

Methodology / Characteristics	**Lean Start-up** Ries (2012)	**Customer Development Model** Blank (2007)	**Design Thinking** Plattner et al. (2009)
Goal	Create innovations	To establish a profitable, scalable business	Create innovative solutions
Model	Feedback loop • Build • Measure • Learn *Enter the build loop with an MVP	Process model • Customer discovery • Customer validation • Customer creation • Company building *Start with turning founder's vision into reality	Process model • Empathise • Define • Ideate • Prototype • Test *Start with problem
Experiment	✓	✓	✓
Pivot/Iterations	✓	✓	✓
User-centric approach	✓	✓	✓
Problem focus	✓	✓	✓
MVP/Prototype	✓		✓
Metric-based measurement	✓		
Qualitative research (Interview, observation)		✓	✓
Summary notes of the key concept	• Build-measure-learn loop (Feedback loop) • MVP Early customer engagement	• 'Getting out of the building' • Test and validate the business model assumption • Four steps: Customer discovery, customer validation, customer creation, company building • Iterative process*	• Emphathise by using human-centered core • Tools and techniques to capture and identify user's insights • Prototype • Experimentation

Even though all three approaches share similarity in promoting the iteration process, their sequences are different. Iteration is the core concept of the Lean Start-up and can be embedded into any other sub-process to facilitate the iterative process. The Design Thinking and Customer Development Model allow customer feedback and iterate at the end of each phase. Customer Development captures the iterations and a pivot from critical business assumption through the Business Model Canvas. The pivot in Design Thinking, is mainly in the iteration of the solution.

Concerning adoption for business incubators in practice for supporting start-up development, only the Customer Development Model focuses on the whole business development. The four

steps of the Customer Development Model guide the business development process, starting from customer discovery to company building. An incubator can use appropriately in the incubation process, according to the stage at which the start-up is at. Though Blank (2007) suggest the first step (Customer Discovery) should be concentrated on understanding customer and identifying a problem that customers want to solve, and this is key in subsequent stages, incubators can choose to accept start-up at any stage and focus on down steam business development still. Since the whole process initiates from translating the founder's vision, this may cause flaws in support sequencing for nascent entrepreneurs and inexperienced mentors progress the solutions quickly. This can result in premature scaling, which is one of the main start-up failure reasons (Marmer et al., 2012).

The other two principles (Lean Start-up principle and Design Thinking) were established to create focused and innovative solutions. They share concepts that are not emphasised in the Customer Development Model: Minimal Viable Product (MVP) and/or prototype development to validate a solution idea to address the core problem. The outcome of both approach is the solution(s) that address customers' needs. However, it is arguable that these two concepts are suitable for start-ups at different stages of their entrepreneurial journey. The feedback loop (Build-Measure-Learn) of Lean Start-up begin after start-ups develops an MVP to test with their potential customers.

Design Thinking aids in problem discovery before a pre-required solution or prototype. The production of the generated ideas or actual implementation is not considered in Design Thinking. The prototype is developed and tested later once the core problem is identified. Design Thinking tends to come before the feedback loop (Build-Measure-Learn) of Lean Start-up, though it may have loops within it when evaluating solution ideas. An incubator could consider combining these two processes to assist start-ups in solution development and testing in their entrepreneurial journey. Thus, start-up could benefit from the richness in customer insights from qualitative data from Design Thinking and from the targeted, measurable goals by the quantitative Lean Start-up guidance. These two processes do not emphasise the development of the business model, like the Customer Development Model. Therefore, they can potentially enhance it by combining all three principles to improve the start-up process.

Mueller and Thoring (2012) and Dobrigkeit et al. (2019) also suggested to combine these two principles to help in the innovation development process.

2.2.2 The start-up development methodologies

This section discusses and compares the start-up development methodologies that build on the start-up principles discussed in Section 2.2.1. This section begins by introducing and critiquing each start-up methodology (Sections 2.2.2.1, 2.2.2.2, and 2.2.2.3), followed by a comparison in Section 2.2.2.4 to determine their differences and advantages through the lens of beneficial impacts on business incubators.

2.2.2.1 Running Lean technique

Ash Maurya (2012) proposed Running Lean technique built on Ries's (2009) Build-Measure-Learn loop, MVP development and the Business Model assumption validation suggested by Blank's (2007) principle of Customer Development. From its action of testing possibly risky assumptions, Maura (2012) claimed that start-ups need to have stakeholder empathy and test risky assumptions at each stage of the business development journey. Maurya (2012) classified key three risks domains: product, customer, and market. The weightings for these risks vary according to the development stage of the start-up. Maurya (2012) classified the start-up development into three stages (Figure 2.7).

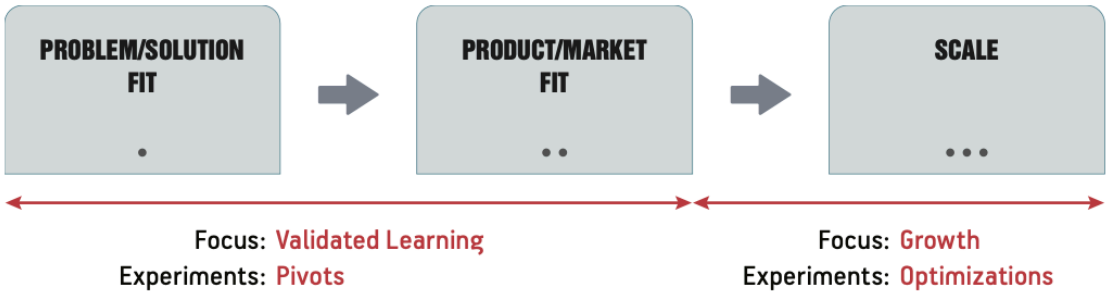

Figure 2.7: Lean start-up methodology as proposed by Maurya (2012)

The first two stages concentrate on validated learning. Start-ups have to go through several develop, test, adapt experiments in order to develop a solution that addresses customers' needs, sufficiently that they would be willing to pay for it. This is where the Running Lean technique

focuses. The final stage recognized that a business model for validation of value will be different than one that grow, and thus it focuses on developing and proving a business growth architecture. However, the work of Maurya (2012) does not detail the processes at the Scale stage; thus, the author mainly discusses the first two stage (Problem/Solution Fit and Product/Market Fit).

Maurya (2012) propose a new tool (The Lean Canvas) that aids in identifying and capturing the business model hypotheses for new start-ups by adapting the Business Model Canvas of Osterwalder et al. (2009). A comparison between these business model canvasses is provided in Section 2.2.2.4. Figure 2.8 illustrates the Lean Canvas model and how it captures three types of risk: Product, Customer and Market.

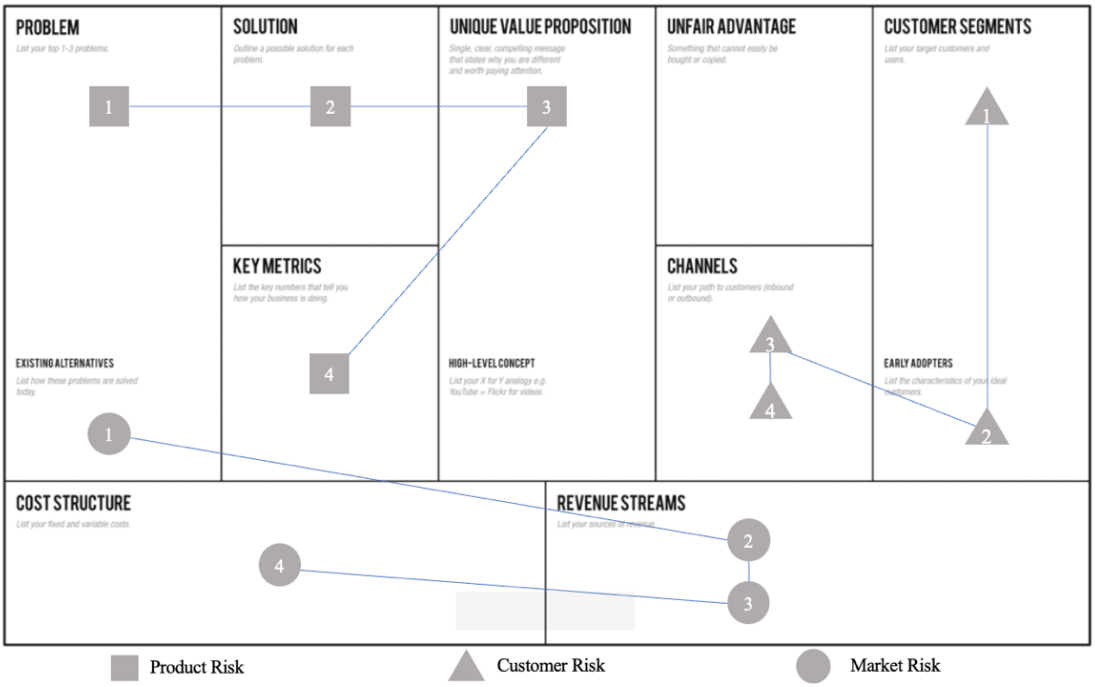

Figure 2.8: Lean Canvas proposed by Maurya (2012)

The following sections discuss the processes and milestone at each development stage.

Stage One: Problem/Solution fit (P/S)

A start-up needs to conduct customer interviews and observations in order to identify the problems worth addressing. Start-ups are required to tackle the three risks in each of the activities. Two primary activities are:

1. **Understanding Problem**: Focusing on the problem interview to ascertain the nature and level of the problem. The three elements in Lean Canvas to be tested are the:
   - Problem
   - Existing Alternatives
   - Customer Segments

2. **Define Solution**: Three elements in Lean Canvas that are suggested to be tested are:
   - Identify and work with Early Adopters
   - Develop MVP Solution
   - Define and test Revenue Streams

Overall, this stage is comparable to Plattner et al.'s (2009) Design Thinking regarding the sequence of processes in testing problems through interviews (Empathise) and testing solution (Prototype). The goal is to identify problems with sufficient "monetisable pain": A pain sufficient for the target customers to be willing to pay to reduce/remove it. The problems need to have the following attributes.

- A solution that customers want (or must-have).
- The customer is willing to pay to solve the problem (viable).
- The problem can be solved (feasible).

Stage Two: Product/Market fit (P/M)

Maurya (2012) asserts that the first significant milestone for start-ups is achieving a Product/Market Fit. This stage relies on the Lean Start-up Principle of Ries (2009) and emphasises iterative processes through which start-ups can pivot their product or idea in order to achieve Product/Market Fit. The level of Product/Market fit varies depending on the metrics that start-ups choose to measure. The two primary activities are:

1. **Validate qualitatively**: Focuses on developing and testing the MVP with specific groups of customers (Early Adopters). Three elements in Lean Canvas that are suggested to be tested are:
   - Unique Value Proposition
   - Channels
   - Revenue Streams

2. **Validate quantitatively**: Launch the refined product to larger groups of customers to validate the customer acquisition process. The three elements in Lean Canvas that should be tested are:
   - Channels
   - Cost structure
   - Key metrics

Start-ups need to address the following points to help achieve Product/Market Fit:

- The customer is willing to pay for the product.
- There is an economically viable way to acquire customers.
- The market value is large enough for the business to cover its costs and make a profit.

Concerning an incubator's adoption of this method, Running Lean benefits the new start-ups as they suggest starting with problems and customers and follow a precise sequence in identifying and testing the critical hypotheses. The initial process appears to align with Plattner et al.'s design thinking principle (2009), discussed in Section 2.2.1.3. Thus, as a tool, it explores

and validates the core problem before resource is wasted on ideating their solution(s). However, the method was built on Blank's (2007) principle of Customer Development, this model does not address the customer creation process. It would be desirable to extend the model, so incubators can consider the entire entrepreneurial journey.

2.2.2.2 Customer Development Model (Start-up Owner's Manual)

Steve Blank worked with colleague on extending the Customer Development Model into the Start-up Owner's Manual (Blank and Dorf, 2013). The latter adds the Lean Start-ups principles from Ries (2009) (discussed in Section 2.2.1.1) to the "Four Steps to the Epiphany" of Customer Development model (discussed in Section 2.2.1.2). Key MVP development and quantitative metrics are incorporated.

Figure 2.9 illustrated the four stage of Customer Development model. Blank and Dorf (2013) concentrate on the first two stages (Customer Discovery and Customer Validation), as they assert that the most critical stages of start-up development are the first two stages, and where most start-ups fail. Start-ups often need to go through several iterations to ensure achievement of the milestone. The latter two stages may follow the practices of more mature organisations, design the internal processes to scale their business model after all business model assumptions have been validated.

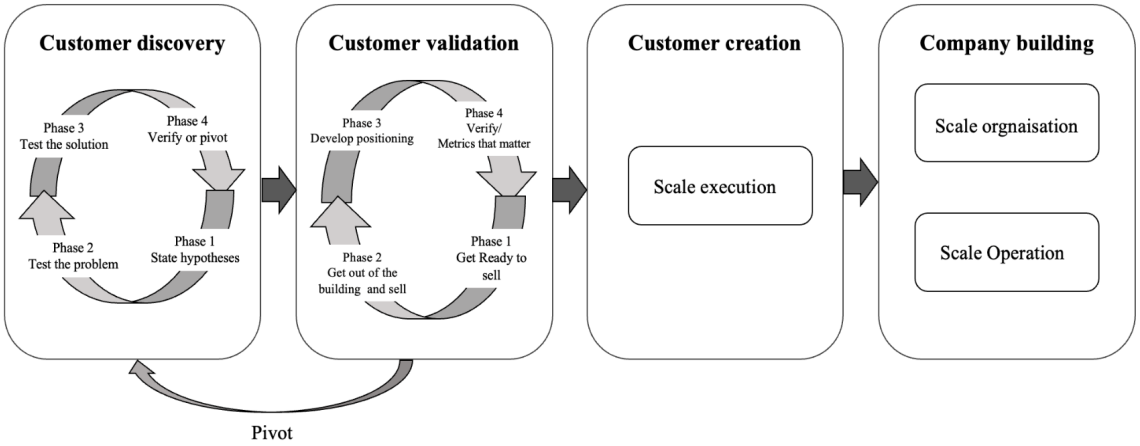

Figure 2.9: Customer development model of Blank and Dorf (2013)

Key distinctions between the Customer Development Model and Running Lean technique are the tools specified and the start activity. Due to the core concept of validating Business Model assumptions, Blank and Dorf (2013) suggest starting from the founder's vision. The founder's vision is then captured and translated into a business model hypothesis using the Osterwalder et al.'s (2009) Business Model Canvas with its nine building boxes (see Figure 2.10) that define and capture how the start-up will create, deliver and capture value. However, the problem statement is not explicitly captured in Osterwalder et al.'s (2009) business model canvas. "Running Lean" begins with problem identification and statement using the Lean Canvas to capture and test assumptions.

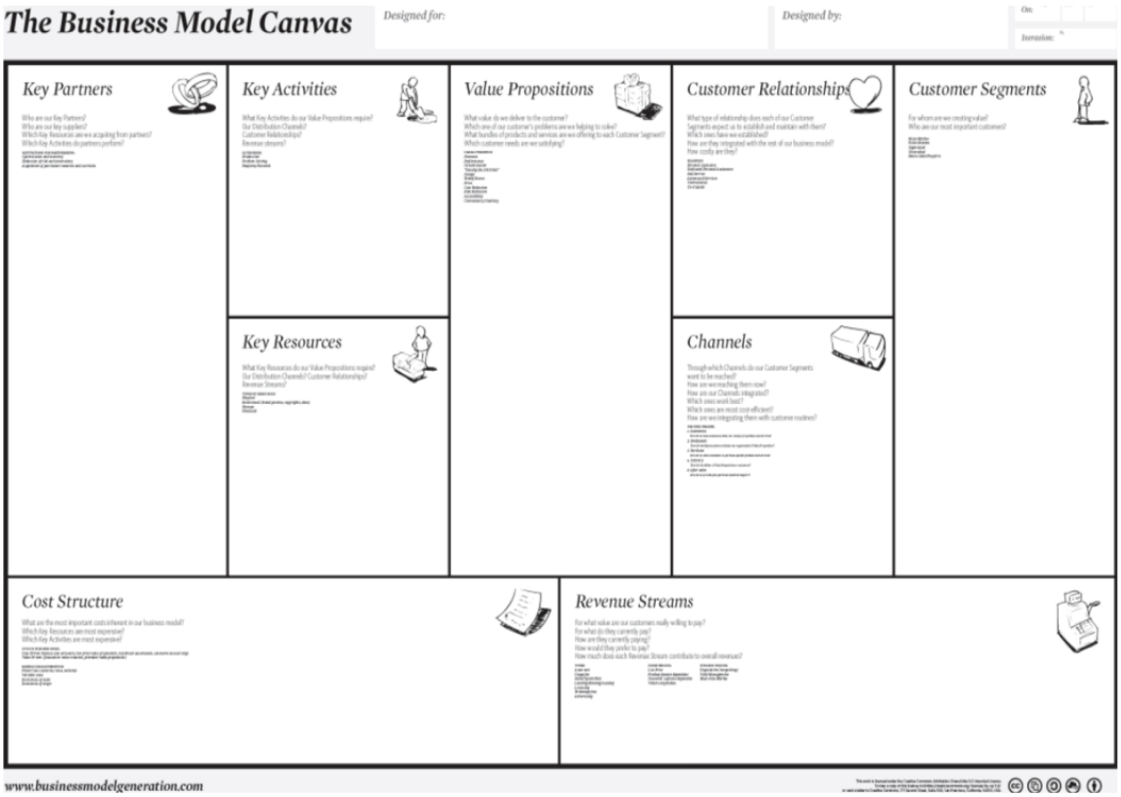

Figure 2.10: Business model canvas of Osterwalder et al. (2009)

The following sections discuss the processes and milestones at each development stage.

Stage One: Customer Discovery

The Customer Discovery stage is divided into four phases. These four phases are iterative processes in which start-ups decide at the last phase, whether to pivot and repeat or proceed to the next step, as illustrated in Figure 2.9. The four key phases in the journey are:

1. **Phase One**: Translate the founders' vision onto the Business Model Canvas design, beginning with Value Proposition though often many iterations between the value propositions and customer segments are necessary to align and focus them sufficiently for progress. At this phase, Business Model Canvas serves as the hypothesis statement.
2. **Phase Two:** The objective of this phase is to gain a thorough understanding of the customer's problem through experimentation and update the hypotheses in response to customer feedback ('Get Out of the Building' to test problem). Start-ups are

encouraged to develop a low-fidelity MVP, such as a single web page, or brochure to collect customer feedback**.**

3. **Phase Three**: Test the value proposition of the solution, pricing, and features in order to validate the problem identified in phase two, rather than focusing on selling the product. ('Get Out of the Building' to test solution).
4. **Phase Four**: Assess the results of the previous phases of testing and justify whether the customers 'problems have been fully understood and actioned, and that the business model hypotheses have been proven.

The start-up must decide whether to pivot or continue to the next stage at the end of this phase. Start-ups are ready to move to the next stage when the founders have identified:

- A problem that needs to be solved
- A solution with a value proposition that potential customers are willing to pay for
- Channels to reach customers,
- Revenue streams that will enable the business to be profitable.

Stage Two: Customer Validation

This stage continues to validate the remaining components of the business model, with an emphasis on developing a replicable sales process. "Orders" or "service usage" can be evidence of successful business model validation at this stage. This step aims to establish a repeatable sale funnel for subsequent sales and marketing teams. It is advised that Customer Validation is divided into four phases.

1. **Phase One:** Prepare for sales activities by developing a product positioning strategy, a customer acquisition strategy, a high-fidelity minimum viable product (MVP), a metrics toolkit, and establishing an advisory board.
2. **Phase Two:** Initiate sales, with the objective of obtaining customer feedback and orders or usage in order to validate the sales roadmap and acquisition activities. These operations must be measured and optimised. Once the start-ups acquire sufficient customer data, they progress to phase three.

3. **Phase Three:** Refine and develop the product position based on the results of the phase two experiment. Additionally, the company's position is developed and validated through conversations with industry influencers.
4. **Phase Four:** Conduct a critical analysis of all previous phases 'findings and outcomes, particularly the financial metrics. Each component of the business model must be validated. After the assessment, the founders must decide whether to pivot or continue.

The start-ups are ready to move to the next stage when the company proves that the business is scalable, the sales roadmap is repeatable and scalable, and the sales funnel is predictable. Blank and Dorf (2013) suggested that the financial metrics that matter to each business are required to measure success. Start-ups use the metrics to support their decision to determine whether they have to pivot or can proceed to the next stage. Several research studies, such as Mar (2012), Rompho (2018) created a list of performance indicators based on the company's objective. These could be financial performance measurement, metrics to understand the company's customers, marketing effort measurement, operational measurement, employee performance, and environmental and sustainability performance compared to planned levels.

Start-ups and business incubators can use the metrics that are applicable to particular start-ups to analyse the current situation. Blank and Dorf (2013) suggest setting up a measurement time frame to achieve the planned performance and possibly drive necessary changes to the business model. Milestone at this stage, as recommended by Blank and Dorf (2013), are

- Customer problems are understood
- A set of early evangelists has been found
- The company has delivered a product its customers want to buy
- Developed a repeatable and scalable sales process
- Demonstrated a profitable business model

Stage Three: Customer creation

When all business model hypotheses have been proved, and the sale roadmap validated, this stage focuses on executing and validating the designed marketing and sales activities. The metrics suggested to measure the start-up's progress are identified at the second stage. These are used to assess when a start-up executes the validated sale processes effectively.

Stage four: Company building

The core focus here, is on developing the mindset of learning and discovery for start-up execution.

Regarding adoption into the incubation process, this model assists in addressing the issues with conventional business plans, such as volatile environments. The Customer Development Model has potential enhancements to make it more suitable for supporting nascent entrepreneurs. Though the model concentrates on problem validation, it suggests beginning with translating the founder's vision into the hypotheses Value Propositions prior to problem validation. Hence, it may not a customer focus. Doing this may result in premature scaling if solutions are tested before first defining the problem-solution fit.

2.2.2.3 Lean Design Thinking

Mueller and Thoring (2012) conducted a comprehensive review of the existing literature on start-up development methodologies and proposed the ‘Lean Design Thinking’, as illustrated in Figure 2.11. Mueller and Thoring (2012) combine the Customer Development Model of Blank and Dorf (2013), the Lean Start-up from Ries (2009) and Maurya (2012) and the Design Thinking of Plattner et al. (2009) into their model. As claimed by Mueller and Thoring (2012), this model is proposed based on the following rationales:

1) Iteration cycles of Lean Start-up principle could be introduced earlier in the process of Design Thinking.
2) Metric-based evaluation techniques can be used to quantify customer feedback in Design Thinking

3) In addition to prototype development, Business Model hypothesis development should be tested in the design thinking stages.
4) Qualitative user research techniques and tools can be used early in the Lean Start-up to assist the founders in better understanding their customers' needs.
5) Ideation techniques, such as brainstorming, clustering ideas, voting, can be used to iterate an idea in a Lean Start-up principle and Customer Development Model, particularly prior to developing and validating the solution

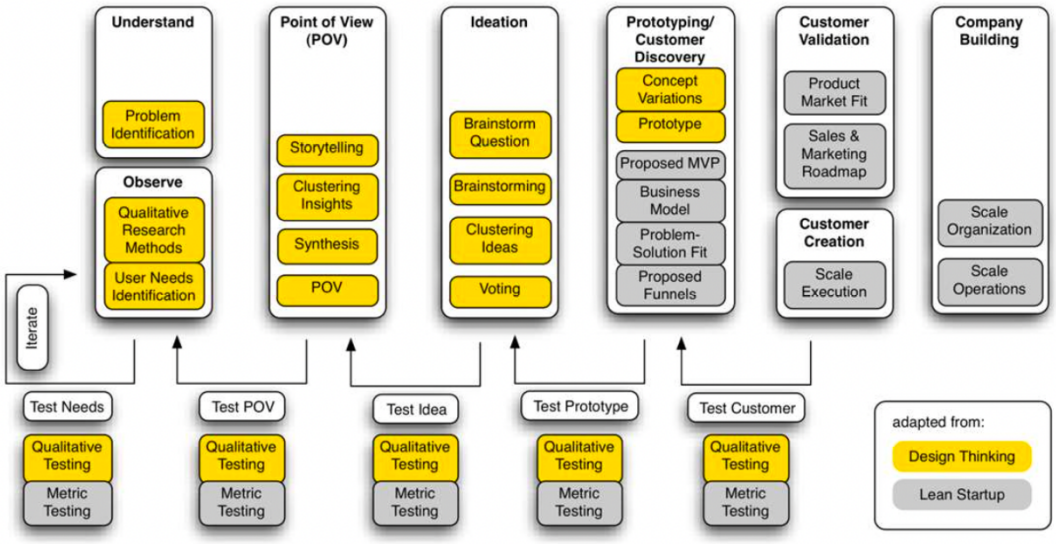

Figure 2.11: The 'Lean Design Thinking' model of Mueller and Thoring (2012)

The Lean Design Thinking approach comprises of six key stages. The first three stages of the design thinking process—*Empathize* (understand and observe), Point of View, and Ideate—are placed, followed by the Customer Development Model. The detailed processes of six stages are:

(1) **Empathize**: Start-ups develop a problem understanding from secondary research (Understand) and start-ups conduct user research employing qualitative methods such as interviews and observations to gain understanding of customers in depth. (Observe)

(2) **Point of View**: Gathering acquired insights gained in the previous steps through several tools including persona and user journey

(3) **Ideation**: Start-up team brainstorms to develop an innovative solution that addresses the users' needs as identified in the previous step.

(4) **Prototype and Customer Discovery**: This stage is where the two principle (Design Thinking and Customer Development Model) are merged. The selected idea is prototyped in order to test and gather feedback in the next step. The business model assumption are developed and tested.

(5) **Customer Validation and Customer Creation**: Start-ups test and validate the prototype in order to gain customer feedback, which is the iteration loops until they obtain positive feedback.

(6) **Company Building:** build on the Customer Development Model of Blank and Dorf (2013)

Lean Design Thinking is comparable to Running Lean start-up in prescribing a precise sequence beginning with problem validation through an iterative cycle of qualitative testing, followed by the solution idea(s) generation and validation.

However, Lean Design Thinking has potential modifications to suit the business incubator context. Several steps in the Lean Design Thinking model have redundant objectives that could be combined into a single stage to aid business incubators in facilitating start-up development. For example, *Empathize* and the *Point of View* steps could be merged as both steps focus on gaining an in-depth customer understanding. Also, *Customer Validation* and *Customer Creation* could be treated as standalone stages due to their distinct objectives; otherwise, start-ups may face danger from prematurely scaling, resulting in failure (Marmer et al., 2012). These potential modifications are discussed in next in Section 2.3.

2.2.2.4 A comparative review of start-up methodologies

The discussion previously shows that each methodology has gaps when considering the overall journey. Thus, for the incubator context and to be able to be more readily applied by incubators, it is desirable to build upon the tested methodologies to help incubators by prioritising critical

activities, clearly identifying start-ups' needs, and presenting the right support to address their challenges. Table 2.2 summarises the key distinctions and the potential dimensions for modifying each methodology. For example, the steps (*Empathise* and *Point of View*) that have a similar objective in Lean Design Thinking can be combined to guide the focus of incubators. Incubators can benefit from the systematic testing process of Running Lean, though that model overlooks the customer creation process.

Table 2.2: The key distinctions and potential aspects for modification

Methods / Principles		**Running Lean** Maurya (2012)	**Customer Development Model** Blank and Dorf (2013)	**Lean Design Thinking** Mueller and Thoring (2012)
Underlying Principle	**Customer engagement**	✓	✓	✓
	Feedback loop (BML)	✓	✓	✓
	Problem exploration	✓		✓
	Ideation	✓		✓
	MVP development	✓	✓	✓
	Customer acquisition		✓	✓
Key distinctions		• Start with problem validation • Lean Canvas to capture the business model assumption	• Clear objectives and milestones suggested at each stage • Consist of the later process: Customer creation and the company building	• Empathise process of Lean Design thinking
Potential areas for modification to incubator		• The customer creation process after the refined product	• Starting from the founder's vision rather than the problem	• Objectives and milestones suggested at each stage • Combine Customer Validation and Customer Creation into the same step could lead to prematurely scale.

These three separate methodologies (Running Lean, Customer Development Model and Lean Design Thinking) are built on the same principle (Lean Start-up, Customer Development):

(1) Speed the learning process through the early customer engagement and fast iteration.
(2) Advocating for the use of tools to capture and update business model assumptions.
(3) Encouraging an MVP development to test the business concept rather than creating the full version of the product.

Underpinned by these principles, all start-up development methodologies have shifted from a linear development process toward an iterative customer-centric focus.

Figure 2.12 illustrates the processes and stages of each start-up methodology considered. It is evident that the three methodologies have common processes in their models, though they employ different tools and techniques.

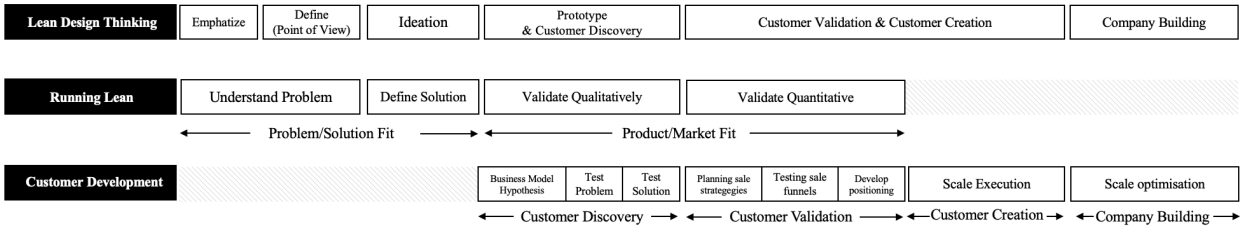

Figure 2.12: A comparison of the process's stages of the three start-up development methodologies (Author)

(1) **The focus on the problem at the initial stage.**

Though all three methodologies encourage start-ups to concentrate on problem validation, the Customer Development Model begins with translating the founder's vision into the solution hypothesis (consolidated Value Propositions) prior to testing the on the problem and customers. The other two methodologies (Running Lean and Lean Design Thinking) emphasise the customers' problem identification from the beginning. Both methods begin with thorough customer research to identify and understand customers' problems, before formulating solutions. This tests to ensure possible revenue & market for the problem exists before spending time on defining solutions. Maurya (2012) advocates interviewing at least ten people to test and identify monetisable pain, in order to proceed to solutions and their testing. Both methods describe a logical sequence that can guide nascent entrepreneurs in at the start

of their entrepreneurial journey. Employing these could reduce the chance of failure. An investigation of business accelerators by Hoffman and Radojevich-Kelly (2012) found that new start-ups usually misunderstand the target market.

(2) **Encouraging adaptive behaviour (Idea generation)**

To avoid the common problem of "falling in love with the solution" incubators should consider adopting a methodology and mindset that encourages start-ups to be flexible and adaptive. All three methodologies are underpinned with this mindset. Lean Design Thinking and Running Lean embrace brainstorming activities to generate and cluster ideas that are further evaluated and developed into the MVP prototype. Start-ups need to explore alternative solutions to the problem. However, the Customer Development Model does not emphasise the importance of brainstorming to generate alternative solutions to tackle customers' problems. From a mindset perspective it is debatable whether before developing a business vision, founders could concentrate on identifying a monetisable problem and validating whether it is worthwhile solving.

Therefore, in terms of fostering adaptive behavior, an incubator would benefit from the Lean Design Thinking and Running Lean principles during their incubation support processes. They can use qualitative measures with appropriate metrics to facilitate and then evaluate the iterations and accelerate the learning process.

(3) **Tool for capturing business model hypotheses**

All three methodologies embrace the benefit of using appropriate tools to capture business model assumptions. Maurya (2012), Blank and Dorf (2013) agree that the canvas helps start-ups structure the critical hypotheses of the business model to be systematically tested and refined through rapid iteration. All three methodologies focus on the key failure issue of having a static or fixed business plan, by incorporating early iterative, repeat processes.

Running Lean from Maurya (2012) and the Customer Development Model of Blank and Dorf (2013) suggest different tools in their processes. Blank and Dorf (2013) rely on Nine core

building blocks of the Business Model Canvas of Osterwalder et al. (2009) (See Figure 2.10 in Section 2.2.2.2). Maurya (2012) suggests using the Lean Canvas (See Figure 2.8 in Section 2.2.2.1), whilst Mueller and Thoring (2012) do not emphasise any specific business model tools.

The Lean and the Business Model canvasses focus on questioning different core elements of the business. Compared in Table 2.3, there are eight different elements between these two canvases. The differences in key elements help start-up focus towards different hypotheses to be tested through the validation. For example, the left-hand side of the Business Model Canvas questions the key activities that start-ups have to conduct with what resources and which partners to deliver the customer value propositions. Thus, it emphasises the internal operations of the business. The left-hand side of Lean Canvas explores the problem and how proposed solutions address the problem facets, plus defining the critical metrics to be used to determine progress in achieving problem-solution fit.

Table 2.3: A comparison of elements in Business Model Canvas and Lean Canvas

Business Model Elements	**Business Model Canvas (Osterwalder et al., 2009)**	**Lean Canvas (Maurya, 2012)**
Value propositions	✓	✓
Customer relationships	✓	
Customer segments	✓	✓
Channels	✓	✓
Key activities	✓	
Key partners	✓	
Key resources	✓	
Cost structures	✓	✓
Revenue model	✓	✓
Problems		✓
Solutions		✓
Key metrics		✓
Unfair advantages		✓

It is possible to combine both tools in practice to boost startup development efficiency. For example, an incubator could benefit from combining these two canvases to support in the problem discovery process. For example, regarding the Running Lean approach of Ries (2009), the Lean Canvas can be used initially to capture the customer problem assumptions. Further on, Osterwalder et al. (2009)'s Business Model Canvas can be used to assist in testing the other elements (Key Activities, Key Partners) of business model assumptions regarding the critical activities involved in developing and delivering products to market. Also, Business Model Canvas can be used for stakeholder conversation and meetings.

In summary, these three methodologies benefit start-up development at different stages of business development. Running Lean and Lean Design Thinking could be suitable for new start-ups, while the Customer Development Model is more appropriate for start-ups that want to test their vision. Thus, the amalgamation of three methodologies could help incubators align their support in assisting start-ups through the entrepreneurial journey.

The following section, the stage of start-up development underpins a conceptual framework developed from the literature review is discussed.

2.3 The start-up development framework for business incubators

This section proposes the start-up development stage that underpins the foundation of the conceptual framework of this study. The author proposes synthesising all three key methodologies (Running Lean, Customer Development Model and Lean Design Thinking) and structuring them into a four stages model drawing on the resource-based view theory, which categorises critical processes and critical achievements. Each stage collects and categorises the key processes that help focus a business incubator at each stage. This structure also guides how incubators should prioritise skills and team development factors and more efficiently manage their limited resources. Figure 2.13 depicts the proposed four-stage framework derived from a synthesis of the core methods in the literature.

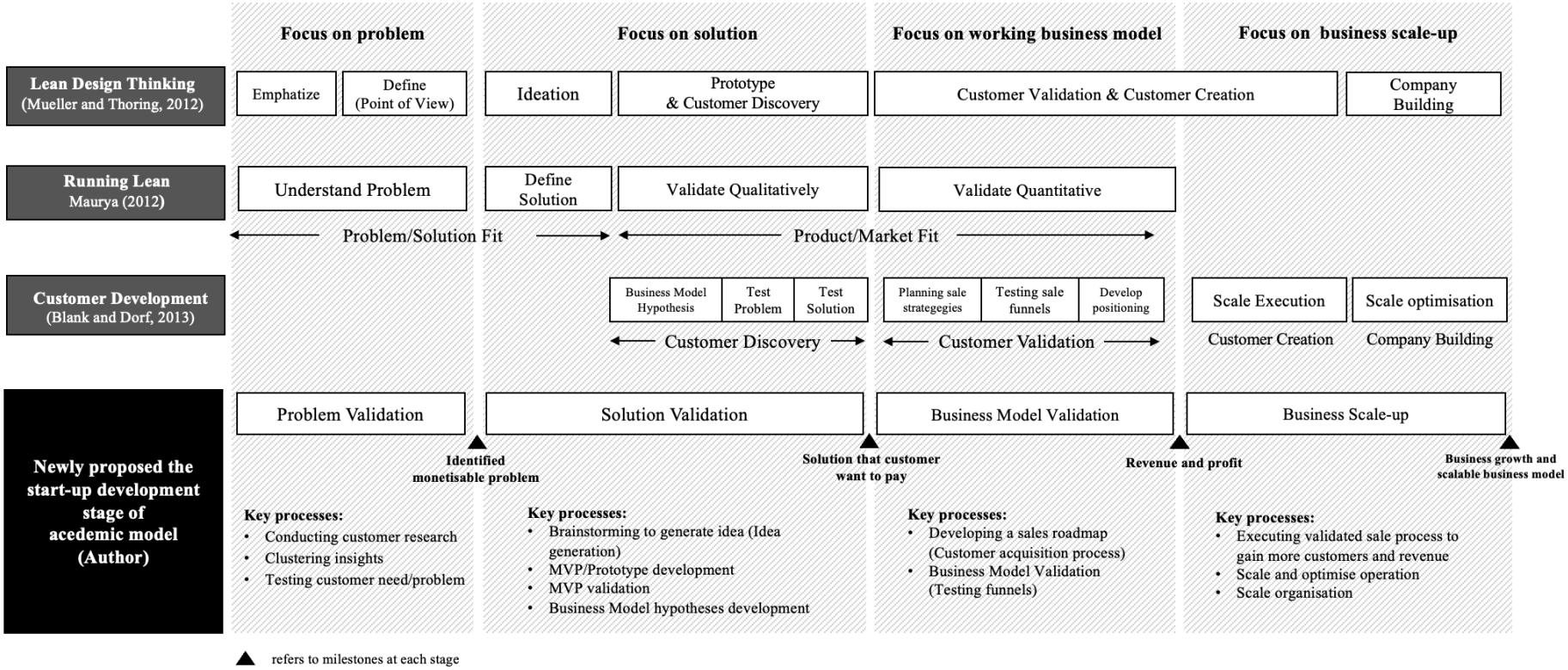

Figure 2.13: The proposed four-stage framework (Author)

Stage One: Problem Validation

The first stage adopts the elements of Design Thinking (Empathise) and Running Lean (Understanding problem) as it focusses on exploring the customers' problems. New entrepreneurs often start with a solution idea, to address the inevitable weakness created by inherent assumptions in a solution, Incubators must encourage new entrants to focus on the problem rather than the solution. This is not easy as "falling in love with a particular solution" is the key reasons cause of start-up failure (Giardino et al., 2015). This leads to one of the most crucial aspects of good incubator support, the balancing of entrepreneurial passion and drive, with the clear logical analysis and evaluation for good problem solving. Framing, from the beginning, the journey as problem solving exercise, can play a key role in the necessary mindset and skill development necessary to progress.

The key activities at this stage are to validate the problem and the customers' needs often through several iterations. The key milestone at this stage is the identification of a 'monetised problem'. Classifying the problem validation into a key first stage task, an incubator can support using the tools and techniques suggested by the two methodologies in order to achieve the stage milestone:

- Conducting customer research
- Clustering insights
- Testing customer need/problem

Stage Two: Solution Validation

This stage builds on the concept of Lean Design Thinking (Ideation and Prototyping), Running Lean (Define Solution and Validate qualitatively) and Customer Development Model (Customer Discovery). Utilising these tenets, incubators can align their support assisting start-ups to achieve solution validation through these processes:

- Brainstorming/Ideating to generate idea (Idea generation)
- MVP/Prototype development

- MVP validation
- Business Model hypotheses development

The key milestone identified is consistent with Maurya (2012), who refers to Problem/Solution fit as the key achievement after start-ups demonstrate that there are potential customers (Early Adopters) who will pay for the products. The validation focuses on a few tightly segmented customers in order to gain rich insights from customer feedback in reasonable time

Stage Three: Business Model Validation

The proposed third stage is aligned with the Customer Validation stage of the Customer Development Model and Validate Quantitatively in the Running Lean model. This stage aligns to the Product/Market Fit stage of Running lean.

Product/Market fit is a critical milestone for start-ups (Maurya, 2012). For Blank and Dorf (2013), this is the achievement when a start-up's value proposition, revenue model, pricing, and customer acquisition efforts support and align with the customers' needs. Only then should start-ups move to the next stage, when they need to prove that the business is delivery is scalable, the sales roadmap is repeatable, and the sales funnel is operational.

Start-ups need to validate the refined solutions to larger groups of customers and determine potential sales channels and customer acquisition processes. Key metrics are introduced to measure processes and 'Product/Market fit' at this stage. The goal is to validate the business model and create a repeatable sales process. The goal is for incubators to assist start-ups in achieving the following stage milestones:

- Developing a sales roadmap (Customer acquisition process)
- Business Model Validation (Testing funnels)

Stage Four: Business Scale-up

The fourth stage builds on the *Customer Creation* and *Company Building* of the Customer Development Model. Unlike Lean Design Thinking, the researcher proposes separating Customer Creation from Customer Validation. Customer Creation is a scaling process that should be operationalised when the business is ready; premature scaling can often result in the failure of the business (Marmer et al., 2012).

Blank and Dorf (2013) suggested scaling the validated marketing and sales activities in order to acquire more customers, though it is probable that scaling results will not be linear, and additional processes may need to be considered. The ultimate goal is to demonstrate achievement of scalable business by showing growth. The metrics required measure the effectiveness of sale processes. Following these suggestions incubators can align their support processes to assist start-ups in achieving the following key milestones:

- Executing validated sale process to gain more customers and revenue
- Scale and optimise operations
- Scale the organisation

2.4 Chapter summary

This chapter lays the foundation for a conceptual framework for business incubator support. Through reviewing the possible reasons for start-up failure, whilst searching for successful business models, the author aligns the incubators need to address these issues and assist start-ups with a framework that draws upon resource-based view theory and synthesis best practice.

This research incorporated the view of resource-based theory with the start-up development methodology to identify critical start-up activities at a particular stage so incubators could identify key resources of start-ups and provide the right support to address their challenges. According to the resource-based view, valuable resources enable businesses to gain and maintain competitive advantage, as well as to use these resources to achieve superior performance (Barney, 1991).

A business incubator is required to prioritise key support activities and resources, identify start-ups' knowledge status, position them in the journey and address their challenges. This study conducted a comparative review of the core relevant literature to compare and contrast core start-up development principles and their methodologies from the work of:

- Customer development model of Blank and Dorf (2013)
- Lean start-up approach of Ries (2008) and Maurya (2012)
- Lean design thinking of Mueller and Thoring (2012)

The three approaches shared critical concepts that address start-up failure issues identified in many previous studies (discussed in Section 2.1). These key concepts are:

(1) Focus on the problem discovery and validation
(2) Encourage Brainstorming/alternative idea generation and adaptive behaviour
(3) Speed the learning process through the early customer engagement and fast iteration.
(4) Use tools to discuss, capture and validate business model assumptions through different lens.
(5) Derive Minimum Viable Product (MVP) concepts to test the customer engagement before launching the full commercial service.
(6) Growth implementation/Customer acquisition process

However, there are potential areas for enhancing these approaches—for instance, the focus of problem identification during the initial stage and the idea generation. The Lean Design Thinking model of Mueller and Thoring (2012) and the Running Lean of Maurya (2012) adopt Design Thinking principle. Thus, they embrace a precise process beginning with problem exploration and validation, followed by idea generation. The Customer Development Model is the only model that addresses the customer creation processes. Thus, this study proposes synthesising from all three methodologies (Running Lean, Customer Development Model and Lean Design Thinking) and structuring into four stages (Section 2.3).

From the resource-based view perspective, an incubator can provide resources or access to resources through the use of the incubator's capability to assist start-ups in addressing the liability of newness (van Weele et al., 2017). This study adds to the theory by incorporating resource-based view theory into the methodology of start-up development. The proposed four-stage of start-up development framework will better focus on helping the incubator with sequencing, managing and allocating their internal resources to help ensure that they have the capability and capacity needed at each stage.

Also, start-ups will require specific critical skills and team effectiveness constructs at each stage to proceed to the next stage, and these are incorporated into the framework suggested. Thus, an incubator can design and align their business support to prioritise the acquisition of critical resources that assist start-ups in progressing to the next stage of the journey. In the following, Chapter Three, the author focuses on synthesising, reviewing, and identifying the critical skills and team effectiveness constructs required of a start-up team. These help business incubators assess and guide their support to increase their own success rate.

Chapter Three: Team Development Factors

3.0 Introduction

Start-ups have to develop a viable business model in the face of extreme uncertainty (Ries, 2009; Blank and Dorf, 2013). For a start-up to be functionally competent, a start-up needs to maximise heterogeneity of skills through effective collaboration, either internally or externally, to complete critical development activities (Cantu et al., 2018). One of the essential roles of business incubators is to support start-up capability development as this has significant impacts on the start-ups' growth (Mrkajic, 2017; Lai and Lin, 2015; Klaasa et al., 2019; Mahmood et al., 2017). Early-stage entrepreneurs, in particular, require business capability development through training, as they frequently lack essential business skills (Hoffman and Radojevich-Kelly, 2012; Diakanastasi et al.,2018). Though, as discussed in Section 1.1.2, the framework of how incubators can provide customised support regarding the skills and teamwork process in particular is still largely overlooked (Van Weele et al., 2019; Mrkajic, 2017; Klaasa et al., 2019, Vanderstraeten et al., 2016). Without considering the varying needs and impact of the crucial skills and team factors along the entrepreneurial journey, incubators may have a false customised support strategy.

This chapter focuses on the synthesis and critical analysis of the relevant literature regarding skills and team effectiveness factors, these are where business incubators can assess needs and offer the appropriate support in order to promote start-up success. A synthesis of key stages and the start-up development process derived in Section 2.3 are used as the foundation of a conceptual framework in identifying the critical skills and team effectiveness factors at each stage of business development. This outcome of these reviews serves as a key element of a conceptual framework for guiding customised support from business incubators to their start-ups. The key research issues for this chapter are:

- What are the crucial skills that influence the success of start-ups?
- What are the factors of team effectiveness that are required to enhance venture development?

This chapter is organised into two sections:

- Section 3.1 investigates the critical skills that have been shown to be associated with success in the venture development process in recent studies and investigates how each skill impacts the venture development process in order to justify the crucial skills included in the conceptual framework built.
- Section 3.2 reviews relevant research studies on team effectiveness literature and compares prominent models of teamwork to identify key factors of team effectiveness. The study then discusses the definition and significance of the constructs, as well as their impact on the venture development process.

3.1 Crucial skills associated with start-up success

There is a strong consensus among researchers from a wide range of study contexts that skills play a significant role in entrepreneurial success (Thom, 2016; Hatthakijphong and Ting, 2019; de Wolf and Schoorlemmer, 2007; Kunene, 2008; Abdullah and Hadi, 2018). Much of the current literature focuses on the impact of skills on business success by employing quantitative methods to examine the effects of skills. The findings correlate which skills have a significant impact on which aspects of business success and in what contexts, though there is no consensus on the uniform crucial skills categories for start-ups' success. The goal of this literature review is to identify the critical skills that start-ups require in each development stage in order to progress to the next stage of development, doing so will help incubators design or validate their start-up support activity to maximise added value.

To assist start-ups in achieving liability of newness, incubators provide key resources to help start-ups gain competitive advantage and establish legitimisation of the start-ups (Kong, 2019) through capability development. Zimmerman and Zeitz (2002) claim that legitimacy is one of the key resources for new start-ups to acquire new resources and crucial for venture growth. The business incubation process could be considered the legitimacy establishment process where it instils trust in stakeholders' judgments and decisions (Zimmerman and Zeitz, 2002). Thus, identifying key skills and crucial resources helps the incubator enhance the legitimacy of start-ups by improving the start-ups' capability to achieve the goal.

The review is divided into three key areas based primarily on the following questions:

(1) What are the critical skills that influence the success of start-ups?
(2) Do entrepreneurs require different sets of skills at each stage of development?
(3) What effect does each critical skill have on the venture development process?

Definition of skills:

From a review of the literature on crucial skills for the entrepreneurial journey, it was found that the term skills used in the literature is synonymous with the terms competency and ability, which can lead to confusion. Skills and ability share some attributes, yet they are distinct. According to Chell (2013), skills are a multidimensional construct, comprising the cognitive, affective, behavioural, and sectoral. The definition of skills used in this study is based on Chell (2013) and Spenner (1990). They further refine the term 'skill' to refer to "performance proficiency" that can be improved through practice and training, which is grounded in context and in the task environment.

3.1.1 A review of the critical skills that influence the success of start-ups

The research on the impact of skills on business success falls into two broad categories:

(1) Studies that focus on the impact of single skill on business success. For example, Klerk and Saayman (2012) investigated the role of networking skills with regard to artist entrepreneurs, and Natrajan and Chattopadhyay (2014) examined the effect of leadership skills on the success of IT projects.
(2) Research that examines impact of various skills that are critical to a business's success, such as the work of Thom (2016), Chatterjee and Das (2016) which evaluate the effect of four skills: leadership, communication, human relations, and technical skills, on the success of micro-entrepreneurship. Their results found that the significance of each skill towards the business success is different.

In order to derive the crucial skills for start-up development, this study focuses on the latter, which aims to identify critical entrepreneurial skills through an examination of the impact of multiple skills on business success in disciplines such as entrepreneurship and business

management. Once the crucial skills were identified, this study then reviewed research studies focusing on specific skills to ensure the impact on their business development.

As summarised in Table 3.1, the research studies that examined the impact of various skills on business success were reviewed in order to determine the crucial skills necessary for entrepreneurs. These studies empirically investigated and validated multiple skills necessary for entrepreneurial success. These research studies were conducted in different contexts and employed different research methodologies. Thus, this allows the researcher to examine the consistent effect of skills on entrepreneurial success.

Table 3.1: The findings from literature review on crucial skills for business success

Authors	Skills	Success	Method	Context	Finding
Perk and Struwig (2005)	• Personal skills • Technical • Business operations • Management	• Financial growth • Strategic growth • Structural growth • Organisational growth	Qualitative - interview	Micro and small entrepreneurs in South Africa	Thirteen skills are found to be important due to the fact that small business entrepreneurs value these skills in terms of the growth of their businesses, and also have to acquire these skills after beginning the business.
de Wolf and Schoorlemmer (2007)	• Professional/ Technical • Management • Opportunity • Strategic • Cooperation/ Network	N/A	Qualitative - Interview	Stakeholders in the farming industry in Europe (agriculture entrepreneurs)	The finding reveals key important skills in relation to agricultural entrepreneurs across different countries in Europe. The results reveal that professional skills are the fundamental requirement for farming. Opportunity and strategic skills are crucial for creating a profitable business.
Kunene (2008)	• Personal skills • Business • Entrepreneurial skills • Technical skills	Number of years in business, number of employees, income	Mixed-methods	Textile industry in South Africa	The results from the comparison between the perception of successful business and less successful business show that successful businesses are more competent regarding key skills and training in all required skills. The key skills are the ability to gather resources, and marketing, motivational, legal, financial, and operational management skills.
Thom (2016)	• Idea/Creativity • Strategic thinking • Opportunity recognition • Networking • Leadership • Finance • Marketing	Not clearly defined	Survey	Lecturers in fine arts the UK and Germany (artist entrepreneurs)	The survey results show that there is an alignment in what UK and Germany lecturers in fine arts value regarding the skills of artist entrepreneurs, but there is no empirical evidence on entrepreneurs or experts confirming the impact of these skills on business success.
Chatterjee and Das (2016)	• Leadership • Communication • Human relations • Technical • Inborn aptitude	Perceived business success	Quantitative research - Questionnaire	Micro-entrepreneurs in India (not a specific industry)	The significant level of each skill is different. Communication is the most important, while technical skills have a negative impact on success.
Abdullah, Hadi and Dana (2018)	• Managerial skills • Entrepreneur resilience skills • Entrepreneur strategic skills	Sales Net profit Cash flow Increase in assets	Quantitative research - Questionnaire	Entrepreneurs in marble manufacturing in Pakistan	All skills significantly impact business success. The strongest impact is resilience skills, which have a large effect if the skill is changed.
Hatthakijphong and Ting (2019)	• Technical • Business management • Personal entrepreneurial • Critical and creative thinking	Business has survived eight years or longer	Quantitative - survey	Entrepreneurs and aspiring entrepreneurs in Taiwan (not a specific industry)	The priority of skills among successful entrepreneurs and aspiring entrepreneurs is different. The top rank of skills are business management and critical and creative thinking skills. However, the results reveal that aspiring entrepreneurs underestimate persistence (entrepreneurial mindset) and overestimate creativity, innovation, and human resources management.

The terminology for each category may be different in each research study. Thus, the definitions for each skill are inferred and synthesised from the existing literature in order to ensure the consistency of the review. Table 3.2 summarises which skills were found to have a significant impact on business success identified by each of the chosen research studies. Though the research studies have different contexts regarding countries and sectors, seven skills have emerged as crucial skills that every business should have in its venture development no matter what the context is. The seven core skills are:

(1) Finance skills
(2) Networking skills
(3) Strategic thinking skills
(4) Marketing and sale skills
(5) Entrepreneurial mindset
(6) Technical skills
(7) Communication skills

Leadership skills appear to be crucial for start-ups, though this study combines these skills with the *team leadership* that are discussed in Section 3.2.3.2 as the entrepreneur(s) require these skills to successfully deliver team leadership; thus, the observation of their significance is made under *team leadership* factors.

The impact of each skill on the venture creation process is investigated in Section 3.1.3. It is important to note that the author does not imply that the other skills, not investigated, in the following section are irrelevant.

Table 3.2: Comparison of the empirical findings from skills studies

Skills	Definition	Perk and Struwig (2005)	de Wolf and Schoorlemmer (2007)	Kunene (2008)	Thom (2016)	Chatterjee and Das (2016)	Abdullah, Hadi and Dana (2018)	Hatthakijphong and Ting (2019)
Strategic thinking	Ability to set goals and develop long-range planning in a variety of areas, for anticipating the unexpected, for analysing the business environment, and for collaborating with others.	✓	✓	✓	✓		✓	✓ **Decision making**
Finance	Ability to plan, fund, direct, monitor, organise, and control the monetary resources of the business.	✓	✓	✓	✓		✓	✓
Marketing and sales	Ability to reach the market (its potential customers, including decision-makers) and to achieve visibility and customer awareness. Activity including market research, identifying a target market, analysing existing market, customer discovery, developing sale strategy, developing marketing strategy and marketing planning, developing a brand positioning, advertising, promotion.	✓		✓	✓		✓	✓
Communication and negotiation	The ability to communicate effectively and positively with others, such as partners, colleagues, and employees, in every type of communication scenario, including negotiations, non-verbal communication, and using some medium to imparting information.	✓		✓		✓		✓
Entrepreneurial mindset	Concentrate on execution, particularly adaptive execution, when the optimal method of exploitation evolves.	✓	✓	✓ Motivation (Need for achieve)	✓		✓ Resilience	✓ Persistence
Networking	Ability to develop and use contacts for business purposes beyond the reason for the initial contact, including target activities strategically, systematically plan networking, engage other effectively, assess opportunities	✓	✓	✓	✓	✓		✓
Leadership	Ability to develop a "Business Vision" of where one wants to be and to inspire people (external experts) to help achieving this vision.	✓	✓	✓	✓	✓	✓	✓
Technical	Skills that require to perform a functional role in entrepreneurial tasks such as technology implement and use	✓	✓ Fundamental	✓				✓

The relative importance of skills varies according to the respondents' perspectives and contexts. For instance, Chatterjee and Das (2016) discovered that not all entrepreneurial skills positively impact business success and that the level of significance of each skill varies. Their study demonstrates that communication skills have the most significant impact on business success, followed by leadership skills. Technical skills, on the other hand, were found to be less significant to micro-entrepreneurs in Jharkhand. They explained that Jharkhand is in the early stage of entrepreneurial development, thus there are a low technical support resources, which influencing the perception and familiarity towards the technical skills of micro-entrepreneurs. Hatthakijphong and Ting's (2019) quantitative research examining the importance of entrepreneurial skills with 89 entrepreneurs in Taiwan reveals that the priorities for successful entrepreneurial skills vary according to the entrepreneurs' business experience. However, the seven research studies were conducted from the perspective of entrepreneurs rather than incubator specialists. There is still a paucity of research from the lens of the business incubator.

3.1.2 Staging skills requirement

The preceding discussion highlighted that each skill has a different level of significance. This study concentrates on developing the framework to aid business incubator in identifying the start-ups' need. The stage of the overall start-up journey is one of the factors affecting the need of skills. As previous discussed in Section 1.1.2, Sullivan (2000), Kunene (2008), and Chell (2013) suggested that entrepreneurs require different skills at different stage of business development, though only a few of the existing studies have attempted to empirically investigate the critical skills at different business stages, particularly from the perspective of business incubators.

Sullivan (2000) extended Churchill and Lewis's (1983) life-cycle approach to identify the critical leadership and management skills at each developmental stage, as illustrated in Figure 3.1, in order to investigate entrepreneurial education and mentoring effectiveness. The study discovered that their proposed model enables long-term benefits to entrepreneurs while also increasing the cost-effectiveness for support providers. However, the model of Sullivan (2000) is dated as it does not align with the modern methodologies such as Lean Start-up which now

dominate thinking, such as the key stages associated with a new start-up development like customer discovery and customer validation.

Conception	Survival	Stabilisation	Growth orientation	Rapid growth	Resource maturity
Communication	Financial management	Financial management	Communication	Communication	Communication
Administration	Communication	Vision	Motivating others	Vision	Motivating others
Vision	Marketing	Planning and goal setting	Financial management	Planning and goal setting	Financial management
Time management	Vision	Communication	Vision	Financial management	Planning and goal setting
Planning/goal setting	Motivating others	Motivating others	Planning/goal setting	Problem solving/ decision making	Problem solving/ decision making
Human resources	Planning/goal setting	Relationship building	Relationship building	Relationship building	Customer/vendor relations
Business and tech knowledge	Customer/vendor relations	Problem solving/ decision making	Business and tech knowledge	Motivating self	Ethics and culture
Financial management	Employee development	Employee development	Problem solving/ decision making	Leadership/ management skills	Motivating self
Problem solving/ decision making	Problem solving/ decision making	Marketing	Leadership and management skills	Human resources	Leadership/ management skills
Leadership/ management skills	Business and tech knowledge	Business and tech knowledge	Human resources		

Figure 3.1: The model of Sullivan (2000)

Kunene (2008) conducted a comprehensive review of the literature and discovered that critical skills vary across a four-stage development model that includes innovation, a triggering event, and implementation and growth. The skills required at each stage of development, as proposed by Kunene (2008), are summarised in Table 3.3. However, his study's findings conclude the critical and supportive skills that businesses require in general, rather than verifying his proposed model on the required skills at each stage.

Table 3.3: Required skills in entrepreneurial development process (Kunene, 2008)

Stage 1 Innovation	**Stage 2 Triggering event**	**Stage 3 Implementation**	**Stage 4 Growth**
• Opportunity recognition • Creativity • Marketing • Motivation	• Motivation • Securing resources • Networking • Planning	• Human resources • Marketing • Motivation • Financial • Networking • Technical • Operation • Planning • Communication • Gathering resources	• Networking • Financial • Marketing • Technical • Planning • Opportunity • Human resources • Motivation • Gathering of resources skills

Bozwards and Rogers-Draycott (2017) proposed the notion of focal entrepreneurial competency based on the nine stage-based model, as shown in Table 3.4. Their proposed model is based on two frameworks, these are the QAA Enterprise and Entrepreneurship Education and EntreComp: The Entrepreneurship Competence Framework. This implies the varying skills required at each stage of business development.

Table 3.4: The model of Bozwards and Rogers-Draycott (2017)

Stage	Discovery	Modelling	Start-up	Existence	Survival	Success	Adaptation	Independence	Exit
Focal competency	Opportunity recognition, creation and evaluation	Financial and economic literacy. Self-discipline & personal organisation	Mobilising resources. Identify and approach target markets	Coping with uncertainty, ambiguity and risk. Tolerance of uncertainty, risk and failure.	Learning through experience. Implementation of ideas through leadership & management.	Operational & Financial planning	Investor Management. Delegation	Mental ability to coordinate activities.	Negotiation. Merger and acquisition.

While it is self-evident that different skills are required at different stages of start-up development, it is practically impossible to determine which skills are required at which stage due to the different life-cycle models used in these three studies. Thus, a synthesis of the start-up development process derived in Section 2.3 is used as the foundation of an academic framework to identify the critical skills at each stage for business incubators. A discussion of these three models is included in the evaluation of the critical skills at each stage. Section 3.1.3 investigates how each skill impacts the venture development process in order to justify the crucial skills included in the conceptual framework built.

3.1.3 The effect of critical skills on the venture development process

This section examines the seven skills emerged from the literature review identified in Section 3.1.1 above, on their impact on business success.

3.1.3.1 Finance skill

Many research studies (Thom, 2016; Hatthakijphong and Ting, 2019; de Wolf and Schoorlemmer, 2007; Kunene, 2008; Abdullah and Hadi, 2018) found that finance skills play a significant role in business success across a variety of business sectors, including textiles,

the arts, and manufacturing. It can be drawn many reasons why start-ups require financial skills as follows:

- Manage financial resources effectively and efficiently, as start-up businesses in particular must manage cash flow well (Kunene, 2008; Hatthakijphong and Ting, 2019).
- Monitored and interpreted the balance and cash flow statements must be to ensure that the business generates a profit and meets the target of achieving a return on investment.
- Consider the total investment, calculate the expected return on investment, and conduct financial planning.
- Consider the cost of paying employees, suppliers, and the credit term.
- Start-ups must consider when external investment is necessary, and how many equity shares are distributed among the co-founding team and investors. It becomes more complicated as the business grows; as a result, start-ups require financial experts to handle all of the details. When a business expands, finance is typically separated into a separate department responsible for all financial matters.

While finance is a vital skill for running a business, it may not be necessary for success at every stage of development. The levels of significance in each study differed. For example, the study of Hatthakijphong and Ting (2019) found that successful businesses rated financial skills as average positive impact on business success. The lower ranking for financial skills in their study could be because the study's participants are business owners that have been in business for at least eight years. The experienced business owners may not require specific finance skills to run the business, as most enterprises have a finance department or financial manager that handles all financial matters.

According to Kunene's (2008) detailed in section 3.1.2, a comprehensive review of 100 prior research studies on critical skills indicates that financial skills are critical for start-ups during so-called “third and fourth” development stages, when business operates in the market, achieves higher sales volumes, and deals with various business stakeholders, as financial issues

become more complex. This finding is consistent with the models of Bozwards and Rogers-Draycott (2017) and Sullivan (2000), which emphasise financial skills during the expansion stage of a business and on sales growth during the success stage and growth-oriented stage, respectively. Within the context of this study, financial skills are proposed to be crucial for start-up development during *Solution Validation, Business Model Validation and Business Scale-up stages* because they require to consider and evaluate various aspects of financial measures to ensure that their business is feasible, profitable and have sufficient financial resources for scale-up.

3.1.3.2 Networking skill

Many research studies on entrepreneurial skills refer to networking skills in various ways, including social, networking, cooperation, and human relations skills. These four terms have been used interchangeably across a number of studies such as Chatterjee and Das (2016) define human relations skills as the ability to develop and maintain healthy relationships with customers, suppliers, and other stakeholders, which aligns with Thom's (2016) and de Wolf and Schoorlemmer's (2007) definitions of networking skills.

In this study, *networking skills* are defined as the ability to initiate contact with customers, suppliers, entrepreneurs and other stakeholders and to develop and maintain a relationship with them. According to Thom (2016), networking skills comprise, in particular, the ability to:

1) Target activities strategically
2) Systematically plan networking
3) Engage others effectively
4) Showcase their expertise
5) Assess opportunities
6) Deliver value to others.

Klerk and Saayman (2012), Thom (2016), Chatterjee and Das (2016), de Wolf and Schoorlemmer (2007), and Kunene (2008) all have conducted empirical research on the critical role of networking skills in business success. Even these studies were conducted in different

countries and industries, the findings are consistent and demonstrate the positive impact of networking skills on business success. However, the relative importance of networking skills varies according to the intensity of the relationship establishment in various industries and the resources required by entrepreneurs at each stage of the entrepreneurial journey. For example, Klerk and Saayman (2012) and Thom (2016) found that networking skills play an important role in developing connection due to the nature of the art business, which which requires these entrepreneurs to rely on suppliers and event organisers whenever they relocate.

Kunene (2008) suggests that start-ups need networking skills in order to gather necessary resources and acquire business expertise once they have established the business. Entrepreneurs need networking skills to develop and maintain relationships with stakeholders in order to gain support, acquire critical resources, exchange knowledge and information, and provide value to others (Thom, 2016). Carolis et al. (2009) discovered that social networks and connections directly affect the formation of ventures. This emphasises the critical nature of networking skills in the early stages of start-up development.

This study proposes that networking skills are crucial for success at *every stage of business development* because entrepreneurs require networking skills in order to acquire social capital to gain knowledge and connections through being a part of a social network for business development. During the later stage, businesses cannot carry out certain entrepreneurial activities alone; they require business partners to develop and deliver the value necessary to successfully establish a sustainable business. Having these business networks aids success timescales and accelerates growth for businesses (Pirolo and Presutti, 2010).

3.1.3.3 Strategic thinking skills

Strategic thinking skills are primarily associated with entrepreneurial decision-making. According to Dhir, Dhir and Samnanta (2018), their findings reveal that a person with strategic thinking is better at decision-making. Furthermore, the findings of Hatthakijphong and Ting (2019) confirmed the importance of decision-making to business success, as supported by successful Taiwanese entrepreneurs. Strategic thinking skills are embedded in decision-making, including knowledge acquisition and scanning the environment in order to translate

knowledge into action, resulting in organisational strategy being more competitive and innovative in a dynamic environment.

This study's definition of strategic thinking was drawn from two research studies: Pisapia et al. (2011) and Dhir, Dhir, and Samnanta (2018), as presented in Table 3.5. These two measures have been empirically validated using data from various positions in business to confirm the constructs' validity, reliability, and generalisability. Table 3.5 maps these two studies' measures to synthesise a strategic thinking construct alignment.

According to Pisapia et al. (2011), strategic thinking skills include systems thinking, reflecting and reframing. Dhir, Dhir, and Samnanta (2018) proposed four dimensions: reflection, organisational awareness, trend analysis, and pattern recognition. It appears that the four dimensions of Dhir, Dhir, and Samnanta (2018) fit the three elements of Pisapia et al.'s (2005) model. Surprisingly, Dhir, Dhir, and Samnanta's (2018) reflection measures refer to reframing the constructs in Pisapia et al.'s (2005) model. Trend analysis and organisational awareness are systems thinking constructs, whereas pattern recognition refers to Pisapia et al.'s (2005) reflection. Pisapia et al. (2005) define strategic thinking skills in terms of a leader's ability; however, individual team members should also have this skill.

According to Dhliwayo and Vuuren (2007), they claim that there are no clear distinctions between strategic and entrepreneurial mindsets. It can be explained by the model of Kuratko et al. (2020) that strategic thinking refers to the cognitive aspects of the entrepreneurial mindset. Hence, distinguishing ‘how to think’ into a distinct skill could highlight the importance of how entrepreneurial thinking affects business development.

Table 3.5: Description of strategic thinking skills constructs (Author)

Strategic thinking skill	Description of Pisapia et al. (2011)	Measurement by Dhir, Dhir and Samnanta (2018)
Systems thinking	Systems thinking refers to the leader's ability to see systems holistically by understanding the properties, forces, patterns and interrelationships that shape the behavior of the system, which hence provides options for action.	• I understand the situation of organization within extended and complex systems, such as markets, industries and international arena • I understand diverse changes in internal and external environment of the organization • I like to design processes and mechanisms of promotion of change and development • I am aware about organisation strengths and weaknesses • I always consider the opportunities • I acquaintance myself with ambiguities and complexities for interpretation and evaluation of events • I consider organisations internal and external analysis
Reflecting	Reflecting refers to the leader's ability to weave logical and rational thinking, through the use of perceptions, experience and information, to make judgments on what has happened, and the creation of intuitive principles that guide future actions.	• I try to establish connections among past, present and future events • I try to select and use appropriate patterns from organisation's background • I prefer to ignore short-term takings to achieve long-term profit
Reframing	Reframing refers to the leader's ability to switch attention across multiple perspectives, frames, mental models, and paradigms to generate new insights and options for actions.	• I try to find a common goal between two components • I consider the relation among different units and organisational duties • I recognise the role of individual in bigger systems and understand the effect of his/her behavior on outputs • I prefer to ask why questions to develop an understanding of problems

Jelenc and Pisapia (2015) surveyed Croatian information technology entrepreneurs in order to examine the relationship between strategic thinking and entrepreneurial behavior. Their research discovered that strategic thinking skills (system thinking) fuel entrepreneurial behavior, such as innovativeness, risk-taking, and proactiveness, which are critical components of successful entrepreneurship. They assert that systems thinking assists in identifying opportunities, gaps, and market needs, thereby enabling the realisation of new possibilities for potential outcomes, which is consistent with Zahra and Nambisan's (2012) finding, that strategic thinking drives innovation.

Additionally, De Wolf and Schoorlemmer (2007), Thom (2016), and Abdullah, Hadi, and Dana (2018) all provide empirical evidence confirming the importance of strategic thinking and business success. These three research studies examine the beneficial effect of strategic thinking skills on business process improvement in a variety of industries. All of these research studies align their findings with an emphasis on the later stages of the entrepreneurial journey. Kunene (2008) that strategic thinking is necessary for entrepreneurs to develop a strategic plan for the business's establishment when a company must be competitive to survive in the market. However, the empirical investigation to confirm the level of significance of strategic thinking skills among each development stage remain scarce.

The investigation of Zahra and Nambisan (2012) implies that entrepreneurs develop their strategic thinking skills differently depending on their stage of development and business ecosystem. They investigated how entrepreneur leverages his or her capabilities through the use of strategic thinking skills. For example, they assert that founders typically employ informal planning and *ad hoc* decision-making during the early stages of a new venture's development, whereas established companies typically employ analytical and formalised thinking throughout the organisation.

This study aligns the rationale with Kunene (2008) that strategic thinking is necessary for entrepreneurs to develop a strategic plan for the business's establishment when a company must be competitive to survive in the market. Thus, this study proposes that strategic thinking skills are crucial at the *Solution Validation, Business Model Validation and Business Scale-up stages* where start-ups need to make critical decisions. Thus, strategic thinking skills enable them to critically evaluate the business situation and market environment.

3.1.3.4 Marketing and sales skills

Marketing and sales skills are rooted in the category of business skills, which have been identified as critical for business success. Marketing skills refer to the ability to communicate with potential customers and to generate a high level of market awareness and visibility. Marketing skills entail generating customer interest and developing sales techniques for products or services targeted at specific customers (Kunene, 2008; Thom, 2016;

Hatthakijphong and Ting, 2019). As discussed in Table 3.2 in Section 3.1.1, all of the studies that included marketing and sales skills discovered a positive impact on business performance. Perk and Struwig (2005) also discovered that marketing skills are necessary for developing customer relationships, which helps microentrepreneurs grow.

Consistent with Bozwards and Rogers-Draycott (2017), this study asserts that marketing and sales skills are crucial for success at *Solution Validation*, *Business Model Validation* and *Business Scale-up* stages. These skills enable start-ups to approach the market to gain traction with customers because, in order to enter the market successfully, businesses must invest significant time and effort in understanding the market and developing a marketing and sales strategy. Several entrepreneurial activities, such as customer discovery, developing a sales strategy, developing a marketing strategy and marketing plan, developing brand positioning, advertising, and promotion—all necessitate the use of marketing and sales skills.

3.1.3.5 Entrepreneurial mindset (EM)

The entrepreneurial mindset (EM) is a set of skills that enables people to take entrepreneurial action to capitalise on the benefits of uncertainty. According to McGrath and MacMillan (2000), The characteristics of individuals with an entrepreneurial mindset are as follows:

- Passionately seek new opportunities
- Pursue opportunities with enormous discipline
- Pursue only the best opportunities and maintain a strong link between their strategy and project selection
- Concentrate on execution, particularly adaptive execution, when the optimal method of exploitation evolves
- Align the energies of all those within their domain (internally and externally)

Entrepreneurial mindset consists of three aspects (Kuratko et al., 2020):

1. The emotional aspect refers to how entrepreneurs feel.
2. The behavioural aspect refers to how they act.

3. The cognitive aspect refers to how they think.

The cognitive aspects of how to think are similar to strategic thinking skills, as suggested by Dhliwayo and Vuuren (2007). They assert that strategic "thinking" is synonymous with entrepreneurial thinking and that the two should be viewed as a unified construct. As previously stated in section 3.1.3.3, this study distinguishes “entrepreneurial thinking” as strategic thinking skills to emphasise the strategic thinking into a separated factor. Thus, only emotional aspects and behavioural aspects are considered under entrepreneurial mindset factors. Table 3.6 details the constructs of an entrepreneurial mindset and their definition from various researchers.

Table 3.6: Definition of entrepreneurial mindset construct

Entrepreneurial mindset constructs	Aspects of EM	Definition	Author
Passion (Need for achievement)	Emotional	Enable entrepreneurs to be enthusiastic about their company's goals, endeavours, and dreams. Passion helps entrepreneurs in overcoming disappointments and challenges that arise during entrepreneurial journey	Chen et al. (2020)
Motivation	Emotional	Entrepreneurial intention and the chances that those intentions will be converted into action.	Kunene (2008)
Persistence	Emotional	The ability to persistence on keeping going or push toward the finish line when the instant success is out of reach	Hatthakijphong and Ting (2019)
Resilience	Emotional	Dynamic and evolving process through which entrepreneurs acquires the knowledge, abilities, and skills to help them face the uncertain future with a positive attitude, with creativity and optimism, and by relying on their own resources. resourcefulness, hardiness, and optimism are distinct factors in the entrepreneurs’ resilience	Abdullah, Hadi and Dana (2018)
Adaptability to change	Behavioural	the founders’ willingness and ability to make appropriate adjustments to the business concept as the venture evolves from an initial business idea to the business plan and finally to an operational enterprise	Kunene (2008); Morris and Zahra, (2000)
Innovation	Behavioural	A willingness to introduce newness and novelty through experiment and creative process aimed at developing new products and services, and new processes.	Lumpkin and Dess (1996)
Proactiveness	Behavioural	Foresight characteristics to pursue opportunities in anticipation of future demand to be a market leader.	Lumpkin and Dess (1996)
Risk-taking	Behavioural	Making decisions and taking actions without certain knowledge of probable outcomes.	Lumpkin and Dess (1996)

This study proposes that the entrepreneurial mindset is critical at *all stages of development*, as start-ups face numerous obstacles and uncertainty. Without an entrepreneurial mindset, start-ups may fail to succeed. The proposal is consistent with Kunene's (2008) proposed model. His model claims that motivation is viewed as a critical skill at every stage of development. Additionally, Bozwards and Rogers-Draycott (2017) argue that start-ups require an entrepreneurial mindset in order to deal with uncertainty, particularly during the stage in which they must maintain a market presence. Their statement can be explained by the nature of start-up development. According to Blank and Dolf (2013), start-ups must navigate an iterative experimentation loop. Start-ups with a strong entrepreneurial mindset are more likely to maintain business growth than those that do not. The entrepreneurial mindset is required to assist start-ups in iteratively testing until their assumptions are validated.

However, the majority of research on the effectiveness of entrepreneurial mindset constructs has been conducted from a business perspective, with little research from the perspective of a business incubator. It is critical to understand the impact of the entrepreneurial mindset on business success at each stage of the life cycle and which EM constructs are relevant at which stage from the incubator's perspective. It is worth researching from the incubator's perspectives as they have engaged high- and low-performing teams; thus, they could identify the factors that differentiate them and influence the team's performance.

3.1.3.6 Technical skills

Technical skills refer to skills that are required to perform a functional role in entrepreneurial tasks such as technology implementation and use (Chatterjee and Das, 2016; Hatthakijphong and Ting, 2019). Smith (2006) defines technical skills as product knowledge, process knowledge, service knowledge, market knowledge, and communication knowledge. The review of prior studies on skills (Chatterjee and Das, 2016; Perk and Struwig, 2005; de Wolf and Schoorlemmer, 2007; Kunene, 2008; Hatthakijphong and Ting, 2019) reveals that the impact of technical skills on business success depends on business context. An analysis of these research studies indicates that a business industry that requires a high level of specialisation to perform a functional job may require technical skills, whereas some businesses can succeed without them. Thus, the priority of technical skills is found to be lower

than the other skills (Hatthakijphong and Ting, 2019). However, the majority of the existing literature frames the findings through the lens of entrepreneurs rather than experts.

According to Kunene (2008), technical skills are required later in the business's establishment stage, whereas Bozwards and Rogers-Draycott (2017) do not consider technical skills to be an entrepreneur's competency focus. Viewed from a business mindset, technical skills may be regarded as elements that can be "bought" into the business. However, if entrepreneurs have little in the way of money, that may not be possible for them. Also, without some level of technical understanding, an entrepreneur cannot make good business judgements regarding what technical experts are telling him, especially when considering the product or operational software that is necessary for most new businesses. Thus, this study proposes that technical skills are crucial for success for start-ups when they require to develop an MVP (*Solution Validation* Stage) and turn the MVP into the solutions (*Business Model Validation* stage).

3.1.3.7 Communication skills

Communication is a fundamental business skill that enables effective interaction with other people, whether within the team or with external stakeholders. It is important to note that this factor focuses on the skills to communicate with external stakeholders because internal team communication is included in the team effectiveness model discussed in Section 3.2.3.4. This study follows the definition of communication skills of Hatthakijphong and Ting (2019), who define communication and negotiation as “the ability to communicate effectively and positively with others, such as partners, colleagues, and employees, in every type of communication scenario, including negotiations, non-verbal communication, and using some medium to imparting information”.

According to Chatterjee and Das (2016), communication skills are found to be significantly associated with the microentrepreneur's success. The findings from previous studies such as Sullivan (2000) imply the need for communication skills in every stage of business development because entrepreneurs must deal with a range of people during the start-up development process, including customers, suppliers, and investors. Entrepreneurs, for example, may be required to deal with the presentation or "pitch" of their business ideas to an

investor. With strong communication skills, they will easily convey the key message and persuade and attract investors to invest in their company. However, Kunene (2008) identified that communication is particularly critical when entrepreneurs must gather resources and plan for the business's establishment.

Additionally, Hatthakijphong and Ting (2019) reveal the distinct value of communication skills among successful and aspiring entrepreneurs. They found that aspiring entrepreneurs place a lower priority on these skills. It implies the need for business incubators to identify the priority of skills as entrepreneurs may not be aware of what they need. This study proposes that start-ups require communication skills at *every stage of business development* to effectively communicate, explain, and discuss issues with others, ultimately resulting in the accomplishment of their goals.

3.2 Team effectiveness

Start-ups are typically comprised of several co-founding individuals who collaborate to develop a sustainable business successfully. As a result, nearly all researchers regard the team aspect as key to success. Start-ups are required to maximise their skills with a successful collaboration with others, either internally or externally, to carry out certain activities in the development journey. For example, start-ups need to brainstorm to generate ideas and communicate customer feedback among team members to develop a solution that meets customers' needs. In order to successfully launch a business, start-up teams must effectively collaborate towards a common goal, and teamwork is an important factor driving business innovation (Pearce and Ensley, 2004). Thus, the manner in which a team works is an important aspect for a business incubator to assess and support start-ups. Comprehending the current state of teamwork and the quality of interaction and collaboration in a team (Hoegl and Gemuenden, 2001) can be critical to increase incubator performance. The following section divides the review into three sub-sections based on the following questions:

(1) What are the team effectiveness model that can explained the team dynamics of start-ups?
(2) What are crucial factors of team effectiveness that incubator should support?

(3) What effect does each team effectiveness construct have on the venture development process?

3.2.1 The team effectiveness literature

There is a substantial body of literature on team effectiveness (Salas et al., 2005; Moe and Dingsøyr, 2008; Hoegl and Gemuenden, 2001). These research studies discuss the critical elements in teamwork that every high performing team should possess. Many recent research studies have used the team effectiveness model as a lens in which to observe and explain the phenomenon of team effectiveness. Typically, suggested models for teamwork are studied in psychology and management science. More recently published literature on factors in team effectiveness has been in relation to software development teams (Moe and Dingsøyr, 2008; Hoegl and Gemuenden, 2001) and healthcare teams (Leggat, 2007), where tasks require coordinated and collaborative interaction between multiple people.

As discussed in Section 1.2.2, the prominent team effectiveness models such as Salas et al. (2005) and Hoegl and Gemuenden (2001) tends to be overlooked in the entrepreneurship and venture development. Diakanastasi et al. (2018) investigate the factors that influence how a start-up team works together and affect the new venture creation process. They found that lack of collaboration, improper leadership, lack of appropriate skills and background, the different motives could lead to the team collapse. These factors are captured in the team effectiveness models of Salas et al. (2005). However, other factors such as team monitoring are not considered in the study. This implies that there may be other team effectiveness factors influencing the success of venture development.

To derive the critical factors for start-ups, this study reviews existing team effectiveness models that have been used to examine the effectiveness in several type of teams such as software development teams. This review explores the research studies particularly in a domain of software development team, as software development team and start-up teams share some commonality in a critical collaboration activity. Three major reasons why the two types of teams have a common environment are:

I. Many technology start-ups are involved in software development, with co-founders of the start-ups developing the software themselves or contracting external partners to develop software solutions.

II. Second, both teams are often self-managed, operating in an environment where requirements are constantly evolving, with interchangeable roles and shared authority within the team. Further, the work is relatively self-contained but driven by external inputs and evaluation.

III. Thirdly, software development domain has developed new methodologies such as lean, scrum, and agile methodologies to manage team tasks. As discussed in Sections 2.1 and 2.2.1, agile methodology is an underpinned concept for existing start-up development methodologies (Lean Start-up, Customer Development Model) and have been used in current start-up practices (Livieratos and Siemos, 2020). Another example is the Google Lean Sprint method for software development which was then tested in the Google Ventures accelerator and is now recommended as the GV Design Sprint for incubators to use (Knapp, 2016).

Three key team effectiveness models considered are those of Hoegl and Gemuenden (2001), Dickinson and McIntyre (1997), and Salas et al. (2005), which are illustrated in Figures 3.2, 3.3 and 3.4, respectively. Table 3.7 presents the findings of empirical investigation from the recent team effectiveness model studies. It appears that the studies of teamwork can be classified based on two objectives:

Table 3.7: Empirical Findings on Team Effectiveness Models

Team effectiveness model	Empirical validation research studies	Finding
Dickinson and McIntyre (1997)	Single case study with software developer team (Moe et al., 2010)	The study of Moe et al. (2010) found that the trust and shared mental models were important components that are not included in the model of Dickinson and McIntyre (1997)
Hoegl and Gemuenden (2001)	Hoegl and Gemuenden (2001)	The research considers teamwork quality factor (TWQ) as a higher latent construct consisting of six facets. The model is empirically validated with 145 software development teams from four laboratories in a large company in Germany.
	Weimar et al. (2013)	Weimar et al. (2013) extend the model from that of Hoegl and Gemuenden (2001) by enhancing with three additional factors: trust, shared values and coordination of expertise. The study compared their new model with Hoegl and and Gemuenden's by conducting questionnaires with two hundred and fifty-two participants (team members and stakeholders) in the Netherlands. The result shows that the new proposed model explains team performance better than those of Hoegl and Gemuenden (2001). Both studies found that team performance varies according to the raters' perspectives and TWQ are considered as latent constructs. Communication, mutual support, and coordination of expertise are more important for team performance**.**
	Ahmad et al (2016)	The impact of teamwork factors from Weimar et al.'s (2013) model is examined apart from team leadership and mutual trust in a software development team in the telecommunications industry in Iran. The finding supports the work of Weimar et al. (2013), which found that coordination of expertise significantly influences team effectiveness.
Salas et al. (2005)	Moe and Dingsøyr (2008)	The results of testing the Big Five theory with a single case study of a scrum project show that team leadership behaviour according to the definition of Sala et al. (2005) cannot explain the team leadership in a scrum team because there is no designated team leader in the agile team.
	Strode (2015)	The study validated the teamwork model with three cases from a single organisation in the banking industry. Strode (2015) extends Sala et al.'s (2015) work in their study of agile software development by replacing team leadership with shared leadership to align with the concept of agile methodology. Also, the adapted model incorporates the *shared mental model* from the work of Mohammed et al. (2010). The results show that new model cannot fully explain teamwork in a software development team that adopts the hybrid agile methodology (Kanban and Scrum). However, the study does not confirm better performance if they adopted all teamwork factors. The factors that are adopted in all cases are: communication, backup behaviour, and trust.

(1) The demonstration of significant impact of teamwork factors on team effectiveness.

Research studies (Hoegl and Gemuenden, 2001; Weimar et al., 2013; Ahmad et al., 2016) in this stream frequently refer to Hoegl and Gemuenden's (2001) model of teamwork, as illustrated in Figure 3.2. This stream utilises quantitative research techniques such as questionnaires. These studies reveal that teamwork constructs significantly influence team effectiveness.

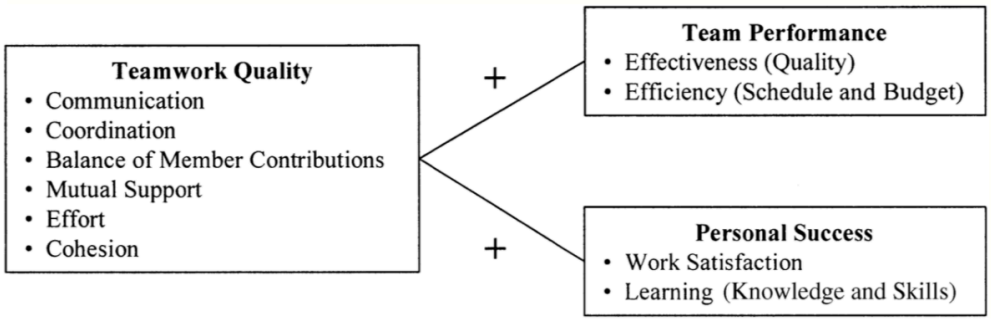

Figure 3.2: Teamwork model of Hoegl and Gemuenden (2001)

Hoegl and Gemuenden (2001) proposed a conceptual model that emphasises the importance of the quality of team interaction regardless of their activities. For instance, they assess team members' ability to communicate task-related information rather than the content of their communications. The model was empirically validated using 575 team members and leaders of 145 German software teams' innovative projects. The findings identified that the six facets of the model, as follows, represent the behaviour of highly collaborative teams:

- Communication
- Coordination
- Balance of member contribution
- Mutual support
- Effort
- Cohesion

Weimar et al. (2013) expanded on Hoegl and Gemuenden's (2001) work by identifying additional factors affecting software team performance. The three additional factors are *trust, shared values, and expertise coordination*. The model was empirically validated in the Netherlands with 252 team members and stakeholders of 29 teams. They claimed that the new proposed model more accurately describes teamwork behaviours. This is in line with Ahmad et al. (2016), who discovered that expertise coordination has a significant impact on the team effectiveness of software development teams in the telecommunications industry.

(2) The comprehensive of the team effectiveness phenomenon

The second research theme aim to explain and comprehend the phenomenon of teamwork, including the associated challenges, using a team effectiveness model. These researchers have employed qualitative methodology to examine the effectiveness of teams through case studies. The models of Dickinson and McIntyre (1997), as well as Sala et al. (2005), illustrated in the Figure 3.3 and Figure 3.4, have been used as models for teamwork in this research stream. The model of Dickinson and McIntyre (1997) consist of seven constructs which are

- Team orientation
- Team leadership
- Monitoring
- Feedback
- Back-up behaviour
- Communication
- Coordination (outcome)

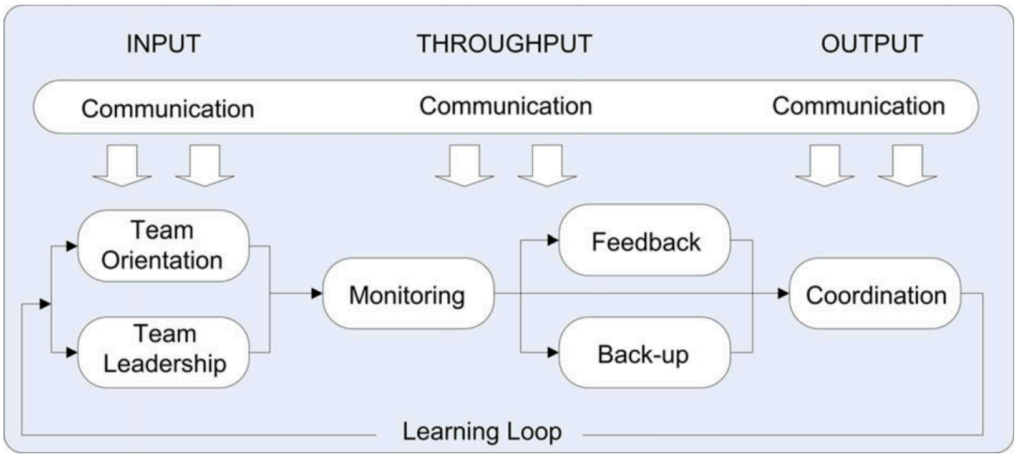

Figure 3.3: Dickinson and McIntyre model (1997)

Moe et al. (2010) adopted Dickinson and McIntyre's (1997) model to study an agile software development team in order to examine the effect of individual constructs of teamwork, though they discovered that *trust* and a *shared mental model* are critical components for examining teamwork These two constructs are not included in either Dickinson and McIntyre's (1997), while these two constructs are proposed in the model of Salas et al. (2005). Salas et al. (2005) consider *trust* and the *mental mechanism* as coordinating mechanisms in teamwork and have stated that the importance of teamwork key components varies according to the team's life and task.

The model of Salas et al. (2005), as illustrated in Figure 3.4, was derived based on a comprehensive literature review, consists of eight factors which are

- Team orientation
- Team leadership
- Mutual performance monitoring
- Back-up behaviour
- Adaptability
- Communication
- Shared mental models
- Mutual trust

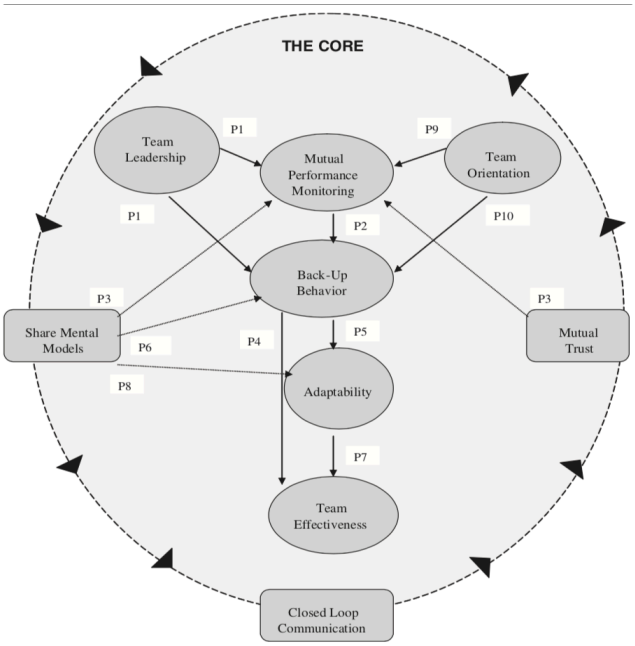

Figure 3.4: Teamwork model of Salas et al. (2005)

In more recent literature, Strode (2015) examined teamwork behaviour in a software development team, adapting the model of Salas et al. (2005) by replacing *team leadership* with *shared leadership* to align with the concept of agile methodology. Also, the adapted model incorporates the *shared mental model* from the work of Mohammed et al. (2010). The results indicate that the new model does not adequately explain teamwork in software development teams that use a hybrid agile methodology. The findings are consistent with Dingsøyr and Dyba (2012), which advocate for developing a distinct conceptual model for agile software development teams in light of their unique characteristics. Additionally, the findings imply the difference in significance of team effectiveness factors because the study does not confirm better performance if they adopted all teamwork factors. The factors that are adopted in all cases are *communication*, *backup behaviour*, and *trust*.

3.2.2 The crucial constructs of team effectiveness

As presented in Table 3.8, eleven constructs are derived from team effectiveness models discussed in Section 3.2.1. According to the synthesis of definition, it appears that some factors share the same characteristics but have been defined under different terminologies. For instance, team orientation identified by Dickinson and McIntyre (1997) and cohesion in the

study of Hoegl and Gemuenden (2001). This study proposes five critical team effectiveness factors for incubators to investigate in order to assess and promote the quality of team interaction and collaboration. Constructs that have similar impacts are categorised under same factors. For example, shared leadership and team leadership are categorised into one factor. The factors were proposed based on their impact and possibility to be assessed and promoted during the business incubation process. These five factors identified in the academic framework of this study are as follows:

(1) Team orientation
(2) Team leadership and shared leadership
(3) Feedback and monitoring
(4) Team communication
(5) Shared vision

It is important to note that the author does not imply that the other factors are irrelevant, the rationales to explain the exclusive of four team effectiveness factors in this study are:

(1) Adaptability: This factor is included in the entrepreneurial mindset, as previously discussed in section 3.1.3.5; thus, it is excluded from observation of the team effectiveness constructs in this study.
(2) Mutual trust: This factor refers to an internal factor, which may be difficult for incubators to evaluate during the business incubation process, as incubator staff members are not considered as part of the internal start-up team.
(3) Coordination: Even though Hoegl and Gemuenden (2001) consider coordination as a facet of teamwork quality, it is found that *coordination* refers to an outcome of *team leadership.* Dickinson and McIntyre (1997) stated that *coordination* is the outcome of the integrated execution of team members' activities. Thus, this study does not explicitly measure coordination.
(4) Backup behaviour: backup behaviour arguably become more intrinsically difficult as the organisation grows. Thus, this study does not explicitly measure because it is difficult for incubators to evaluate during the business incubation process.

Table 3.8: Comparison of key constructs in team effectiveness models

Teamwork constructs	Definition	Bahaviour maker	Dickinson and McIntyre (1997)	Hoegl and Gemuende (2001)	Salas et al. (2005)	Weimar et al. (2013)	Strode (2015)
Team orientation	Refers to the team tasks and the attitudes that team members have towards one another. It reflects an acceptance of team norms, the level of group cohesiveness, and the importance of team membership (Dickinson and McIntyre Model, 1997).	• Taking into account alternative solutions provided by teammates and appraising that input to determine what is most correct • Increased task involvement, information sharing participatory goal setting • Value teamwork • Strongly believe in the team's collective ability to succeed • Assign high priority to team goals • Participate willingly in all relevant aspects of the team	✓	✓ Cohesion	✓	✓	✓
Team leadership	Capable of directing and coordinating the activities of other team members, evaluating team performance, assigning tasks, developing team knowledge, skills, and abilities, motivating team members, planning and organising, and establishing a positive atmosphere (Salas et al., 2005)	• Facilitate team problem solving. • Provide performance expectations and acceptable interaction patterns. • Synchronise and combine individual team member contributions. • Clarify team members' roles. • Have a clear and common purpose. • Involve the right people in decisions. • Establish and revise team goals and plans. • Distribute and assign work thoughtfully.	✓	✓ Balance of member contribution	✓	✓ Coordination of expertise	✓ Shared leadership
Monitoring	The ability to develop common understandings of the team environment in order to accurately monitor teammate performance.	• Performance monitoring and cross-checking systems • Error correction, intra-team monitoring strategy development • Procedure maintenance • Identifying mistakes and lapses in other team members' actions	✓		✓		✓
Feedback	Team members' ability to provide, seek, and receive task clarification feedback, provide constructive feedback and offer advice for improving performance (Salas, Burke, and Cannon-Bowers (2000) combined this factor with monitoring)	• Giving feedback refers to providing information regarding other members' performance. • Seeking feedback refers to requesting input or guidance regarding performance and to accept positive and negative information regarding performance. • Responding to other members' requests for information about their performance • Accepting time-saving suggestions offered by other team members	✓				

Backup behaviour /Mutual support	Ability to anticipate the needs of other team members through accurate knowledge of their responsibilities.	• Recognition by potential backup providers that there is a workload distribution problem in their team • Shifting of work responsibilities to underutilized team members • Completion of the whole task or parts of tasks by other team members	✓	✓	✓	✓	✓
Coordination	The synchronised of the individual effort.	• Teams need to agree on a common goal structure and develop sufficiently subgoals for an individual team member that does not overlap.	✓ Outcome	✓		✓	
Communication	The process by which information is exchanged clearly and accurately between two or more team members in the prescribed manner and using proper terminology. (Salas, Burke and Cannon-Bowers (2000)	• Following up with team members to ensure message was received • Acknowledging that a message was received • Clarifying with the sender of the message that the message received is the same as the intended message sent • Communicate often ‘‘enough.’’ • Information exchange • Closed-loop communication Information sharing • Consulting with others • Open exchange of relevant information	✓	✓	✓	✓	✓
Adaptability	Ability to alter strategies based on information gathered from the environment. Changing a course of action or a team's range of skills in response to changing circumstances (internal or external). (Salas et al., 2005)	• Identify signs that a change has occurred, give that change meaning, and create a new plan for the changes.			✓		✓
Mutual trust	The shared belief that individual will carry out their responsibilities. (Salas et al., 2005)	Willingness to accept feedback and admit mistakes			✓	✓	✓
Shared vision	A shared mental model of the team's future state or tasks that serves as the foundation for team action.	Team members share the same values and goals.			✓ Shared mental model	✓ Effort, shared vision, shared mission	✓ Value sharing

3.2.3 The effect of team effectiveness constructs on the venture development process

This section discusses the impact of team effectiveness factors and how they influence better performance in the venture creation process. The findings of Strode (2015) imply the difference in significance of team effectiveness constructs because the study does not confirm better performance if they adopted all teamwork factors. Diakanastasi et al. (2018) suggest investigating how team performance factors vary according to developmental stage. On the other hand, Weimar et al. (2013) reveal that individual facets of the teamwork construct have no significant difference in terms of team effectiveness. As a result, they suggested considering all of the factors when assessing the quality of team collaboration.

However, the available literature examining the significance of each construct according to start-up development is scant. As discussed in section 3.2.1, there are research gaps in using team effectiveness models to investigate the factors influencing the venture development process and how their significance varies according to the start-up stage of achievement. Identifying these factors could help incubators prioritise support and better allocate resources to start-ups in need. The following sections discuss why the factors are important and how they affect the venture development process. Further, the propositions to be validated in this study are proposed.

3.2.3.1 Team orientation

Team orientation is regarded as an attitude rather than a behaviour (Salas et al., 2005). Teams are required to establish a certain level of team cohesive among their members, where the input is appraised, and individuals are encouraged to contribute to the team's tasks to successfully complete them. According to Hoegl and Gemuenden (2001), team orientation refers to a desire of team members to stay "on team," to have a sense of belonging and togetherness, and high priority of team goals over those of the individual. Therefore, this work categorises constructs such as cohesion and togetherness as part of the main team orientation factor.

Good team orientation results in faster achievement of goals, as it encourages team members to work hard on their own, share information and knowledge among team members, and conduct entrepreneurial activities such as iteration of customer discovery. Additionally, it is

important to encourage team member to believe that the success of the team is the collective ability of the team members because each team member's contribution counts due to the fact that different people will have different perspectives of tasks.

This study proposes that team orientation is considered a key factor at *every stage of business development* as it refers to team members' attitudes toward one another and the value of team membership. Additionally, it is necessary for the individual team to have high team orientation at the later stage of a start-up when they require a high level of specialised skill to accomplish tasks. Start-ups will face more challenges if members have low team orientation; as Moe, Dingsøyr, and Dyba (2010) discovered, low team orientation leads to low team monitoring because the members sometimes do not understand what others are doing.

Business incubators can help foster team orientation, as emerging entrepreneurs may encounter difficulties interacting with other team members and resolving conflicts to promote the appreciation of team members. Thus, the incubator could intervene to assess and facilitate this construct during the training.

3.2.3.2 Team leadership

Team leadership entails the capacity to establish a goal, develop strategies for achieving it, and delegate tasks to team members (Cannon-Bowers et al., 1995; Salas et al., 2005). It is debatable whether team leadership, with a single leader, or shared leadership among team members, is more appropriate for start-up teams. As Moe and Dingsøyr (2008) discovered, the definition of team leadership as defined by Salas et al. (2005) cannot account for the behaviour of agile software development teams. On the other hand, Strode (2015) states that shared leadership cannot explain the behaviour in a team that applies mixed agile methodology either. Some start-ups also adopt agile methodology in order to manage tasks during their business development as well. Thus, both types of team leadership are present in start-up teams.

This study proposes that team leadership is critical at *every stage of business development.* Start-ups require a team leader because he or she must assess and monitor progress and step in when necessary to keep the team "on track" (Salas et al., 2005). Without team leadership, the

team would lack a defined task structure, resulting in low performance. When a team is small, the role of each member may not need to be defined explicitly, though co-founders must understand their respective responsibilities and work collaboratively to accomplish the goals. When a team grows and tasks become more complex, it is necessary to assign clear roles to each team member in order to avoid conflict as more people are involved in completing the task.

Additionally, the team leader must ensure that everyone on the team can contribute his or her expertise. It is the result of selecting the right team members for the team and good resource management. The concept of the balance of member contribution supports the cross-functional team. The team leader should motivate team members to perform a task when the team needs support because a start-up must contend with a great deal of uncertainty. Hence, team member motivation is critical. However, it is important to investigate the requirement of leadership behaviours across the start-up development process. It can be explained by the findings of Natrajan and Chattopadhyay (2014), who found that each leadership behaviour has a differential impact on managing and controlling the team to achieve project success.

Business incubators can assist in promoting team leadership because nascent entrepreneurs may lack an understanding of how to manage a team, which includes allocating tasks among team members and setting goals. Thus, the incubator could intervene to make recommendations and transfer skills to the team leader.

3.2.3.3 Monitoring and feedback

Monitoring behaviour occurs when the team establishes a goal, and each team member clearly understands his/her role and agrees on the objective. Salas et al. (2005) hypothesised that monitoring acts as a mediator between team leadership and effectiveness. Dickinson and McIntyre (1997) consider monitoring an enabling factor of the learning process. Good monitoring occurs when the team understands each other's tasks to justify appropriate progress and the situation in order to offer support or feedback (Salas et al., 2005). However, it means noting if monitoring is conducted, but no further action is taken. This study follows Salas et al.

(2000) by combining feedback and monitoring as one dimension of teamwork skills because these two constructs are found to occur concurrently.

This study proposes that monitoring and feedback are necessary at *every stage of the business development* because it enables the team to keep track of progress and improve performance to address challenges or accelerate progress. Additionally, these behaviours are found to embed in the concept of the Lean Start-up methodology of Ries (2010), which encourages entrepreneurs to establish actionable metrics for measurement. After a business enters the market, each team will have a target to meet; therefore, if the team monitor its progress and finds that performance is likely to fall short of the target, the team can adjust its strategy in real-time. Thus, it confirms the significance of these constructs on start-up development.

Monitoring and feedback is one of the incubator's jobs, where he or she must monitor the progress of the start-up and encourage the start-up to complete the agreed-upon task on time. However, the incubator cannot monitor every task performed by the team. The team members' responsibility is to learn how to set goals and monitor progress. So, these constructs should be crucial factors for incubators to assess the effectiveness of teamwork but to be considered across all development stages. As suggested by Dickinson and McIntyre (1997), the measure of monitoring behaviour in the team can be measured by comprehending others' tasks, monitoring, and providing feedback and/or backup to demonstrate the completed loop.

3.2.3.4 Team communication

Communication is included in every model discussed above, such as Dickinson and McIntyre's model (1997), that of Salas et al. (2005), Hoegl and Gemuenden (2001), Weimar et al. (2013), and Strode (2015). The impact of communication is empirically found through both quantitative and qualitative research. Every activity relies on communication in order to allow successful collaboration among team members. Effective communication can reduce confusion, conflicts and increase cohesion. (Moe, Dingsøyr, and Dybå, 2010).

Hoegl and Gemuenden (2001) focus on the quality of communication and how well information is communicated, including consistency, and informal and open communication,

without considering what is communicated; in fact, the communication content should be considered as well. For example, at the early stages, start-ups must discuss the data they collect from customers among team members to align it with the team's understanding. However, even with consistent meetings, there will be no progress if the same thing is continued to be reported or if there are unrelated tasks. As a result, it would be beneficial if the incubator assessed team communication and guided the priority for start-ups so they understand what should be communicated at what time.

Interestingly, Salas et al. (2005) suggests that team communication is more important during the early stage of start-up development when they are not familiar with the terms and may interpret the message differently. They need communicate various aspects. Their studies indicate that, over time, teams appear to develop a shared vocabulary, thereby shortening the message. However, the empirical investigation confirming this issue is scant, particularly from incubators' perspectives.

This study proposes that communication is a critical factor *at every stage of business development*. Lack of communication results in longer task completion times and low team efficiency (Moe, Dingsøyr, and Dybå, 2010). Incubators can monitor whether the team has adequate communication by ensuring that all team members understand the same goal and the frequency of team meetings. Encouraging meetings with the start-up team can improve communication effectiveness.

3.2.3.5 Shared vision

Shared vision drives team members to effectively coordinate their efforts and to engage in collaborative behaviours (Pearch and Ensley, 2004). Weimar et al. (2013) introduce the value sharing construct in their teamwork model as they proposed that team are diverse and require value sharing in order to prevent conflicts in the team. Weimar et al. (2013) suggested to include the effort construct under value sharing because effort, as defined by Hoegl and Gemuenden (2001), refers to the shared expectations of team members. Ahmed (2016) confirmed the finding of Weimar et al. (2013) that shared vision has a positive impact on team performance. According to Jehn (1994), the measure of value sharing is to assess if team

members have and understand (1) similar goals, (2) values, (3) work values, and (4) beliefs about what is important within the team.

Research studies such as Pearce and Ensley (2004) and Strese et al. (2018) found that shared vision among team members influences the company's innovation performance. Apart from CEO's passion for the company's innovation, the shared vision among team members also influences this performance. A shared vision can be developed through the connection among team members, where they communicate and listen to each other. The interview with managers conducted by Kouzes and Posner (2009) found that the leader should not only take his or her opinion as the priority but should also listen and understand what others want and develops the shared vision from the collective agreement.

This study proposes that shared vision is important throughout *every stage of business development* because a team consists of team members with different backgrounds. During the early stage, co-founding teams are required to have shared values as they decide to form a team to develop a business together. It is important to ensure that everyone in the team shares the same values in running the business. At a later stage, as suggested by Preston and Karahanna (2009), it is crucial to ensure that the company develop an effective shared vision among each department to align with the business strategies.

3.3 Chapter summary

This chapter focused on synthesising and critically analysing relevant studies regarding critical skills and team effectiveness factors that incubators could assess start-ups' needs and provide appropriate support. Crucial factors were evaluated, synthesised and identified their significance based on the four-development stage derived in Section 2.3

The chapter begins with a review of literature studies that empirically validated the impact on start-up development in order to determine the critical skills necessary for start-up success. Regarding the review, start-ups require specific skills at different stages of business development. The reviews guide the incubation strategy on the priority of support for business incubators. From the legitimacy perspective, incubators understand what support they could

prioritise by identifying resources gap to improve their start-ups' capability in achieving the goal; thus, the legitimacy of new start-ups are increased.

Seven critical skills were emerged from the literature review. Each of them is found to have varying impact on different stage of business development, which serves as the propositions to be empirically validated in this study from the perspective of business incubators. These skills are as follows:

(1) Finance skills
(2) Networking skills
(3) Strategic thinking skills
(4) Marketing and sale skills
(5) Entrepreneurial mindset
(6) Technical skills
(7) Communication skills

The second section of this chapter examines team effectiveness factors that influence the performance of start-up development. This study examined prominent team effectiveness models such as Hoegl and Gemuenden (2001), Dickinson and McIntyre (1997), and Salas et al. (2005). Based on the review of different models, five team effectiveness factors were proposed to be crucial for business incubators to monitor and support during start-up development process as start-ups need to maximise their skills through a successful collaboration with others, either internally or externally, to carry out certain activities in the development journey.

(1) Team orientation
(2) Team leadership and shared leadership
(3) Feedback and monitoring
(4) Team communication
(5) Shared vision

However, the majority of research on the impact of these factors has been conducted from a business perspective, with little research from the perspective of a business incubator. It is critical to understand the impact of these factors on business success at each stage of the life cycle and which are relevant at which stage from the incubator's perspective. It is worth researching from the incubator's perspectives as they have engaged high- and low-performing teams; thus, they could identify the factors that differentiate them and influence the team's performance.

The outcome of this reviews serves as key elements in the academic framework for guiding customised support. By identifying critical resources (skills and team effectiveness) required at the particular stage, it contributes to the understanding of how incubators could assist start-ups in establishing legitimacy at each development stage to enhance the confidence of other stakeholders so as to increase the chance of acquiring new resources such as new sources of skills and funding.

However, whether the derived framework (authors) is aligned with incubators' needs and resources needed to be tested. Empirical validation from an incubator perspective is necessary to determine the practical application of the enhanced framework. The next chapter discusses and justifies the research methodology employed in this study for empirically validating the academic framework derived from a review of literature.

Chapter Four: Research Methodology

4.0 Introduction

A framework for incubator customised support was derived by synthesising the start-up development process, critical skills, and team effectiveness factors in Chapters Two and Three. However, whether the derived framework is aligned with current incubator practices needs to be validated. This chapter discusses the rationale to select research approach and research methodologies employed to empirically assess, iteratively refine and validate the academic framework aggregated from the lessons and learning from a range of reviewed publications. This chapter comprises five sections:

- Section 4.1 revisits the research questions and research objectives, which determines the nature of the research methodology.
- Section 4.2 discusses the research philosophy to justify the underlying principle of this research study and the researcher's approach toward collecting, analysing, and interpreting social phenomena.
- Section 4.3 discusses how this study was conducted.
- Section 4.4 evaluates the primary research methodologies employed in this study
- Section 4.5 discusses the research design, ethical considerations, the data collection and analysis procedures.

4.1 Revisiting research question and research objectives

This study aims to develop a conceptual framework for business incubators to help guide a customised support strategy. The key research question of this study is:

> How can the customised support service be designed for start-up business incubator?

From the research question, it was decided to create a framework to guide creating a customised support service, which any incubator could examine and evaluate. This was broken down into four sub-objectives, as follows:

1) To evaluate a representative selection of start-up development methodologies that are both recognised by the research community and adopted by business incubators with proven impact.
2) To critically review how key constructs have affected a start-ups performance along their development journey, in particular essential skills and team effectiveness factors in the literature.
3) To contrast literature with practice, and to inform the design of a conceptual framework to assess and guide customised support mechanisms for business incubators.
4) To empirically assess, iteratively develop and validate the conceptual framework designed.

In order to address the research question, this study employed a qualitative approach, with semi-structured interviews serving as the main primary data collection method. Additionally, data collection is triangulated using observation and secondary data sources. Figure 4.1 summarises the research methodologies used in this study and Section 4.2 describes how and why this approach was chosen.

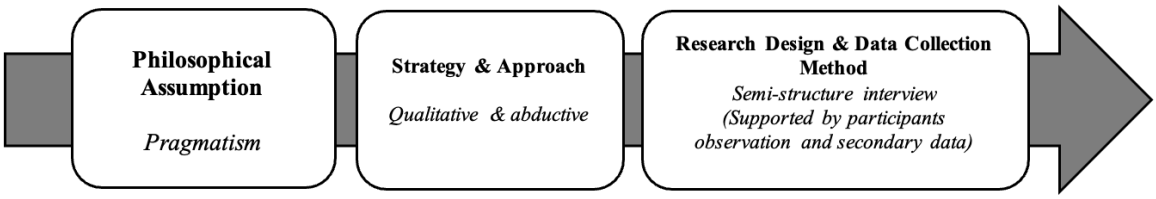

Figure 4.1: The overview of research methodology

4.2 Research philosophy

Mcdonald et al. (2015) suggests, grounded in entrepreneurship research, that there are four key research philosophies: positivism (Hornberger et al., 2017), interpretivism (Packard, 2017), pragmatism (Surie and Ashkey, 2008) and critical realism (Hu, 2018).

Positivism measures the phenomena using an objective method rather than relying on subjective beliefs or experiences. Positivists seek to operationalise the measurable constructs

derived from observable facts and then to determine their causal explanation. Following that, statistical analysis is used to generalise the findings. The positivist approach is based on the use of large amounts of data, statistical models, and quantitative measurement to test general theories (Benton and Craib, 2001; Tunrner, 2001).

On the other hand, interpretivism believes that reality is constructed through the interpretation of a large number of related actors. Due to the fact that realities are social and experiential in nature, local and specific in form and content, and contingent on the individuals who hold them, they emerge from a shared understanding. People have a variety of ways of perceiving the world and there is no superior interpretation. The objective of interpretivism is to comprehend and interpret the meanings in human behaviour, rather than to generalise and forecast causes and effects. The central concept of interpretivism is to acknowledge, reconstruct and understand already-existing subjective meanings in the social world (Goldkuhl, 2012).

Pragmatism is another paradigm that combines positivism and interpretivism (Mitchell, 2018). The pragmatic researcher is able to maintain both subjectivity and objectivity in their own reflections on research and in data collection and analysis, respectively. In other words, the ontology of pragmatism is based on the objective and subjective. Due to its critical nature, it emphasises a flexibility of research approaches and methodologies. Thus, a study can integrate multiple approaches to address the research question. Pragmatism is predicated on the belief that theories can be contextual and generalisable through an examination of their transferability to another situation (Shannon-Baker, 2016; Goldkuhl, 2012; Kelly and Cordeiro, 2020; Mitchell, 2018).

Critical realism lies in the middle between positivism and interpretivism. The main characteristics of critical realism are that social phenomena are real and exist independently, but also allowing for the flexibility of such social entities in response to the interdependent behaviours of social actors. Critical realism believes that the knowledge of social reality is differentiated into distinct levels of reality. Each of which has its own characteristics and interconnections with the other. According to Bhaskar (1987), critical realism consists of three layers of reality: 'the real' is the underlying mechanism, which is distinguished from 'the actual'

event, which may or may not be observed, and 'the empirical' event, which is observed. In other words, realism is a perspective that focuses on both observable and unobservable characteristics of the real world (Bhaskar, 1978).

This study leans toward transferability of the theory and the belief in actionable knowledge. As a result, pragmatism serves as an underpinning research philosophy in this study. The decision to embrace pragmatism as the overarching philosophical orientation was influenced by the motivation to contribute guiding and actionable knowledge that is grounded in real life operations, and thus to guide real business incubators. Thus, the goal of this study is to develop a general framework for guiding the provision of customised support for start-up incubators. This study investigates the transferability of results by determining the degree of context-specificity and the generalisability of the framework. Though many research studies on critical skills for start-ups and the factors of founding team effectiveness adopted a positivist perspective, the author does not, because this study believes that reality emerges from the shared understanding and is constructed through the interpretations of participants and researchers. Qualitative data is required to establish a thorough understanding of the phenomenon in order to establish the fundamental framework. The positivist perspective can be expanded upon in further studies to further explore the generalisation of the approach suggested by this research.

4.3 Research approach

According to Saunders et al. (2016) and Mitchell (2018), three primary research approaches are deductive, inductive and abductive. The first two approaches are linear, while the third is an iterative process. The three research appraoch processes are depicted in Figure 4.2. This study employed an abductive approach because the research objective is to develop a conceptual framework based on real-world practices, which necessitated an iterative process for theory development.

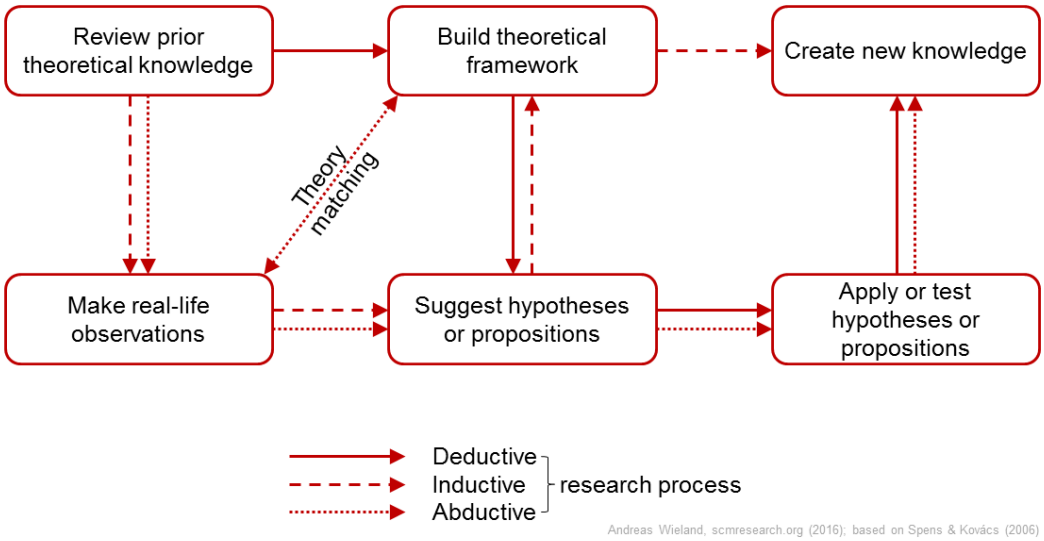

Figure 4.2: Research approach (Spens and Kovacs, 2006)

The key difference between deductive and inductive approaches is in the researchers' starting point. Saunders et al. (2016) suggests the deductive approach begins with deriving a theory supported by multiple pieces of literature. A deductive approach focuses on testing established theory (Gabriel, 2013). The researcher must develop research strategies to test the theory. On the other hand, inductive research begins with collecting primary data through real-world observation and progresses to the development of the theory or framework (Saunders et al., 2016).

The abductive approach begins by deriving the concept through observation of real-world practises, which can serve as a foundation for comprehending the research problem and combining the theory. Abductive research is used to develop theories with the primary goal of increasing understanding of novel concepts and theoretical models (Kovács and Spens, 2005). The abductive approach includes a process called theory matching, which develops and tests the theory iteratively.

This study employs an abductive approach comprised of three stages, as illustrated in Figure 4.3. The first stage addresses the first three objectives by reviewing prior theoretical knowledge about business incubation, the start-up development methodologies, skills and team effectiveness factors that affect the success of start-ups. The outcome of this stage informs the

pre-defined themes for theory matching. The second stage is the theory matching stage, in which the empirical data and the theory are combined. Semi-structured interviews and participant observations with business incubators in various countries were conducted to investigate real-world practices. A result from this stage was a refined framework for business incubators to guide customised start-up support that augments the conceptual framework. Finally, this framework was then validated through the examination of Thai business incubators. Underpinned by pragmatism, by dividing the validation study into two contexts, the researcher can examine transferability.

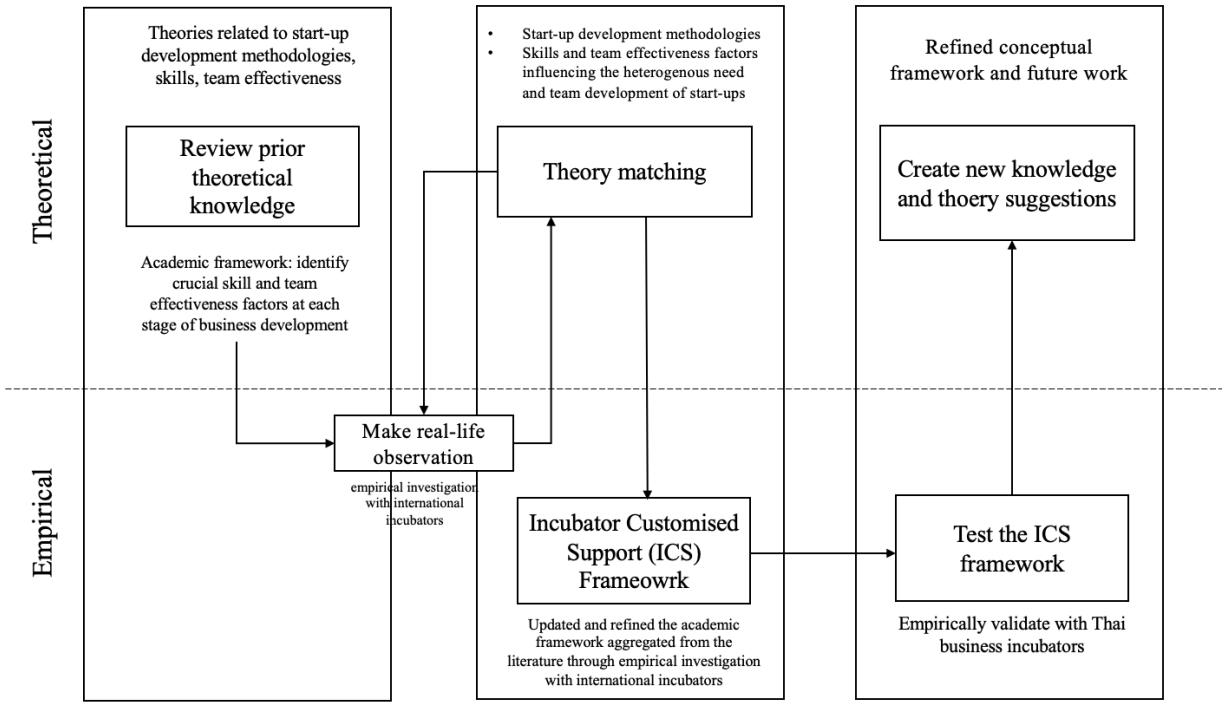

Figure 4.3: Three stages of abductive research approach (Author)

The pragmatism and abductive approach of this research study address Morgan's (2007) suggestion of connecting theory and data by converting real-world observations into theories and then evaluating those theories through action. The refined framework emerges from the combination of the subjective interpretations of researchers' and participants' perspectives and objective analysis of the critical factors required for start-ups to advance to the next stage of their business development. The findings of this study emphasise the actionable knowledge that incubator specialists can apply to build tailored support practices.

4.4 Research methodologies

This study employs a multi-method qualitative methodology, with semi-structured interviews serving as the main primary data collection technique. Another primary data source was participant observations of the incubation program, which enables the researcher to triangulate the data from other sources. Additionally, textual data from secondary sources, such as publicly available data on company websites and documents, is used to supplement data analysis and ensure that it is consistent with interview findings. The qualitative method was chosen for this study because it enables the researcher to collect open-ended data and develop themes from it in order to ascertain social processes and relationships. Qualitative methodology is used to gain in-depth insight and reveal the phenomenon's meaning from the perspective of the participants.

Mcdonald et al. (2015) in his paper revealed that quantitative research was the dominant research methodology used in the entrepreneurship domains between 1985 and 2013. A diagram from their comprehensive review is shown in Figure 4.4. The findings on research methodologies employed in research studies derived from a review of the literature on entrepreneurial skills and team effectiveness in Chapters Two, Three are consistent with Mcdonald et al. (2015). For example, many research studies (Chatterjee and Das, 2016; Abdullah, Hadi, and Dana, 2018; Hatthakijphong and Ting, 2019; Ahmad et al., 2016) used quantitative and statistical surveys to demonstrate critical skill factors. Lai and Lin (2015) and van Weele et al. (2019) used a quantitative approach to investigate the various needs of start-ups. According to Golafshani (2003) and Winter (2000), the quantitative researcher aims to have as little interaction with the research process as possible because quantitative research closely resembles positivism in its avoidance of human influence. The quantitative approach allows for generalisation from a large data set; however, the advantages of gaining an in-depth understanding of the phenomenon are compromised.

Another research approach used in social science is the mixed methods viewpoint (Creswell, 2003). A mixed research method is a blended approach that combines quantitative and qualitative techniques. The mixed research method establishes a procedure for conducting research that begins with a survey and concludes with open-ended qualitative interviews

(Tashakkori and Teddlie, 2003). Both quantitative and qualitative data are gathered to create a final research database (Creswell et al., 2003). Further, Wisdom and Creswell (2013) assert that the mixed method's approach enables the researcher to observe, compare and cross reference for validation, data from both outcomes. This process generates complex data, which necessitates the use of many resources to ensure the research study's validity.

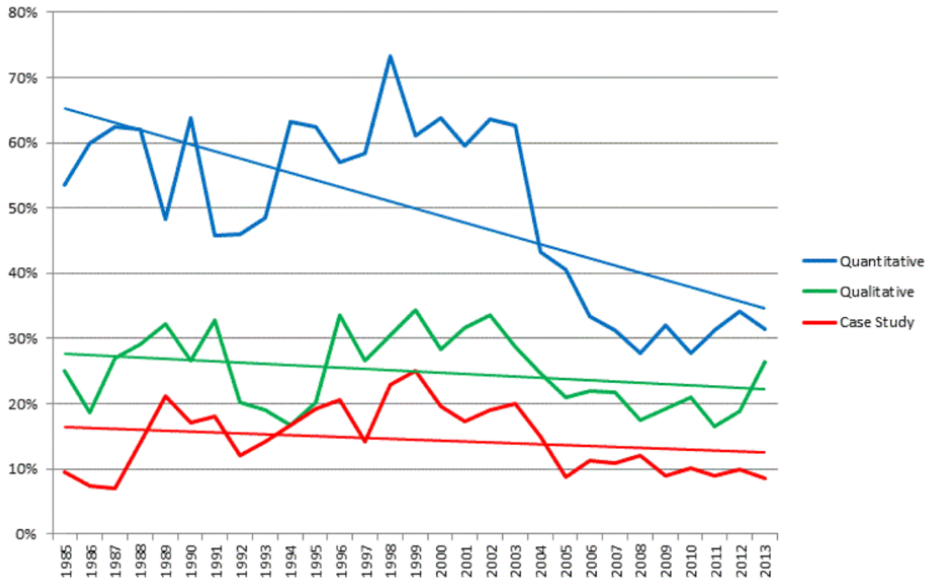

Figure 4.4: Research methodologies used in entrepreneurship research between 1985-2013 (Mcdonald et al., 2015)

A qualitative approach is viable for this study because it seeks an in-depth understanding of how business incubators value the factors that affect a start-up's development and how these factors may impact the start-up(s) success. Miles and Huberman (1994) write that qualitative research is an exploratory process that allows researchers to gain an in-depth understanding of the social phenomenon. This process entails formulating, comparing, sorting, and categorising the patterns found in the study. Marshall and Rossman (2014) describe how the approach takes a holistic view of a social phenomenon and interprets it, resulting in interpretive and detailed findings (Bryman, 2003; Creswell, 2013).

In qualitative research, interviews and participants observation are frequently used data collection techniques. Interviews primarily allow research participants to express themselves in their own words, which can help reveal new insights. Interviews enable researchers to

explore, clarify points in real-time and delve deeper than other data collection methods, such as questionnaires. The disadvantages of the interview method are that it can be difficult to control the context and it takes time to conduct and analyse the results. Often the analysis is not straightforward, and generalisation from the collected data can be difficult due to unknown contexts. This study used semi-structured interview as the primary sources of data collection.

Participant observation was also employed as this allowed the researcher to witness various methods and styles of start-up support that were not revealed during the interview process. The primary characteristic of observation methods is that they provide direct access to the phenomena being studied. However, this method has the drawback of being prone to observer bias and the observer can influence the scenario and corrupt the data. (Bogdewic, 1992). This study attempts to minimises observation bias by analysing observation data using predefined coding derived from the literature. This study employed both interviews and observation as a method of data collection. Thus, it allows the researcher to correlate and compare the results from two different methods, as well as generating insights from both approaches. The following section discusses the research processes in detail.

4.5 Research design

This study employed a qualitative research approach, with semi-structured interviews serving as the main primary data collection method. The participant observation approach was used to gain a deep insight into the real-world operations in business incubations programs studied. Secondary sources augmented this view, such as publicly available data from the company websites and internal documents as suggested by Saunders et al. (2016). The primary data collection of this study was divided into two phases. Following the abductive approach, as illustrated in Figure 4.3, the objectives of each data collection phase are:

(1) To derive, validate and refine an academic framework appropriate to the context of this research. This context narrows and focusses the broad context inherent when aggregating findings from a broad range of studies each with its own context. This is necessary to produce actionable results.

(2) To validate the Incubator Customised Support (ICS) Framework empirically derived from the first phase of data collection further to test its contextual relevance.

Table 4.1 depicts the two phases of this qualitative research. Both phases follow the same data collections techniques and data analysis methods. The benefit to these approaches is to investigate the transferability of results of the research.

Table 4.1: Two phases of empirical data collection

Phase 1: To validate and refine the academic framework		
#	**Process**	**Description**
1	Preparation	• Interview guide development • Observation fieldnote • Participant recruitment • Obtaining informed consent
2	Data collection	• Conduct interviews with thirteen business incubators • Gathering secondary data • Conduct participant observations
3	Data analysis	• Transcribe • Analysis and interpretation of data
Phase 2: To validate the ICS Framework derived from the first phase		
1	Preparation	• Interview guide development • Participant recruitment • Obtaining informed consent
2	Main data collection	• Conducting interviews with sixteen business incubators • Gathering secondary data • Creating database
3	Data analysis	• Transcribe • Analysis and interpretation of data

The following sections discuss the ethical consideration (Section 4.5.1), preparation processes of two data collection phases (Section 4.5.2), the data collection processes (Section 4.5.3.) and data analytics (Section 4.5.4).

4.5.1 Ethical consideration

Prior to beginning the data collection, the following activities were undertaken by the author in preparation for the ethical consideration.

- The author developed the research protocol discussing the research's context, design, and ethical considerations throughout data collection, analysis, and publication of the finding such as participant confidentiality.
- The author obtained a BSREC ethical approval in order to comply with the University of Warwick's standard requirements. (See Appendix I)
- The interview results were pseudonymisation as soon as the completion of the interview and kept confidential in order to protect the interviewees.

The PIL and consent form were sent to individual research participants prior to conducting the interviews to ensure they were aware of the research's intended use of the data. The purpose of the research, data security, how the identities of participants and their organisations were kept confidential in the research outputs, participant withdrawal rights, and data dissemination were all discussed in detail. Before interviewing subjects, they were required to sign a consent form. The Biomedical & Scientific Research Ethics Committee (BSREC) of the University of Warwick reviewed and approved the application for ethical approval. The reference number is BSREC 46/19-20. It was issued on January 30th, 2020. (See Appendix I).

4.5.2 Preparation of data collection

The first step is to prepare for data collection, including developing interview guides, recruiting participants, and gaining access to interviewees. An informed consent process was prepared, and approval obtained prior to the data collection as discussed in Section 4.5.1.

The development of the interview guide is a critical step in preparing for qualitative research involving semi-structured interviews since it establishes the framework for the interview and the observation process. The interview guide includes a list of themes derived from the literature review (Sections 2.3, 3.1, 3.2). The complete interview guide used is shown in Appendix A. Pilot studies were undertaken prior to conducting the main interview to validate the research protocol and data collection instruments. It is necessary to use consistent research instruments to increase the trustworthiness of obtained data (Malmqvist et al., 2019). Pilot studies can help improve the quality of research by informing the subsequent stages of the

research process (Hassan et al., 2006; Malmqvist et al., 2019). They prepare the researcher to address potential difficulties that may arise during the primary study and to rehearse and assess the overall data collection and analysis process. The interview guide was continually refined after pilot interviews. Pilot studies were conducted with three incubator specialists until there is no major modification to the interview guide.

A business incubator is the unit of analysis in this study. As defined in Section 1.1.1, this study uses a broad term of 'business incubator'. The term 'business incubator' refers to an organisation that support the establishment and growth of new businesses with tangible and intangible resources (Hausberg and Korreck, 2018). Hence, it allows the researcher to investigate various dimensions and support for different types of support organisations, including incubators, accelerators, private equity firms. This study used the terms' incubator' and 'accelerator' interchangeably and explore support actions addressing the full journey. Business incubators usually have limited resources, it is important to investigating how they prioritise the crucial factors that impact the start-up journey. A purposive sampling strategy was used to recruit business incubator through the research's accessibility to obtain an operational perspective.

The criteria to select a representative sample for the study adapted from the measurement of customisation support used by Vanderstraeten et al. (2016) in order to ensure that incubators provide customised support services. The criteria were:

(1) Provide customised support in addition to structured training
(2) Regularly monitor start-up progress
(3) High intervention of incubation team in the start-up development process

The full screening questions prior to the main interview are described in Appendix A.

Phase 1: To validate and refine the academic framework

During the first phase of data collection, thirteen business incubators agreed to participate. These incubators are operated by different types of sponsor companies and in multiple countries. The international samples cover the variety of global entrepreneurship index score. This allows the researcher to investigate similarities and differences in start-up support

mechanisms to validate the conceptual framework derived from the synthesis of prior literature studies. However, it is important to note that this study does not focus on the comparison of the effectiveness of incubation practices across countries. Table 4.2 summarises the profile of business incubators (see Appendix B for the completed profile of business incubators research participants).

Table 4.2: The profiles of research participants

Name of incubator	Country of operation	Sponsor company	Program duration	Focused business sector	Incubator support coverage	Reference
I3P	Italy	University	1-3 years	Technology	Ideation to scale up	INV_M
WMG Accelerator	UK	University	1-3 years	Manufacturing and technology	Ideation to scale up	INV_A
St.John	UK	University	1-3 years	Technology	Ideation to scale up	INV_W
Bornrex	Japan	Independent Private	1-3 years	Generalised	Ideation to scale up	INV_E
Incubator F	Singapore	Independent Private	No time limit	Social impact	Ideation to scale up	INV_F
FORWARD Accelerator	UK	Independent Private	1-3 years	Technology	Ideation to scale up	INV_N
The Tank Incubator	Jordan	Corporate	1 years	Technology	Idea to market entry	INV_AB
The Studio	UK	Science Park	1 years	Technology	Idea to market entry	INV_AC
Ignite Incubator	UK	Science Park	1 years	Technology	Market entry	INV_K
Unreasonable Mexico	Mexico	Independent Private	1 years	Social impact	Market entry	INV_AD
IDG	China	Independent Private	1 years	Technology and sport	Market entry	INV_S
Incubator C	Mexico	Independent Private	12 weeks	Generalised	Market entry	INV_C
Warwick Incubator	UK	University	16 weeks	Technology	Idea and solution development	INV_L

Phase 2: To validate the ICS Framework derived from the first phase

The second phase of the empirical research was designed to validate the ICS framework derived in the first stage of data collection. As underpinned by the pragmatism, this study is based on the belief that theories can be contextual and generalisable through an examination of their transferability to another situation (Shannon-Baker, 2016). Thus, it allows the researcher to investigate whether the framework suggested by global incubators is applicable to local business incubator context using Thailand as an example.

Due to the personal motivation discussed in Section 1.2.1 and the available access to the pools of incubators in single country, Thailand was chosen as a country for ICS Framework Validation. Initially, participants were screened prior to the main interview conducted to ensure they met the aforementioned criteria (identfied in (1), (2), (3) above). Sixteen Thai incubator specialists with different incubation models and types of sponsoring companies, including science and technology parks, independent private company and corporate were interviewed. Table 4.3 summarises the profile of business incubators (see Appendix E for the completed profile of business incubators research participants and supporting evidence)

Table 4.3: The profiles of research participants (Thai incubators)

Name of incubator	Sponsor company	program duration	Focused business sector	Incubator support coverage	Reference
STeP	Science Park	1 – 3 years	Technology	Ideation to scale up	D
Rise Impact	Independent private	4 months	Social Impact	Idea to market entry	B
New energy Nexus	Private	4 months – 1 year	Energy sector	Idea to market entry	Q
PSRU	Science Park	1 year	Technology	Market entry	U
UPSP	Science Park	1 – 3 years	Technology	Ideation to scale up	V
SCG	Independent private	1 – 3 years	Technology	Ideation to scale up	G
HandUp	Independent private	6 months	Social Impact	Ideation to scale up	O
KKU	Science Park	1 – 3 years	Technology	Ideation to scale up	H
Finnovate	Independent private	No time limit	Fintech	Business Scale-up	AA
Hubba Accelerator	Independent private	4 months	Technology	Ideation to scale up	P
Youth Challenge	Independent private	1 year	Social Impact	Ideation	T
Ultron Asia	Science Park	6 months – 1 year	Technology	Ideation to market entry	R
PSU	Science Park	1 – 3 years	Technology	Ideation to scale up	I
KT Ventrue	Independent private	No time limit	Technology	Business Scale-up	X
NVEST Venture	Independent private	No time limit	Technology	Business Scale-up	Z
Root Incubator	Independent private	3 months	Social Impact	Ideation	J

4.5.3 Data collection

The main primary data collection techniques used in both phases were semi-structured interviews. Participant observation in business incubator was also employed in the first phase of data collection. Both methods help researchers to gain a deeper understanding of how, and which factors, contribute to the progress of start-ups in their entrepreneurial journey.

The first phase of primary data collection investigated start-up development methodologies and gained insights on the critical skill and team effectiveness factors and correlated them with the literature findings. The insights from this study informed on how business incubators could (re)configure their services for customised start-up support in their incubation programs.

The second phase of the empirical research was designed to validate the incubator customised support (ICS) framework derived in the first stage of data collection. The semi-structured interview was the primary methodology used at this stage as the study's objective is to elicit detailed perspectives from business incubators in order to investigates how the international ICS framework can be modified to suit different start-up ecosystems.

Semi-structured interviews

The use of semi-structured interviews elicits insight from the interview participants' perspective while adhering to the conceptual framework and research questions' pre-defined theme derived from the literature (discussed in Chapters Two and Three). Additionally, the openness and flexibility of the semi-structured interview allow for further exploration of the interviewee's responses and the spontaneous emergence of new and in-depth perspectives (Saunders et al., 2016). For example, incubator specialists also commented and identified critical processes and factors that start-ups required during other stage of development despite the fact that their incubators do not focus on that particular development stage. The pilot studies conducted in the preceding phase improve the consistency of the research instruments, ensuring the quality of data collection. The interview comprises three parts.

1. Gathers information related to the business incubator and the profile of interview participants.
2. Investigates start-up development methodologies and incubation processes employed in their business incubation program.
3. Observe critical factors to identify the crucial team factors that contribute to the progress of a start-up.

All interviews were recorded to help explore different interpretation approaches. The transcription procedure was carried out in parallel with the primary data collection. Once transcribed, the interview data were pseudonymized with a unique participant number. (See Appendix B and E for the completed profile of business incubators research participants).

Observation

The current covid pandemic situation, limited the observations made to only one development stage. WMG Accelerator allowed the researcher to observe their actual operations during a six-week business incubation program with a total of three start-up teams in order to gain an operational perspective on the social phenomena that occur in a real business incubator. This observation enables the researcher to investigate the business incubation process and how incubators encourage aspiring entrepreneurs to develop a business idea and strengthen their entrepreneurial mindset and skills. The program was delivered virtually through Microsoft Teams from November to December 2020. Three teams are working on distinct projects with the goal of developing a solution.

During the observation, the researcher took field notes on the activities and interactions that occurred during the project discussion. Furthermore, the researcher observed the project leads internal discussion in order to gain understanding on how business incubators design, execute and evaluate their support, at each stage for their cohort. The observation field note is illustrated in Appendix D and the results of observation are described in Appendix G.

Secondary data sources

This study employed semi-structured interviews and observation to obtain deep insights into the business incubation process employed at the study sites. Semi-structured interviews were the primary investigation technique for this study; however, while semi-structured interviews allow for in-depth exploration of interviewee responses and perspectives, they do have some limitations. One is related to interview bias, while another is concerned with validity. Researchers are encouraged to use multiple data sources to establish a chain of evidence in order to ensure construct validity. According to Saunders et al. (2016) and Yin (2003), these issues can be partly addressed by applying a triangulation technique to cross-validate with secondary data. This study gathered secondary data from the data sources illustrated in Appendix F.

4.5.4 Data analysis

The analysis and theme development focused on three main areas as the key components of the academic framework derived from the literature:

1) The start-up development process and key achievements
2) The crucial skills influencing team dynamics and new venture creation
3) The crucial team effectiveness factors influencing new venture creation

The data were coded and classified according to the themes and patterns identified in Chapters Two and Three informed by the review of prior research studies. NVivo software was used to assist in structuring the data coding from the interview analysis to ensure the accuracy. The six phases of thematic analysis proposed by Braun and Clarke (2006) guide this study as they allow a dynamic and iterative process and provide clear guidelines to replicate. The thematic analysis process of Braun and Clarke (2006) is employed by many studies (Maguire and Delahunt, 2017; Kiger and Varpio, 2020) as it offers a systematic process. Also, practical examples on how these processes could establish trustworthiness were examined by Nowell et al. (2017). The process followed at each phase is summarised in Table 4.4.

Table 4.4: Thematic analysis process

#	Phase of thematic analysis	Process
1	Familiarising with data	The transcripts and other data sources were read through the entire document more than three times before beginning the coding process. This procedure encourages researchers to become familiar with all different aspects of the data. The initial reading was carried out to ascertain the overall message conveyed during the interviews. While reading, the concept of coding was documented.
2	Generating initial code	The codebooks were derived from a review of the prior research studies conducted in chapters Two and Three. Additionally, the emergent theme and pattern are coded during the initial coding process. The codebooks assist in identifying and labelling data associated with a particular theme and ensure a consistent approach (see Tables 4.6, 4.7 and 4.8 for the data coding theme).
3	Searching for themes	The study begins with predefined codes based on the critical factors and start-up process identified in an academic framework. The thematic process is guided by deductive analysis. Other data that could not be classified using the predefined codes were assigned to the miscellaneous theme, as Braun and Clarke (2006) suggested. At this point, no code was abandoned. Additionally, an audit trail of the code generation process was documented.
4	Reviewing themes	Themes, subthemes, and coded data extracts were reviewed and evaluated for validity to ensure that they accurately reflect the data set's meanings. The themes and subthemes were refined to capture distinct ideas and reflect the perspectives of the participants. This stage was an iterative and reflective process.
5	Defining and naming themes	The characteristics of data that each theme captures have been determined. The detailed analysis and narrative each theme tell were used to identify their relevance to the research questions. This stage serves as the foundation for the findings reported in Chapters Five and Six.
6	Producing the report	This procedure was conducted to report the findings, including direct quotes from participants, which are presented in Chapters Five and Six.

Additionally, this study ensured the establishment of trustworthiness during each phase of analysis by following a procedure as suggested by Nowell et al. (2017). They outline the process of thematic analysis in addressing the trustworthiness criteria of Lincoln and Guba (1985):

1. Credibility
2. Transferability
3. Dependability
4. Confirmability
5. Audit trials.

This research followed these trustworthiness guidelines to ensure the reliability, as illustrated in Table 4.5.

Table 4.5: The establishment of trustworthiness

#	Phase of thematic analysis	Establishment of trustworthiness suggested by Nowell et al. (2017)	Employed for this PhD study
1	Familiarising with data	• Triangulate different data collection • Prolong engagement with data • Documents thoughts about potential codes/themes • Store raw data in well-organised archives • Keep record of all data field	Yes Yes Yes Yes Yes Yes Yes
2	Generating initial code	• Use of a coding framework • Audit trail of code generation	Yes Yes
3	Searching for themes	• Keep detailed notes about development and hierarchies of concept and themes	Yes
4	Reviewing themes	• Test for referential adequacy by retuning to raw data	Yes
5	Defining and naming themes	• Documentation of theme naming	Yes
6	Producing the report	• Describing process of coding and analysis • Report on reasons for theoretical methodologies and analytical choices	Yes Yes

To focus the analysis on aspects of the data directly relevant to the research question, a deductive coding process based on literature reviews was used. The data were coded and classified according to themes and patterns identified through a review of prior research studies. Three codebooks are presented in Tables 4.6, 4.7 and 4.8.

Table 4.6: Codebook of the definition of team effectiveness factor

Attribute	Definition	Reference
Team orientation	The team tasks and the attitudes that team members have towards one another. It reflects an acceptance of team norms, the level of group cohesiveness, and the importance of team membership.	Dickinson and McIntyre (1997), Hoegl and Gemuenden (2001), Salas et al. (2005)
Team leadership	Ability to direct and coordinate the activities of other team members, assess team performance, assign tasks, develop team knowledge, skills, and abilities, motivate team members, to plan and organize, and establish a positive atmosphere	Dickinson and McIntyre (1997, Hoegl and Gemuenden (2001), Salas et al. (2005)
Monitoring	Ability to develop common understandings of the team environment and to apply appropriate task strategies in order to accurately monitor teammate performance	McIntyre and Salas (1995)
Feedback	Ability of team members to give, seek, and receive task clarifying feedback; provide constructive feedback regarding errors and offer advice for improving performance	Salas, Burke, and Cannon-Bowers (2000); Dickinson and McIntyre (1997)
Communication	Process by which information is clearly and accurately exchanged between two or more team members in the prescribed manner and with proper terminology; the ability to clarify or acknowledge the receipt of information.	Salas, Sims, and Klein (2004) Salas, Burke and Cannon-Bowers (2000)
Shared vision	Value diversity also relates to the team's goals and missions. When team members share the same mission or vision, it is likely that they will prioritize the task of the team and have the same ideas regarding work norms.	Weimar et al. (2013)

Table 4.7: Codebook of the definition of skills

Attribute	Definition	Reference
Finance	Ability to plan, fund, direct, monitor, organise, and control the monetary resources of the business	Thom (2016)
Networking	Ability to develop and use contacts for business purposes beyond the reason for the initial contact.	Thom (2016)
Strategic thinking	Ability to set goals and develop long range plans in a variety of areas, to anticipate the unexpected, to analyse the business environment, and to cooperate with people	Thom (2016); Rudmann (2008); de Wolf and

		Schoorlemmer (2007)
Marketing	Ability to reach the market (its potential customers, including decision-makers) and to achieve a high degree of awareness. Activity including market research, analysing existing market, identifying a target market, customer discovery, developing sale strategy, developing marketing strategy and marketing planning, developing a brand positioning, advertising, promotion.	Thom (2016)
Entrepreneurial Mindset	The ability to persistence on keeps going or push toward the finish line when the instant success is out of reach	Hatthakijphong and Ting (2019)
Technical	skills that require to perform a functional role in entrepreneurial tasks such as technology implement and use	Smith (2006); Hatthakijphong and Ting (2019)
Communication	The ability to communicate effectively and positively with others, such as partners, colleagues, and employees, in every type of communication scenario, including negotiations, non-verbal communication, and using some medium to imparting information.	Hatthakijphong and Ting (2019)

Table 4.8: Codebook of the definition of start-up development process

Attribute	Definition	Reference
Problem identification	The goal is to identify validated problems from customer research.	Mueller and Thoring (2012)
Clustering insights	Gathering acquired insights gained in the previous steps through several tools including persona and user journey	Mueller and Thoring (2012)
Customer understanding	Conduct user research employing both secondary and primary research to gain understanding of customers in depth.	Mueller and Thoring (2012)
Business model hypothesis development	The assumption development around the business model elements suggested by the business model canvas of Osterwalders et al. (2009) or lean canvas of Maurya (2012).	Osterwalders et al. (2009); Maurya (2012)
Brainstorming	Start-up team brainstorms to develop an innovative solution that addresses the users' needs as identified in the previous step	Mueller and Thoring (2012); Plattner et al. (2009)
MVP development	Lean start-up concept that focuses on validating a solution with customers early in the start-up development process. An MVP contains only the features necessary to be usable.	Ries (2008); Maurya (2012)
Prototype testing/MVP Validation	Concepts try to gather user feedback in early stages of the process, in order not to waste lots of resources by building something that nobody wants. The testing result in several iteration that rely on early adopter feedback to inform ongoing improvements.	Maurya (2012)

Developing a sales roadmap	To create sales and marketing strategy for acquiring customers	Blank and Dorf (2013)
Business Model Validation	Validate the customer acquisition process and other parts of Business Model, including channels, partners to ensure that business model is feasible	Maurya (2012); Blank and Dorf (2013)
Scale Execution	Launch and the refined product to larger groups of customers to replicate the customer acquisition process. Executing validated sale process to gain more customers and revenue	Maurya (2012)
Scale and optimise operations	Optimise business operation process	Blank and Dorf (2013)
Scale the organisation	Expand business opportunity for growth, including findings new markets, grow international.	Blank and Dorf (2013)

4.6 Chapter summary

This chapter discusses and justifies the methodology selection rationale for the research. This study is underpinned by pragmatism, which emphasises transferability and the belief in actionable knowledge. The decision to embrace pragmatism as an overarching philosophical orientation was influenced by the motivation to contribute valuable and actionable knowledge that was grounded in respondent experience and thus relevant to the business incubators. The pragmatism allows the research to combine the subjective interpretations of researchers' and participants' perspectives and objective analysis of the critical factors required for start-ups to advance to the next stage of their business development. The findings of this study emphasise the actionable knowledge that incubator specialists can apply to their tailored support practices. The study took a qualitative approach and was carried out in an abductive manner. The primary data collection process was divided into two phases with the goal of achieving distinct research objectives—this study analyses business incubators as a unit of analysis.

The first phase of data collection investigated start-up development methodologies and the critical factors identified by business incubators as affecting the venture development processes in order to validate and refine the academic framework into the study context. This stage relied heavily on semi-structured interviews to elicit in-depth perspectives from business incubator specialists with international context (thirteen business incubators operated in different countries). Participant observation of the incubation program is another primary data source that enables the researcher to triangulate the data. The outcome of this stage is an

incubator customised support framework synthesised the empirical results with the literature findings.

The second phase validated the derived framework from the international context. The semi-structured interview is the primary methodology employed during this stage. As underpinned by pragmatism, this study validated the derived framework from international business incubators with Thai's context in order to examine transferability and investigate the adaptation of framework into a country-specific context. This stage involved sixteen Thai business incubators with varying incubation models to determine whether the international framework with can be applicable to context-specific.

The thematic analytic method with pre-defined coding was employed in both phases of data collection. Additionally, the data triangulation and the trustworthiness establishment are conducted to ensure the validation and reliability of this study. The following chapter, Chapter five, discusses the finding of the first phase of data collection and derived the refined academic framework to guide customised start-ups support for business incubators.

Chapter Five: Conceptual Framework Refinement

5.0 Introduction

Following Chapter Four's data collection, this chapter particularly focuses on the first phase of data collection and attempts to validate the conceptual framework derived from the literature studies. This study augments previous works by investigating the actual practices employed in thirteen business incubators in a selection of international locations. This allows the researcher to investigate different support practices to guide the development of a framework for business incubators based on real practice. The synthesised framework guides how business incubators can assess the needs of start-ups to make business progress at key stages and provide timely customised support to them. This chapter is structured into the following sections:

- Section 5.1 revisits and presents the conceptual framework aggregated and synthesised from the literature review described in Chapters Two and Three.
- Section 5.2 compares the literature synthesised framework to industry practice, analyses the differences between the two, and advance the interpretation of such differentiation.
- Section 5.3 derives and presents the Incubator Customised Support (ICS) Framework validated in international contexts by this study.

5.1 Conceptual framework synthesised from the literature

This section summarises the conceptual framework synthesised from previous research studies in Chapter Two and Three. This study hypothesises a conceptual framework, based on the rationales that it is beneficial for business incubators, to assess the development stages of start-ups, and to provide them with tailored support to take them to the next key stage. Thus, it maps a linear journey, with internal cyclical loops in the four key stages of the journey, as illustrated in Figure 5.1. The resulting framework comprised two key elements:

- The key start-up development process stages.
- The critical team development factors that drive progress from stage to stage.

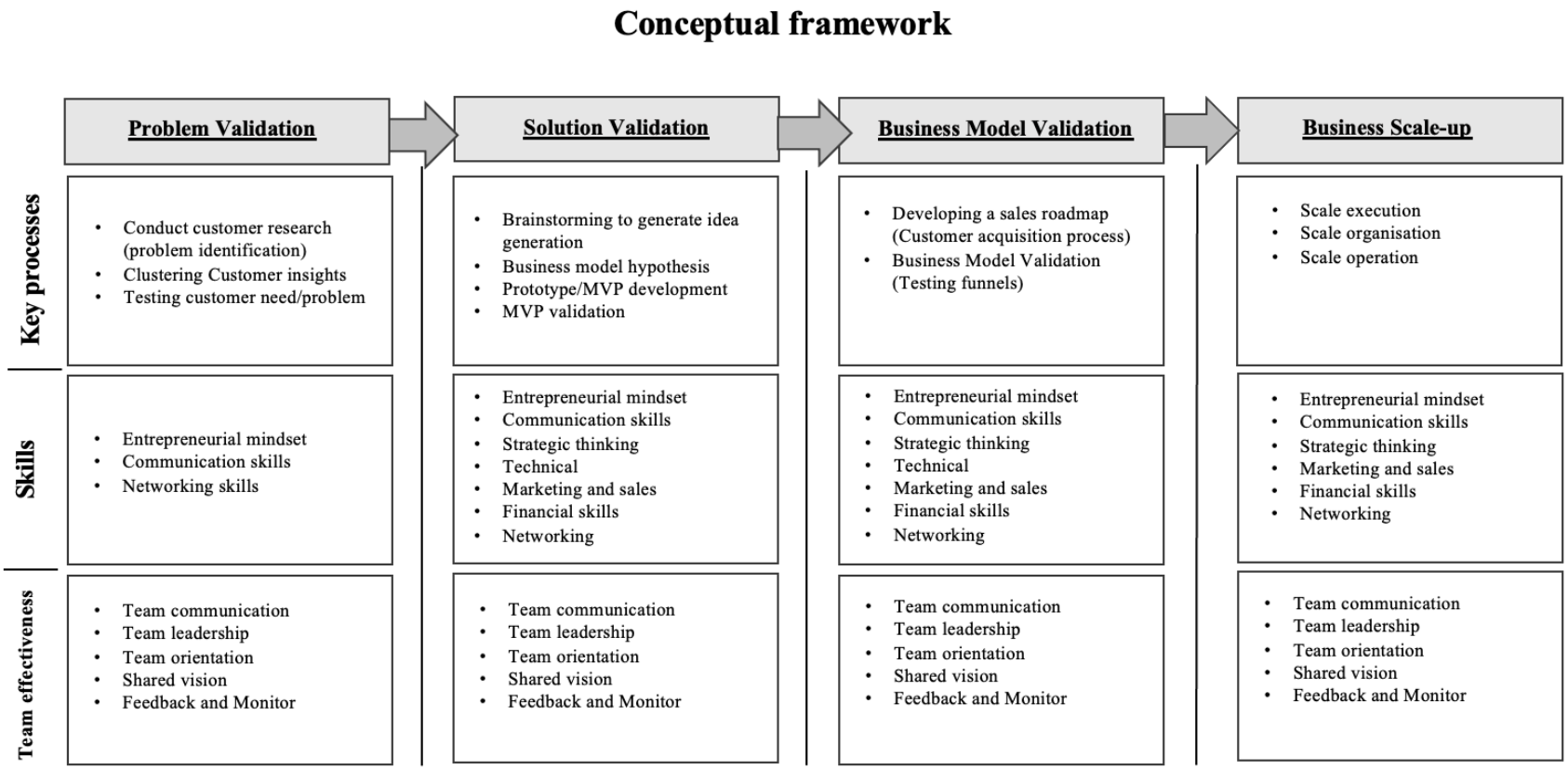

Figure 5.1: The Conceptual framework based on Literature (Author)

This study proposes a four-development stage framework derived by structuring the fusion of start-ups development methodologies of Customer Development Model (Blank and Dorf, 2013), Running Lean (Maurya, 2012) and Lean Design Thinking (Mueller and Thoring, 2012) into four-stage methodology based on critical achievements and the processes that support them. The integration of these methods helps shape the focus of the role of the business incubator at each stage of the start-up journey. The rationales to follow this approach are based on the following key points as discussed in Section 2.3:

(1) Focus on the problem discovery and validation
(2) Encourage Brainstorming/alternative idea generation and adaptive behaviour
(3) Speed the learning process through the early customer engagement and fast iteration.
(4) Use tools to discuss, capture and validate business model assumptions through different lens.
(5) Derive Minimum Viable Product (MVP) concepts to test the customer engagement before launching the full commercial service.
(6) Growth implementation/Customer acquisition process.

A start-up development process alone is insufficiently detailed for incubators to diagnose and support the needs of individual start-ups to make progresses. As discussed in Section 1.1.2, the literature studies investigating varying skills and team effectiveness factors along the stage of business development in the context of incubator customised support are still in infancy (Mrkajic, 2017; Klaasa et al., 2019; McAdam and McAdam, 2008).

To address this, the author investigated crucial team development factors, particularly skills need at each stage of the process and team effectiveness factors which an incubator can assess and support during the overall incubation process. The critical factors were identified through a review of literature on crucial business skills and team effectiveness model (discussed in Chapter Three) based on their impact on start-up development against the four-stage framework. Figure 5.1 summarises the derived conceptual framework, and identifies the critical processes, skills, and team effectiveness factors required at each development stage. This is a key contribution to best practice knowledge from this research

5.2 The Framework Validation

This section analyses, reviews and discusses the interview data of thirteen business incubators in order to identify the similarities and differences between the conceptual framework (Figure 5.1) and real-world experience gathered from the study incubators at each stage of start-up development. In particular, it investigates

1. The crucial processes that show progress for a start-up.
2. Critical skills and team effectiveness factors required for start-ups

Thirteen business incubators offered valid data to this research. They provided a coverage of various funding models and a spread of geolocations. Primary data produced by them were utilised to validate, augment and contextualise the academically derived framework in Figure 5.1. The profiles of each incubator are shown in Table 4.2. Pre-defined themes derived from the literature are used to analyse the interview. Data codebooks are summarised in Tables 4.6 4.7, 4.8. Figure 5.2 maps their key start-up supporting activities against the four-development stage of the academic synthesised framework. This is used to discuss the crucial processes in the following sections.

Also, regarding the crucial skills and team effectiveness factors, the interview analysis reveals that the incubator sample in this study place greater emphasis on "team" development rather than the idea. Forward Accelerator claimed that they design their program based on the "skill" to develop start-up teams along each stage; however, not all incubator has the framework to customise their support. For example, Incubator F stated that the guidance provided by incubator staff members depends on an individual's judgement, though each start-up is usually supported by at least two staff to ensure appropriate guidance.

This section is organised into four subsections. Section 5.2.1 to 5.2.4 are structured according to the four key stages of the start-up development framework to validate the critical processes, skills, team effectiveness factor identified by incubator samples and compare with the conceptual framework (Figure 5.1)

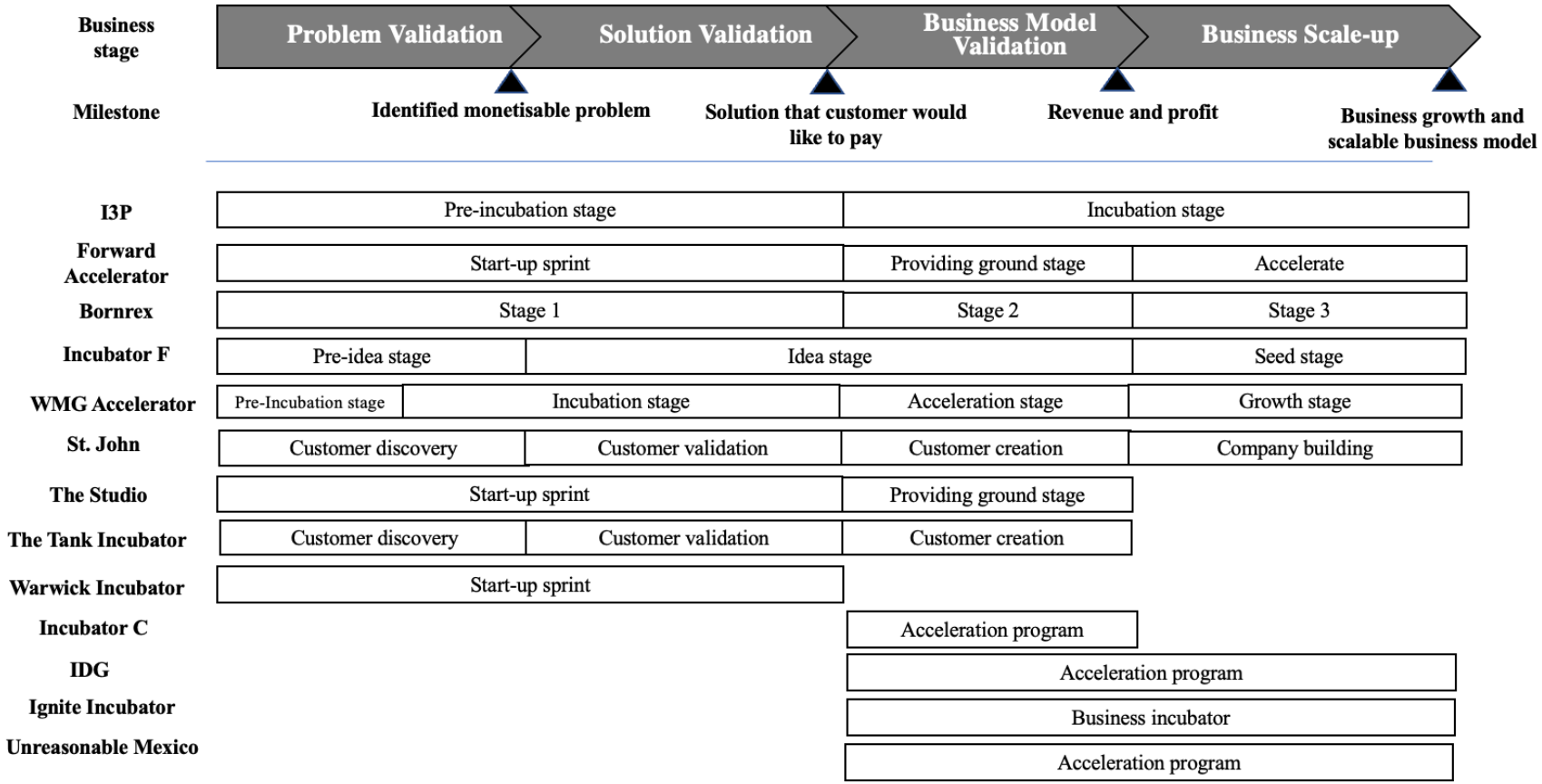

Figure 5.2: The incubation journey stages of thirteen researched incubators addressing all stages from ideation to business scale-up (Author)

5.2.1 Stage 1: Problem Validation

The section discusses and compares the interview analysis of nine incubators supporting start-ups in problem validation stage (as illustrated in Figure 5.2) through key processes and team development factors. Nine incubators are I3P, Forward Accelerator, Bornrex, Incubator F, WMG Accelerator, St. John, Warwick Incubator, The Tank Incubator, The Studio. Also, the observation made at WMG Accelerator is discussed, compared and synthesis with the interview analysis. The observation results are presented at Appendix G.

In the following subsections, the key processes that the nine incubators studied drive Start-ups to undertake (Section 5.2.1.1), and the key team development factors identified during the interviews (Section 5.2.1.2) are discussed.

5.2.1.1 Key processes at Problem Validation stage

In Table 5.1, the processes that real incubators support a start-up to conduct in order to achieve the stage milestone (problem validation) are itemised and compared with conceptual framework (Figure 5.1). Three key themes were derived from the interviews, based on the key processes operated by the incubators. These are:

(1) Customer research
(2) Business model hypothesis development
(3) Customer engagement (Validation)

Table 5.1: The interview analysis of critical process at Problem Validation stage

Derived Theme	Start-up development process (Literature)	Conceptual framework	Interview results	Processes from empirical data	Reference statements	Reference cases
Customer research	Understand - Problem identification	✓	✓	• Develop a problem understanding from secondary research • Understanding the trends in market using the secondary sources • Competitor analysis • Conduct user research employing qualitative methods such as interviews and observations to gain understanding of customers in depth	"I think having that clear understanding, and then doing what I've called it the groundwork. Try to understand, what else is out there in the market. Understanding the quickest way to stop providing that value that they're trying to put effort in that solution. And yes is obvious, it sounds actually then taking action is a lot of people that get stuck in this, what you'd call the kind of explore phase where they're researching and gathering information." (INV_N at Forward Accelerator) Very early conversations with potential customers, or at this stage, not even customers they are the target audience in terms of the people that experienced that problem. That is going to be the most valuable source of information. Nobody is going to understand the problem better than the people that have experienced the problem themselves." (INV_N at Forward Accelerator)	Observation at WMG Accelerator Forward Accelerator
Business model hypothesis development	Clustering customer insight	✓	✓	Through the use of tools (Value Proposition Canvas, Trend Canvas, persona and user journey,	"This is a set of goals that are supposed to be sub-sequence and that we aim to get the start-up, for example, in the business area, value proposition, business model, test the business model, secondary research, primary research, trying to get validation from the customers, get feedback to establish KPI, and it goes along to the business plan. And then, of course, at the end, try to get your first client get ready." (INV_M at I3P)	WMG Accelerator, FORWARD Accelerator, The Tank Incubator I3P

	Business model hypothesis development	x	✓	• Develop an assumption through the use of tools (Lean Canvas/Business Model Canvas)
				• Customer identification
				  ◦ Specify the profiles customer segment and the characteristics of target
				  ◦ Explore different target groups to identify the most potential one
				• Value proposition design		

Customer engagement	Testing customer need/problem (quantitative measure)	✓	✓	• Testing the customer need by developing an POC • Validating the assumption • Iterate from customer feedback • External engagement to develop customer understanding	"I would say that the most important thing and going back to what I said about collecting evidence and kind of developing the momentum is the lean methodology is not just this kind of model of starting with this concept and then going out and test again. It is actually starting with the concept going out and test it again, learning from it coming back and reiterate it and doing that as fast as possible. And so that is where that kind of continue learning process has come in and so the guys, that we are working with has taking evidence, in fact, that they are just going through this cycle over and over again." (INV_AB at The Studio)	The Studio Forward Accelerator

The key distinction identified is the Business Model hypothesis development, which was proposed to be in the Solution Validation stage of the conceptual framework. The conceptual framework proposed to focus on 'problem' and 'customer' assumptions. Though, the interview analysis with nine incubators and the observations made at WMG Accelerator suggested that incubators place emphasis on the 'Business Model' to structure business assumption. The analysis suggests that incubators employed a range of tools to capture the design assumptions at this stage: Business Model Canvas, Lean Canvas, and Value Proposition Canvas. For example, incubator specialists at WMG Accelerator used Lean Canvas and Value Proposition Canvas to identify and validate the customers' problems during their pre-incubation program. This process guides the validation through engaging with customers to gain a better understanding of their problem from their perspective.

Also, the Business Model Canvas is also used to help incubators in analysing the current state of a business such as how start-ups have conducted their entrepreneurial activities, their thinking mindset, and team working effectiveness. Interview INV_M at I3P clarified:

> "Most of the time we started with the business model of design, and then we try to give them the best approach. So, we try to build a compelling business model and then we try to push the Start-Up to test hypotheses of this model" (INV_M at I3P)

Both the WMG Accelerator and Bornrex claim problem validation activities are key processes to incubate an entrepreneurial mindset. Observations made of the pre-incubation program at the WMG Accelerator reveal that incubator staff members encourage aspiring entrepreneurs to validate the customers' pain point by using the Value Proposition Canvas and then validate the other Business Model assumption through the Lean Canvas. This evidences that WMG Accelerator prioritise problem validation as the first critical achievement for new start-ups.

There is a potential advantage of priortising problem validation over the solution validation. For example, participant INV_N at the Forward Accelerator emphasises the importance of problem validation as the first critical achievement for start-ups at the start of their entrepreneurial journey. He/She claimed that customers' problems underpin how start-up develop the product, INV_N stated that

> "I think the understanding the customers and the problems don't leave it at the end, it has to be the most important because everything else comes from that so your ideas, your solutions, the way you build the products, the choices that you make about product design needs to be underpinned by your understanding of the customers, where, where we see people focus too much on the solution before understanding the problem, they build a solution lacks the kind of fit of the market, or product market fit. So, yes of course it is important in terms of product development, but the most important needs to be the problems and the customers" (INV_N at Forward Accelerator)

Incubator specialists at WMG Accelerator and Incubator F confirmed that start-ups with a clearer understanding of customers' problems perform better than those that have to gain that through multiple iterations. The problem validation process helps start-ups avoid the trap of "falling in love with their idea", identified as the key reason for start-up failure by Ash Maurya and Giardino et al. (2015). This process enables start-ups to determine whether a problem is worth solving.

The results of the interview suggest the priority focus of guiding start-ups is based on problem validation and suggest modifying the conceptual framework (Figure 5.1) by emphasising the activities in *business model assumption development*, *customer research* and *customer engagement* to validate the customer's problem. As identified in Table 5.1, the *Business Model hypothesis development* and *clustering insights* are categorised under the same theme. These two helps structure business assumptions and are referred to as *Business Model hypothesis development* regarding the incubators' emphasis on this process.

5.2.1.2 Team development factors at Problem Validation

In Table 5.2, a comparison of the team and skill factors informed by the academic literature and industry practice from the interviews were drawn. The comparison results suggested that incubators' practice is predominately consistent with literature studies on the majority of such factors, except for *strategic thinking*, *networking skills, shared vision and team monitoring and feedback.* The possible reasons for this are discussed in (1), (2), (3) and (4) below.

Table 5.2: The comparison of team development factors during the Problem Validation stage

	Stage 1	Conceptual Framework	Interview results	Behavioral makers	Reference statements	Reference cases
Skill	**Entrepreneurial mindset**	✓	✓	• Actively seeking support and engaging with mentors and process • Enthusiasm, Eagerness for (execution) • Consistently maintain activeness and passion/ Passion/ internal drive • Adaptivity to change, accept external advice and let go of the idea • Resilient	"it's such an early stage is very hard to look at the team based on experience because nine times out of 10 they have no experience. So a big part of it is being resilient and enthusiastic, because like I've seen people who are super clever, but they can't be bothered to put in the hours that are required to have a successful startup." (INV_L at Warwick Incubator)	WMG Accelerator, I3P, Incubator F, Unreasonable Mexico, Forward Accelerator, St. John, The Studio Bornrex Warwick Incubator
	Communication	✓	✓	• Communicate effectively with customers	"Communication is a skill that to me and in my experience, a good communicator can open any door, and I would say that the earlier you learn as an entrepreneur and the earlier you develop an entrepreneur, the faster you'll go in your experience, building a company" (INV_AC at Unreasonable Mexico)	WMG Accelerator, I3P, Incubator F Unreasonable Mexico* Forward Accelerator St. John, The Studio
	Strategic thinking	-	✓	• Evaluate opportunity • Evaluate strength and weakness • Decising making of the further action • Self-reflection • Synthesise information	"It is a self-awareness piece. Are you aware of what your strengths and weaknesses are? how can you assess based on the opportunity that you see in front of you and all those factors, how can you assess that you are the right person? You may know that the problem exists, but why you that needs to solve problems. Another problem. That's another issue because you can know the problem, but it doesn't mean that you can solve it." (INV_A at WMG Accelerator)	WMG Accelerator, I3P, Unreasonable Mexico, The Studio, Incubator F, Forward Accelerator
	Networking	✓	-	-	-	-
Team effectiveness	**Team communication**	✓	✓	• Communicate the role of individual member, goal of the team	"We monitor the team, the aspects of the team, but this one is not really like structure that we see in our evaluation model or something that is more, let's say, the personal adjustment, the consultant. I just personally see the team and the evolution of the team and the communication skills of the team, but it's not structured into a scorecard." (INV_M at I3P)	WMG Accelerator, I3P
	Team leadership	✓	✓	• Task prioritisation • Assign appropriate metrics • Findings the right people	"We give the sessions related to choosing the right people. One of the startups, they were in the process of recruiting new employees. So we invite them with the HR department in the company. The HR department gave them an orientation session about how to choose the right person and how to get background checked out with them. So we provide that kind of guidance" (INV_AA at The Tank)	WMG Accelerator, I3P The Tank Incubator
	Team orientation	✓	✓	• Commitment to team goal • Team member appreciation	"People should appreciate the linkages between each of the things because there's a there's a domino effect. There's a knock-on effect from everything. (INV_A_04 at WMG Accelerator)"	WMG Accelerator, The Tank Incubator
	Shared vision	✓	-	-	-	-
	Feedback and monitoring	✓	-	-	-	-

(1) Strategic thinking skills

Most of literature studies (Kunene, 2008; De Wolf and Schoorlemmer, 2007; Thom, 2016; Abdullah, Hadi, and Dana, 2018) highlighted that strategic thinking skills are critical at a relatively later stage of business development– after a company is established. However, the interviews reveal that incubator practitioners emphasise the importance of *strategic thinking skills* at an earlier the problem validation stage. The strategic thinking skills highlighted by three incubator practitioners (WMG Accelerator, I3P and Incubator F) align with the "reflecting and system thinking" dimension of strategic thinking skills as suggested by Pisapia et al. (2015) and Dhir, Dhir and Samnanta (2018).

For example, Incubator F claimed that they have recently adjusted their methodology to focus on founder reflection, by providing a founder development program to help entrepreneurs develop these skills. They claim this results in better performance for their start-ups. Their focus on "self-reflection" and "evaluation of strength and weakness" elements attempt to enable founders to learn from their prior experiences. Their view on reflection was:

> "We discuss about their life story, how do they reflect their life, any situation you face as consider as a failure, what make you fail? How do you learn from the failure? In our company, we have the framework to help look at the self-reflection, open to change, openness to learn. Does the field they choose to do related/link to the life goal of the founder?" (INV_F at Incubator F)

I3P suggested that start-ups must evaluate whether the founders have the knowledge and resources related to addressing the problem. The "knowledge" particularly includes including understandings of their strengths and weaknesses, which were considered a key area of expertise.

The observations at the WMG Accelerator revealed that they have a special focus on "evaluating opportunities", through a process of analysing, assessing and critiquing cohorts' customer problem validation results. They promote use the established tools such as Consumer Trend Canvas and Value Proposition Canvas to start-ups, so that business can all assess the customer insights gained, and to make informed decisions about their future actions.

The need for strategic thinking skills in enabling start-ups to assess their resources and information they obtain to make informed decisions about their future actions toward achieving their targets, was a common thematic response in all the interviews.

The empirical findings from Incubator interviews adds new insights from the incubators' perspective to the body of knowledge and highlights that building strategic thinking skills is critical for start-ups during the problem discovery and validation processes. These strategic thinking skills are thus included as key elements in the Problem Validation stage of the derived framework

(2) Networking skills

Previous research studies such as Thom's (2016) and de Wolf and Schoorlemmer's (2007) highlighted that start-ups require networking skills to engage with customers, acquire social capital and build resources even at this early stage. Though a claim made by many incubators is to provide networking, none of the interviewee emphasised the significance of networking skills in achieving problem validation. An inferred explanation is that incubators deprioritise developing relationships with external stakeholders until the proposed value proposition is validated. Additionally, incubators consider themselves as a crucial resource for start-ups, therefore start-ups in the incubation program may not require additional networking skills to gain extra resources at this stage. Therefore, networking skills were excluded from the key elements at the Problem Validation stage of the derived framework.

(3) Shared vision

The practitioners' perspective does not support the main literature finding (Salas et al., 2005; Weimar et al., 2013), which viewed a shared vision as a key factor. None of the incubator specialists highlighted the significance of shared vision during this stage. It may be explained by the fact that start-ups are still validating the business opportunities. Prior to the certainty of a recognisable market gap, they are not yet ready to develop shared visions. In addition, it is arguable if a shared vision or the divergences in the common visions may be more constructive at this stage of venture development. The author's view is that you cannot force fit a common

vision and that some ambiguity at the early stages may actually be useful. Thus, the *shared vision* was not included in the key elements at the Problem Validation stage of the final framework.

(4) Team feedback and monitoring

This research also noted that business incubators do play an essential role in measuring, monitoring, and providing feedback to start-ups to help improve their performance. For example, several business incubators prioritise scheduling regular meetings with the start-up team to evaluate time-boxed progress and determine how they can assist them, and they may overlook a specific activity. However, the incubators may see many entrepreneurial tasks as common sense; as a result, the interviewees did not specifically highlight team monitoring actions as being worth commenting on. The interview concluded that *team feedback and monitoring* were excluded from the key elements at the Problem Validation stage of the framework, as these were concluded to be a standard part of any management process and not specific to start-ups.

Overall, from analysing nine incubators who support start-ups in problem validation process and Unreasonable Mexico that identify critical skills for the Problem Validation stage, as shown in Figure 5.3, it suggests the ranking of the crucial factors for start-ups based on the number of incubators that value them. The analysis supporting the value ratings for each construct is identified in in Table 5.2. These findings highlight that incubators value the skills more than the team effectiveness factors during Problem Validation stage. This may be explained that the essential activities at this stage are to understand customers and validate problems, which can be achieved by individual members of the team with the required skills in presence. Thus, the incubators do not emphasise the team effectiveness at this stage yet. Furthermore, start-up teams are typically comprised of two to three people at this stage. The small team size allows the ease of conveying similar vision and passion across all team members, as opposed to communication covering a large team. Thus, the critical factors that the incubator helps develop during the first stage are those that pertain to skill development.

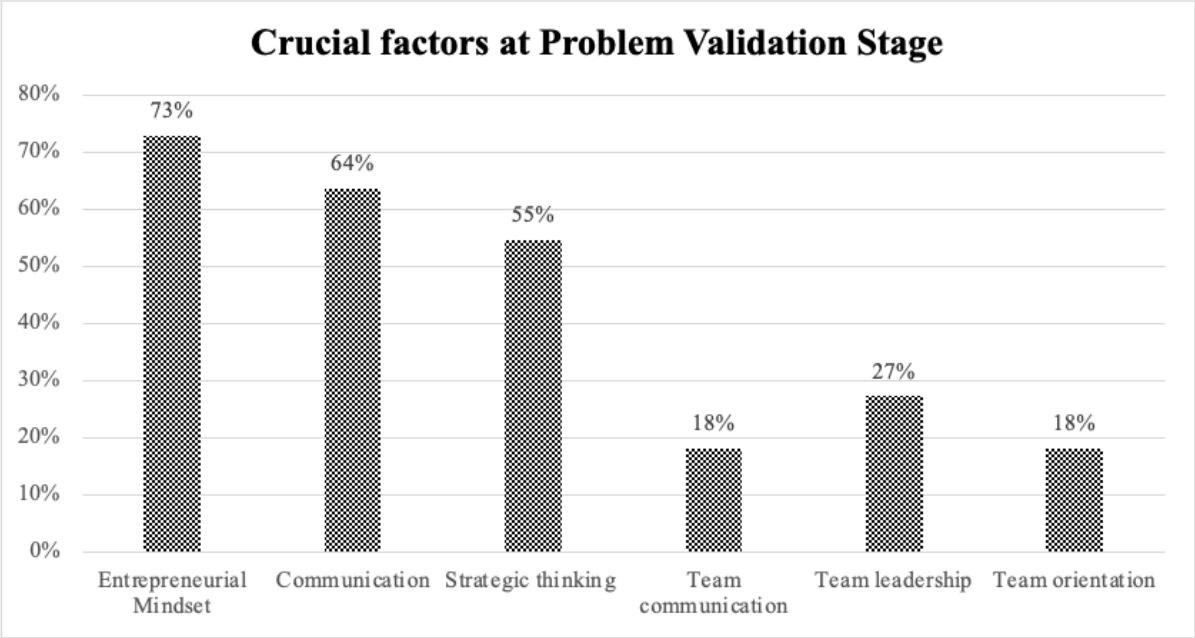

Figure 5.3: Crucial factors and at Problem Validation stage

5.2.2 Stage 2: Solution Validation

As in Figure 5.2, all incubators which support the Problem Validation stage also support start-ups in validating solutions. Nine incubators supporting start-ups in validating solutions are: I3P, Forward Accelerator, Bornrex, Incubator F, WMG Accelerator, St. John, Warwick Incubator, The Tank Incubator, The Studio.

Four incubators (WMG Accelerator, St. John, The Tank Incubator and Incubator F) distinguish problem and solution validation into a separate incubation stage. This structure helps incubators shape their strategy and evaluate the performance of start-ups. For example, the first stage of Incubator F's program (Pre-idea stage) focuses particularly on founder development and problem identification. They claimed that it helped them screen the potential start-ups to proceed to the next stage of the program. WMG Accelerator designs the first stage as a pre-incubation program to help aspiring entrepreneurs build entrepreneurial skills and a growth mindset.

The section discusses and compares the interview analysis of nine incubators supporting start-ups in identifying and validating the solution(s) that customer would pay for, with the conceptual framework (Figure 5.1). The following subsections discusses the key processes that incubators support start-ups to conduct (Section 5.2.2.1) and the crucial team development factors identified during the interviews (Section 5.2.2.2).

5.2.2.1 Key processes at Solution Validation stage

The processes that incubators encourage start-ups to conduct in order to achieve this stage milestone (solution validation) are listed and compared with conceptual framework (Figure 5.1) in Table 5.3. Three themes resulting from the interview align with conceptual framework:

(1) Business Model hypotheses development
(2) MVP development
(3) MVP Validation (Rapid iteration from customer feedback)

The business model hypotheses development was found to be critical for assisting in both problem and solution validation. Business modelling development tools are commonly deployed when incubators assisting in identifying and structuring the critical assumption that needs to be tested. *Brainstorming to generate the idea* were classified under the *Business Model hypotheses development* as they are part of the ideation activities in structuring business model assumption such as Value Proposition. St. John claimed that they use Business Model Canvas as they follow the Customer Development Model of Blank and Dorf (2013).

At this stage, incubators expected start-ups to have a product to test. The product need not to be mature at this stage, rather an MVP to test traction through target customer feedback and expressions of interest. Therefore, incubators' effort shifted to help start-ups develop an MVP. However, from the interview analysis, incubator that does not focus on deep tech start-ups, such as Incubator F, does not offer support in MVP development. Incubator F claimed that their main focus at the idea stage is founder development, thus necessary capability and an aligned vision for the market to be served.

Table 5.3: The interview analysis of critical process at Solution Validation stage

Derived Theme	Start-up development process (Literature)	Conceptual model	Interview results	Processes from empirical data	Reference statements	Reference cases
Business model hypotheses development	Brainstorming to generate idea	✓	✓	Exploring different solution to the problem	"The first one is making concept like mission and after that business model, like making business model and team building. Making a prototype, building MVP and POC, prove of concept like lean startup like try and improve, try and improve. So maybe five steps." (INV_E at Bornrex)	WMG Accelerator I3P
	Business model hypotheses development	✓	✓	• Value proposition design • Identify potential channels		Bornrex
MVP development	MVP development	✓	✓	MVP development	"Some products like an app, you can make a super basic MVP on PowerPoint or something that takes you like two hours. And that will do the same thing as what spending 10,000 pounds on proper MVP and outsourcing developers and all that stuff well. So I think it's the testing and constantly iterating and getting feedback that really separates founders." (INV_L at Warwick Incubator)	Warwick Incubator WMG Accelerator I3P Bornrex
MVP Validation (Rapid iteration from customer feedback)	MVP Validation	✓	✓	• Getting customer feedback • Feedback evaluation • Rapid iteration • Pivot	"I definitely come from myself. I think that I would say that the most important thing and going back to what I said about collecting evidence and kind of developing the momentum is the lean methodology is not just this kind of model of starting with this concept and then going out and test again. It is actually starting with the concept going out and test it again, learning from it coming back and reiterate it and doing that as fast as possible. And so that is where that kind of continue learning process has come in and so the guys, that we are working with has taking evidence, in fact, that they are just going through this cycle over and over again. Those are the ones that are more successful as compared with others who think you just got to do it once. You are not going to have the right answer." (INV_AB at The Studio)	St.John Bornrex WMG Accelerator The Studio The Tank Incubator Warwick Incubator Forwad Accelator

In order to test the MVP, a core underpinning process emphasised by the incubator specialists during interviews is customer feedback evaluation, and rapid iteration to refine their offering(s). Iteration relates to the learning process in which start-ups capture, evaluate and adapt based customer and market feedback The incubators encourage start-ups to evaluate and learn from the customer feedback in order to determine what elements of the Business model to iterate and innovate. Iteration is not a one-time event; rather, it is an ongoing process that is integrated into business development. Incubator specialists such as Bornrex and Forward Accelerator emphasised that they employed the Lean Start-up principle of Ries (2008) in their start-up development. Forward Accelerator highlighted that start-ups who adopts this learning process perform better than those who do not:

> "And so that is where that kind of continue learning process has come in and so the guys, that we are working with, are just going through this cycle over and over again. Those are the ones that are more successful as compared with others who think you just got to do it once. You are not going to have the right answer." (INV_AC at Forward Accelerator)

In summary, these interview findings align with conceptual framework (Figure 5.1), in emphasising the focus for the business incubation process on *business model hypothesis development, MVP development, rapid iterate through validation.* The emphasis on MVP development and iteration subsequently drove the team development focus towards solution-oriented skills.

5.2.2.2 Team development factors at Solution Validation stage

The variety of critical skills and team effectiveness factors is greater than those identified during the Problem Validation stage. As illustrated in Table 5.4, the results of the interviews mostly align with the derived academic framework, except *marketing, sales and finance skills*. These skills are not crucial during this stage of business development from the perspective of the sample incubator specialists. This contradicts some of the existing models such as Kunene's (2008) and Bozwards and Rogers-Draycott's (2017). A further investigation was conducted to seek insights from practitioners:

Table 5.4: The comparison of team development factors during the Solution Validation stage

	Stage 2	Conceptual Framework	Current practice Framework	Behavioral makers	Reference statements	Reference cases
Skill	**Entrepreneurial mindset**	✓	✓	Adaptivity to change • Learning attitude • Ready to adjust, Pivot the idea Proactiveness • Doing something without someone tell what to do • Actively seek for advice • Devotion and put effort Motivation • Passion/ internal drive • Motivation to develop business Resilience • Not giving up, Not fear of failure	"Why they need to do this business, so this motivation is really important, but it depends on the entrepreneurs. Like entrepreneurs that have already strong belief because of their experience, like childhood experiences, like strong experience or something like that but every people doesn't have these kinds of experiences, like connecting with their motivation of their business. So, some people really need to approach their potential customers and potential customers must have the desire or need. They ask, they talk with them, and they really need the customer's voice and to strengthen their belief, to strengthen their mission because of the customer's voice, they can strengthen and be their motivation. that is going to be really important." (INV_E at Bornrex)	I3P, Bornrex, The Tank Incubator, Incubator F, WMG Accelerator, Unreasonable Mexico*. Ignite incubator*, Warwick Incubator, Forward Accelerator, St. John The Studio
	Communication	✓	✓	Communicate and present their idea effectively with external stakeholders	"They have got to be able to present themselves well, in terms of whether they like pitch, whether it is a pitch in a networking event, or whether it is a 20 minutes, half an hour pitch, that something more substantial if you can articulate what you are working on well enough, and then it is going to really help your ability to bring on the team members, secure investment, make sales to customers" (INV_AB at The Studio)	I3P, Incubator F, WMG Accelerator, Ignite incubator*, Warwick Incubator, St. John The Studio
	Strategic thinking	✓	✓	• Evaluate opportunity • Evaluation the customer feedback • Evaluate strength and weakness • Self-reflection	"It's about how they think about problems and how they how they break down what they're trying to build relative to how long it takes to achieve these kinds of things. So, it's more like that strategic mindset that maybe maybe I think still the lower performing entrepreneurs don't really understand. The good ones do understand like doing it." (INV_D at WMG Accelerator)	I3P, Bornrex, Incubator F, WMG Accelerator, Ignite incubator*, Warwick Incubator, St. John, The Studio
	Technical	✓	✓	• Technical expertise	"It's always going to be important to have someone with a financial background, with a background in technology and programming, and then in this agile methodology, obviously is a guy that's like the leader and it's really good selling, commercialising, really good talking and yeah, someone really involved in the operating role. So I think it's also very important for them to have to diversify the background." (INV_C at Incubator C)	I3P, Incubator C, St. John, The Studio
	Marketing and sales	✓	x	-	-	-
	Finance	✓	x	-	-	-
	Networking	✓	✓	• Network with incubation staff • Network with entrepreneurial community	"Another reason that I never mentioned that is the network between the internal staffs. So many times when we try to let some of our older start-ups to engage with the new project is the new process to provide	I3P, Bornrex, WMG Accelerator

				• Network with external stakeholders	mentorship, with feedback, with potential advice, or to help them accomplish this particular problem. So we focus a lot on this cross match between the start ups that we incubated and in the pre-incubation." (INV_M at I3P)	
Team effectiveness	**Team communication**	✓	✓	• Internal communication such as customer feedback	"Communication in the team is fundamental and that kind of also basic complementary skills of co-founders. And because I guess we're such early stages that we probably rarely see a successful team as bigger than three people once you get bigger than three people it becomes too complicated automates. So yeah, I'd say team communication is super important" (INV_L at Warwick Incubator)	I3P, Warwick Incubator
	Team leadership	✓	✓	• Team motivation • Ability to lead the team	"What I am really looking for is the quality of the team. And when I say team I really mean team, I do not want just to have a star, CEO, above the three or four people who work with you, also to be high value and well balanced. So, one of you has got obvious leadership skills to copy somebody else has got strong technical skills, somebody else's, to build and so forth." (INV_W at St. John)	I3P, Bornrex, The Tank Incubator, WMG Accelerator, Warwick Incubator, St. John
	Team orientation	✓	✓	• Team cohesion • Team member appreciation	"I think in a later stage. Where you've grown up quite big in the team is quite big, then a leader is definitely a must because somebody needs to drive the team forward in, but a very early stage when the team is too small. I see the team chemistry is way more important and the team should all feel included. Just like actually they're motivated because most of the times is that trying to solve a problem and they want to make a change and if they also included in this process, then they become to become more motivated by the impact that they're creating to the society and in the economy." (INV_A_03 at WMG Accelerator)	WMG Accelerator
	Shared vision	✓	✓	• Team members align their understanding • Team know what they're working towards	"(Vision) it's always important, even if it's one person, but especially when there are multiple people involved, so if you've got some fat like co-founders where there's a mega team or to bring four people, well then you start to bring in employees or people. They have to all know what they're working towards. And it helps to set the kind of strategic direction for the business, because if you're mapping out your goals, and a lot that we do on that middle programme is. We're going to work with you for six months. That needs to be based upon that that main vision so if you don't know the destination, it's very hard to map out how to how to get there. So absolutely essential." (INV_N at Forward Accelerator)	Bornrex, The Tank Incubator, WMG Accelerator, Warwick Incubator, Forward Accelerator
	Monitoring and feedback	✓	✓	• Task monitoring	"When you have a team of several people isn't, like, one person can make sure that that's being done. Like just, there's so many jobs and they have all the one hour, make sure that stuff's done when you grow the organisation, not become a full-time job into servicing many this person versus specifically like a you know a CEO or chief of staff or something like that, to perform that role, so important but easier to manage." (INV_N at Forward Accelerator)	Forward Accelerator

(1) **Marketing and sales skills**

Bozwards and Rogers-Draycott (2017) highlighted *marketing and sale skills* as essential for start-ups to test customer acquisition processes and understand customer behaviour. However, none of our business incubators emphasised the importance of *marketing and sales skills* during this stage. A possible reason suggested by the WMG Accelerator is that *marketing and sale skills* are crucial when start-ups know exactly whom they are selling to and exactly what they are selling.

As discussed in section 5.2.2.1, the critical processes at this stage (testing and rapid iteration) are underpinned by a Lean Start-up approach. Start-ups require to approach only a few potential target customers to validate their offering. This implies that an incubator should place more emphasis on developing other skills more critical to achieve this stage milestone. Thus, *marketing and sales skills* were excluded from the key elements at the Problem/Solution Fit stage of the framework.

(2) **Financial skills**

None of the incubators highlighted the importance of the *financial skills* at the Solution Validation stage. This is because start-ups primarily focus on developing and validating the solution during this stage. *Financial skills* are beneficial for cost modelling when assessing different business models but have no direct impact on the critical achievement at the second development stage such as establishing the solution proposed by the startup actually solves/alleviates the problem. Hence, *financial skills* are excluded from the key elements at the Problem/Solution Fit stage of the framework

Shown in Figure 5.4, results illustrate that the majority of incubators value *entrepreneurial mindset, strategic thinking, and communication skills*, which are similar to those identified in Problem Validation stage (Figure 5.3). This implies that incubators should ensure that start-ups acquire all these skills prior to enter this stage. The analysis supporting the value ratings for each construct is identified in in Table 5.4.

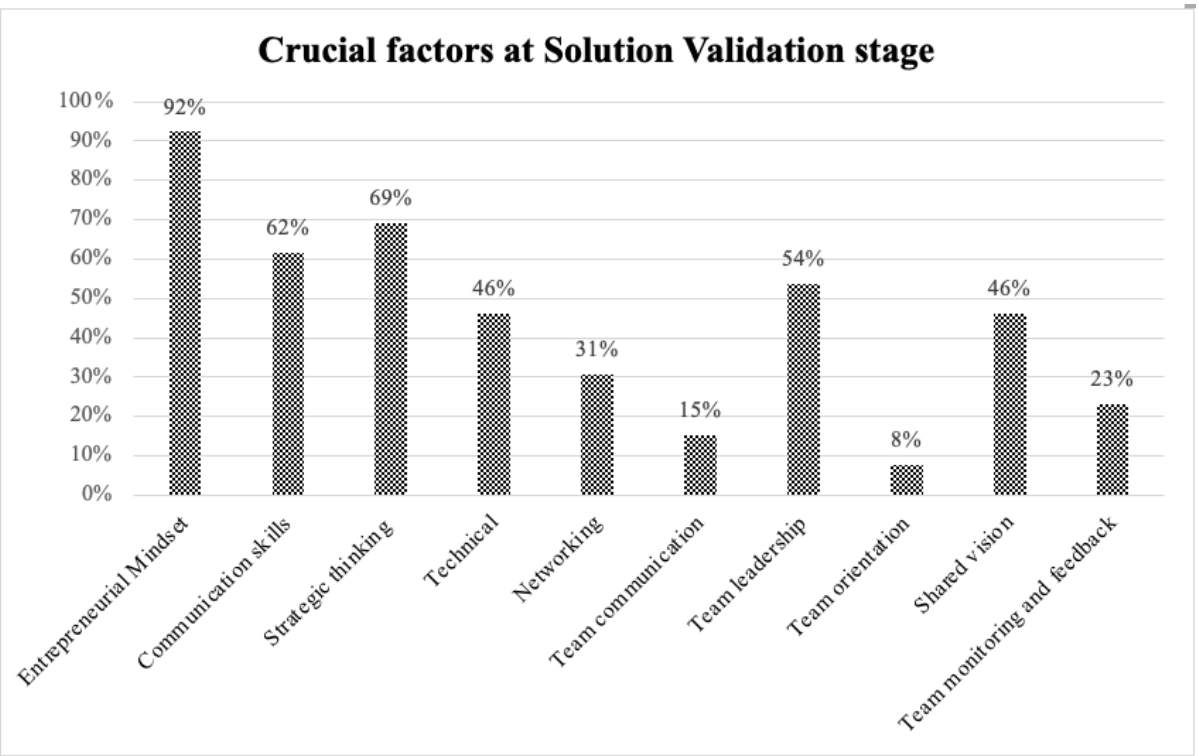

Figure 5.4: Crucial factors at Solution Validation stage

From the analysis, *entrepreneurial mindset* and *strategic thinking* are found to be higher than in the Problem Validation stage (Figure 5.3), maybe owing to the fact that start-ups are required to evaluate information and feedback from customers in order to determine how they will iterate and improve their solutions. The decisions made by start-ups during this stage have a significant impact on the overall company's strategy. Incubators emphasise that high-performing teams are more proactive in their approach. They made significant progress in different elements without someone telling them what they have to do—being proactive results in going out and talking with people, testing and iterating.

Interestingly, the majority of the incubators (89%) do operate some technical skills-oriented programme, but *technical skills* were not identified as crucial as entrepreneurial mindset or strategic thinking at the Solution Validation stage. An interpretation is that incubators play a proactive role in bridging the gaps in technical skills, which informs their programmes or even consultative package for start-ups. Therefore, this is deemed as a factor for start-up progress assessment by this work.

Networking skills once more failed to appear as crucial as the factors above. Though, the lower priority during this stage may be explained by the fact that incubators play a crucial role in bridging the gaps in networking skills of start-ups through access to their support and partner networks

The importance placed on team effectiveness factors (*Team leadership and Shared vision*) have become significantly greater than it was during the Problem Validation stage. The incubators also presented evidence in supporting this. For example, in *team leadership*, incubators recognise the value of a clearly defined leadership role in leading the team and motivating team members to overcome iterative feedback challenges. As the business idea are defined and become more solid, a *shared vision* is critical during this stage, as all team members are required to align their vision and goals; otherwise, business development may be slow, and team conflict may arise.

5.2.3 Stage 3: Business Model Validation

From the interview analysis, twelve incubators that support start-ups to achieve the demonstration of a working business model, with revenue and profit generation are: I3P, Forward Accelerator, Bornrex, Incubator F, WMG Accelerator, St. John, The Tank Incubator, The Studio, Incubator C, Ignite Incubator, Unreasonable Mexico.

As in Figure 5.2, the majority of incubators (58%) distinguish the support of Business Model Validation into a distinct stage. Incubator C designed the program to support this stage particularly. Incubator C supports start-ups who have conducted activities to test their offerings but struggle to find a business model that works. Their focus is based on “making a sale” and obtaining financial support. On the other hand, I3P, IDG, Ignite Incubator and Unreasonable Mexico combine their support with business scale-up. I3P organised their support mainly based on the tractions, which they focus on supporting the accessibility to the network once start-ups demonstrate sufficient evidence. These incubators use revenue metrics to evaluate whether start-ups are ready to proceed to business scale-up. The key measurement aligns with what proposed in the conceptual framework. Thus, it implies that revenue generation is the critical achievement that incubators measure start-up progress.

The following sections discuss the key processes that the twelve study incubators encourage start-ups to conduct (Section 5.2.3.1) and the crucial team development factors identified during the interviews (Section 5.2.3.2).

5.2.3.1 Key processes at Business Model Validation stage

Regarding the interview analysis, two themes were derived from the interviews based on the critical process encouraged by the incubators in order to achieve this stage milestone (business model validation). These are:

(1) Business operations
(2) Testing the business model (Revenue generation)

As shown in Table 5.5, the processes that incubators encourage start-ups to conduct in order to achieve this stage milestone (business model validation) corroborate with conceptual framework (Figure 5.1), though the analysis emerges additional activities and suggest combining them *setting up business operation*, *gathering resources, developing sales road map* under the same theme: Business operations.

Table 5.5: The interview analysis of critical process at Business Model Validation stage

Derived Theme	Start-up development process (Literature)	Conceptual framework	Interview results	Processes from empirical data	Reference statements	Reference cases
Business operation	• Developing sales roadmap • Gathering resources	✓	✓	• Sale and marketing roadmap • Develop sales process and sale strategies • Managing resources • Gathering resources • Setting up business operation	"I think it comes down to resources, both in terms of gathering resources, so can you raise investment, can you generate revenue, sales, but also have those resources deployed so if you are able to get things in. How are you spending your time, how are you spending your money? Are you looking at the return on that, because it's all about you know if you've got, you know 10,000 pounds to spend, how do you turn that into 50,000 pounds or 100,000. You know every time you spend money at that stage, it needs to be something that's going to do that, we see a lot of businesses that stage, get some financing and spend it on things that aren't going to bring value to the business." (INV_N at Forward Accelerator) "There is run through a few businesses process redesign workshop just to see if we bottleneck or can we know, can we know, improve the business processes because we always find room for improvement that usually the company people, the CEO, the CTO they haven't considered. So often, we find quite a lot of things that they don't find interesting about. So something that they haven't considered and they're very interested in developing later on" (INV_A at WMG Accelerator)	Bornrex, Forward Accelerator WMG Accelerator
Business model validation	• Testing business model • Testing funnels • Business model validation	✓	✓	Quantitative measure Working closely with customers	"Validating if the business model is scalable. This means that products are needed by customers and their marketing and sales activities work well to get enough customers. We check if the small activity with MVP works or not. If the small-scale activities go well, when we repeat the same thing with big budgets and on the big scale, the business should be scaled." (INV_E at Bornrex)	Bornrex, Forward Accelerator WMG Accelerator Incubator C St. John

The interview analysis suggests that incubators focus on assisting start-ups in setting up their business operation in order to expand their sale activities and prepare for the business scale-up stage. As an example, the acceleration program at the WMG Accelerator provides a business process redesign workshop to evaluate the operation processes of the business and help make it Lean. WMG Accelerator asserted that lack of clear operational processes could be one of the main obstacles to scale-up.

INV_N at the Forward Accelerator suggests that business operations affect long-term success rather than short-term performance. They claim start-ups who prepare for the business operation perform better at the scale-up stage. They gave an example that

> "So, if they are and this is why we always try and get them to start working so if you're going to build a sales process. Make sure you no longer transmit speaker pounders and the fact that, wherever. And you got anything on the answer no, it's in my semi mind. Also, guys, if you have somebody who is in the sales team. They're not going to, You know, if you've brought them in next week, how are they going to know what the sales processes. After start mapping down the systems and having them in place so that when you do get to that high growth" (INV_N at Forward Accelerator)

During this stage, the start-up is required to validate the other parts of the business model, particularly the sale and marketing strategies. For instance, WMG Accelerator alter their business model tool from the Lean Canvas in the previous stages to the Business Model Canvas of Osterwalder et al. (2009) at this stage, so that more operational assessments were included. In order to test the business model, quantitative measures are suggested to evaluate the start-up activities (Incubator C, Bornrex). For instance, Incubator C suggested to set the measurable goals so they can track the progress. Interviewee INV_E at Bornrex highlighted that it is important to ensure that the business model works by evaluating start-ups based on three quantitative metrics:

(1) Revenue. INV_E at Bornrex claims that start-up should demonstrate the revenue generation because the customer tractions generated from the free model are insufficient evidence for working business model.

(2) Cost per acquisition. This metric is to assess the effectiveness of marketing and sales activities.
(3) Churn rate. This metric reflects whether the operational systems work and the satisfaction in customers they produce.

In summary, interview analysis identifies that incubators assist start-ups by developing sales strategies, monitoring performance, and providing access to networks to operate the viable business model they help design and evaluate.

5.2.3.2 Team development factor at Business Model Validation stage

A comparison of the team effectiveness and skill factors covered by the academic framework derived from literature (Figure 5.1) and the interview analysis is presented in Table 5.6. The factors suggested by interviewed incubators are consistent with those derived by previous literature studies, except for *communication skills*.

None of incubators in this study identified the importance of *communication skills* during this stage. Possible reasons to explain for the absence of communication skills is that incubators already anticipated that a start-up already progressed this stage must have demonstrated effective communication skills; otherwise, they would not have survived the first two-stage. This is supported by the evidence from interview analysis in Section 5.2.1.1 and 5.2.1.2 that incubators place emphasis on communication skills. Hence, from the incubators' perspective these skills are not required to be developed in this stage.

Table 5.6: The comparison of team development factors during Business Model Validation stage

	Stage 3	Conceptual fraemwork	Interview results	Behavioral makers	Reference statements	Reference cases
Skill	Entrepreneurial mindset	✓	✓	• Proactiveness • Focus on execution • Learning attitude	"Taking action is very important. For example, like talking to customers like going to the potential customers, like making the sale. many, many people, stop to take actions like they have the fear I don't know why, but many people have like being ashamed. these kind of fears are easily stop the actions. yes, the motivation and taking actions and humble, being humble, have learning attitude, learning from customers or other voices. So if the people are very humble and respect people and they can learn from everything. and the factor that entrepreneurs need are not like skills but more like attitude. so if they have a good, good motivation and their good attitude or learning attitude." (INV_E at Bornrex)	Bornrex, Incubator F
	Communication	✓	-	-	-	-
	Strategic thinking	✓	✓	• Thoroughly consideration and plan • Decision making • Situation analysis	"The low They are action driven like doing something fast without thoroughly consider and plan what they really need to do. For example, speed up in sale and development without consideration carefully. it's the team that I cannot really do the coaching much." (INV_F at Incubator F)	WMG Accelerator, Incubator F, Incubator C, Forward Accelerator, The Studio
	Technical	✓	✓	• CTO, technical person	"Pretty much the CTO left the team, industrial engineer, the technical person, and since then. The whole business actually stop is almost like the whole operations have frozen for now because there is no one on the technical side. We cannot say that this is applicable to all different businesses." (INV_A)	Incubator C, WMG Accelerator,
	Marketing and sales	✓	✓	• Creating marketing plan • Creating commercialising plan • Presentation/ pitching	"You need a guy very good at talking and selling. I mean, if you could have the best of the best programmers, the best people and user experience and Iot and everybody could have a great technology team. But you need that guy that with the skills of knowing how to pitch, how to to sell. So I would put that in number one. This guy needs to create a marketing plan, commercialisation plan. So that's like the biggest skill. I mean, I think it should be there because without realising when you have a business or a Start-Up, you get so involved in the operation and in the development and improvement of your product or service based on that technology. And you spend most of the time doing that, that you forget that the most important thing is to go out and try to sell and pitch what you're doing. So not everyone would be that, like this little communication about selling of or pitching" (INV_C at Incubator C)	Incubator C, IDG, WMG Accelerator, St.John, The Studio
	Finance	✓	✓	• Forecast the financial plan	"The financial skills, you need to know the numbers, the real numbers, that you're experiencing, you need to know the numbers you're going to forecast that you want to project. You need to build the numbers for your present and future in the short, long and the short and medium and long, long term. So that's key. And even if we're talking again about start-ups that are needed to try to raise capital, yeah, you need to be good at your financial indicators." (INV_C at Incubator C)	Incubator C, Incubator F Unreasonable Mexico, St. John, WMG
	Networking	✓	✓	• Business network to	"Also your network in this industry, because let's say I do know, like some projects may not be disruptive or crazy disruptive stuff, but as long as the founder have some really good	I3P

				people in the business sector	knowledge of the sector or that he has a big network of people that can engage with the sector. that's a start-up has a good chance. Well, success because of the founder that he's already won" (INV_M at I3P)	
Team effectiveness	Team communication	✓	✓	• Team meeting • Continuous communicate the progress and KPI within team • Communicated the vision	"I think it's very important to keep continuous track and more continuous track, being able to monitor the KPIs and very related with that the key activity is to have continuous communication with the team." (INV_C at Incubator C)	Incubator C, Ignite incubator, Forward Accelerator
	Team leadership	✓	✓	• Team motivation • Managing people • Task delegation	"Motivating people is very important. It was. So entrepreneurs really need handholding, they need empathy, they need motivation because most things they do will go wrong, you know." (INV_K at Ignite incubator)	Incubator C Ignite incubator St. John Unreasonable Mexico, Incubator F, WMG Accelerator,
	Team orientation	✓	✓	• Team commitment	"The main difference you see in that high performance Start-Up and team is its commitment. You see in some start-ups that all the team, all the co-founders are really committed, really involved in the meetings. They want to participate and know about everything that's going on in the business model. There you see all of them very interested and full time, usually full time in their Start-Up and in low performance team you see that they're not all involved. They have part time jobs, or they got other jobs. And in their spare time, they're involved in the start-up. And so they go really slow in the process, the development or the Start-Up." (INV_C at Incubator C)	Incubator C Ignite Incubator, IDG, WMG Accelerator, Unreasonable Mexico,
	Feedback and monitoring	✓	✓	• Monitor KPI	"It goes related with their planning and follow up of the KPI, because if they really follow up their KPI, that that's what's going to keep them keep their drive and keep them moving and keep them making making a path and say, hey, we're not on the right track because we're still very far from what we plan from reaching these KPI. So I think it's very important to keep continuous track and more continuous track, being able to monitor the KPIs" (INV_C at Incubator C)	Incubator C, Forward Accelerator
	Shared vision	✓	✓	• Aligned their understanding in what they have to acheive	"Going back to that vision as well as is making sure that it's clearly communicated that people understand what metrics are important, what metrics that they're responsible for and where they should be taking those metrics what's expected of them. so very it's a very easy way to measure the success and performance then of team and organisation. If you have clear, clear sight on what that should be." (INV_N at Forward Accelerator)	Forward Accelerator

Regarding the analysis with twelve incubators (Table 5.6), eleven crucial factors were identified during the interview. As demonstrated in Figure 5.5, *team leadership* is considered significantly more important than the other factors at this stage. Interview analysis reveals that the level of importance of *team leadership* increases as the company develops. The key characteristics of *team leadership* highlighted by the incubator specialists are team motivation and team management. These result in the start-up team maintaining a positive culture and retaining members. Unreasonable Mexico provided an example of a team whose leader was incapable of managing people, and each new team member he recruited ended up not staying with the team. This resulted in the slow business's growth.

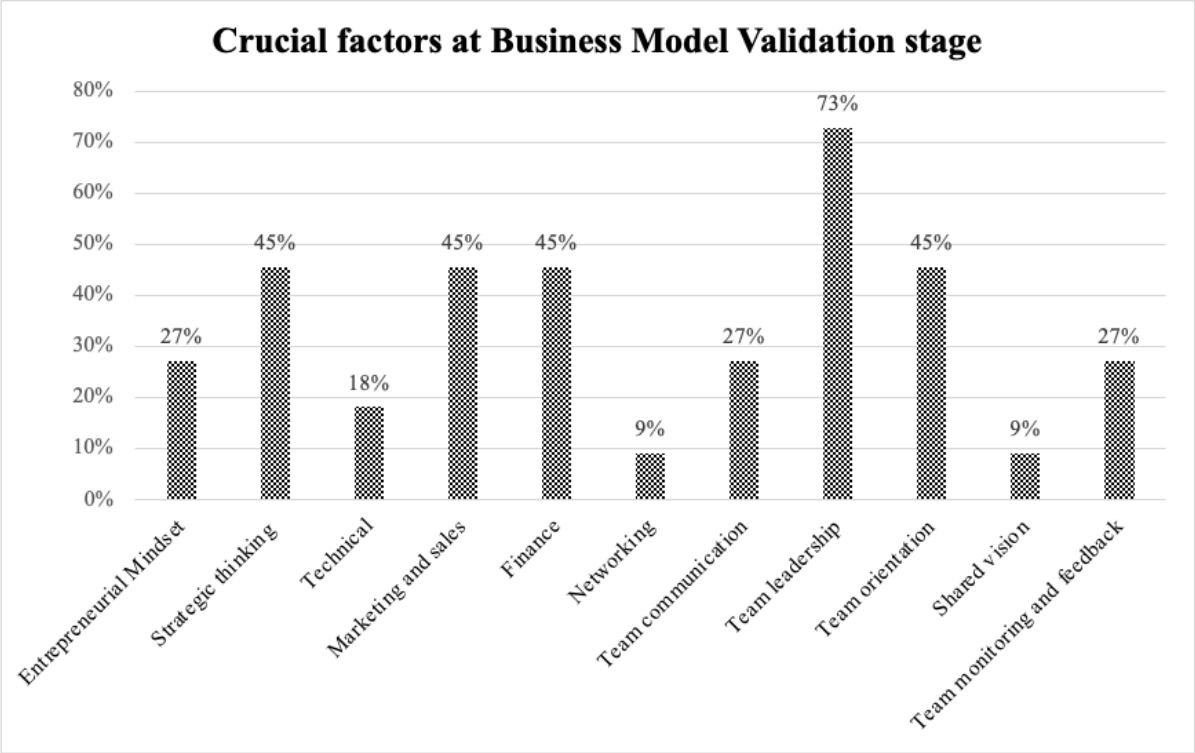

Figure 5.5: Crucial factors at Business Model Validate stage

Three of the skills: *strategic thinking*, *marketing* and *sales, and financial skills*, were equally weighted. INV_A at the WMG Accelerator suggested that start-ups require a combination of these skills to grow their business, as they must evaluate their performance and adjust their business strategy to achieve that. INV_C at Incubator C claims that *marketing and sales skills* are more important than technical skills as *customer and market validation* are more critical at this stage.

While *entrepreneurial mindset* is the most critical construct during the first two stages when start-ups have to identify a monetisable problem and develop solutions that address market need. From an incubators' perspective such as INV_M at I3P, start-ups are expected to have developed the right mindset by going through the learning processes during the previous two stages. Thus, it implies that an *entrepreneurial mindset* is no longer a primary focus during this stage.

5.2.4 Stage 4: Business Scale-up stage

The discussions in this section are based on the interview analysis of nine incubators that support start-ups in achieving business scale-up (I3P, Forward Accelerator, Bornrex, Incubator F, MG Accelerator, St. John, IDG, Ignite Incubator, Unreasonable Mexico).

As discussed in Section 5.2.3, the majority of incubators (55%) distinguish business scale-up into a distinct stage, which helps them focus on accelerating the growth of the business. Incubator F claims that start-up need to have a previous track record and profit in order to enter busines scale-up stage. The difference in support offerings between this stage (equivalent to seed stage of Incubator F) and the previous stage is the level of investment in the start-up to speed up their growth. For WMG Accelerator and Unreasonable Mexico, the key support strategy of this stage is to assist start-ups in scaling their customer bases and business operations. At this stage, there is no standard workshop for start-ups. Start-ups are required to meet with the accelerator team on a regular basis, at least biweekly, to discuss their progress and any issues that the incubator can assist. This demonstrates the different patterns in support offerings provided by incubators.

The following subsections discuss the critical processes that the study incubators support start-ups to conduct (Section 5.2.4.1) and the crucial team development factors identified during the interviews (Section 5.2.4.2).

5.2.4.1 Key process at Business Scale-up stage

In Table 5.7, the interview analysis reveals that the empirically derived themes are closely similar to conceptual framework (Figure 5.1), though the results suggest additional activities

to the conceptual framework on *scale business operation,* including improving the operational processes to reduce bottle neck, managing organisational structure.

Three themes are derived from the interviews based on the critical processes supported by the incubators:

(1) Scale execution (performance measurement)
(2) Scale business operation
(3) Business expansion

The results of analysis suggest changing 'scale organisation' to 'business expansion' in order to clarify the activities under this theme.

In order to help start-ups in executing their *business scalability*, the study business incubators use quantitative measures to evaluate the current state of business. Various metrics are tracked by incubators to measure how well a start-up performs in executing the validated sale processes. For example, customer acquisition cost, lifetime value, churn rate, as well as more traditional measures Profit & Loss and cash flow. For example, Bornrex, highlighted that *"There should be the several points we should check like the customer acquisition cost, lifetime value, churn rate depending on the business models. Of course, they need to check the Profit & Loss and cash flow."* Whilst, Unreasonable Mexico, also measure the employment generated and the company's sale growth.

Table 5.7: The interview analysis of critical process at Business scale-up stage

Derived Theme	Start-up development process (Literature)	Conceptual Framework	Interview results	Processes from empirical data	Reference statements	Reference cases
Scale execution	Executing validated sale process to gain more customers and revenue	✓	✓	• Performance measurement	"We measure their growth, and employment, or people support it, which is the beneficiary, growth in sales and growth in investment. those four things are what we measure once they start our program and a year after and year after, and year after. That's how we know the programme is efficient." (INV_AC at Unreasonable Mexico)	Unreasonable Mexico, Bornrex, Forward accelerator
Scale operation	Scale and optimise operation	✓	✓	• Utilise the resources • Business operation • Identify bottleneck to improve the process • Managing/leading the company	There's a company that's really amazing. The idea it's amazing the execution has been bright, they use artificial intelligence to analyse if you should get a credit or to be financially supported or not. Entrepreneur is very signal. He is an IT guy. He is not a people's person. He is very straightforward, and he has struggled with his team on hiring people, retaining people, growing people, I mean, he has five people in this team, and he should have the team, but once we hire someone they leave. We were trying to tell him that his main problem is that he cannot handle the people. it's because of his profile and that's fine, because he will not turn into a people's person, you know by the morning. So we suggest to him, two things. Either to find a partner that could handle the team, or to hire an HR that can handle the team. And he's very, very fair, that he refused. No, that's not strategic. Three days ago, he said to us you know guys, I can't take it anymore I need somebody that can lead the team and hire people for me because it's true. That's something that you need to take care of, especially when you are a growing business that having rotation within your team (INV_AC at Unreasonable Mexico)	WMG Accelerator, IDG, Forward Accelerator,
Business expansion	Scale organisation	✓	✓	• Market insight • Pivot to blue ocean • Potential market application • Grow international • Find new S curve	"How can you maybe pivot you to a towards a blue ocean more, more and more attractive market? How can we create a future vision for that company, which is, you know, in line with the problem and really give them some advantage? Those kinds of things, so, yeah, we're trying we're trying to basically appropriately select tools and support to support that company with the right type of support at the right time" (INV_A at WMG Accelerator)	WMG Accelerator, I3P, St. John Incubator F

Concerning the *scale business operation*, incubator practitioners (INV_N at Forward Accelerator, and INV_AC at Unreasonable Mexico) claimed that the internal process structure is more important than at the preceding stage, as well as the skills required for start-up CEOs. Therefore, the incubators assessed start-ups' internal processes and executives' leadership skills. For example, INV_AC at Unreasonable Mexico repeated an example of a team collapse from being stuck at scaleup because the team leader could not manage and motivate his staff. Interviewee INV_S at IDG also claimed that they monitored the team closely and often by interviewing the CEO, COO, and CTO to see whether they are in-synced with one another or not.

Another critical support at the Business Scale-up stage identified was based on *business expansion*. Incubators such as I3P focus on access to the network. WMG Accelerator also suggested that they help start-ups at this stage find new market opportunities, as well as assiting to pivot into the new "blue oceans". Their response to the incubation questions during their interview was:

> "You got competencies. How can we make your business better? How can we make it lean and grow it more? How can we then make it lean and grow the existing business, maybe make improvements in the second stage, you know, through business process redesign or, you know, incorporating some automation or, you know, improving the sales funnel, those kinds of things. And then the third stage would be along the lines of, OK, how can you maybe pivot you to a towards a blue ocean and more attractive market? How can we create a future vision for that company, which is, you know, in line with the problem and really give them some advantage?" (INV_D at WMG Accelerator)

The interview analysis conducted found that the current incubation processes of the incubator sample align with the conceptual framework. As this stage the conceptual framework was derived from the Customer Development Model of Blank and Dorf (2013). However, Blank and Dolf (2009) do not extensively discuss their model's scale-up process. This study adds new insights from the incubators' perspective to the body of knowledge by highlighting the critical processes required for an incubator to support start-up *scalability*.

5.2.4.2 Team development factors at Business Scale-up stage

The interview analysis with nine incubators which support start-ups at Business Scale-up stage reveal eight critical factors. Described in Table 5.8, the factors at this stage suggested by incubator specialists are consistent with the majority of conceptual framework derived from previous literature studies, except for *communication skills, team communication* and *shared vision*.

(1) Communication skills

As in the Business Validation stage, the incubator support specialists did not emphasise *communication skills*. This is probably explained by the fact that start-ups at this stage this stage must have had already proven their competence in *communication skills* throught out earlier stages (Problem Validation and Solution Validation). Thus, they should not be a focus for accelerator support and training at this stage.

(2) Team communication and shared vision

Previous research studies such as Salas et al. (2012) and Hoegl and Gemuenden (2001) claimed *team communication* and *shared vision* are critical component of the team effectiveness model. These two factors were also identified emphasised in all preceding stages by this work. However, the result of the interview analysis suggested they were absence at this stage. A claim made by the incubators for such absence was due to limited resources. Incubators decided that these two are low priority support as it is less critical as a skill to move onto the next stage of the overall journey. For instance, I3P and Tank Incubator were both aware of the importance of these factors, though they cannot assess nor support everything due to their resources constrain. Since the main focus of this framework is to guide incubators in tailoring start-up support, the deprioritisation of these factors led to their exclusion from the derived framework of this study. It is noteworthy that the exclusion does not imply that team communication and shared vision are unimportant for start-up performance. Rather, this suggests a future research element to further investigate if incubators should and how to deploy support on these two factors.

Table 5.8: The comparison of team development factors during the Business scale-up stage

	Stage 4	Conceptual framework	Current practice Framework	Behavioral makers	Reference statements	Reference cases
Skill	Entrepreneurial mindset	✓	✓	• Adaptability to change	"Do you keep doing what you're doing and let Covid impact to you and you have less customers. Are you going to change? The smart thing is you change and adapt. Right. And similarly for these businesses, whether they're targeting big markets or small markets, whether they're building really elaborate really, you know, really big solution or very small solution, the opportunity will change overtime." (INV_A at WMG Accelerator)	WMG Accelerator, Incubator F
	Communication	✓	-	-	-	-
	Strategic thinking	✓	✓	• Evaluate company situation • Evaluate opportunity • Evaluate company resources	"The opportunity changes. Two to three to four years down the line after a bit they build something. Maybe the market has changed. Maybe people's perception has changed. Maybe covid come around. Maybe something else has happened. And so the opportunity that you once identified two or three years ago is more than likely to have changed, right? Hmm. Maybe there needs to be within that kind of experimentation phase. There needs to be a re-evaluation of where you are and say, OK, as a stepback, let's really question ourselves as to is this vision still correct? Is the problem still the same has dynamic changed". (INV_A at WMG Accelerator)	WMG Accelerator
	Marketing and sales	✓	✓	• Commercialising plan • Distribution channels	"I kind of think about also how they can distribute their product or service better rather than, you know, thinking of kind of usual ways, let's say, a normal advertising channel. How can we do it differently in order to increase the sales and distributions" (INV_A at WMG Acceleartor)	WMG Acclerator
	Finance	✓	✓	• Finance and cost planning	"It is critical for the founder or recruits key finance people on the team to understand all of the numbers, how much profit they generated, and how they can maximise the capital that they have." (INV_F at Incubator F)	Incubator F
	Networking	✓	✓	• Growing their network for new business opportunities	"Number one is network. Okay. I can't over emphasise how important that is like the entrepreneurs that develop their network and grow their network. They make things happen because it opens opportunities open connections of partners and customers and so that is number one in growing the network." (INV_N at Forward Accelerator)	Forward Accelerator, I3P
Team effectiveness	Team communication	✓	-	-	-	-
	Team leadership	✓	✓	• People management • Appropriate metric assignment • Establish business structure	"I would say there is a really interesting section in the setup of corporation. When he talks about the difference between culture and structure and culture is what everybody talks about, but actually it is the outcome, the adequacy of the right structures with the right incentives, and the right process. Not just it is emerged, it helped considerably. Let's say you want to be highly collaborative and honest and straightforward. It helps if you recruit people who are like that anyway, but you could mess up the most obvious display for people by giving them the wrong incentives." (INV_W at St. John)	St. JohnI3P, Unreasonable Mexico,WMG Accelerator, Forward Accelerator,
	Team orientation	✓	✓	• Company culture	"You know guys, don't ruin the culture. That's the only thing that you need to do. Do not ruin the culture in your business because that's what made me invest in you	St. John Unreasonable Mexico,

					and that's what makes it the biggest differentiator." (INV_AD at Unreasonable Mexico)	WMG Accelerator, Forward Accelerator
	Shared vision	✓	-	-	-	-
	Monitoring and feedback	✓	✓	• Task monitoring to ensure the tasks being done	"When you have a team of several people isn't, like, one person can make sure that that's being done. Like just, there's so many jobs and they have all the one hour, make sure that stuff's done when you grow the organisation, not become a full-time job into servicing many this person versus specifically like a you know a CEO or chief of staff or something like that, to perform that role, so important but easier to manage." (INV_N at Forward Accelerator)	Forward Accelerator

The ranking of eight critical constructs based on the percentage of factor identification during the interview is shown in Figure 5.6. The importance of the *team leadership* and *team orientation* clearly stands out at Business Scale-up stage. Interviewees INV_N at Forward Accelerator and INV_A at WMG Accelerator proposed that the level of management capability is higher than during the previous stages when the team was small.

Towards expanding the business operation, relationships with partners and customers and limited resources create a higher level of challenge and stress for the management team. For example, INV_N at Forward Accelerator and INV_AC at Unreasonable Mexico both suggested that start-up(s) consider hiring an experienced CEO to manage the business in accelerating business scale-up. They provided an example of teams whose performance improved as a result of their company hiring an experienced CEO. Incubator specialist emphasised the critical nature of both in interviews. *Team orientation* is underpinned by the organisational structure and operational processes implemented by the leader.

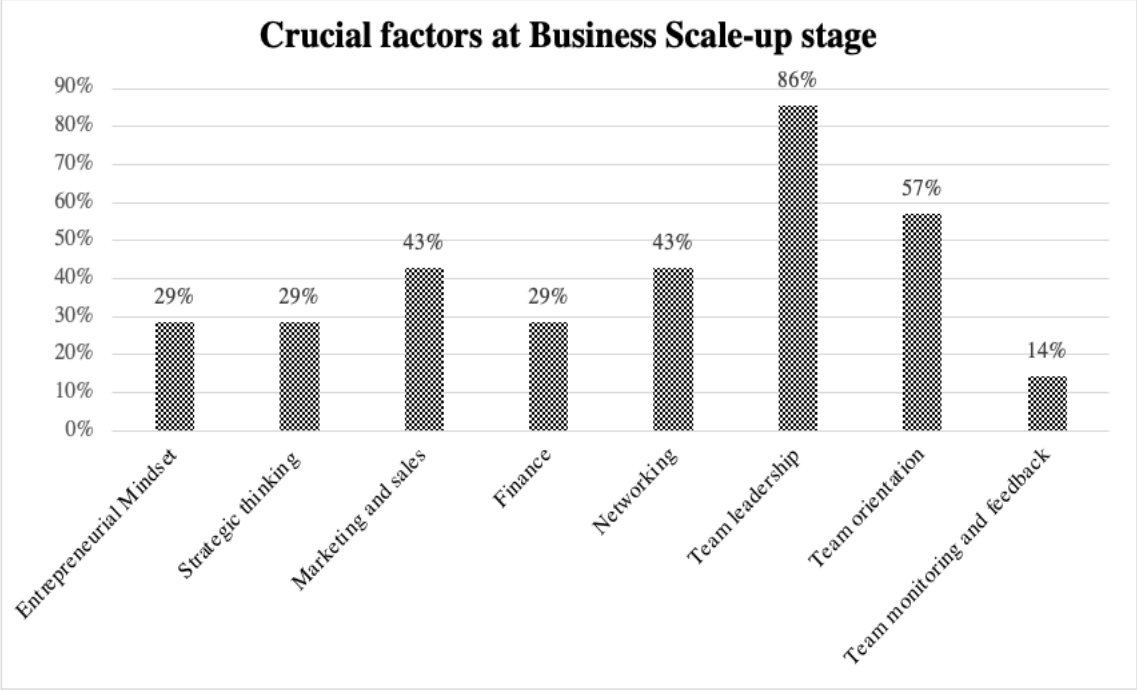

Figure 5.6: Crucial factors at Business Scale-up stage

From the interview analysis, *networking*, *marketing* and *sales skills* are identified equally as the third most critical factor as perceived by business incubators in the study. These factors are all related to the task of scaling up the business, they are all being key tools in making sales. The INV_N at Forward Accelerator identified that the importance of *networking skills* increases as a business grows. In line with the interview analysis, start-ups required *networking skills* the most during Business Scale-up as they required to engage and maintain their relationship with other stakeholders. This could enhance the business opportunities in expanding new market.

5.3 Framework refinement: the Incubator Customised Support Framework (ICSF)

This section discusses the refined framework, which the author labels the Incubator Customised Support Framework (ICS Framework). This was developed and validated from the perspective of incubator specialists operating in a variety of business incubation models and contexts discussed in Section 5.2. Figure 5.7 summarises the elements and the differences and thus updates the conceptual framework into a new derived Framework (Figure 5.9), which more closely reflects actual practice and element importance at different stages of an entrepreneurial journey.

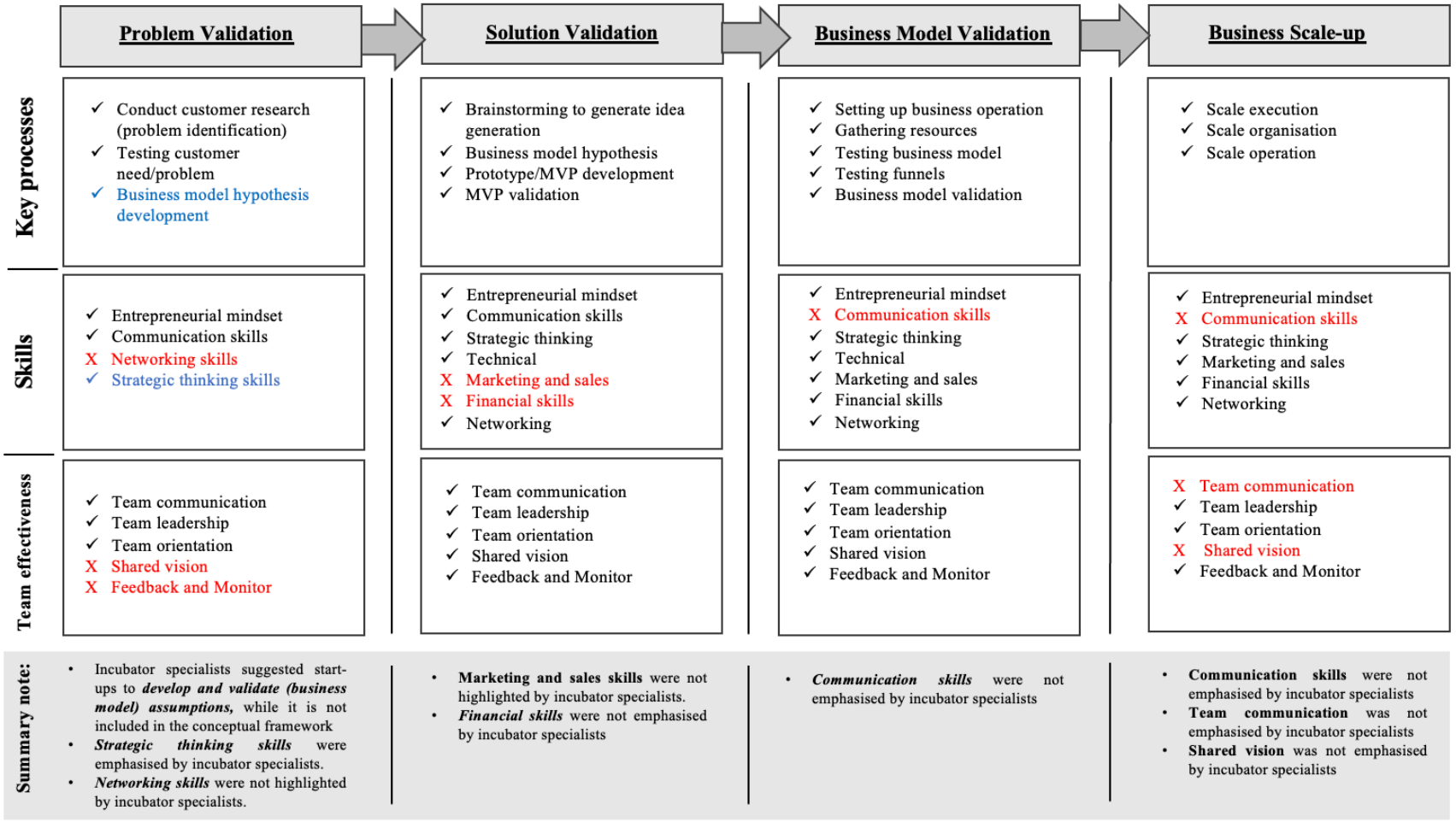

Figure 5.7: The comparison of the interview analysis with incubators with those derived from previous research studies

✓ Refers to the constructs that support the derived constructs from the literature

X refers to the construct that contradicts to the derived constructs from the literature (highlighted in red colour)

Blue colour text refers to the additional constructs highlighted by incubator specialists that is not included in the Conceptual framework (Figure 5.1)

From the incubator samples and evaluation of their operations, incubators could align their support strategy based on four critical stage milestones that categorises distinct process, skills and team effectiveness factors. These four stages are:

(1) Problem validation (identified monetisable problem)
(2) Solution validation (solution that customer would pay for)
(3) Business model validation (working business model, revenue and profit)
(4) Business scale-up

Despite the variation of support program and its staging of thirteen business incubator samples, all cases in this study have arrived at a somewhat similar configuration of their program, which is significantly aligned with the four-stage of conceptual framework. More than half of the incubator study (56%) combine Problem Validation and Solution Validation into one stage. Though, the findings reveal advantages of prioritising the Problem Validation as the first achievement. The problem validation process helps start-ups overcome “Falling in love with the solution” and serves as the entrepreneurial mindset development. 58% of incubators that offer support at Business model validation stage distinguish the support of Business Model Validation into a distinct stage, though the others emphasised revenue generation as key measures to proceed to Business Scale-up stage.

In this context, it is worthwhile to consider the four-stage framework as a major trait for incubators’ start-up development assessment. Results from business incubators in this study confirmed their intentions in assessing cohorts’ achievement on these four-stage validations.

The results attest to the fact that the importance of the "skill and team effectiveness" factors varies at each stage, as discussed previously in Sections 5.2.1.2, 5.2.2.2, 5.2.3.2, and 5.2.4.2. The incubator interviews conducted have helped identify weightings for these at different stages of the journey. The significance of skills could vary depending on the perspective of the stakeholders. For example, from a start-up's perspective as identified in the literature, communication skills are fundamental skills that every start-up needs. From the incubator's perspective, these skills are not key support needs for Business Model Validation (stage 3) and

Business Scale-up stages (Stage 4). A claim made by the incubators for low priority support was due to limited resources. They anticipated that start-ups would need to have these skills to have reached these two stages.

Figure 5.8 illustrates the variation of the importance of these factors over four stages of business development. This demonstrates the trend of team development factor variation, which informs the incubator support focus. This helps incubators better prioritise their support and allocate their resources more effectively.

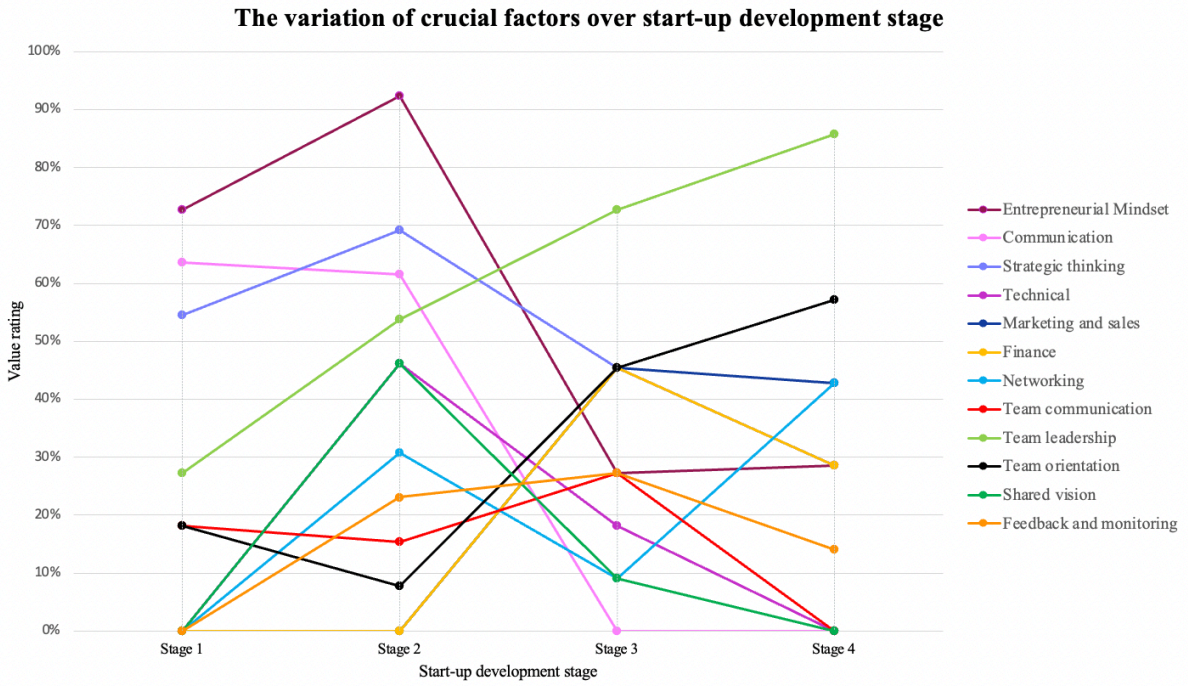

Figure 5.8: The variation of crucial factors over start-up development stage (Author)

The trend shown in Figure 5.8 implies that the incubator providing early-stage start-up support could help start-ups develop an *entrepreneurial mindset*, *strategic thinking* and *communication skills*. These skills are critical for conducting early-stage activities, such as problem and solution validation. Incubators place a lower emphasis on these skills at the later stage as they anticipate start-ups to demonstrate them; otherwise, start-ups would have low chance of survival in the first two-stage.

Additionally, *shared vision* and *technical skills* should be emphasised during the Solution Validation stage (Stage 2), as this is a critical stage where start-ups have identified the potential business opportunities and decide to develop the product for market testing. It is critical for the team to align their vision and goals; thus, they can put effort into business development; otherwise, the process may be slow, and team conflict may arise.

On the other hand, the significance of *team leadership* and *team orientation* increase over the development journey. These two factors have a direct impact on accelerating business scale-up as the start-ups involve more people and require a higher level of management capability to operate the business. Also, the team should ensure to establish the *team feedback and monitoring* behaviour to complete the learning loop and improve team performance. The findings suggest that incubators supporting later-stage start-ups can help transfer these abilities by supporting start-ups in setting the business structure reducing the bottleneck processes and tasks.

Networking, finance, marketing and sales skills are importance in the latter stage of development, when the start-ups know exactly whom they are selling their products to and exactly what they are selling. All skills related to the task of scaling up the business, they are all being key tools in making sales.

This framework also takes an objective perspective – from the incubator specialists' perspectives, whereas previous studies mostly present a subjective view from the start-up's perspective. Thus, the findings add alternative views to enhance the accuracy of skills needed because incubators engage with high and low performing teams throughout the incubation process. This will contribute to the literature on how the support providers/specialists should prioritise. Potentially, the objectiveness creates a significant managerial impact on how third parties assess start-ups at these stages, because start-ups face due-diligence assessment throughout their growth journey by (third party) investors and/or clients.

The refined framework from this study is illustrated in Figure 5.9, where the team development factors are synthesised and rated based on how the majority of incubators in this study valued

them. The ICS framework captures the critical processes and achievements required at each key stage and highlights the essential skills and team effectiveness factors to create or enable progress to the next stage.

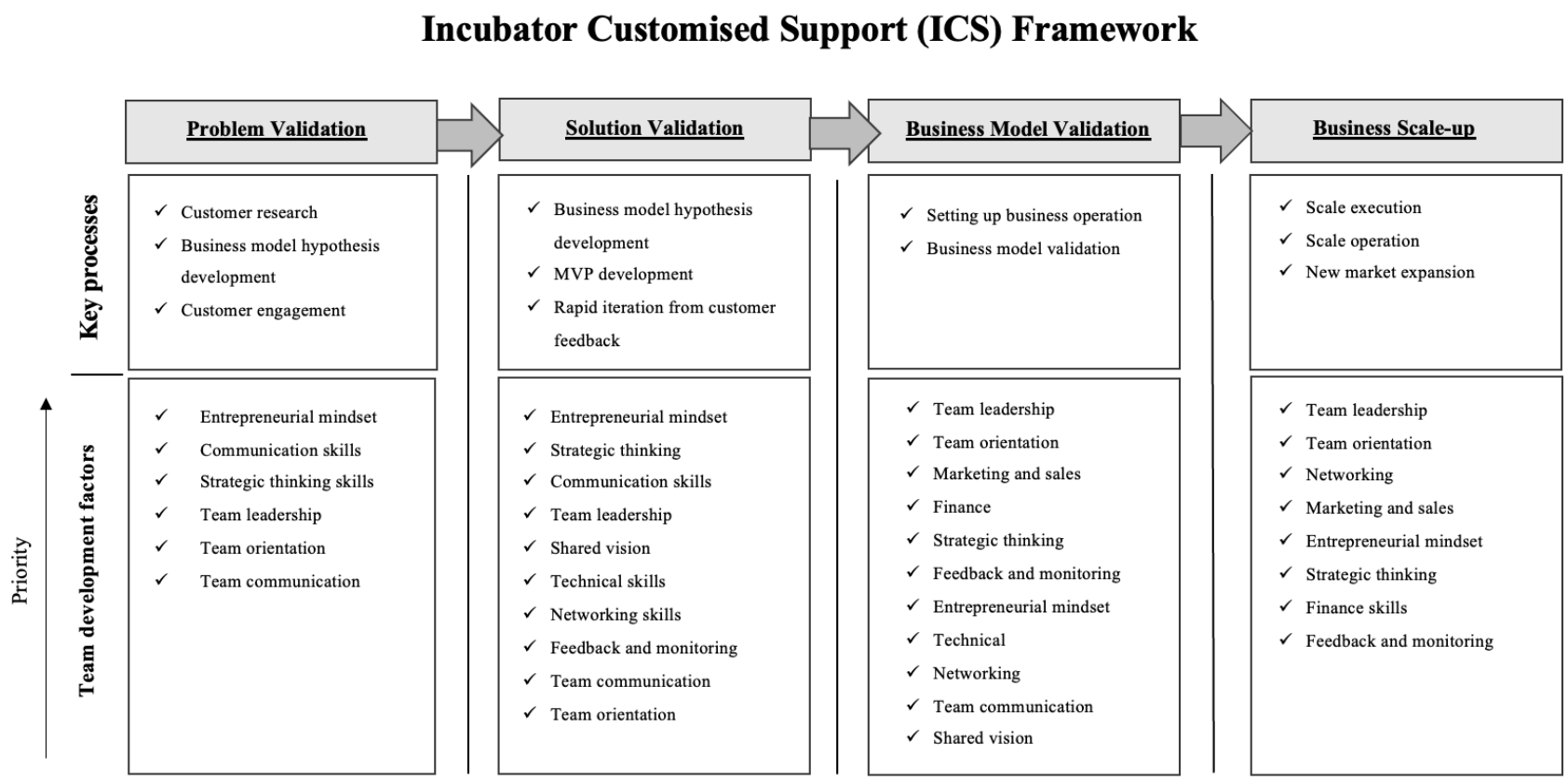

Figure 5.9: The refined framework: Incubator Customised Support (ICS) Framework

*The order of team development factors in the ICS Framework is structured based on the priority highlighted by incubator specialists as discussed in Sections 5.2.1.2, 5.2.2.2, 5.2.3.2, 5.2.3.2.

The findings align with and enhance the work of Sullivan (2000), Kunene (2008), and Chell (2013), who advocated that entrepreneurs require specific skills at different stages of business development. This study further adds new insights into the team effectiveness model by identifying how the importance of the factors varies according to the stage of business development. The findings support Diakanastasi et al. (2018) regarding the varying impact of team effectiveness factors on venture creation.

It is important to note that this study does not lower the value of factors that are not highlighted, just that the highlighted factors were weighted a more important at particular stages. This study concentrated from the perspective of how incubators emphasise the crucial factors that can be assessed and supported through their interactions with start-ups.

The findings do not suggest that the incubator should organise their incubation program into four sub-stages, as this depends on the objectives and strategy of each incubator. The findings do suggest that incubators should ensure that they align their support program to address critical milestones in-line with their overall program coverage. This study highlights support factors priority for incubators during their start-ups' entrepreneurial journey. For example, if the goal of the incubator is to help start-ups develop a working business model (Business Model Validation stage). The incubator has to ensure that start-ups acquire the required skills and team factors and demonstrate that they have validated problems and solutions prior to acceptance onto the program. Thus, they can assess and support start-ups to develop other skills and team factors necessitated for achieving the Business Model Validation milestone.

5.4 Chapter summary

The goal of this chapter was to critique and validate the conceptual framework (Figure 5.1), which was generated through a review of relevant literature, with the actual practices (stages, elements and value ratings) at the incubators supporting this study. The interviews with thirteen business incubators in different countries were analysed according to two critical issues: the start-up development process and team development factors.

The critical processes among each stage of development are mostly aligned with the conceptual framework apart from the emphasis of business model hypothesis development during the Problem Validation stage. Many incubators use the business model workshop as their first engagement with start-ups. Hence, this suggests the refinement of the conceptual framework to emphasise Business Model hypothesis development in the Problem Validation stage.

This research identifies the processes and stages in the entrepreneurial journey and also attempts to identify the most crucial factors at each stage to drive progress to the next stage. The interview analysis reveals the varying significance of skill and team effectiveness factors at each stage of business development from the perspective of incubators. Also, the ranking of crucial factors was suggested based on the number of incubators that value them from the interview. Thus, this helps incubators prioritise their support. The ICS framework captures the critical processes and achievements required at each key stage and highlights the essential skills and team effectiveness factors to create or enable progress to the next stage. This synthesis supports that it is appropriate to categorise the overall start-up journey into four stages, with distinct key achievements and critical team development factors.

This framework does not conclude that the four business development stages identified are optimal for every business incubator. This depends on the distinct objectives of each business incubator. All of the study incubators can be mapped on the four-stage framework, though not all of them use key achievements as the stage milestone. This four-stage framework can guide incubators worldwide on what stages and elements/factors align with their key objectives. The framework generated does not specify what stages an incubator should address; that depends on the strategy and capability within each incubator. It does, however, highlight key milestones that need to be achieved to be able to make progress along with the support focus of each incubator. The following chapter discusses the findings of the second phases of data collection. The ICS framework derived from global context was validated with a specific-country context to investigate the transferability and adaption of ICS Framework in guiding the tailored support for start-ups.

Chapter Six: Incubator Customised Support Framework Validation

6.0 Introduction

This chapter discusses the validation of the incubator Customised Support (ICS) Framework and how the international ICS framework needs to be modified to suit different start-up ecosystems. The ICS Framework (discussed in Section 5.3) has been created through a critical evaluation of the literature on customised start-up support, validated and refined through semi-structured interviews with thirteen incubators in a global context. However, the incubator practices are affected by contextual factors such as the ownership, social, legal and business context at the location, and internal factors strategy, such as the level of experience of start-ups and route to market (Hannon, 2003). This study tests this contextual ICS framework adaptation taking Thailand as an example through semi-structured interviews with sixteen Thai incubators.

The Thai incubator context was chosen as it is an emerging start-up ecosystem in Asia, and among the 100 global fastest emerging start-up ecosystems worldwide (Start-up Genome, 2021). The Thai government (National Innovation Agency of Thailand) has established a strategy to stimulate economic growth, and a key component is the Thai start-up ecosystem as a basis for sustainable growth. Apart from promoting Thai start-ups, the government also follows a policy of encouraging foreign start-ups. This builds the potential for Thailand to develop a robust business support system for start-ups. Thus, investigating whether the ICS framework is applicable to an emerging start-up ecosystem and how it needs to be adapted to a country specific context is an important test of ICS Framework. Research study material on Thai incubator practices is limited (Munkongsujarit, 2016). Thus, this study adds new insights on Thai incubators practices and the key factors to be addressed for customised support to improve the effectiveness of Thai incubation practices.

This chapter is structured into the following sections:

- Section 6.1 discusses the ICS framework from the lens of Thai business incubators regarding the critical processes and team development factors that are required at each development stage. This identifies the commonalities and differences between Thai current practice and the international ICS framework.
- Section 6.2 incorporates the study conclusions and proposes a modified ICS framework to guide incubators in utilising critical team development factors to tailor support for start-ups at each stage of the business development process.

6.1 The investigation of Framework adaptation for specific context: A case of Thailand

The ICS Framework derived from an international context (Figure 5.9) was assessed against practice at sixteen Thai business incubators. The sample incubators cover the Thai incubation landscape, covering different incubation models and types of sponsoring companies, including science and technology parks, independent private companies and corporates. The profiles of the Thai incubator sample are shown in Section 4.5.2.

Two key elements were analysed in order to determine to what extent the ICS framework needs to be adapted for Thai incubation practices:

- The critical milestones and the processes that the incubators use to assist start-ups.
- The value ratings for crucial skills and team effectiveness constructs that the Thai incubators in this study use for start-up development.

6.1.1 The validation of critical milestones and processes

Sixteen Thai incubators located in different cities, various types of sponsoring companies and different incubation models were interviewed. This variety of incubation models allowed the researcher to investigate the critical milestones and processes to validate whether the four key stage milestones in the ICS Framework (Figure 5.9) can align with the structure used for categorising tailoring support to start-ups in Thailand.

Figure 6.1 captures key stages of the incubation program for each Thai incubator in our sample. In interviews the incubators discussed their processes, and these were mapped into the four-development stage of the ICS Framework. Though the number and name of the substages in each incubation programs varies, they all had a similar pattern for stages after the Solution Validation stage. Commonly, they break their programs into two substages (Business Model Validation and Business Scale-up). They also have similar milestones for start-ups to enter the Business Scale-up stage: revenues and profit.

There are two patterns for support in the early stages of start-up. SCG, PSU, Hand-up, New Energy Nexus, Ultron Asia, Youth Challenge, Root Incubator organise their first stage by combining Problem Validation and Solution Validation into a single stage, while KKU and UPSP distinguish these two key achievements into a distinct stage. KKU, UPSP and STeP claim that the first stage (Problem Validation) of the program is designed for developing an entrepreneurial mindset for the aspiring entrepreneurs.

In the following section, the critical milestones for each stage and the critical processes of the interview data from Thai incubator samples are discussed with reference to the ICS Framework (Figure 5.9).

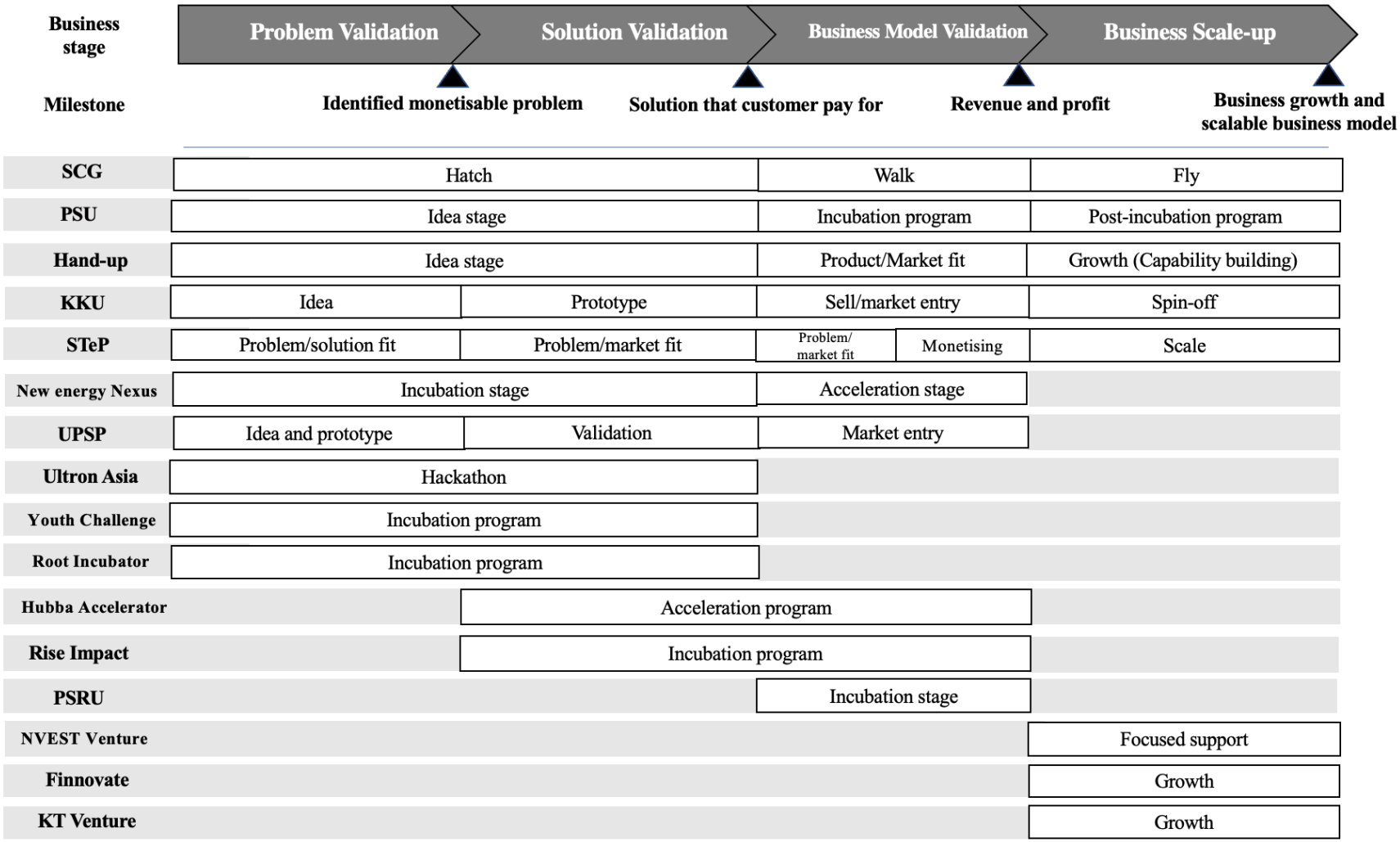

Figure 6.1: The incubation stages of Thai incubator samples (Author)

6.1.1.1 Problem Validation (identified monetisable problem)

In Table 6.1, the critical activities highlighted by the Thai incubators, are structured into three themes, consistent with the critical processes in the Problem Validation stage in the ICS Framework, as discussed in Section 5.2.1.1. The three themes are:

(1) Customer research
(2) Business model hypothesis development
(3) Customer engagement

All incubators encourage start-ups to talk to their potential target customers to understand their problems better. Thai interviewees suggest start-ups engage with customers to validate the problem, align with Blank and Dorf's (2013) suggestion to 'Get out of the building'. In addition to validating the problem, this process assists in fostering an entrepreneurial mindset for the aspiring entrepreneurs. INV_D at STeP and INV_I at PSU claim that the Design Thinking Methodology of Plattner et al. (2009) are used in their first stage to help start-ups develop an entrepreneurial mindset. This process allows start-ups to fully understand the whole entrepreneurial process and demonstrate commitment to their start-up. The processes begin with identifying customers' problems by empathising with potential customers.

Table 6.1: The interview analysis of critical processes of Thai incubators at Problem Validation stage

Derived Theme	Start-up development process (ICS Framework)	International ICSF	Results from Thai incubators	Processes from empirical data	Reference statements	Reference cases
Customer research	Understand -Problem identification	✓	✓	• Develop a problem understanding from secondary research • Understanding the trends in market using the secondary sources • Competitor analysis • Use tools to capture customers' insight (persona)	"We then encourage them to conduct a customer discovery, conduct marketing research, such as we ask them who they would like to sell your products in your province? Call to validate with them. Thus, it really depends on each team, customise to their situation. We also monitor if they understand what they conduct, why they conduct, and what's the next plan after this." (INV_Q at New Energy Nexus)	New Energy Nexus, UPSP, KKU, Youth Challenge STeP

Business model hypothesis development	Business model hypothesis development	✓	✓	• Develop an assumption through the use of tools (Lean Canvas/Business Model Canvas)
				• Customer identification
				  • Specify the profiles customer segment and the characteristics of target
				  • Explore different target groups to identify the most potential one
				• Value proposition design
					"We provide Modules include business model canvas, lean canvas to help them on business value proposition, unique value proposition, customer pain, how about their experiment." (INV_Q at New Energy Nexus)	New Energy Nexus, UPSP, SCG, KKU, HandUp, Youth Challenge STeP,

Customer Engagement	Testing customer need/problem (quantitative measure)	✓	✓	• External engagement to develop customer understanding • Conduct user research employing qualitative methods such as interviews and observations to gain understanding of customers in depth • Testing the customer need by developing an POC • Validating the assumption • Iterate from customer feedback	"They have to evaluate if that problem is worth solving financially. They need to look at the market size too. The key factor for me is the founder. They need to be promising and have the commitment. Not a single start-up succeeds with their first idea. They have to try and pivot their ideas all the time so the idea is not the key factor but the person that will take this idea forward and implement properly so I would say the team is the most important factor." (INV_R at ULTRON Asia)	New Energy Nexus, SCG, KKU, HandUp, ULTRON Asia, Youth Challenge

Aligning with the findings from international incubators (Section 5.2.1.1), the Thai incubators (New Energy Nexus, UPSP, SCG, KKU and HandUp Incubator) encourage start-ups to use tools to structure Business Model assumptions and generate ideas during the Problem Validation stage. A range of tools were suggested by different incubators. For example, Youth Challenge suggested using Value Proposition Canvas, Customer Persona and Stakeholder Mapping to assist in their problem discovery support. INV_J at Root Incubator stated that "*I think value proposition canvas help them scope down and understand the problem of customers, what they could help them overcome that problem*". PSU and STeP uses the Lean Canvas through their mentoring. STeP incubator concentrates on only the following five blocks of the lean canvas:

(1) Problem
(2) Customer
(3) Unique value proposition
(4) Unfair advantage
(5) Solution

In summary, the critical processes to achieve Problem Validation identified by Thai incubators in this study corroborates the ICS Framework discussed in Section 5.2.1.1.

In Figure 6.1, it is evident that the majority of Thai incubators (70%) combine the Problem Validation and Solution Validation into the single stage. However, they highlighted the priority of Problem Validation over the solution at the initial stage to help maintain motivation. An incubator specialist (INV_T at Youth Challenge) emphasised the importance of passion for the problem as did INV_AD at Unreasonable Mexico in the international data sample. Both incubators focus their support on social mission-driven start-ups. For this target market they posited that passion is critical measure for social start-ups, because these businesses may have low revenue potential.

On the other hand, UPSP, SCG and KKU distinguish Problem Validation into a distinct stage. They claimed that problem validation process helps in developing an entrepreneurial mindset

for the aspiring entrepreneurs. Also, they are more focused on avoiding the trap of 'falling in love with the solution', which is the most common cause of start-up failure (Giardino et al., 2015). Giardinao et al. (2015) found that start-ups typically focus on developing solutions rather than solving the problem and overlooking the critical role of validating the problem and the likely demand for a solution.

6.1.1.2 Solution validation (solution that customer would pay for)

Shown in Figure 6.1, the majority of incubators align their key stage milestone in *Solution Validation*, except for Hubba Accelerator and RISE Impact. Their organisation's goal is to assist start-ups in finding a working business model and graduate onto the later program or connect with the investors. INV_B at RISE Impact stated that:

> "We choose to focus on the early-stage start-up that already validated the problem because other programs have expertise in that area. We need some linkage from that to help the start-up build the business and proceed to the growth stage. Thus, our job is to help them find the direction in starting their business and develop an impact and solid business model." (INV_B at RISE Impact)

INV_B at RISE Impact also claimed that their program includes support for Solution Validation, as the idea can be changed along the journey. When recruiting start-ups onto the program, they did not focus on the business idea. They encourage start-ups to find an alternative solution(s) to the problem. Hubba Accelerator also incorporated solution validation as a measure into their start-up evaluation. This implies that Solution Validation is a key measure for business incubator.

From the interview analysis (Table 6.2), the addressed themes of Thai incubators are consistent with the critical processes in the Solution Validation stage of the ICS Framework discussed in Section 5.2.2.1. These are:

(1) Business hypothesis development
(2) MVP development
(3) Rapid iteration from customer feedback

Table 6.2: The interview analysis of critical processes of Thai incubators at Solution Validation stage

Derived Theme	Start-up development process (ICS Framework)	International ICSF	Results from Thai incubators	Processes from empirical data	Reference statements	Reference cases
Business model hypotheses development	Business model hypotheses development	✓	✓	• Value proposition design • Identify potential channels • Specific market • Explore different customer segment • Revenue model, cost of production Pricing • Alternative solutions	"The impact model is flexible. It's like business model which have different method to develop and meet the customer need. Impact model is the model that focus on the aim to make a change in their focused problem. What is the methodology to change and make impact to the problem?" (INV_B at RISE Impact) *They use the term impact model to represent the business model that create impact	New Energy Nexus, SCG, Hubba, KKU, HandUp, UPSP, PSU, STeP
MVP development	MVP development	✓	✓	MVP development	"If they come with an idea, we will match them up with the expert in house to see whether that idea is possible to develop and to be a business. We will then support them to create a prototype and test the product in the market. If they already have the business and want to develop their technology, we will also match them with the expert." (INV_V at UPSP)	New Energy Nexus, SCG, Hubba, KKU, UPSP, PSU, STeP
Rapid iteration from customer feedback	MVP Validation	✓	✓	• Getting customer feedback • Feedback evaluation • Rapid iteration • Pivot	"**HATCH** stage is about the pivot rapidly to find problem/solution fit and if they cannot identify the problem fit, they need to pivot and find different problems, different customer segment, or find other approach is the assumption is not approved." (INV_G at SCG)	New Energy Nexus, UPSP, PSU, HandUp, RISE Impact, SCG

Incubators such as PSU, SCG, STeP and New Energy Nexus encourage start-ups to use business model tools to capture and validate the critical assumption. STeP concentrates on a different block of sets (combinations) from the Lean Canvas model throughout their incubation program. The interviewee INV_D from STeP stated that "*This stage, we focus on the channel element, which related to the channels that start-up will use to validate the customer segment.*" This "set" structure focus from the Lean Canvas elements defines the priority for the incubation support they offer to their start-ups. Not all incubators distinguish the weighting for element from the Business Model tools used. Most of the well-known tools such as Running Lean from Maurya (2012) do suggest an order for defining the elements when using the tools. The critical elements highlighted by the sample set incubators relate to:

- Customer Segments (New Energy Nexus, SCG, Hubba)
- Revenue model (HandUp, KKU and Hubba)
- Cost structure (HandUp, KKU and Hubba)
- Alternative solutions (RISE Impact, Hubba)
- Channel (STeP)

However, INV_V at UPSP claimed that not every business needs to use Business Model tool as it depends on the business type. The Business Model Canvas supports start-ups in framing their thinking and structuring business strategy, though it does not directly impact their business success. Most entrepreneurs in the UPSP Incubator are spin-off companies from established businesses. They attempt to innovate product to a known market. INV_V said that the business hypotheses development is more beneficial for start-ups looking for new business models. Their statements align with comments from incubators (New Energy Nexus, SCG, Hubba) who emphasised the use of Business Model tools to support nascent entrepreneurs, particularly in the technology sector.

The majority of incubators support MVP development, apart from HandUp and RISE Impact. This is because these two incubators do not support high technology start-ups. They claimed that their solution validation can be undertaken using manual operation. The other incubators in the sample have resources to support MVP development through their connections with

universities (New Energy Nexus), science parks (KKU, PSU), and corporate research and development (SCG). Incubators such as Hubba have a specific time for developing the MVP, based on their previous success cases, INV_P said, that they plan that "*the first beta version of the product has to finish within two months after they joined the program*".

All the Thai incubators highlighted the importance of solution validation by incorporating the Lean Start-up principles of Ries (2009) into their start-up development methodology. They encourage start-ups to validate their solution(s) and rapidly iterate based on customer feedback. The Incubators emphasise that the critical issue at this stage is to evaluate customer feedback (SCG, RISE Impact and UPSP Incubator). Interviewee INV_H at KKU Incubator remarked that start-ups that struggle with the necessary change from customer feedback perform poorly.

The key metrics that incubators (HandUp and SCG) use to evaluate these activities is based on traction (growth of orders), rather than a financial metric. This determines whether customers are willing to pay for their offerings before moving forward with scale-up resource building. SCG claimed that "*we cannot wait for generating revenue to evaluate the feedback and improve the solution".*

The interviews suggested that the critical processes that incubators encourage start-ups to undertake at this stage focus on discovering the solutions that address the customers' problems through iteration. Start-ups must demonstrate evidence of customer interest in order to achieve the critical milestone, a solution that customers will pay for. The incubation processes highlighted by Thai incubators appear to corroborate the ICSF derived from the international incubators studied (Section 5.2.2.1).

From the interview analysis, incubators even with distinct incubation models agreed on the importance of solution validation. Hubba Accelerator and RISE impact have incorporated all three critical activities (Business model hypotheses development, MVP development, rapid iteration), they highlight these processes as part of their support to develop a working business model. It means that substages are not essential, but Solution Validation is a key milestone to evaluate start-up achievement.

6.1.1.3 Business model validation (working business model, revenue and profit)

Figure 6.1 illustrates that the Thai incubators align their support program by a distinct stage after Solution Validation towards achieving Business Model Validation, except for the Hubba Accelerator and RISE Impact Incubator. These two offer a shorter duration for the program (6-9 months), while the other offer one year plus programs. Even though their incubators' goal is to support start-ups to achieve the working business model, they use solution validation as the key measure and provide support for Solution Validation, as the idea can be changed along the journey.

From the interview analysis (see Table 6.3), Thai incubators encourage start-ups in undertaking the two critical processes, consistent with the ICS Framework (section 5.2.3.1):

(1) Business operation
(2) Business model validation

STeP claimed that start-ups need to validate other aspects of business model, and thus they alter their business model tool from the Lean Canvas to the Business Model Canvas of Osterwalder et al. (2009) at this stage. Also, incubators (RISE Impact and KKU) support start-ups in developing sales and marketing strategies. They assist start-ups in developing sale strategies in order to generate repeatable customer acquisition processes and retain customers. Sales strategy development and business model validation need to be undertaken simultaneously.

Table 6.3: The interview analysis of critical processes of Thai incubators at Business Model Validation stage

Derived Theme	Start-up development process (ICS Framework)	International ICSF	Results from Thai incubators	Processes from empirical data	Reference statements	Reference cases
Business operation	• Setting up business operation • Gathering resources	✓	✓	• Internal resources building capacity recruitment • Support in business operation by matching with the expert • Innovation/product development (Turning MVP into product) • Company structure • Sale and marketing roadmap • Develop sales process and sale strategies • Managing resources • Focus on sales strategy	"Pattern and process on how team works, and able to operate the business according the 2–3 years plan. The understanding in the team and are able to see the role of each team member" INV_B at RISE Impact "They need to know how to recruit to expand their team properly. They can't hire the wrong person to destroy their company. They have to hire the people that fit the company's culture." (INV_P at Hubba)	New Energy Nexus, HandUp, Hubba Accelerator, RISE Impact, UPSP, STeP
Business model validation	• Testing business model • Testing funnels • Business model validation	✓	✓	• Quantitative measure • Validating sales process and sale strategies	"They have to pivot, listen to customer feedback to improve their product and service to meet the market need until they find the right product/market fit. It's all about adjust and trail of their product, sell strategy, marketing communication, website, brochure, and material that make the customer perceive the business value." (INV_Q at HandUp)	HandUp, UPSP, SCG, KKU, STeP

Some Incubators (such as New Energy Nexus, HandUp, Hubba Accelerator, RISE Impact, and UPSP) assist entrepreneurs in evaluating their capability and managing their internal resources for business delivery. Apart from assisting the start-ups in determining which new team members to recruit, they help control unnecessary resource growth. To demonstrate the significance of business operation during the Business Model Validation stage, the selection criteria during the Business Scale-up stage (KT Ventures, Finnovate, NVEST Venture) was highlighted by interviewees. For instance, Finnovate stated that

> "The factors that we use to consider are the founder, company's structure. We do not just talk only with the founder, but we also talk with the lead in all departments in the company, for example, sales lead, marketing lead, operation lead, HR lead etc. Next, we also look at the company's culture." (INV_AA at Finnovate)

Some Science Park incubators such as UPSP, PSU, STeP and PSRU support product development by matching them with the experts on product innovation. INV_I at PSU stated that "*They have already validated the need of the product, but they do not have the innovation.*"

Incubators (UPSP, SCG, KKU) highlighted another critical activity for start-ups at this stage: evaluating feedback to prioritise what to pursue to innovate their offering. Unlike the Solution Validation stage that focuses on the 'solution' to the problem, other elements of the Business Model must be considered and validated in order to deliver a working business model during this stage. INV_V at UPSP and INV_H at KKU, INV_P at Hubba Accelerator agree that an increase in customer feedback will drive start-ups to iterate on their target customers, channels, product offering, or even iterate back to the Solution Validation stage.

In conclusion, the feedback regarding the critical processes through which Thai incubators assist start-ups during the Business Model Validation stage, are consistent with the ICS Framework (Section 5.2.3.1). This study suggests that incubators can align their strategy with the ICS Framework, to allocate resources and categorise support needs to assist start-ups in business operation setting and business model validation targeted at building a repeatable and scalable business model.

6.1.1.4 Business Scale-up

The interview analysis, shown in Figure 6.1, reveals that Thai incubators in this study are uniform in supporting business scale-up stage. Three of the incubator sample (KT Ventures, Finnovate, NVEST Venture) support start-ups, particularly at the Business Scale-up stage. This implies that specialised may be required towards achieving business scale-up. The intensity of support among KT Ventures, Finnovate, NVEST Venture and SCG, KKU, PSU is different. This is discussed later in this section but could be due to the incubation model used and the organisation goals.

From the analysis, in Table 6.4, the Thai incubators aligned with international practice, with the addition of fundraising. Four themes were highlighted by Thai incubators:

(1) Scale and optimise the operation
(2) Market expansion
(3) Scale execution
(4) Fundraising

Incubators, SCG, KKU, and PSU emphasised that they encourage entrepreneurs to seek funding from venture capital firms to expand the business operation. They assist start-ups by providing access to an investor network.

Incubators KT Ventures, Finnovate, NVEST Venture have distinct differences compared to the others. Apart from their expertise in supporting Business Scale-up, they are private equity firms, which also invest in start-ups in exchange for equity. The author must restate that the term ‘business incubator’ used in this study refers to an organisation that offers incubation processes or support to entrepreneurs. Thus, private equity driven operations are also included in this study.

Table 6.4: The interview analysis of critical processes of Thai incubators at Business Scale-up stage

Derived Theme	Start-up development process (ICS Framework)	International ICSF	Results from Thai incubators	Processes from empirical data	Reference statements	Reference cases
Scale execution	Executing validated sale process to gain more customers and revenue	✓	✓	• Performance measurement	"We use the OKR because OKR give more ownership to start-ups than KPI. If we use KPI, it will look like we tell them what to do. OKR is what they think they are going to do. So they will have inspirational goal. OKR will force them to give input." (INV_Z at NVEST Venture)	STeP, Finnovate, NVEST Venture,
Scale operation	Scale and optimise operation	✓	✓	• Utilise the resources • Human resource management • Business operation • Identify bottleneck to improve the process • Managing/leading the company	80-90% of our work is looking at the operation to ensure that the operation internally is ready for the scale up. Legal and Accounting are also the aspects that we will give support. For us, we think that the real aspects that drive the growth and scale up is the operation, not the market. Market is just the potential drive of growth. We do have the best practice in terms of operations for different type of startups and this save a lot of time for them to grow. By this I mean a year. Currently we have 8 startups that we funded, and their market cap is more than 100M THB. All of them achieve this from the operational scale up. (INV_Z at NVEST Venture)	NVEST Venture, Finnovate, Handup
Market expasion	Scale organisation	✓	✓	• Market insight • Pivot to blue ocean • Potential market application • Grow international • Find new S curve	For scale stage, we focus on the scalability to different markets or exit the business, or get investment series A. It like S Curve, which could be new product, same market or even spin-off products to the same customers under their area of expertise. Also, utilise the resources and determine how their existing core technology could be applied to other market or other problems because they may find other interesting pinpoints during their market validation that they can develop other products for this target customer. (INV_D at STeP)	STeP, Finnovate, NVEST Venture, KKU
Fundraising	-	-	✓	• Fundraising, provide access to investor network	"When the product/market fit, it's about raise funding, who will be the VC, talk to VC, what is business roadmap? to scale up the revenue. More focusing on the revenue. This stage is equal to seed round or series A. We expected to see growth in every month" (INV_G at SCG)	SCG, KKU

KT Ventures, Finnovate and NVEST Venture concentrate on assessing business operations. For example, NVEST Venture works closely with start-ups to investigate their business's structure. They claim that this is crucial, to ensure that they have a clear operational process to reduce bottlenecks. This corroborates Blank and Dorf (2013), who suggested that the scaling process should be operationalized only when the business is ready; otherwise, premature scaling could result in business's failure. Interviewee INV_Z at NVEST Venture:

> "We found a key problem that most companies hire people before thinking about what they will assign them to do. This might make sense if they have only 10-15 employees as they need high flexibility, but this type of structure will not suit them if they want to scale up." (INV_Z at NVEST Venture)

In addition, business incubators (NVET Venture, SCG, KKU, Finnovate) use quantitative measures to assess the current state of a business and assist start-ups in tracking their progress. The success of their start-ups was measured using financial metrics such as revenue, profit, and sale target. NVEST Venture aimed to transfer skills to start-ups by advising them to use Objective Key Results (OKR) tools to set quarterly milestones rather than having them set the KPI's. They believe that OKR will instill a sense of ownership and motivation in start-ups, that they can act on rather than being forced to address it.

Concerning *market expansion*, even though nearly all incubators expect to see growth and encourage start-ups to expand their business opportunities, Thai incubators in this study did not stress how they offer support in expanding the market. A possible explanation from NVEST Venture was:

> "We also provide other support if start-ups request, such as business strategy development, product design. However, we expect them to understand the market better than we do as they are the team that works on it." (INV_Z at NVEST Venture)

In summary, the findings regarding the critical processes that Thai incubators assist start-ups during the Business Scale-up stage are consistent with the ICS Framework (Section 5.2.4.1), with the addition of fundraising. It is reasonable to claim that the Thai incubators need to strengthen the access to funding sources for start-ups as the funding score for Thailand is

relatively low (score 3/10) according to the Global Start-up Ecosystem Report (2021). This may support why SCG, KKU, and PSU highlighted the importance of fundraising. However, the Global Start-up Ecosystem Report (2021) reveal that the market reach score is even lower (score 1/10). Market reach is measured by the market size and the company valuation of the global companies in the ecosystem. The Thailand start-up ecosystem report (2021) revealed the weakness of Thai start-ups regarding a global mindset, most Thai start-ups are too focused on solving local problems. Perhaps Thai incubators should target global practice for a better focus on external market expansion, to seek new business opportunities.

6.1.2 The validation of team development factors

Here findings regarding the key distinctions of crucial team development factors identified from interview analysis of the Thai incubators and the ICS Framework are discussed. The interviews with Thai incubators were analysed through thematic process, as discussed in Section 4.5.4, to identify the critical skills and team development factors for each stage of business development and compared with the ICS Framework (Figure 5.9). The interview analysis of crucial team development factors is covered in Appendix H. The refined framework for Thai contexts resulting from this study is illustrated in Figure 6.2, where the team development factors are synthesised, and then rated based on how the majority of the incubator interviewed valued them.

From the interview analysis the overall factors of skills and team effectiveness are consistent with what the reviewed literature suggests, and what was validated from the global incubator sample. However, the relative importance of the constructs was found to vary at each stage. This is not unexpected as local context (social, political, market, incubator goals and resource skills) will adjust them. Figure 6.2 summarises the elements and the refined ICS Framework into a new ICS Framework adapted for the Thai context, which the author labels “Thai ICS Framework” (Figure 6.2). The Thai ICS Framework captures the critical processes and highlights the crucial skills and team effectiveness factors required at each key stage to enable progress to the next stage, which more closely reflects the actual Thai entrepreneurial ecosystem.

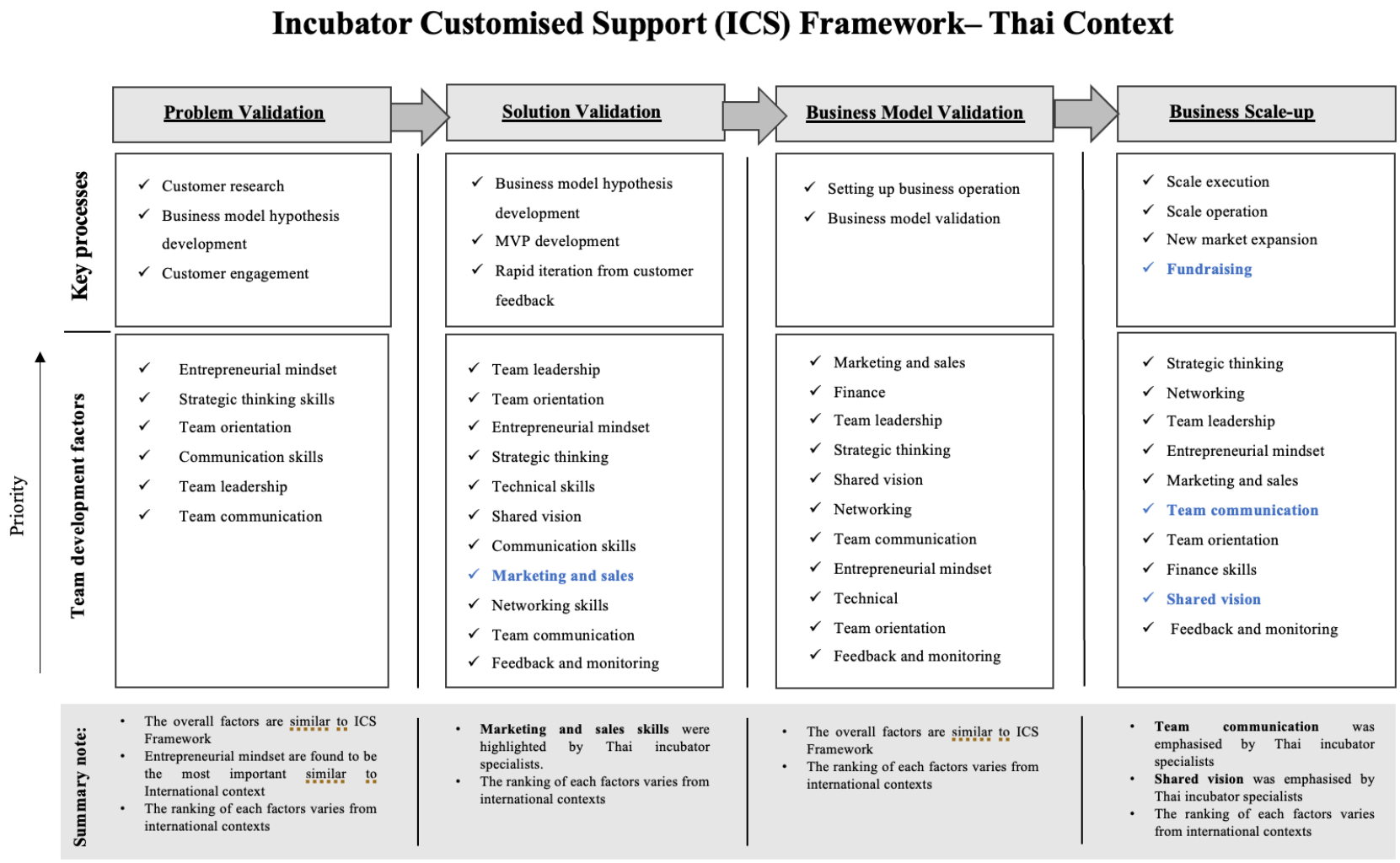

Figure 6.2: Thai ICS Framework: the comparison of the interview analysis of Thai incubators with ICS Framework derived from international incubators studied (Author)

Regardless of the value rating by Thai incubators study, the importance of the skills and team effectiveness factors at each stage of business development identified during the interviews with the Thai incubators are consistent with those derived from the international incubator studies, except for three factors:

- *Marketing and sales skills*
- *Team communication*
- *Shared vision*

Possible explanations for these differences are:

(1) Marketing and sales at Solution Validation stage

The difference in *marketing and sales skills* at the second journey stage (Solution Validation) is highlighted. The increased emphasis aligns with Bozwards and Rogers-Draycott (2017) ratings, who suggested that *marketing and sales skills* are essential for start-ups, to be able to test customer acquisition processes and understand customer behaviour. Discussion with the Thai interviewees (SCG, KKU, KT Venture, ULTRON Asia) revealed that these skills are key to identify potential markets, conduct thorough market research, and quiz customers to validate their initial idea or MVP.

When discussing the composition of the founding team, INV_G at SCG, INV_X at KT Venture, and INV_H at KKU said that at least one of the founders must be an excellent salesperson to engage with customers and collect customer feedback, to iteratively improve their offerings. Also, INV_R at ULTRON Asia placed more emphasis on *marketing and sales skills* claiming that though start-ups have to develop an MVP at this stage, *marketing skills* are the most important because start-ups can use manual means to develop and test the business product.

The Thailand Start-up Ecosystem report (2021) revealed that the performance in “market accessibility” of Thai start-ups is relatively low compared to the potential in the start-up ecosystem in Thailand. Other studies such as and Suksawad (2017) concur and claim that Thai start-up founding teams often have low marketing skills due to a lack of understanding about

the links between markets, products, service creation, and marketing strategy. Thai entrepreneurs often do not conduct extensive research on market segmentation, targeting, and consumer behaviour before developing and producing products and services. In testing a business model, they rely on word of mouth to acquire customers. The Global start-up ecosystem report (2021) conducted by Start-up Genome found that Thai start-up performance in global market reach capability is relatively low (scored 1/10) comparing to the other local Asian country such as Indonesia (9/10), China (9/10), Malaysia (9/10).

Though, the degree of significance of *marketing and sales skills* tends to be lower than *entrepreneurial mindset*. The interviewee INV_X at KT Venture who support start-ups at early-stage, said that start-ups with a strong passion would find a way to learn and develop these skills. They felt that an *entrepreneurial mindset* is more significant measure and can indicate capability in *marketing and sales skills*. The interviews found that the Thai interviewees who do not highly weight *marketing and sales skills*, emphasise the weight of an *entrepreneurial mindset*. The findings are consistent with the previous finding from international incubators in the ICS Framework regarding the higher priority of *entrepreneurial mindset*.

(2) Shared vision at Business Scale-up stage

The differences in the significance of *shared vision* among international and Thai incubators in the sample were found to be the Business Scale-up stage. INV_H at KKU and INV_V at UPSP agreed that *shared vision* is essential at every stage of business development because the aims and the vision may change at each development stage. INV_O at HandUp suggested that start-ups should ensure that they have a *shared vision*, particularly when they have a working business model in order to avoid team conflicts. The management team needs to ensure that the team members have aligned viewpoints in order to progress towards the goal. This is supported by previous studies such as Pearce and Ensley (2004) and Strese et al. (2018), who found that, apart from CEO's passion towards the company's innovation, the shared vision among team members also influences their performance.

However, INV_Z at NVEST Venture observed that start-ups at the Business Scale-up stage should more prioritise setting up a business structure than the *shared vision*, as the *shared vision* is a result of managing resources appropriately. This is consistent with Preston and Karahanna (2009) suggestion that the company should first focus on implementing business strategies and then use them to align the departments with the shared vision.

The Thai incubator specialists' comments are generic and not context-specific to a particular stage of development, and thus the author thinks the importance of this factor cannot be disregarded. This implies that business incubator specialists should not overlook benchmarking and developing the start-up team's shared vision, though they could prioritise other skills for assisting start-ups to the next stage of the overall journey if they have limited resources.

(3) Team communication at Business Scale-up stage

Incubators (KT Venture, Finnovate, NVEST Venture) that offer support, particularly at the Business Scale-up stage, emphasised team communication during the interviews. They claimed that they look at the effectiveness of how the team communicate in order to invest in the start-up. They participate in team meetings and collect the viewpoints of all stakeholders to evaluate this performance. Team communication is key to facilitating the operational process, which is key to good business scale-up. KKU observed that the founder needs to clearly convey the goal of the business so that other people in the company work towards the same goal.

NVEST Venture supports facilitating team communication by arranging meetings with start-ups weekly to discuss goals and actions. INV_Z at NVEST Venture claimed that they must collaborate closely with the team because most Thai start-ups they work with lack entrepreneurial experience. In the Global Start-up Ecosystem Report (2021), the talents score for previous start-up experience for Thai start-ups is rated at three out of ten, which is much lower than the other countries in Asia such as Indonesia (8/10), China (10/10) and Singapore (5/10). This could explain why Thai incubators say that Thai start-ups need to be more assertiveness.

NVEST Venture was established specifically to support start-ups at the Business Scale-up stage; thus, they allocate their resources to assisting start-ups in this critical aspect. Team communication may be overlooked in start-up assessment by most incubators in this study because team communication is typically anchored by team activities. It may also be because of the limited resources within incubators; thus, they choose to prioritise other factors with their support. As discussed in Section 5.2.4.2, interviewees such as INV_M at I3P and INV_AA at the Tank Incubator said that they are aware of the importance of these factors, though they cannot assess them and support due to their limited resources.

The findings of this study identify that the business incubator could and should assess the quality of team communication and suggest ways for the team to improve it in order to enhance performance. The number of meetings held by the team can be used to gauge the level of team communication. Team communication effectiveness should not be disregarded during the Business Scale-up stage.

6.2 Summary of the Framework Validation

The goal of this chapter was to test and investigate how the ICS Framework (Figure 5.9), generated through evaluation of the international incubators supporting this study, could be applicable to the Thai incubator practices in order to adapt the ICS Framework for a specific jurisdiction and incubator structure.

The interview analysis discussed in Sections 6.1 led to a conclusion that the ICS Framework structured into the four-stage based on critical achievements, could guide how incubators assess start-ups, and tailor their support. Each stage contains distinct processes, skills, and team effectiveness factors. This section discusses the findings synthesised from the empirical evidence of ICS Framework validation with both contexts and suggests the modified ICS framework.

Stage 1: Problem Validation

The derivation of critical processes of the Problem Validation stage was based on the *Empathise* process of Design Thinking (Plattner et al., 2009) and the *Understanding problem* of Running Lean (Maurya, 2012). The findings from framework validation of international and Thai contexts corroborate with a conceptual framework in conducting *customer research* and *engaging with customers* to test customer problems. However, the findings reveal that the incubator in this study emphasises the use of Business Model tools (Business Model Canvas and Lean Canvas) to support entrepreneurs in developing and questioning critical business assumptions. Also, these tools assist incubators in analysing the current state of a business, such as how start-ups have conducted their entrepreneurial activities, their thinking mindset, and team working effectiveness. Hence, the findings suggest that *business model hypothesis development* in the Problem Validation stage is key, in the ICS Framework.

To ensure that start-ups are able to undertake these processes, both international and Thai incubators suggest six crucial team development factors for start-ups:

- *Entrepreneurial mindset*
- *Communication skills*
- *Strategic thinking skills*
- *Team leadership*
- *Team orientation*
- *Team communication*

The value ranking of these factors from the majority of the study incubators varies among incubators in Thai and international contexts. *Entrepreneurial mindset* was the most frequently highlighted value by both groups. Incubator should prioritise their support in *entrepreneurial mindset* to encourage start-ups to proactively conduct customer research and engage with potential customers.

The importance of *Entrepreneurial mindset, communication skills, team leadership, team orientation, team communication* are confirmed in the literature (Kuratko et al., 2020;

Bozwards and Rogers-Draycott (2017); Natrajan and Chattopadhyay, 2014; Salas et al., 2005), though the findings highlight that building *strategic thinking skills* is critical for start-ups during the problem discovery and validation processes. This observation adds new insight to the skills literature as some studies such as Kunene (2008), Thom (2016), and Abdullah, Hadi, and Dana (2018) place emphasis on strategic thinking skills only for the later stages of the entrepreneurial journey. However, *shared vision, team feedback and monitoring, networking skills* derived from the literature were not supported by the empirical findings of this study.

The findings also reveal the significance of maintaining motivation through the problem validation process. Incubators employed problem validation processes, including *customer research, customer engagement, and business model hypothesis development* to facilitate entrepreneurial mindset development. This process helps determine whether the problem is actually worth solving. The problem validation process helps start-ups avoid the trap of "falling in love with their idea", cited as a critical reason for start-up failure by Giardino et al. (2015).

Stage 2: Solution Validation

The empirical investigations with both international and Thai incubators corroborate the critical processes synthesised from the process for *Ideation and Prototyping* in Lean Design Thinking (Mueller and Thoring, 2012), *Define Solution and Validate qualitatively* from Running Lean (Maurya, 2012) and *Customer Discovery* from the Customer Development Model (Blank and Dorf, 2013). The findings confirm that incubators need to encourage start-ups to conducting:

- Business Model hypotheses development (Iterative Idea generation)
- MVP/Prototype development
- MVP validation

Team development factors identified to support start-ups during the Solution Validation stage by incubators in both contexts are mostly aligned apart from *Marketing and sale skills.* Critical factors identified by both contexts were:

- *Entrepreneurial mindset*
- *Communication skills*
- *Technical skills*
- *Networking skills*
- *Strategic thinking skills*
- *Team leadership*
- *Team orientation*
- *Team communication*
- *Shared vision*
- *Team feedback and monitoring*
- *Marketing and sales skills* (Thai context)*

The distinct factors that were highlighted by Thai incubators are: *Marketing and sale skills*. The validation with Thai contexts suggests that global market reach capability could influence how incubators value *marketing and sales skills.* Thailand Start-up Ecosystem report (2021) identified that Thai start-up teams need to develop *marketing and sales skills* in order to overcome the barrier in approaching the global market.

The value ranking appointed by the majority of the study incubators identified during the interviews differ between Thai and the international contexts. From the study observations, the majority of international incubators emphasise *entrepreneurial mindset*, whereas *team leadership* is the most frequently highlighted by Thai incubators. Also, *team orientation* is found to be significantly different in terms of the emphasis among Thai (57%) and international incubators (8%). This implies that Thai incubators place much higher value on team effectiveness factors. There may be a national culture influence behind this difference. The need for assertiveness in assisting start-ups starting their businesses could be one of the reasons for this emphasis. In Global Start-up Ecosystem Report (2021), Thai start-ups have a relatively low score in the previous start-up experience of talents (3/10), compared to other countries in Asia such as Indonesia (8/10), China (10/10) and Singapore (5/10).

The International incubators emphasised customer engagement based on the critical assumption that *entrepreneurial mindset* characteristics like proactiveness and resilience are associated with this concept. *Entrepreneurial mindset* encourages start-ups among other things, such as proactively communicate with potential customers in order to obtain feedback and ensure that their solutions address market needs, which are the critical activities at Solution Validation stage.

The empirical findings from this study confirm the significance of all factors derived from the literature studies (Bozwards and Rogers-Draycott, 2017; Sullivan, 2000; Kunene, 2008), except for *financial skills*. This may be because start-ups primarily focus on developing and validating the solution during this stage. *Financial skills* are beneficial for cost modelling when assessing different business models but have no direct impact on the critical achievement at the Solution Validation stage.

Stage 3: Business Model Validation

The critical processes identified from the empirical investigations from both international and Thai contexts align with those was synthesised from the *Customer Validation* stage of the Customer Development Model (Blank and Dorf, 2013) and *Validate Quantitatively* in the Running Lean model (Maurya, 2012). These two critical processes supported by incubators are:

- Business operation
- Business model validation

Critical business assumptions such as sale and marketing channels, revenue model, pricing, and customer acquisition efforts that have not been tested in the preceding stage need to be validated in order to prove that the business delivery is scalable, the sales roadmap is repeatable, and the sales funnel is functional. The results suggest that incubators should support other aspects of *business operation* than just the sale strategy and sales process development. These are *evaluating and gathering resources needed* and *setting up the business structure.*

This observation adds new insight to start-up development methodologies such as the Customer Development Model (Blank and Dorf, 2013) and Running Lean model (Maurya, 2012) which do not detail the processes in the business Customer Validation stage. The findings also, do not support, the integration of Customer Validation and Customer Creation into one stage as proposed by Mueller and Thoring (2012) in the Lean Design Thinking.

Both international and Thai contexts align in the eleven crucial team development factors. *Financial skills* were found to be the additional factors in the preceding stage, while *communication skills* were not identified as critical for supporting start-ups at this stage. Possible reasons to explain for the lack of emphasis on communication skills is that incubators may believe that at this later stage, start-ups should have demonstrated effective communication skills to have reached this stage. Critical factors identified were:

- *Entrepreneurial mindset*
- *Technical skills*
- *Networking skills*
- *Strategic thinking skills*
- *Marketing and sales skills*
- *Finance skills*
- *Team leadership*
- *Team orientation*
- *Team communication*
- *Shared vision*
- *Team feedback and monitoring*

The value ranking from the majority of the study incubators varies between incubators in Thai and international contexts. Most Thai incubators highlighted *marketing and sales skills*, while *team leadership* are the most frequently emphasised by the international incubators. As in the Solution Validation stage, *marketing and sales skills* are crucial for Thai start-ups (Thailand Start-up Ecosystem report, 2021). This may be due to the low quality of market data available. This influences why Thai incubators value these skills in gathering and assessing market data.

The International incubators more emphasise the importance of team effectiveness factors, particularly *team leadership*, as key to maintaining a positive culture.

The significance of all the team development factor in Business Model Validation aligns with the literature studies (Bozwards and Rogers-Draycott, 2017; Natrajan and Chattopadhyay, 2014; Salas et al., 2005; Kunene, 2008), except for *communication skills*. It seems from interviewee comments due to the limited resources in incubators, from their perspective, communication skills are not required to be developed in this stage. By arriving at the Business Model Validation stage, the findings suggest that start-ups have acquired all the crucial team development skills and have the core competency to achieve Product/Market Fit, as Maurya (2012) suggested.

Stage 4: Business Scale-up

The key goal for this stage is to demonstrate the achievement of a scalable business through the delivery of significant growth. The critical processes were derived from the *Customer Creation* and *Company Building* of the Customer Development Model (Blank and Dorf, 2013). The empirical investigation results from international and Thai incubators corroborate with Blank and Dorf (2013). However, Thai incubators also highlighted the *fundraising* processes as critical for Thai start-ups to achieve business growth. Discussed in Section 6.1.1.4, the requirement for *fundraising* support is influenced by the higher financial constraints for entrepreneurs in Thailand by the lack of a strong start-up investment ecosystem (Thailand start-up ecosystem report, 2021). Currently, Thai incubators address and support the access to funding sources for start-ups to address this issue. The Start-up Genome report (2021) found access to funding and the quality of funding activities in Thailand was low (3/10). Thus, the author suggests modifying the critical processes at the Business Scale-up stage in the ICS Framework, if the funding ecosystem is weak. The critical processes are:

- Scale and optimise the operation
- Market expansion
- Scale execution
- Fundraising (Thai context)

The critical team development factors identified by international and Thai contexts mostly aligned, apart from *shared vision and team communication.* Critical team development factors are:

- *Entrepreneurial mindset*
- *Networking skills*
- *Strategic thinking skills*
- *Marketing and sales skills*
- *Finance skills*
- *Team leadership*
- *Team orientation*
- *Team feedback and monitoring*
- *Team communication* (Thai context)*
- *Shared vision*(Thai context)*

Contextual factors influence the need for *team communication* at the Business Scale-up stage. The value of these factors was found to be influenced by a general lack of previous entrepreneurial experience affecting the performance of Thai start-ups. Both the Thai Start-up Ecosystem report (2021) and interviewee comments, such as INV_Z found that Thai start-ups often lack previous entrepreneurial experiences.

Team communication is a key to good collaborative working, and the tasks are more multifaceted than in previous stages, it can be difficult for start-ups without previous experiences to manage their people. Incubators in both contexts agree that *team leadership* are critical for managing business scalability. From Thai incubation practices, the argument for the necessity of *shared vision* is more generic than context-specific and adding *shared vision* support to the ICS Framework may be necessary.

Due to the limited resources of incubators, from their perspective, *communication skills* are not required to be developed in this stage. The other factors aligned with the suggestions in the

literature (Bozwards and Rogers-Draycott, 2017; Sullivan, 2000; Kunene, 2008; Salas et al., 2005).

In conclusion, the further framework validation and contextual testing with business incubators in Thailand concludes that the ICS Framework could apply to the Thai context as the critical processes, achievements, and overall team development factors are consistent. However, it requires adaptation as the priority of crucial team development factors identified by Thai incubators studied vary depending on the level of start-up background and performance in the particular country. Figure 6.3 summarises the modified ICS Framework, highlighting that the significance of factors may vary depending on the local context. From the evaluation, the factors influencing the focus of support depend on

1. Global market reach capability
2. Funding structure
3. Start-up background and experience

The findings from this study suggest that incubators need to consider the factors identified 1-3, in their country context, to adapt the ICS Framework. Team development factors for designing the start-up support may also need higher priority. The "global market reach" capability was found to impact the importance of *marketing and sales skills*. These findings are consistent with Narasimhan et al. (2015), who identified that an impediment to globalisation is a lack of effective sales and go-to-market strategies.

Funding structures and ecosystem influence the support for fundraising activities and the access to an investor network also direct incubator support provision.

Previous start-up experiences may impact the level of assertive support during the incubation process. Here, an intervention to facilitate internal team processes could help improve the start-up performance. The findings are in line with van Weele et al. (2017), who suggested that incubator intervention is important for first-time entrepreneurs to help them develop missing resources. Future research studies to investigate ICS Framework alignment with other

countries or regions are required to further validate the overall ICS Framework and factors affecting the design of customised support.

Regarding start-up team development factors, the framework validation helped confirm that the significance and impact of skill and team effectiveness factors varies depending on the stage of business development by the start-up. These findings corroborate the works of Chell (2013) and Diakanastasi et al. (2018), who suggested that entrepreneurs need specific skills and team factors at different stages of business development. The study also adds empirical evidence from the perspectives of incubators to team effectiveness studies (Salas et al., 2005; Moe and Dingsøyr, 2008; Hoegl and Gemuenden, 2001) on the varying significance of these factors in the venture development process. This study also contributes to team effectiveness studies by illustrating how team effectiveness models can be used to help incubators prioritise support and better allocate resources to start-ups in need.

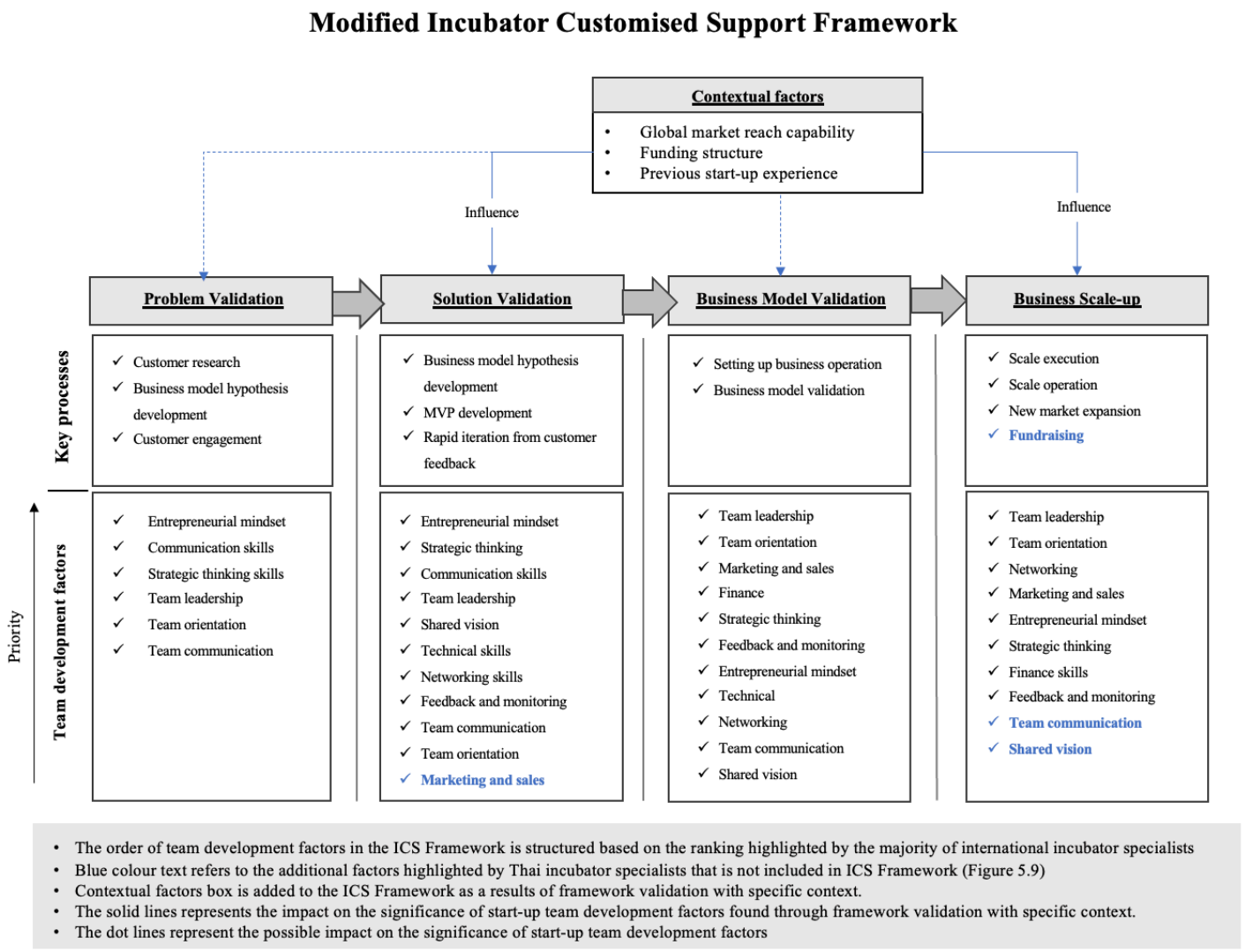

Figure 6.3: Modified Incubator Customised Support Framework (Author)

6.3 Chapter summary

The purpose of this chapter was to discuss and validate the ICS Framework (Figure 5.9), which was generated through aggregated experience and feedback from incubators in a global context through semi-structured interviews with sixteen Thai incubators.

Regarding two key points of validations (Critical process and crucial team development factors), the findings suggest that the international ICS Framework could apply to the local context as the critical processes, achievement, and overall team development factors are consistent. Four-stage of start-up development underpinned the ICS framework aligned with international incubators. Even though not all incubators use all four achievements to break the stage of incubation program, results from Thai business incubators in this study confirmed their intentions in assessing start-ups' achievement on these four-stage validations. Hence, the four-stage framework could be considered a guide for incubators' start-up development assessment.

The findings confirm that incubators emphasised skills and team effectiveness as critical to ensure that start-ups are able to undertake key processes and accomplish key milestone at each stage. Though, the priority of skills and team effectiveness factors identified by Thai incubators studied varies from the international context depending on the local start-up performance and start-up ecosystem. Three key differences were affected by these contextual factors:

- Marketing and Sales at Solution Validation Stage
- Shared vision at Business Scale-up Stage
- Team communication at Business Scale-up Stage

The results of this study support Hannon (2003) that incubators practices are affected by contextual factors, which this study discovered three factors: global market reach capability, funding structure, previous start-up background and experience. Hence, this study suggests the modified ICS Framework adapted to the local context in which incubators could evaluate these contextual factors prior to designing the support. The following chapter concludes the key achievement of this study against the research question and objectives.

Chapter Seven: Conclusion and Recommendations

7.0 Introduction

This research has addressed key questions regarding the incubator customised support to increase the effectiveness of business incubators. There is evidence (Li et al., 2020; Mahmood et al., 2017; Stal et al., 2016) that support for new start-ups through an incubation period can help increase success rates and some further evidence (Mrkajic, 2017; Mas-Verdu et al., 2014; Monsson and Jørgensen, 2014; Weele et al., 2016; Klaasa et al., 2019) that this support should be customised to the needs of the start-up team.

The main objective of this study was to develop a framework for guiding customised support for start-ups for Business Incubators. Figure 7.1 illustrates how chapter of the thesis contributed to the research objectives and the overall research question. The main research question was:

How can the customised support service be designed for start-up business incubator?

From literature review, it was discovered that there is a lack of a framework to guide creating customised support service, which any incubator could examine and evaluate. Although a variety of research has suggested the customised support can be derived based on stages of the entrepreneurial journey with staged specific support mechanisms (Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017; McAdam and McAdam, 2008), the existing literature often presented from the viewpoint of a start-up and not from that of incubators. It does not advise on how the start-up support can be customised according to the needs of the start-up and the resources available in the Incubator. In essence to limit resource requirements, Incubators often provide standardised support programs when the evidence suggests that customised support is very important to success rates (Peter et al., 2004; Mas-Verdu et al., 2014; Pauwels et al., 2016; Vanderstraeten et al., 2016). Thus, the research question was addressed by the task of: Building a staged framework to enable Incubators to design customised support services for their incubatees.

The following four objectives were achieved in order to address the research question:

1) To evaluate a representative selection of start-up development methodologies that are both recognised by the research community and adopted by business incubators with proven impact.
2) To critically review how key constructs have affected a start-ups performance along their development journey, in particular essential skills and team effectiveness factors in the literature.
3) To contrast literature with practice, and to inform the design of a conceptual framework to assess and guide customised support mechanisms for business incubators.
4) To empirically assess, iteratively develop and validate the conceptual framework designed.
    a. To test and modify the conceptual framework with primary data collected using semi-structured interviews from thirteen internationally distributed incubators.
    b. To test the level of variability introduced by a national start-up ecosystem, focusing on assessing the International Framework against the Thai ecosystem using semi-structured interviews with sixteen Thai incubators to challenge and adapt the International Framework.

This chapter is organised into four sections. Section 7.1 discusses the findings drawn from the study against the research questions and objectives. Sections 7.2 and 7.3 discuss the contributions of this study to academics and practices, respectively. Finally, Section 7.4 discusses the limitations of this study and provides recommendations for future research.

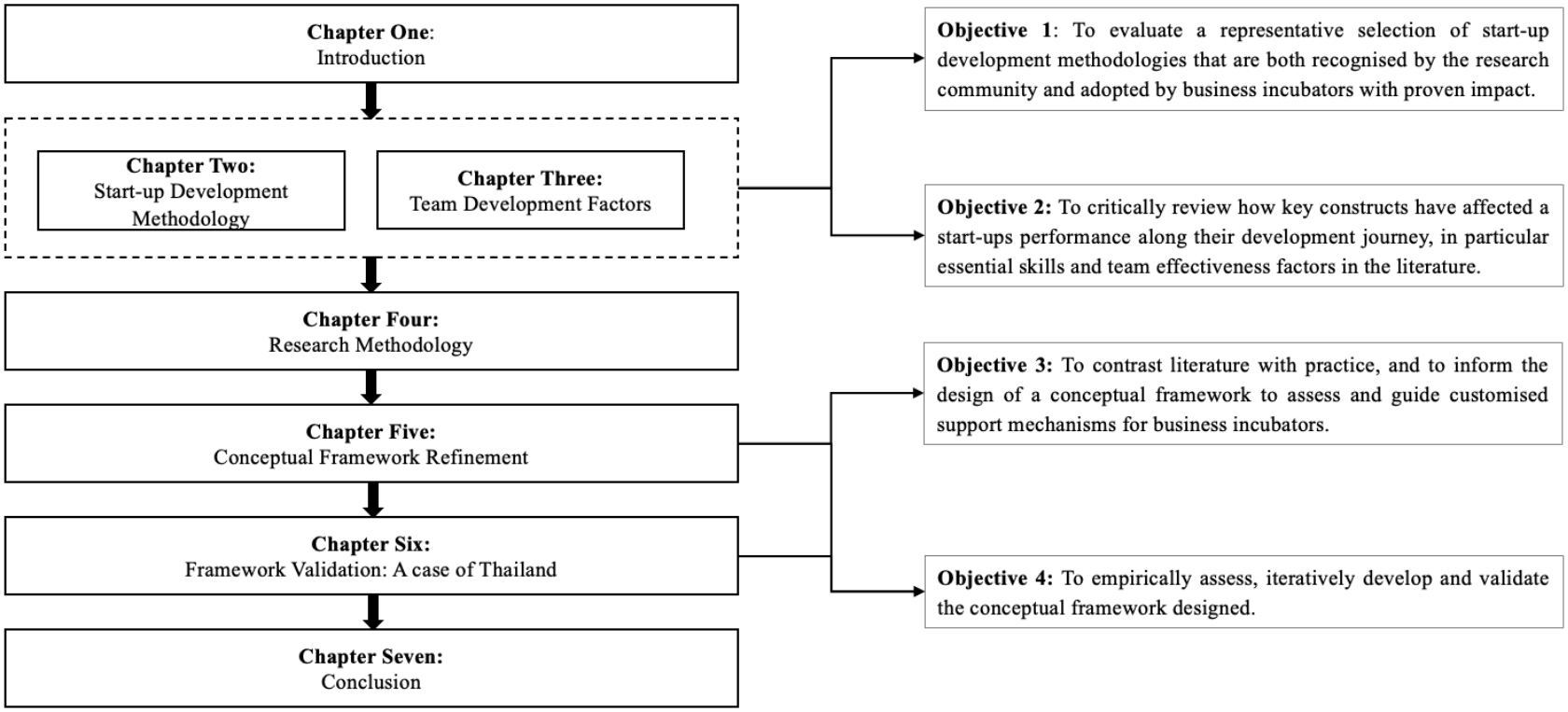

Figure 7.1: Thesis structure and the achievements against research questions and objectives

7.1 Achievements against research questions and objectives

In this section, the details of how the research objectives were addressed and the outcomes of this thesis are laid out in three phases of the abductive approach used in this study.

(1) Conceptual framework development

The first stage of the abductive approach addressed the first two objectives by reviewing prior theoretical knowledge related to business incubation, start-up development methodologies, skills and team effectiveness factors that affect the success of start-ups, in order to formulate an academic knowledge-based framework for business incubator support.

The review of literature studies on customised incubator support found divergent viewpoints on approaches for a customised support framework. Existing frameworks were proposed based on either the stage of business development (Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017; McAdam and McAdam, 2008) or on the attributes of start-up teams (Monsson and Jørgensen, 2014; van Weele et al., 2019). This leads to combining both factors to evaluate the support needs of a start-up by determining the current state of the start-up.

The start-up journey is undertaken in a complex and unpredictable environment; team members may leave or join; new competitors may arise. Without considering these perturbations and their impact on the required skills and processes along the whole entrepreneurial journey, may lead to a failed customised support strategy by incubators. This study synthesised learning from the skills and team effectiveness literature domains to enhance contribution to the customised support development of business incubators. The resulting framework is underpinned by these two elements, which are normally not fused together:

- Review start-up development methodologies and their contribution to the guiding framework.
- Evaluate how Team development factors: crucial skills and team effectiveness factors can contribute to start-up success and how these guide start-up processes and tools.

Through a comparative review of the core relevant literature on start-up development principles and their methodologies (Customer development model of Blank and Dorf (2013), Lean start-up approach of Ries (2008) and Maurya (2012), Lean design thinking of Mueller and Thoring (2012), there were areas for enhancing these approaches when considering an overall journey. Thus, for the incubators, and to be more readily applied by incubators, the consolidation of these methodologies helps incubators prioritise critical activities, clearly identify start-ups' needs, and present the right level of support to address their challenges. The result of this review was a four-stage framework based on critical achievements and processes. Each stage categorised the key processes that help business incubators focus their support and more efficiently manage their limited resources. These key stages are:

1) Problem validation (Identified monetisable problems)
2) Solution validation (Solutions that customer would pay for)
3) Business model validation (Working business model, revenue and profit estimates, revenue proved)
4) Business scale-up (Growth – how to go from testing/prototyping to delivering at scale)

Seven critical skills necessary for start-up success were identified through a review of the literature that empirically validated the impact of skills on start-up development. From the review, start-ups require specific skills at different stages of business development. Seven critical skills are identified. These skills are as follows:

1) Finance skills
2) Networking skills
3) Strategic thinking skills
4) Marketing and sale skills
5) Entrepreneurial mindset
6) Technical skills
7) Communication skills

Further, through a review of prominent team effectiveness models (Salas et al., 2005; Dickinson and McIntyre model (1997); Hoegl and Gemuenden, 2001), five more team effectiveness constructs were identified. Compensating those individual skills, these team effectiveness constructs are measurable by incubators, therefore, can be used to determine if start-ups may need facilitation and support. Five critical team effectiveness factors are:

1) Team communication
2) Team leadership
3) Team orientation
4) Shared vision
5) Team monitoring and feedback

The resulting conceptual framework (Figure 5.1) was derived through the synthesis from these literature reviews. At its core, a synthesis of the start-up development processes was created and used as the foundation of the conceptual framework for identifying the critical skills, and team effectiveness factors for each stage of business development. Each of the factors was found to have varying impacts at different stages of business development. These became "propositions" to be empirically validated in this research study, from the perspective of business incubators. The outcome of this stage informed the pre-defined themes for theory matching in the next stage of the research methodology.

(2) Empirical validation with international incubators to validate and refine conceptual framework

The second phase was a theory matching stage, in which the empirical data and theory are compared. Semi-structured interviews and participant observations with thirteen business incubators in representative countries were conducted to investigate real-world practices. This stage addressed the third objective, by empirically testing the conceptual framework. The empirical investigation was used to validate, update and augment the conceptual framework (Figure 5.1). The outcome of this objective was a refined conceptual framework. The author labeled this as the Incubator Customised Support (ICS) framework (Figure 5.9).

The findings from the sample incubators and the evaluation of their operations, support that it is appropriate to categorise the overall start-up journey into four stages. Each stage with distinct key achievements and critical team development factors. The ICS framework can guide incubators to align their support strategy according to the journey stage that they are addressing.

These four key stage milestones identified are in sequence, though the interviews revealed that not all incubators use these four milestones. Some combine milestones into one or more stages of incubation program, particularly the first two milestones (Problem Validation and Solution Validation). This can depend on the incubator strategy (funded goals) and their resources. The author does not suggest that the incubator need to organise their incubation program into four stages, as this depends on the objectives and strategy of each incubator. The findings do suggest that incubators should ensure that they align their support program to address critical milestones in-line with their overall program coverage.

The critical processes identified at each stage are consistent with the conceptual framework apart from the processes supporting problem validation. Viewing Business Model development as an iterative hypothesis and test process has been employed in incubator practices during the problem validation. The Business Model Canvas (Osterwalders et al., 2009) and Lean Canvas (Maurya, 2012) are commonly used tools to support start-ups in the incubators and in the literature. Incubators use the Business Model tools to help in analysing the current state of the business. Using them to judge factors such as how start-ups have conducted their entrepreneurial activities? their thinking mindset? and the team working effectiveness? Many incubators use a business model workshop as their first engagement with start-ups. This suggests the refinement of the conceptual framework to emphasise the Business Model hypothesis development in the Problem Validation stage is necessary.

The interviews attest that the importance of the “skill and team effectiveness” factors varies at each stage. The explorative questions used during the interviews, suggest that the twelve team development factors, identified in the literature review, cover the dimensions which incubators use to assess and offer support to their start-up cohort. Regarding the team development factors,

several differences in crucial team development, from the framework validation with international incubators study, inform the refinement of the conceptual framework (discussed in Section 5.2). The empirical investigations have helped identify weightings for these at different stages of the start-up journey. For example, the key team development factors at the Problem Validation stage are very focused and pertain to skills development, rather than to building assertiveness in the teams' interactions. Incubator support for the Business Model Validation stage required start-ups to build and exhibit eleven team factors to progress to the Business Scale-up stage. Then support at the Business Scale-up stage could focus on team leadership development, as start-ups have to increase their management capability as the business grows.

The key result from this stage was a refined framework (ICS Framework) for business incubators to guide customised start-up support. This augments the conceptual framework and more closely reflects actual practice and element and its weighting, importance at different stages of the entrepreneurial journey.

The ICS framework captures the critical processes and achievements required at each key stage and highlights the essential skills and team effectiveness factors to create or enable progress to the next stage.

(3) Empirical validation with Thai incubators to validate and refine ICS framework

The third phase of the research explores the adaptation of the ICS framework into a specific context. The ICS framework was derived from a generalised international context, this was then tested through an evaluation of its fit with practices at Thai business incubators. Semi-structured interviews were conducted with sixteen Thai business incubators, with a variety of sponsors and incubation models. This allows the study to explore the fit and weighting framework elements with practice in the Thai incubation landscape.

The framework validation within the Thai incubator context supports that the ICS Framework, structured into the four-stage based on critical achievements, can guide how Thai incubators

assess start-ups and tailor their support. Each stage consists of distinct processes, skills, and team effectiveness factors. The findings from this study suggest that incubators can consider contextual factors in their country to adapt the ICS Framework and should prioritise team development factors for designing the start-up support. Hence, a modified ICS Framework for particular context was suggested (Figure 6.3). These additional elements highlighted by this activity were:

- Funding structure
- Start-up background and experience
- Global market reach capability

Fundraising was emphasised as a critical process during the Business Scale-up stage in the Thai context, while it was not identified in the international context. The significance of the fundraising process is influenced by particular financial constraints for entrepreneurs identified in the Thailand start-up ecosystem report, 2021. This is supported by the Start-up Genome report (2021), the access to funding and quality of funding activities in Thailand was assessed as relatively low (3/10) compared to other Asian countries such as India (7/10), China (8/10), Taiwan (7/10). Interview feedback from Thai Incubators emphasised the need to provide access to a network of investors to help start-ups seek funding from venture capital firms, to drive expanding business operations and achieve business scale-up. Thai incubators should strengthen support and access to funding sources for start-ups to address this issue.

Secondly, Thai start-ups should develop better marketing and sales skills from the Solution Validation stage in order to better understand markets and help identify alternative international opportunities. The global market reach performance of Thai start-ups is judged low. The Thailand Start-up Ecosystem report (2021) and Suksawad (2017) identify that Thai start-ups have low marketing skills due to a lack of understanding about market, product and service creation, and associated marketing strategy. This influences how much weighting Thai incubators should give to supporting marketing and sales skills for their incubatees.

The Thai findings also identify that shared vision and team communication are significant for start-up development in the Business Scale-up stage for Thai start-ups, while the international incubators samples did not highlight them. Team effectiveness factors were found to be more emphasised by Thai incubators during the entry interview compared to skill factors. A reason for this emphasis may be a relative lack of previous start-up experience in Thai start-ups. In the Global Start-up Ecosystem Report (2021), the talent score for previous start-up experience for Thai start-ups is rated at three out of ten, which was much lower than other countries in Asia such as Indonesia (8/10), China (10/10) and Singapore (5/10). The level of previous start-up experience may require a more assertive support process during incubation.

Interestingly, and maybe in hindsight, this study found a possible correlation between the findings from the semi-structured interviews at sample Thai incubators and the start-up ecosystem performance data supplied by the Start-up Genome report. This could radically simplify the ICS Framework's adaption into any local context. For example, regarding the Start-up Genome report (2021), several emerging start-up ecosystems such as Vietnam and Greece are found to have a comparable score to the Thai ecosystem: the quality of funding activities (3/10), market reach capability (1/10) and previous start-up experience of talent (3/10). Thus, this implies that their incubators could consider increasing the focus on the development of marketing and sales skills for the Solution Validation stage to support start-ups to improve identifying potential markets, including global markets. Also, due to the low start-up experience level in these countries, incubators need to increase their assertiveness in facilitating team activities. Probably by arranging meetings with start-ups regularly to discuss goals and actions. Lastly, emphasising the focus on the fundraising processes and supporting networking skills development during the Business Scale-up stage would also benefit countries that had similar low scores.

To summarise, the findings suggests that the ICS Framework could adapt directly to a local international context as the critical processes, achievement, and overall team development factors are consistent. However, it requires some adaptation as the priority of crucial team development factors can vary depending on start-up background and start-up ecosystem in the particular country.

This study suggests three contextual factors to adapt the ICS Framework and prioritise team development factors for designing start-up support. Initial investigations suggest that scoring data for individual countries for factors in the start-up ecosystem from the regularly updated Start-up Genome report could be used to change the weightings for different elements in the ICS framework. This would significantly benefit incubators in designing their customised support framework. Further validation is required.

In conclusion, this study suggests that providing customised support could be addressed in six steps:

1) Prior to designing the support for start-ups, the incubator should evaluate the current state of global market reach capability, funding structures, previous start-up experience to determine the priority of support in a particular stage. These can be judged with data from the Global Start-up Genome publication.
2) Assessing the current stage of a start-up in the overall start-up development journey.
3) Validating the skills and team effectiveness that start-ups require to have reached their current stage.
4) Evaluating the ICS Framework identified critical skills and team effectiveness (and associated activities) ability needed to progress to the next stage, including their relative weighting.
5) Supporting the start-up for the skills and team development acquisition required to progress through to the next stage.
6) Delivering the resource in an accessible manner.

The author believes that these are key contributions to improving the current practice of business incubators.

7.2 Contributions to Academic knowledge

The author suggests that study has made three significant contributions to academic knowledge in this domain:

1. Contribution to the business incubator literature

The findings of this study contribute to the advancement of business incubator research. First, it has formulated a novel Incubator Customised Support framework that can be used to guide incubators in assessing start-ups' support needs, and a means to tailor their support, based on the critical skills and team effectiveness factors, focused on proceeding them to the next stage of the business development journey. The framework comprises of four-stages, organised on critical achievements, that can focus incubators support strategy, and better manage their resources.

This study offers the generalised ICS framework for international context and suggests and tests a mechanism for adaptation to local contexts. This adaptation process was demonstrated for the Thai context. The results of this study support Hannon (2003) in that incubators practices and priority of skills and team effectiveness needed are affected by external contextual factors. This study identified three key factors: global market reach capability, funding structure and previous start-up background and experience. These findings also reveal a correlation between Start-up Genome national scoring data and the empirical evidence gathered by this study. This correlation suggests a quick way of adjusting weightings for factors to tune the ICS framework for differing national contexts.

Thirdly, informed by empirical evidence from business incubator practice globally, this research has advanced from Mueller and Thoring's (2012) fusion approach (Lean Design Thinking) into an integrated approach, by consolidating a range of models, including Lean start-up (Ries, 2009), Running Lean (Maurya, 2012), the Customer Development model (Blank and Dorf, 2013) and Design thinking (Plattner et al., 2009) into a four-stage framework with distinct processes, skills and team effectiveness factors at each stage of start-up

development. This framework appears to underpin current incubator support practice for the overall entrepreneurial journey.

Finally, this study responds to the research gaps in incubator customised support by introducing an alternative view to that in the current literature by integrating three dimensions (skill, team effectiveness, start-up development stage) into one framework from the business incubator context. In existing studies regarding a customised support framework for incubators, the majority of which (Lai and Lin, 2015; Mrkajic, 2017; Klaasa et al., 2019; van Weele et al., 2017) look at only a single and discrete dimension used when designing the support, rather than evaluate needs as they progress through the overall start-up journey.

2. Contribution to the skills literature

This study contributes to the understanding of how skills affect the venture creation process and highlights the importance of skills on start-up development. This builds on the studies of Chell (2013) and Kunene (2008), by highlighting the varying significance of skills across the start-up development stage. The study also identifies the crucial skills at each development stage, which update the model of Sullivan (2000) and Bozwards and Rogers-Draycott (2017) by incorporating modern methodologies such as Lean Start-up and the Customer Development Model as the key stages, associated with new start-up development.

The findings of this study contribute to the skills literature by adding insights of crucial skills from the perspectives of incubators. Previous studies on skills (Hatthakijphong and Ting, 2019; de Wolf and Schoorlemmer, 2007; Kunene, 2008; Abdullah and Hadi, 2018) are primarily from the viewpoint of start-ups to identify what start-up needs. However, many studies (Van Weele et al., 2017; Bone et al., 2019) claimed that start-ups may be unaware of what they require to improve their performance. Thus, the empirical evidence from business incubators who have identified differences between high and low performance start-ups helps strengthen the insights on what skills are crucial at each stage of the business development process.

The significance of skills could vary depending on the perspective of the stakeholders. For example, communication skills are fundamental skills that every start-up needs. From the

incubator's perspective these skills are not key support needs for Business Model Validation and Business Scale-up stages, as start-ups will have needed to have these skills to have reached these two stages. This helps incubators better prioritise their support and allocate their resources more effectively.

3. Contribute to team effectiveness literature

This study bridges the knowledge gaps in understanding how team effectiveness affects start-up development performance. Based on the empirical investigation, the study helps confirm Diakanastasi et al. (2018) that team factors vary across different stages of development, and the significances of these factors toward the venture creation process are distinct. Team leadership and team orientation have grown in importance over time as they have a direct impact on accelerating business scale-up as start-ups involve more people and require a higher level of management capability to operate business.

The findings of this study reveal that the team effectiveness model of Salas et al. (2005) can underpin understanding the crucial factors affecting start-ups performance. The empirical findings from this study adds to the team effectiveness literature by identifying that the significance level of each support construct varies depending on the development stage from the incubators' perspective, as previous research studies (Salas et al., 2005; Dickinson and McIntyre model, 1997; Hoegl and Gemuenden, 2001) has overlooked the distinctions between developmental stages.

4. Contribute to resource-based view literature

This research contributes to the resource-based view literature by incorporating the perspective of the resource-based view considering skills and team effectiveness as the key or strategic assets of firms in start-up development methodology to develop a managerial framework for start-up business incubators. The ICS four-stage framework assists incubators in determining the strategic resources of the firm to develop and maintain a competitive advantage to achieve superior performance. According to the resource-based view, incubators could identify

valuable resources for start-ups and provide the right support to address the liability of newness.

5. **Contribute to legitimisation theory**

The findings of this study contribute to the legitimacy theory by integrating a new perspective on how the legitimacy of start-ups could be established through skill and team development. This study adds insights to legitimacy theory through the incubator's perspective, which is one of the key stakeholders in enhancing the legitimacy of new ventures and increasing other stakeholders' confidence.

7.3 Contributions to practices

This study offers managerial implications for incubators, investor, and policymakers, as well as start-ups and aspiring entrepreneurs. Firstly, it suggests and guides incubators and other third parties in assessing the degree of team capability, and to align their tailored support strategy with the significance of the team development factors at each development stage. Additionally, the ICS Framework can serve as part of start-up recruitment criteria when evaluating applications from start-ups into their program. For instance, if an incubator's primary objective is to focus on MVP development and validation, then from the framework, incubators must test that the applicant start-ups have the necessary skills from the problem validation stage, and demonstrate evidence of problem validation, to judge if the start-up team is ready to enter the incubator at the MVP stage.

Secondly, the ICS framework helps incubators in managing and allocating their resources to ensure that they have the capability and capacity needed; for example, the study findings indicate that the second development stage necessitated the most skills and team effectiveness factor capability. If incubators focus exclusively on the second stage of development (Solution Validation), they may need to consider providing support for ten critical factors (see the second stage in Figure 5.9). Thus, the incubator needs to determine whether its staff is capable of covering these team development constructs or has access to experts who can provide these supports.

Thirdly, regarding the empirical investigation with Thai incubators, the findings suggest incubators and policymakers to take consideration into contextual factors such as global market reach capability, previous start-up experience, funding structure when designing the support for start-up development. As observed in the investigation of Thai and international incubators, these factors could influence the development of entrepreneurial mindset, team monitoring and feedback, communication skills, marketing and sales skills.

Finally, for start-ups who are in the process of searching for a new business model or struggling to maintain business, the study guides how they can evaluate their team capability regarding the combination of skills in the founding teams or their organisation, as well as the quality of interaction among team members. This could be able to help them identify the resources gaps and inform whom they should development, recruit onto the team or whom they should reach in order to seek support to improve their performance. Additionally, the ICS framework could help them assess whether incubators offer the support that matches their need so they will not waste time with the wrong support.

7.4 Limitation and direction for future research

Despite the methodology followed, this study has several limitations. These limitations suggest paths for future research into designing customised start-up support by incubators.

This study adopted a qualitative approach to gain a thorough understanding of incubation processes and the team development factors that incubators value for start-up development in order to derive the ICS Framework. The conclusions regarding the priority of skill and team effectiveness factors need to be investigated in more details, using a larger sample through quantitative research, to enhance and validate the authors findings. Also, future studies are needed to test the generalisability of the ICS Framework developed using quantitative techniques.

This study used semi-structured interviews as the main primary data collection method. Participant observations were also conducted within the incubation programs to triangulate the

results from the interviews with incubators. The current covid pandemic situation, limited the observations made to only one development stage. The observation data did reveals insights such as the crucial team effectiveness factors that incubators did not identify during the interviews. Future studies could empirically validate the ICS framework using observation methods to investigate the other development stages to test for further insights.

This study did not take the "success" of the study incubators into consideration, as there is no common measure for it. This study did not aim to compare the performance between each incubator, but rather focus on the in-depth investigation of how several types of incubators provide the support to formulate the framework development. Future research studies are encouraged to evaluate the incubators' performance to test the ICS Framework and identify the best practices.

Based on the findings of this study, critical skills and team effectiveness were suggested as important attributes. The study suggests how incubators can measure these factors; however, this study does not focus on developing the measurement scale for these factors. Future research could delve deeper into the level of skill and team effectiveness factors.

Finally, regarding the validation of the ICS framework, this study validated it within the Thai incubator context and revealed distinct constructs, that did not align with the international contexts, such as marketing and sales skills at the Solution Validation stage. Also, contextual factors such as global market reach capability and previous start-up experience are found to influence the importance of this support. A correlation between the empirical evidence of this study and Start-up Genome data were identified. This study proposes that national versions of the ICS framework can be created using Start-up Genome data, reducing the effort required, as demonstrated in the Thai modification undertaken in this research. This needs further research to more fully validate the approach.

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Appendices

Appendix A: Interview guideline

Questions to ensure that the research participants meet the recruitment criteria:

1) Provide customised support in addition to structured training
   - Do you change the way in providing support service for each start-up cohort?
   - Do you consult the start-ups about their needs before developing a service?
   - Do you assess their need before offering the support?
2) Regularly monitor start-up progress
   - Do you monitor their progress during the incubation program?
3) High intervention of incubation team in the start-up development process
   - Do you involve in designing business strategy for start-ups?
   - Do you provide regular feedback for start-up performance improvement?
   - Do you organise meetings with start-up regularly?

Main Interview guide:

No.	Topic	Point to address
Part One: Information related to the business incubator and the profile of interview participants.		
1	Profile of interviewee	• Role and responsibility in the organisation Question lists: • Could you please kindly introduce yourself, your role and responsibility?
2	Business Incubator strategy	• Goal of incubators Question lists: • Could you please introduce your incubator/accelerator? • What are start-up support focus (industry/stage of intervention)? • What is the expected outcome of your incubator/accelerator program?
Part Two: Investigates start-up development methodologies and incubation processes employed in their business incubation program.		
3	Incubator support/ Start-up development process	• Start-up development methodologies used in their incubators • Critical processes • Key achievements of start-up Question lists: • How do you design your incubation program?

		• What guidance/ support activity do you provide to start-up at each stage of your program? • What support do you think they are the most important to the start-up success? • Are there any milestones or achievement of activity that start-ups need to do, otherwise they cannot move forward? • How do you evaluate start-ups' need/gap? • Do you provide support in customer research, MVP development, business strategy, offering tool, team building, sale strategies development, business operation, market research, human resources, access to investor?
Part Three: Observe the crucial team factors that contribute to the progress of a start-up at each stage		
4	Factors influencing the start-up performance	(Explorative questions to investigate other critical factors) • Crucial factors for start-up achievement at each stage of business development Question lists: • What are key factors that start-up need at each development stage in order to proceed to the next stage? • What is the key difference among high and low performance team?
5	Critical skills	• Critical skills for start-up achievement at each stage of business development Question lists: • What are crucial skills for start-ups at each stage of your program? • Does (__skills) crucial for start-up progress at this stage? o Finance skills o Networking skills o Strategic thinking skills o Marketing and sale skills o Entrepreneurial mindset o Technical skills o Communication skills • How do you support them in develop (__ skills)? • What skill distinguish a high-performing team from a low-performing one? • What are the most crucial skills that start-up should have at this stage? • Are there any other skills related to their performance?
6	Team effectiveness factors	• Critical team factors for start-up achievement at each stage of business development

		Question lists:
		• Do you monitor the team process, how team works in order to offer the support to the start-up?
		• Is it necessary for start-up to have these factors during (stage of business development)?
		  o Team communication
		  o Team leadership
		  o Team orientation
		  o Team monitoring and feedback
		  o Shared vision
		• Do you think these factors are crucial to success at this stage?
		• Are there any other factors related to teamwork that you find it is critical for start-ups?

Appendix B: A list of international incubator interviewees, interview date and duration

Organisation	Type of sponsor company	Operating country	Interviewee	Role of Interviewee	Date	Duration (mins)	Reference
WMG Accelerator	University	United Kingdom	INV_A_01	Head of Accelerator	11th February 2021	53	R-A, T-A, DC-A F-A01, F-B01. F-C01
Incubator C	Independent private	Mexico	INV_F_01	Programme Director	5th March 2021	67	R-C, T-C
Bornrex	Independent private	Japan	INV_G_01	Senior Incubator Manager	11th April 2021	92	R-G, T-G, DC-G
Incubator F	Private	Singapore	INV_F_01	Corporate strategy associate and relationship manager	4th March 2021	50	R-F, T-F
Ignite Incubators	Science Park	United Kingdom	INV_K_01	Lead Advisor	26th May 2021	43	R-K, T-K, DC-K
Warwick Incubator	University	United Kingdom	INV_L_01	Incubator director	27th May 2021	35	R-L, T-L, DC-L
I3P	University	Italy	INV_M_01	Business associator	27th May 2021	56	R-M, T-M, DC-M01, DC-M02
Forward Accelerator	Independent private	United Kingdom	INV_N_01	Incubator Manager	28th May 2021	40	R-N, T-N, DC-N
IDG	Independent private	China	INV_S_01	Programme director	31st May 2021	45	R-S, T-S, DC-S
St. John	University	United Kingdom	INV_W_01	CEO of business accelerator	3rd June 2021	56	R-W, T-W
The Tank Incubator	Corporate	Jordan	INV_AA_01	Programme manager	9th June 2021	35	R-AA, T-AA, DC-AA
The Studio	Science Park	United Kingdom	INV_AB_01	Incubator Manager	10th June 2021	51	R-AB, T-AB, DC-AB
Unreasonable Mexico	Independent private	Mexico	INB_AC_01	Program director	1st July 2021	42	R-AC, T-AC, DC-AC

R - Recorded audio file, T- Transcript, DC – Documentation, F- Field note

Appendix C: A list of observation date and duration

Observation participants					
Organisation	**Type of sponsor company**	**Operating country**	**Observation case**	**Project**	**Observation period**
WMG Accelerator	University	United Kingdom	Team A	Livestock exchange platform, specialised in cattle farming and exchange	6 weeks (2^{nd} November – 11^{th} December 2020)
			Team B	E-sport business	
			Team C	The application of in-wheel motor technology	

Appendix D: Observation field note

	Expected outcome	***Key activities/ Incubation process***	***The suggestion provided by project lead during the week***	***Note on the discussion***
Week 1				
Week 2				
Week 3				
Week 4				
Week 5				
Week 6				

Appendix E: A list of Thai incubator interviewees, interview date and duration

Organisation	Type of sponsor company	Interviewee	Role of Interviewee	Date	Duration (mins)	Reference
RISE Impact	Independent private	INV_B	Incubator director	20th May 2021	53	R-B, T-B, DC
STeP	Science Park	INV_D	Senior incubation manager	24th May 2021	95	R-D, T-D, DC
SCG	Corporate	INV_G	Senior Incubation manager	18th May 2021	40	R-G, T-G, DC
KKU	Science Park	INV_H	Senior Incubation Manager	19th May 2021	52	R-H, T-H, DC
PSU	Science Park	INV_I	Incubator Manager	20th May 2021	40	R-I,T-I, DC
Root Incubators	Independent private	INV_J	Director of Business Incubation	25th May 2021	51	R-K,T-K, DC-K
HandUp	Independent private	INV_O	Incubator Director	28th May 2021	48	R-O,T-O, DC-O
Hubba Accelerator	Independent private	INV_P	CEO of business accelerator	2nd June 2021	43	R-P,T-P, DC-P
New Energy Nexus	Independent private	INV_Q	Program director	31st May 2021	69	R-Q,T-Q, DC-Q
Ultron Asia	Independent private	INV_R	Program director	31st May 2021	37	R-R,T-R, DC-R
Youth Challenge	Independent private	INV_T	Program manager	1st June 2021	42	R-T,T-T, DC-T
PSRU	Science Park	INV_U	Senior Incubator Manager	2nd June 2021	30	R-U,T-U, DC-U
UPSP	Science Park	INV_V	Senior Incubator Manager	3rd June 2021	54	R-V,T-V, DC-V
KT Venture	Corporate	INV_X	CGO	4th June 2021	56	R-X,T-X, DC-X
Finnovate	Corporate	INV_Y	Director	9th June 2021	42	R-Y,T-Y, DC-Y
NVest Venture	Independent private	INV_Z	Director	9th June 2021	60	R-Z,T-Z, DC-Z

R - Recorded audio file, T- Transcript, DC – Documentation

Appendix F: Secondary sources

Documentation no.	List of secondary data
DC_A	www.warwick.ac.uk/fac/sci/wmg/business/accelerator/
DC_B	https://www.riseimpact.co/snowball?fbclid=IwAR1jtVCBN1BqLKEG3IzOwnVJ_uoL2HAVKHgK2FXPKL_fkRj3fOA-nv9lwnI
DC _D	www.step.cmu.ac.th
DC _E	http://www.bornrex.com
DC _F	The arc reactor for sustainable entrepreneurship document
DC _G	https://www.thereporter.asia/en/2019/06/04/scg-strategy-startups/
DC _I	http://www.psu-bic.psu.ac.th
DC _J	https://www.warwicksciencepark.co.uk/business-support/incubation/
DC _K	https://www.facebook.com/RootsIncubation/
DC _L	https://www.warwickincubator.co.uk
DC _M	www.i3p.it, Incubator press kit
DC _N	https://www.birminghamenterprisecommunity.co.uk/uncategorized/where-do-i-find-startup-news/
DC _P	https://www.hubbathailand.com/hubba-accelerator
DC _Q	https://www.newenergynexus.com/region/thailand/
DC _S	https://www.lusep.co.uk/lu-inc#whofor
DC _T	https://www.generationunlimited.org/our-work/youth-challenge
DC _U	https://www.facebook.com/PSRU.SciencePark https://www.scienceparkpsru.in.th/2021/
DC _V	http://www.upbi.up.ac.th
DC _Y	https://ksunicorn.com/
DC _Z	https://www.nvestventure.com
DC_AA	https://www.umniah.com/en/explore-umniah/umniah-s-business-incubator/
DC _AB_01	https://www.lusep.co.uk/lu-inc#whofor https://www.lboro.ac.uk/services/the-studio/
DC _AC_01	https://www.irrazonable.org

Appendix G: Result of Observation

Key activities	Team A	Team B	Team C
Customer research	• Understanding the trends in market using the secondary sources • Analysing the trends and the trigger of change that potentially affect the business and customers • Structuring the assumptions using trend canvas • Validate the trends that team proposed by talking to the target customers • Discuss and evaluate the findings of validation	• Exploring and understanding trends that may affect the customers behaviour • Identify existing alternatives that customer used to solve the problem • Competitor analysis	• Exploring and understanding trends • Understand the value chains behind the customers in the market • Using root tree analysis and PASTLE as tools to understand the market
Customer identification	• Specify the profiles customer segment and the characteristics of target • Explore several target groups	• Explore different markets to identify the most potential one • Identify early adopters	• Identify potential customer segments and markets that are potentially adopt the technology • Explore different markets to identify the most potential one
Problem identification	• Using value proposition canvas as a tool to identify the pains and gains	• Using value proposition canvas as a tool to identify the pains and gains	• Using value proposition canvas as a tool to identify the pains and gains
Problem validation	• Validate assumptions on value proposition canvas by talking to customers	• Validate assumptions on value proposition canvas by talking to customers	• Validate assumptions on value proposition canvas by talking to customers
Hypotheses development	• Using multiple tools to capture the assumptions including trends canvas, value proposition canvas and lean canvas	• Create own framework to develop the assumption in customer segments, problems, alternative solutions to solve the problems, early adopters • Value proposition canvas and lean canvas were used to capture the snapshot of business idea	• Using multiple tools to capture the assumptions including trends canvas, value proposition canvas and lean canvas
Idea generation and value proposition development	• Identify value propositions emerging from the trends analysis • Using value proposition canvas as a tool to identify the pain killers to address customers' pain • Encourage to think about proof-of-concept development to test the idea	• Analyse the competitive advantages • Financial model • Discuss how the proof of concept should be • Suggest developing the proof of concept	• Analyse the competitive advantages and determine market application • Financial model
Hypotheses validation	• Validation through different channels • Several times of validation • Discuss and evaluate the findings • Iterate and update the finding on the canvas	• Suggest the channels to reach out the target customers • Suggest to interview • Iterate the questions to talk to customers • Talk to competitor to validate the assumption • Encourage to do more iteration	• Talk to stakeholders and different market to validate assumption
Activities facilitated by project leaders	• Suggest how to manage the time, prioritise tasks • Assign the tasks to team members • Set up the timeline for each activity • Encourage team member to talk to the real customers to validate the assumption • Encourage the collaboration and opinion sharing among team members • Reflective • Feedback to improve the performance	• Allocate tasks for each team members • Encourage the collaboration and opinion sharing among team members • Reflective • Feedback to improve the performance	• Suggest collaborating the work among team members • Encourage the collaboration and opinion sharing among team members • Reflective • Feedback to improve the performance

Appendix H: H1-The data analysis of crucial team development factors at Problem Validation Stage (Thai incubator samples)

	Stage 1	ICS Framework	Results from Thai incubators	Behavioral makers	Reference statements	Reference cases
Skill	**Entrepreneurial mindset**	✓	✓	• Actively seeking support and engaging with mentors and process • Enthusiasm, Eagerness for (execution) • Consistently maintain activeness and passion • Passion/ internal drive • Adaptivity to change, accept external advice and let go of the idea. • Resilient	"Another factor is to always be ready to change. Many people came into the programme and stuck with their idea from the beginning and not following the process, they all ended up in failure." (INV_T at Youth Challenge)	STeP, Rise Impact, SCG, Root Incubator, HandUp, Hubba Accelerator, New Nexus Energy, Ulton Asia, Youth Challenge, KKU, UPSP, PSU
	Communication	✓	✓	• Communicate effectively with customers	"Negotiate, communication skills to talk to other people. All are basic need for entrepreneurs. Key success is that they need to really talk to customer in the market, not just searching information on the Internet to avoid the fake demand. They have to involve with customers to understand the process" (INV_H at KKU)	STeP, KKU, PSU, UPSP
	Strategic thinking	-	✓	• Evaluate opportunity • Evaluate strength and weakness • Decision making of the further action • Self-reflection • Synthesise information	"We also use value proposition canvas and business model canvas tools. I think value proposition canvas help them scope down and understand the problem of customers, what they could help them overcome that problem." (INV_J at Root Incubator)	STeP, HandUp, Youth Challenge, Ultron Asia, KT Venture, Finnovate, Root Incubator
Team effectiveness	**Team communication**	✓	✓	• Communicate the role of individual member, goal of the team	"The communication and the commitment in the team are also very important. They need to manage and prioritise the work properly. The team leader should know how to allocate the work to team members." (INV_T at Youth Challenge)	Ultron Asia, Youth Challenge, UPSP
	Team leadership	✓	✓	• Task prioritisation • Assign appropriate metrics	"Another thing is that when they join an incubator, they cannot do what they want to do at their own pace. They need to have a proper plan as they will have to work with many groups of people. Management skills cover the skill to prioritise the task, time management, commitment and responsibility." (INV_D at STeP)	STeP, Ultron Asia, Youth Challenge, New nexus energy
	Team orientation	✓	✓	• Commitment to team goal • Team member appreciation	"Also, they need to be clear on the time management as the majority of the participants have their main job and do the hackathon in their free time. They need to have a similar level of commitment in the team." (INV_R at Ultron Asia)	STeP, HandUp, Youth Challenge, Ultron Asia, UPSU, KT Venture

H2-The data analysis of crucial team development factors at Solution Validation Stage (Thai incubator samples)

	Stage 2	ICS Framework	Results from Thai incubators	Behavioral makers	Reference statements	Reference cases
Skill	**Entrepreneurial mindset**	✓	✓	Adaptivity to change • Learning attitude • Ready to adjust, Pivot the idea Proactiveness • Doing something without someone tell what to do • Actively seek for advice • Devotion and put effort Motivation • Passion/ internal drive • Motivation to develop business Resilience • Not giving up, Not fear of failure	"The successful team need to have two main things which is team and idea. We cannot really select only one of them. It needs to be both. Team needs to be consistently good. Some team changes. They cannot maintain their activeness and passion like the first day they join the program. In the early day they may show a strong passion, but once they attend the program, they are not really active to approach to customers, pivot, develop the project. Thus, they cannot make much progress. Team need to keep walking, not fear of failure" (INV_G at SCG)	STeP, Rise Impact, SCG, Root Incubator, New Energy Nexus, Youth Challenge, KT Venture
	Communication	✓	✓	Communicate and present their idea effectively with external stakeholders Storytelling, pitching	"Good founders mean not only one people, but it's the composition of at least three people in the team, business design and technology. I didn't say that they need to have all three but at least founder need to be a good seller, good at storytelling, pitch, the alignment in the founder. All founders are able to communicate the same key point." (INV_G at SCG)	STeP, SCG, KKU, New Nexus Energy, Rise Impact
	Strategic thinking	✓	✓	• Evaluate opportunity • Evaluation the customer feedback • Evaluate strength and weakness • Self-reflection	early-stage venture they are able to answer that their impact model are able to solve the problem they would like to solve, and able to communicate, and to create a strategic planning in their organisation, not just on the paper. (INV_B at Rise Impact)	STeP, Rise Impact, SCG, Root Incubator, KKU, PSU, HandUp, Ultron Asia
	Technical	✓	✓	• Technical expertise	"In my view, founders need to have the knowledge and skills in technologies. Technology means the founder needs to fully understand how to build the solution and the process until the product is launched" (INV_X at KT Venture)	STeP, SCG, KKU, PSU, Hubba Accelerator, KT Venture, Finnovate
	Marketing and sales	x	✓	• Reach and approach customers	"I think the marketing team is really important. We required it in every stage. I mean the marketing, and strategy team. However, in the idea stage it will be the CEO who has to responsible for these including marketing, planning, customers, milestone of the company" (INV_H at KKU)	SCG, KKU, Ultron Asia, KT Venture
	Networking	✓	✓	• Network with incubation staff • Network with entrepreneurial community • Network with external stakeholders	"We are looking for the team capability, but it doesn't need to be a team. Several start-ups success by matching with right partners, for example, (Start-up company) which CEO work full-time, and have a part-time CFO. They can manage to develop the product with an external partner. They don't need to get a co-founder to successfully to develop the product, but they have full capability in product, customers acquisition and finance which are not in the form of co-founder team." (INV_Q at New Energy Nexus)	KKU, HandUp, New Nexus Energy, Finnovate

Team effectiveness	**Team communication**	✓	✓	• Internal communication such as customer feedback	"They need to have technology team and CEO, marketing team to talk and get information with the customers and then communicate customer feedback to back-end team. This is very important because it's the stage that develop the solution to fit with customers. We need two skills at the start" (INV_H at KKU)	Rise Impact, KKU, KT Venture
	Team leadership	✓	✓	• Team motivation • Ability to lead the team	"As I previously mentioned that if they have a clear role allocation and share dividend in the team on who is the leader and key decision maker of business. It will clearly see the difference." (INV_I at PSU)	STeP, Rise Impact, SCG, KKU, HandUp, Hubba Accelerator, Ultron Asia, UPSP, KT Venture
	Team orientation	✓	✓	• Team cohesion • Team member appreciation	"We have 7 core secret sauce for looking at the co-founder. First, Co-founder needs to have different skills. Second, They have to know each other for at least 5 to 10 years so they can stand each other. Third, they need to have domain experience in that industry." (INV_P at Hubba)	STeP, New Energy Nexus, Rise Impact, Root Incubator, HandUp, Hubba Accelerator, Ultron Asia, KT Venture
	Shared vision	✓	✓	• Team members align their understanding • Team know what they're working towards	"I would say passion from the whole team. If one of the members does not want to do it or does not see the importance of solving the problem, they would work at a different pace." (INV_T at Youth Challenge)	STeP, Rise Impact, SCG, KKU, New Energy Nexus, Youth Challenge, UPSP
	Monitoring and feedback	✓	✓	Feedback the team members on how to improve their performance	"They do the monitoring and feedback within the team for the high commitment team, especially in the stage 2 to 3, while the early-stage team, they don't do it. Mostly are about to complain, which leads to team conflict. However, if team has high commitment, they will feedback in the team to discuss on why they cannot achieve the goal, try to find what they could improve to achieve the goal within plan." (INV_D at STeP)	STeP, Rise Impact

H3-The data analysis of crucial team development factors at Business Model Validation Stage (Thai incubator samples)

	Stage 3	ICS Framework	Results from Thai incubators	Behavioral makers	Reference statements	Reference cases
Skill	Entrepreneurial mindset	✓	✓	• Proactiveness • Focus on execution • Learning attitude	"Another one is the fundamental which is entrepreneurial mindset like the business skill it wil help venture able to develop the business. Most of the team likely to focus on the impact and cannot make the business going" (INV_B at Rise Impact)	STeP, Rise Impact
	Strategic thinking	✓	✓	• Thoroughly consideration and plan • Decision making • Situation analysis • Analyse capability	"For the accelerator company, who are in later stage, we will discuss about their internal resources in their business, to determine which resources they have, what help do they need, management, marketing and determine their capability on what they could do by themselves." (INV_Q at New Energy Nexus)	New Energy Nexus, KT Venture, Finnovate
	Technical	✓	✓	• CTO, technical person	"Team that didn't have a CTO in co-founding team, they will have to find CTO to join co-founding team" (INV_D at STeP).	STeP
	Marketing and sales	✓	✓	• Creating marketing plan • Creating commercialising plan • Presentaion/ pitching	"Marketing is the key. We provide them marketing knowledge in the previous stage but in this stage is the implementation. Some people have very good sales skills, but their targets are wrong. Sales skills won't help them in this case. In my opinion, if the market and the target are right, the business can be in any channel." (INV_V at UPSP)	UPSP, STeP, RISE Impact, KKU, PSU, HandUp, Hubba Accelerator, UPSP, PSRU, KT Venture
	Finance	✓	✓	• Forecast the financial plan	"Financial and accounting are critical in this stage. They have to plan how they will work on it when everything is launched" (INV_V at UPSP)	STeP, UPSP, SCG, HandUp, Hubba Accelerator, UPSP, PSRU, KT Venture
	Networking	✓	✓	• Expand business opportunities	"The VC would like to see how their company could scale their business model to other countries. Thus, when they join our accelerator program, they have a clear purpose on why they would like to join our program and how they would like us to help them expand to other countries like Vietnam. So, they have a clear goal. We help them to identify new opportunity through our reginal network, which we connect them with Vietnam partner on how we could connect them with local business there. Also, the founder works on the business model that they can partner with international partners. Thus, they get the business model to present to the VC on how they could scale, and finally they can raise funding with the VC" (INV_Q at New Energy Nexus)	STeP, New Energy Nexus
Team effectiveness	Team communication	✓	✓	• Team meeting • Continuous communicate the progress and KPI within team	"Team is very important. Other important factors are communication in the team, commitment, relationship, accountability and responsibility. Everyone in the team should understand their roles and duty. They should work on it and make progress without having someone to tell them what to do next. The founder should build and set the work and progress by themselves. They should give the tasks to others	KT Venture, KKU

				• Communicated the vision	and be responsible for it by themselves. What our accelerator can fulfill in this stage is the mentor to give advice and open for the discussion on the idea and problem."	
	Team leadership	✓	✓	• Team motivation • Managing people • Task delegation	"The additional factors in this stage are related to team, which team required to discuss about the structure, shareholding agreement as the output of our previous stage is to register the business. It's kind of the main requirement for our program that they need to register business to entering this stage (monetising stage). Thus, these factors are kind of management skills, but more in term of company management such as you have to have a clear role allocation, what the benefits of each person will get as they may need to invest in money and time." (INV_D at STeP)	SteP, PSU, HandUp, New Nexus Energy, Finnovate
	Team orientation	✓	✓	• Team commitment	"For example, they may tell us that they plan to talk to customers, but they haven't talked to any customers after two months. So we need to understand what's wrong in the team and why they cannot talk to customers. Actually, this problem is found in every business stage. However, high commitment teams do not really have this problem. They are faster than we thought." (INV_D at STeP)	STeP
	Feedback and monitoring	✓	✓	• Monitor KPI • Listen to other team members	"Listening in the team, feeling and believe of each person (empathy). I think we did not really familiar in this in our culture. But I think this is key thing in team. Next one could be about asking, reflecting. I think this will help team live with the conflict because there are a lot of challenges and conflict that venture need to face but if they can ask, share, reflect in team. It will make the team more flexible." (INV_B at Rise Impact)	RISE Impact
	Shared vision	✓	✓	• Aligned their understanding in what they have to acheive	"They have to have vision and mission. If you have work alone, it's okay. But if you work in the team, it will be difficult to success if all team member does not understand the same goal or align in their understand. Thus, they need to set the goal and what the organisation would like to do. Some organsation does not convey this message (vision) to the entire organisation and the employee does not really understand the clear direction of the company. For example, if they set the target to export internation, being the green company and zero waste, they need to set up this vision to make every people in the organisation agree and understand what the business direction and goal is, otherwise it will be difficult to success. It's required since the beginning of team formation. They need to convey what they would like to do, how they would like to do it, does other team member agree with this? Thus they can decide if they would like to join the team. This is how they set the vision and it will make all people in the team clearly see the same goal and able to move towards the goal." (INV_H at KKU)	KKU, UPSP, PSRU

H-4 The data analysis of crucial team development factors at Business Scale-up Stage (Thai incubator samples)

	Stage 4	ICS Framework	Results from Thai incubators	Behavioral makers	Reference statements	Reference cases
Skill	Entrepreneurial mindset	✓	✓	• Adaptability to change • Taking action	"Entrepreneurial skills because who only would like to rely on us will not lead to success, they need to do by themselves including, knowledge, finance. In the early stage, we may be able to help them but if they don't have enough passion and commitment in this stage, they may not able to run the business further. Some business cannot survive if they face the challenges for example, covid situation or other urgent situation. They need to know how to manage and adjust the business in this situation. Thus, it mainly depends on the capability of founding of business as we cannot really help them in every issue." (INV_H at KKU)	KKU, PSU, KT Venture, NVEST Venture
	Strategic thinking	✓	✓	• Evaluate company situation • Evaluate opportunity • Evaluate company resources	"Also, business development will be involved because once start-up has established their business for a while, they will have to find new s-curve because they may already have the sustain business model or they cannot generate larger revenue. Thus they will have to find new business model, new S curve to expand their business. Additionally, marketing and human resources also important." (INV_O at HandUp)	STeP, KKU, HandUp, NVEST Venture
	Marketing and sales	✓	✓	• Creating marketing plan • Creating commercialising plan	"I think the marketing team is really important. We required it in every stage. After the product fit market and they would like to expand the marketing, it will then require CEO and marketing team to lead and expand the market." (INV_H at KKU)	STeP, KKU, PSU, NVest Venture
	Finance	✓	✓	• Finance and cost planning	"It's a financial and accounting skill because if they have a clear accounting structure, it will help them a lot when they talked to an investor." (INV_D at STeP)	STeP, PSU, KT Venture, NVEST Venture
	Networking	✓	✓	• Dealing with investors	"The additional factors at this stage are the investor dealing skills, networking skills. It's about raising funding, who will be the VC? Maintain the relationship is also important because they have to involve with a lot of investors at this stage." (INV_D at STeP)	STeP, KKU, PSU, Krungsri, SCG
Team effectiveness	Team communication	-	✓	• Team meeting • Continuous communicate the progress	"The communication path in the organisation is important. We meet with their team weekly. If we only give direction but not support on implementation, most of the start-ups are not likely to grow as entrepreneurs in Thailand lack discipline and experience" (INV_Z at NVest Venture)	KKU, KT Venture, NVEST Venture, Finnovate
	Team leadership	✓	✓	• People management • Appropriate metric assignment • Establish business structure	"It's more about business management and when their company grows. They need to find talents and care more about human resources management because they may need to deal with low performance, not a strong business culture." (INV_O at HandUp)	STeP, HandUp, KT Venture, NVEST Venture, Finnovate

	Team orientation	✓	✓	• Company culture	"This is the new criteria that we set. I think it is very important. We need to see if the board created value for startups or not and how is the relationship internally. We use a Due Diligence tool. The factors that we use to consider are the founder, company's structure. We do not just talk only with the founder but we also talk with the lead in all departments in the company, for example, sales lead, marketing lead, operation lead" (INV_Y at Finnovate)	KT Venture, NVEST Venture, Finnovate, HandUp
	Shared vision	-	✓	-	"I think (shared vision) it's more important **when the business achieve the product/market fit** because business have generated the revenue at that stage. So it's very important for the team to make sure that they have aligned their understanding. It's good to have a clear alignment in the idea stage, but it's not as much important as taking action because I also saw many teams who have aligned their mission, strong passion, but can't execute it." (INV_O at HandUp)	KKU, HandUp, NVest Venture
	Monitoring and feedback	✓	✓	• Ensure the tasks being done	"Better performing team do the monitoring and feedback with in the team, as they will monitor the progress and they will feedback in the team to discuss on how they could improve their strategy to achieve the goal and be more efficient." (INV_D at STeP)	NVEST Venture, Finnovate, STeP

Appendix I: Ethical Approval

Biomedical and Scientific Research Ethics Committee
Kirby Corner Road
Coventry
CV4 8UW

Thursday, 30 January 2020

Miss Phavika Mongkolkittaveepol
WMG
University of Warwick
Coventry
CV4 7AL

Dear Miss Mongkolkittaveepol,

Ethical Application Reference: BSREC 46/19-20
Title: An Investigation of Support Needs and Support Mechanism for start-ups in a business incubator

Thank you for submitting your revisions to the Biomedical and Scientific Research Ethics Committee (BSREC) for consideration. We are pleased to advise you that, under the authority delegated to us by the University of Warwick Research Governance and Ethics Committee, **full approval for your project is hereby granted.**

Before conducting your research it is strongly recommended that you complete the on-line Research Integrity training:
www.warwick.ac.uk/ritraining. Support is available from the BSREC Secretary.

In undertaking your study, you are required to comply with the University of Warwick's Research Code of Practice:
https://warwick.ac.uk/services/ris/research_integrity/code_of_practice_and_policies/research_code_of_practice/

You are also required to familiarise yourself with the University of Warwick's Code of Practice for the Investigation of Research Misconduct:
https://warwick.ac.uk/services/ris/research_integrity/research_misconduct/codeofpractice_researchmisconduct/

You must ensure that you are compliant with all necessary data protection regulations:
https://warwick.ac.uk/services/idc

Please ensure that evidence of all necessary local permissions is provided to BSREC prior to commencing your study.

Please also be aware that BSREC grants **ethical approval** for studies. The seeking and obtaining of all other necessary approvals is the responsibility of the investigator.

Any substantial changes to any aspect of the project will require further review by the Committee and the PI is required to notify the Committee as early as possible should they wish to make any such changes. The BSREC Secretary should be notified of any minor amendments to the study.

May I take this opportunity to wish you the very best of luck with this study.

Yours sincerely

pp. [redacted]

Dr David Ellard
Chair, Biomedical and Scientific Research Ethics Committee