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The erosion of incumbent banks?
A study into disruption within Financial Services using multiple
methods

By

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A thesis submitted for the degree of
Doctor of Business Administration

Warwick Business School, University of Warwick
January 2021

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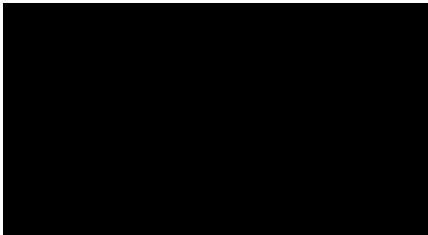
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Declaration of Originality

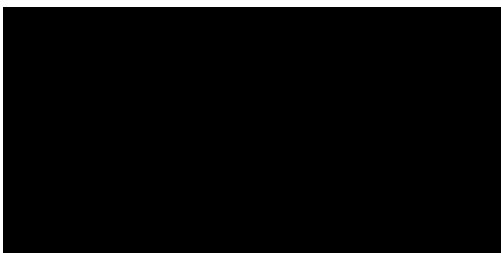
I declare that this thesis, The Erosion of Banks? A study into the disruption within financial services using multiple methods is my own work and no part of the dissertation has been previously submitted to any other university for any degree, diploma or other qualification. Previously submitted work by the author in the form of a reviews and conference presentations are drawn on for parts of this thesis. When reference is made to the work of others, the extent to which it has been used is indicated in the text and bibliography. Any errors or omissions within this thesis are the sole responsibility of the author.

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Acknowledgements

I would like to thank my Professor Ola Henfridsson for all of the encouragement, mentoring, advice and patience. I am truly grateful. I have learnt so much from the process.

I would also like to thank my Professor of Practice, Professor Mark Skilton who unfortunately is no longer with us but I am so grateful for the input and guidance. RIP.

I would also like to acknowledge the awesome support and inspiration I gained from my cohort along the way. We have formed a bond that will last way beyond the end of this course.

Finally, I would like to say a huge thank you to my amazing wife Julie who allowed me to do this and my daughters Abigail and Isabelle for listening to all my theories. Thanks for the support and believing in me.

I dedicate this thesis to my mother and late father. I feel you have been with me every step of this journey I have been on.

Research Questions

The erosion of incumbent banks? – A study into disruption within Financial Services using multiple methods

Research question:

1. How and why disruption impacts incumbent firms within Financial services including an assessment of how these impacts can be anticipated?

There are two sub themes of analysis:

- A. Investigation into the forces driving action and inertia to help understand the ability to respond to the changes in the industry
- B. Understanding what investment decisions are being made to combat the growing threat of disruption within the financial services industry and the reasons why

Abstract

Incumbent banks have held a position of dominance in providing financial products and services to customers who have been willing to stay with them despite questionable service. Post the financial crisis, incumbent banks find themselves less profitable, more heavily regulated and now facing potential disruption being enabled and driven by technological changes. Disruption theory provides insights into other industries where incumbent firms have struggles to deal with disruptive innovations.

New entrants into the market from new financial technology firms (Fintech) and big technology firms (Bigtech), are driving a period of innovation and change. This paper outlines these changes, which factors are more important and the current reactions from incumbents to this.

Through a qualitative study of industry experts and quantitative study of the technological investments of an incumbent bank through the initial phases of disruption, this research presents a detailed insight into how and why incumbent banks are being disrupted and a unique insight into how they are reacting.

The findings have been synthesized into a set of tools and interventions, that both contributes to the extension of current theory, whilst offering a practical guide for practitioners to understand and navigate the forces at play.

At the core of this thesis, is a theory that you can understand the potential of disruption by first understanding the erosive factors at play. Similar to a cliff face being eroded by weather overtime. To understand what the likely erosion will be, it is important to understand the weather patterns, the force of waves against the rocks or the barriers stopping these. The contribution of this thesis is to provide a conceptual framework and tools that help practitioners assess the potential impact of disruption by assessing the forces of disruption, the barriers and incumbent responses.

Abbreviations

<i>API's</i>	<i>Application programming interfaces</i>
<i>AWS</i>	<i>Amazon Web Services</i>
<i>Biotech</i>	<i>Big technology firms</i>
<i>CAQDAS</i>	<i>Computer Assisted Qualitative Data Analysis Software (CAQDAS)</i>
<i>COO</i>	<i>Chief Operating Officer</i>
<i>CEO</i>	<i>Chief Executive Officer</i>
<i>CFO</i>	<i>Chief Finance Officer</i>
<i>CIO</i>	<i>Chief Information Officer</i>
<i>DBA</i>	<i>Doctorate of Business Administration</i>
<i>DeVos</i>	<i>Development/Operations</i>
<i>EU PSD2</i>	<i>European Union Payment Services Directive 2</i>
<i>Fintech</i>	<i>Financial technology firms</i>
<i>FX</i>	<i>Foreign exchange (FX)</i>
<i>GDP</i>	<i>Gross Domestic Product</i>
<i>IAAS</i>	<i>Infrastructure as a Service</i>
<i>IOT</i>	<i>Internet of things</i>
<i>IT</i>	<i>Information Technology</i>
<i>KPI's</i>	<i>Key performance indicators</i>
<i>OS</i>	<i>Operating System</i>
<i>RAP</i>	<i>Resource Allocation Process</i>
<i>RPA</i>	<i>Robotics Process Automation</i>
<i>S&P 500</i>	<i>Standard and Poor's top 500 companies</i>
<i>VC</i>	<i>Venture Capital</i>
<i>VRIN</i>	<i>Valuable, rare, inimitable or non-substitutable</i>
<i>US</i>	<i>United States</i>
<i>WIP</i>	<i>Work in Progress</i>

Thesis Structure

This thesis is broken into a number of chapters to help structure the research. The Doctorate in Business Administration (DBA) is intended to look at academic theory in a real-life practical setting. This thesis takes the very best academic theory and tests it in an industry that until now has not been disrupted like we have seen in other industries. During this research I have had unique access to the inner workings of an incumbent bank at the beginning of what has the potential to be disruptive change. This thesis reinforces, challenges and extends existing disruption theory to come up with potential ways of measuring this phenomena and interventions within the industry setting.

Introduction

The research starts with the introduction to the topic, with an outline of the industry, challenges the incumbent banks have faced since the financial crisis and then focuses on the problems the industry is now facing from the forces of disruption. The research starts at the beginning of this contemporary phenomena and not the end. This research therefore builds on existing research but not looking backwards after the fact when disruptions has happened, but instead at the beginning and in the middle of disruptive change. Therefore, this gives unique and useful insights into forces of disruption, the barriers to these and the interventions incumbents have the ability to implement. The thesis ends with insights into how and why disruption is happening and offers a conceptual framework to understand the potential disruption and combat its impacts.

Literature review

A literature review was completed on disruptive change driven by technological advancements. This is a contemporary subject but the theory connected with the subject has been applied to other industries for some time. After reviewing over 35 books and over 400 articles connected to this subject, the main topics became clearer. They are disruption theory, innovation, ambidexterity, dynamic capabilities and forces for change but also inertia within companies. This helped provide a solid basis of understanding to move forward into method research and design to help test this existing knowledge against what is happening within the financial services industry.

Conjectures

To help structure the methods and data collection process, coming out of the literature are 10 conjectures that will be tested to either reinforce, challenge or extend in the context of incumbent banks being disrupted. The 10 conjectures are designed around the research questions and sub themes and linking to key authors. Within the implications section, we will test these through the findings of the interviews and observational study.

Methods

This section will help the reader understand the research methods used. The data collection process and data analysis can be understood better after having reviewed the research methodology. Interview analysis and observations were collated to create themes that are examined in detail in the findings. The methods section is a critical part of the thesis as this helped ensure the data was collected and analyzed in a systematic way.

Findings interviews

This part of the findings section contains the data from the interviews of experts within Financial Services and Technology. This provides real accounts from experts in the field who are trying to understand the issues and deal with the challenges while disruptive forces are impacting the industry. Through an extensive coding exercise, categories and themes emerged from the data. These categories and themes have been used to structure the findings and brings real color to the subject. At the same time a reflective stance is taken examining and interpreting the data for connections and inconsistencies.

Findings observational study

A separate section covers the findings of an observational study. This is a 140-week study looking at what responses an incumbent bank is making to combat the disruption forces, how decisions are made using what factors and a review of the resource allocation process. The reactions of incumbents are a key part to understand the effects of disruption. They are not standing still and investing to

innovate and these findings show a unique perspective of how this is working at a time that disruption is just starting to make an impact on the industry.

Implications and interventions

The implications of the thesis pull together the findings and help reinforce, challenge and extend existing theory. This thesis provides new insights into why and how disruption is impacting incumbent banks but also how they are reacting. The implications are both evaluating existing theory but also provide a set of tools and conceptual framework designed to help understand the forces of disruption in a financial services context. This helps bridge the academic input with practice. This leads to the implementation of targeted interventions.

Conclusions

The conclusions bring together final views on this topic, the thesis, its limitations and potential future studies.

1 Introduction

1.1 The Problem – Incumbents Dominant Position is Under Threat

Incumbent banks have held a dominant position in providing financial services and products to loyal customers for hundreds of years. This is despite at times questionable service. The financial services industry is global with incumbent banks market capitalization being valued at \$7 trillion (value dropped due to Covid pandemic as at 20th August 2020 it was \$4.9 trillion) and is used by billions of users and companies daily. You can see in figure 1.1, that the capitalization pre-2020 has stayed between \$7.2 trillion Q1 2017 and \$7.6 trillion Q4 2019.

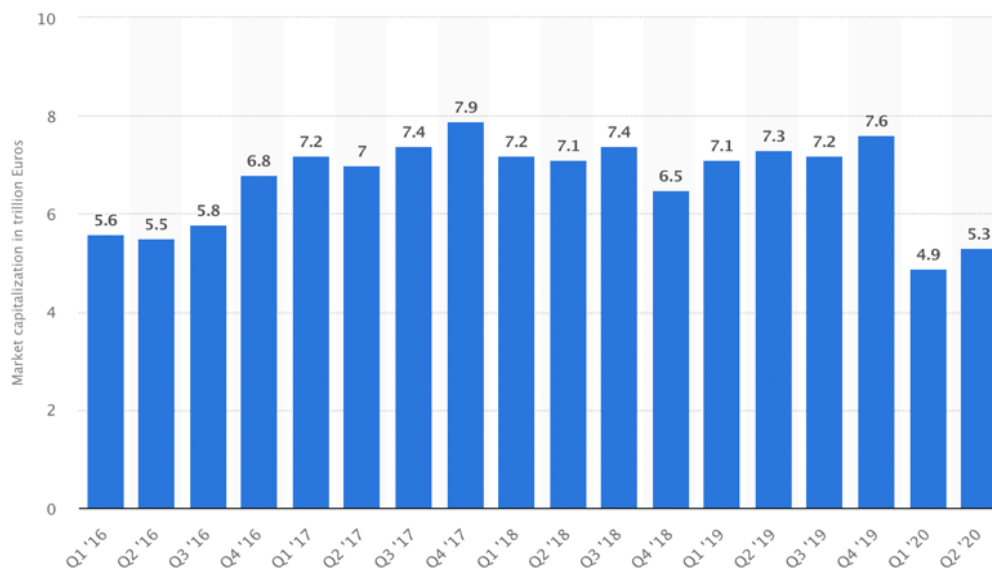


Figure 1.1 - Market capitalization of banking market worldwide from 1st quarter 2016 to 2nd quarter 2020

Source: (zeb, 2020)

These companies complete financial transactions on behalf of clients, they secure our wealth, finance individuals and company ventures, complete investments and advise clients on a range of important subjects including wealth and tax. These are just some of the important tasks incumbent banks do for their customers. These can be complex and, in some cases, global challenges.

Post the financial crisis, incumbent banks face new potential changes after recently recovering from significant losses; in some cases, becoming state owned, with reputational damage whilst responding to waves of regulation change. These potential disruptive threats are new, they are growing and are driven by new technological changes that have the ability to erode and threaten this industry (Gomber, Kauffman, Parker & Weber, 2018).

1.2 Industry Context

The financial crisis saw a near collapse in the financial industry that sent economies into recession around the world. Financial institutions including Lehmann Brothers, collapsed on the back of housing market issues and the use of risky financial products. Liquidity issues and material losses around the world resulted in stringent regulatory changes designed to make the financial industry more robust in the face of an economic downturn and stop the risky practices that led to trillions of \$ of world-wide losses (Birch, Brown & Parulava, 2016; Schoen, 2017). This crisis is an important context as during this period where banks needed to change their business model, de-risk and implement regulatory changes, we saw the rise of big tech and Fintech firms exploiting the use of new technologies (Ashta & Biot-Paquerot, 2018; Gomber *et al.*, 2018).

Table 1.1 Banking key performance indicators (KPI's)

Banking metrics compared		2002–07 Unsustainable expansion	2010–18 New reality
Average returns on tangible equity (ROTE)		16.9%	↓ 10.5%
Revenue growth ¹		16.8%	↓ 3.6%
Emerging markets' share of revenue growth		26.9%	↑ 77.4%
Tier 1 Ratio (average)		8.4%	↑ 12.5%
Loan/deposit ²	Developed	146%	↓ 126%
	Emerging	84%	↑ 86%
Price/book value	Developed	2.2×	↓ 1.00×
	Emerging	2.2×	↓ 1.22×
Percent of banks trading below book value	Developed	28.4%	↑ 61.2%
	Emerging	19.2%	↑ 37.6%
Summary		Robust growth, high ROTE, high multiples	Slow growth, lower ROTE, lower multiples

Sources: Banking Metrics Compared (McKinsey, 2019)

The table 1.1 shows global banks are not making the same profits as before the financial crisis. You can see indicators are not looking good. Some examples are that the average returns on tangible equity is down of 6%, revenue growth is down 13% and the share price of banks are trading at book value of assets to book at 1x. The cost of compliance, the impacts of investing to implement regulations and the need to reduce risky business trading while holding more capital, has meant that the financial performance of banks are under pressure (Reuters, 2018). During this period, banks needed to focus on survival and not exploit the opportunities that arose from the technology changes. The reduction in return on tangible equities, revenue growth and share to book price is dramatic, as is the level of banks that are trading with valuations lower than book value. These are just some of the indicators showing how financially challenging a post financial crisis environment is for incumbent banks (McKinsey, 2019).

1.3 New Challenges

Banks are now facing new challenges with the changes in technology and rise of new competition through Bigtech and Fintech companies. Fintech (Financial Technology companies) a new industry that has been born post the financial crisis and Bigtech firms like Apple, Amazon, Facebook and Google are now offering what were traditional financial services products like payments or lending.

This change in industry dynamics is just at the start of the disruption process but it is significant. This trend has been seen for some time in China. 65% of the profits made by banks as per the report from McKinsey were from origination/sales activities rather than balance sheet provision activities. Affected activities would be transaction payments, foreign exchange (FX) management and in part lending. These activities make up nearly 50% of the global revenues, 65% of after-tax profits and 20% return on equity. This shows that disruption is happening to the most profitable products and services (Miklos Dietz, 2017).

In Figure 1.2, this trend of attacking the most profitable part of the business was also reported more recently by McKinsey. Retail deposits and payments being a prime target. New entrants are focusing on the where the returns are the highest, large revenue pools and where regulation is lowest. Fintechs and Bigtechs are also partnering with banks to help banks innovate while using their regulated embedded platforms to navigate the regulation landscape while learning more about the industry (CBInsights, 2018b).

Figure 1.2 shows the large revenue pools being attacked.

Big tech and fintech return on equity (ROE) by engagement, 2018, \$ billion (total 2018 global banking revenue pool = \$5.4 trillion)

Big tech and fintech focus area, (\$2.4 trillion revenue = 45% of global revenue pool)

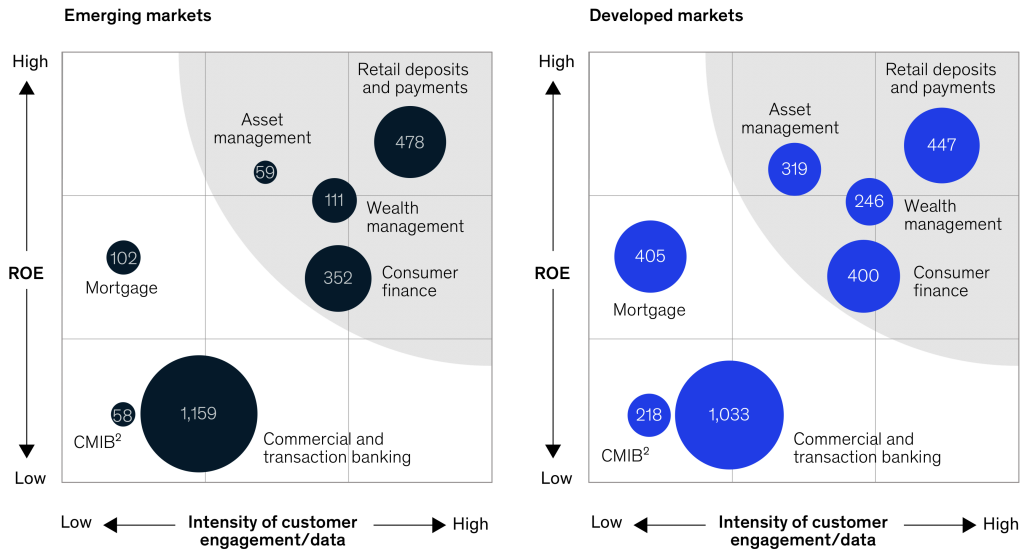


Figure 1.2 - How Bigtech and Fintech are attacking incumbent banking revenue pools.

Source: (McKinsey, 2019)

Despite the inflow of new entrants into the market, customer stickiness still remains high where there is some personal financial risk or where there is a required relationship between customers and the bank. Trust still very important in banking.

Figure 1.3 shows that despite some banking products being more of a commodity, banking customers are staying loyal to their banks. This shows that only 40% of customers with a 4 rating of satisfaction out of 10 would refinance with another bank. This underlines the importance of customer stickiness.

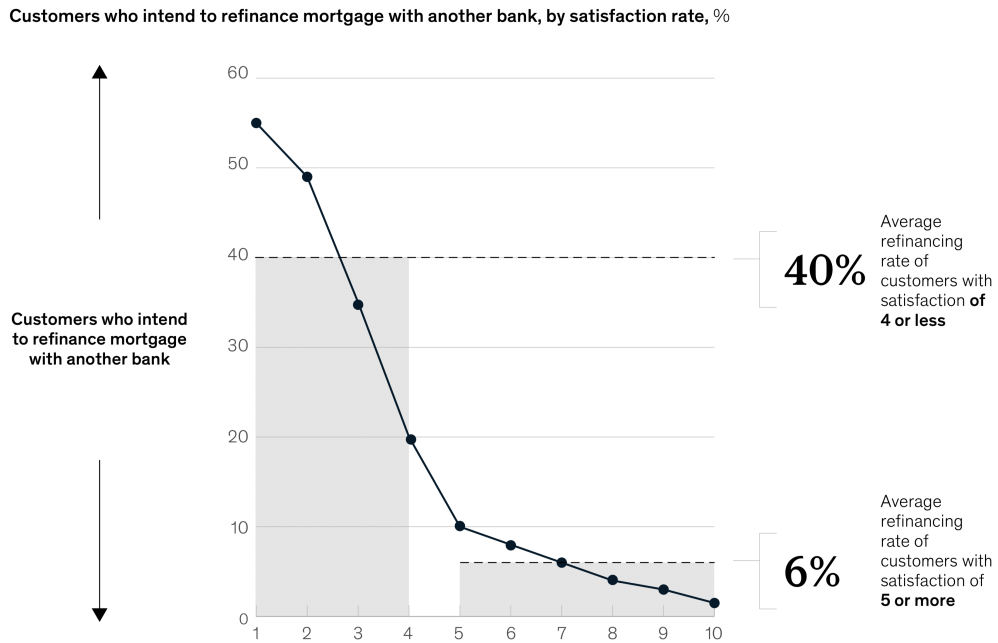


Figure 1.3 - Customer loyalty despite poor client satisfaction

Source: (McKinsey, 2019)

1.4 Historically Disruption has been a Challenge for Incumbent Firms

Banks and companies face constant challenges and have dealt with change for hundreds of years, so why is this particular change so interesting?. There are significant amounts of literature and case studies, completed by some of the most famous academics, that suggest incumbent firms struggle to cope with disruption and either stagnate or decline.

Over the years there have been many studies into how long firms survive. Richard Foster and Sarah Kaplan completed a review on the top 1000 firms over 40 years and found only 160 firms survived (Foster & Kaplan, 2001). Not only do large firms fail but the rate of failure is speeding up. In a 2018 paper the consulting firm Innosights showed that the lifespan of the Standard and Poor's 500 (S&P 500) index was decreasing. An average span of 33 years in 1964 had reduced to only 24 years in 2016 and they forecast that this will reduce even further over the next 10 years as the pace of change accelerates. Innosights (consulting firm co-founded by Clayton

Christensen) are forecasting that the average tenure in the S&P 500 will fall to only 12 years by 2027 (Anthony, 2018).

Disruptive change is described as the biggest challenge that faces our leadership teams today. This includes ensuring that the current business repositions itself to cope with the changes within the environment as well transforming itself ready for the future. This is seemingly simple on the face of it but in reality, it is extremely challenging for incumbent firms to execute both tasks at the same time (Christensen, 1997a).

Despite these challenges and failures, only 49% of these companies “somewhat agree” that they need to transform, and 55% believe that competition will come from within the existing industry (Anthony, 2018). These are remarkable statistics considering the pace of change and level of corporate decline. The connection between the level of change, increase in the pace of change, the technological advancements and the lack of a clear transformation agenda is at the heart of the phenomenon this paper examines.

1.5 Incumbent Response

This thesis looks at this challenge and how incumbent banks will respond. The thesis will look into how and why disruption is happening, the forces and barriers for disruption as well as the incumbent’s response.

S&P 500 firms have resources, skilled workers, brands, customers and experienced leaders but some are unable to adapt to the changes in the environment (Christensen, Horn & Johnson, 2011; O’Reilly lii & Tushman, 2013). However, not all incumbents fail. Although change failure rates are increasing, incumbents do continue, and although there are some high-profile cases of large incumbents failing, the majority of incumbents continue to innovate and continue to survive. Not only is this about survival and failure, it is also about long-term sustainable profitability in the face of disruptive change impacting margins. Not only do incumbent firms need to change to survive, they can also position themselves to be more profitable and take advantage of disruptive change if they create the right strategy. Focusing on just survival ultimately results in margin pressure when being met with significant disruptive forces (Raisch, Birkinshaw, Probst & Tushman, 2009).

Firms like Blockbuster, Sears, Kodak and Nokia are high-profile examples of incumbents who were genuinely at the top of their game and leading the industry but have failed. Nokia sold 6 billion handsets before it was disrupted by Android and the iPhone. Kodak was disrupted by digital photography even though it was one of the leaders in digital innovation. Blockbuster likewise disrupted with the move to streaming video content using the internet (Henderson, 1993). Although these failures are remarkable and grab headlines, there is research showing that in fact some larger firms are creating more innovative ideas and there is hope for incumbents still. After all, incumbents have the market knowledge, customers, resources to reposition the current business and build new exploitative businesses for the future; they should be well positioned to take advantage of any disruptive changes (Chandy & Tellis, 1998; Chandy & Tellis, 2000). This thesis examines all of these issues in a financial service setting.

1.6 Research Questions

In response to some of the challenges listed above and the potential problem of disruption to incumbent banks, the following questions and themes of analysis will be used to draw conclusions.

The research question:

1. How and why disruption impacts incumbent firms including an assessment of how these impacts can be anticipated and applied to financial services?

There are two sub themes of analysis:

- a. Investigation into the forces driving action and inertia within a bank to understand the ability to respond to the changes in the industry
- b. Understanding what investment decisions are being made to combat the growing threat of disruption within the financial services industry and why

The research question and themes of analysis will help predict how the challenge facing financial services will be anticipated and how the impacts can be mitigated.

This can be done through thoughtful leadership and resource allocation alignment. It is important for incumbent banks to get an informed and comprehensive assessment of these variables as the research suggests that disruption can reduce margins further for incumbent banks who are already struggling to make a return on equity.

1.7 Research Methods

This is a multi-method thesis using both qualitative and quantitative research methods. There are two main parts of the study plus the access of archival reports used to triangulate the findings. The first method is qualitative interviews with 30 leading experts in the field of banking, technology and Fintech with over 550 years of combined experience and knowledge of both the industry and the challenges ahead including internal barriers to change. This gives a rich and deep view of the dynamics at play that have the potential to disrupt incumbent banks or hold back incumbents from meeting the challenges ahead.

The second technique used is a structured observational study. This looks at the responses of an incumbent bank. This reviews its investments into capabilities and the decision-making process. Using external reporting comparisons, this thesis also checks the investment decisions and level of investment against the industry as a whole to see if there are can be any identified gaps.

These results are analyzed using best practice research techniques and synthesized into findings, implications and conclusion.

1.8 Research Gap and Contribution

This thesis reinforces, challenges and extends the latest academic literature related to disruption and related leadership topics regarding innovation, dynamic capabilities, ambidexterity and resources allocation. This thesis does this in a financial service setting at the beginning of disruption happening and not a retrospective backward narrative but instead with the intent to learn from other industries and academics to see how these forces can be mapped out and mitigated.

At the core of this thesis conclusions, is a theory that you can understand the potential of disruption by first understanding the erosive factors at play or future erosive factors. Similar to a cliff face being eroded by weather overtime. To understand what the likely

erosion will be, it is important to understand the weather patterns, the force of waves against the rocks or the barriers stopping these. This is a constant assessment process. The contribution of this thesis is to provide a conceptual framework and tools that help practitioners assess the potential impact of disruption by assessing the forces of disruption, the barriers and incumbent responses.

As a DBA body of work, the conclusions are a bridge between the theoretical and a practical understanding of the challenges and forces at play. The conceptual framework and potential disruption equation help to understand the challenges looking now and into the future.

1.9 Tools and Conceptual Framework

A number of tools and a conceptual framework have been presented in this thesis to help enable practitioners to understand how and why disruption is happening. The combination of them give real insights into the process of disruption. The following are presented in the implications section of this thesis.

- Product lens or experience model - This is a model that helps explain at what level the disruption is happening and why this is happening this way. New entrants are attacking where incumbent products have high return on equity, large revenue pools and low barriers to execute.
- Dynamic barriers - This model explains the challenge new entrants will have when moving away from simple transaction products to more wealth related products. The barriers relating to trust, capital requirements, technical knowhow, global presence and regulation, change depending on the product or experience. This again helps explain how and why disruption is happening at the lowest barrier level.
- Potential disruption equation – This model helps frame the four parts of the disruption equation coming from the research. Forces for disruption, the barriers to these forces, incumbent response and internal barriers to change.

- Investment model – This helps explain the need for a top down and bottom up process, if investment allocations will be aligned to exploit and combat the challenges of disruption, while also exploring new opportunities.
- Conceptual Framework – The last model is the conceptual framework that shows the key categories within each of the potential disruption parts of the equation. These show the most important and least important dynamics impacting disruption. This can be used to assess the potential disruption for a product or experience looking at the forces for disruption, barriers to these forces, the incumbent response and internal barriers of change

These models help to explain the process of disruption and the dynamics at play within a financial services context.

2 Literature Review

2.1 Literature Review Scope

It is important that all the literature associated with the themes of this thesis are properly examined. Before going on to review the literature itself, the process used in the review will be stated.

The first stage was to complete a relevance tree of related topics for the thesis questions posed (Saunders, 2016). This begins with reading and researching the topics. Over time the themes have been revisited and the relevance tree has changed as the understanding of the topics has increased and preliminary interviews were conducted raising new themes.

Figure 2.1 shows there are 5 sub areas within the literature review that aim to illustrate the relevant theory. Each area or topic has a list of identified key authors with a focus on peer-reviewed journals. During this project a number of search engines within Warwick Business School library were used to do online search reviews and, in some cases, due to the contemporary nature of the subject, a move away from peer-reviewed journals was needed. Literature on some subjects was very limited so it was necessary to use the latest journals, reports or consultancy papers to help understand what is happening in the industry today. A review of each section will be completed, starting with the base theory disruptive innovation.

The literature review will cover 5 key themes of disruption theory; ambidexterity, dynamic capabilities, innovation/resource allocation and inertia as shown in figure 2.1.

Literature Review - Overview

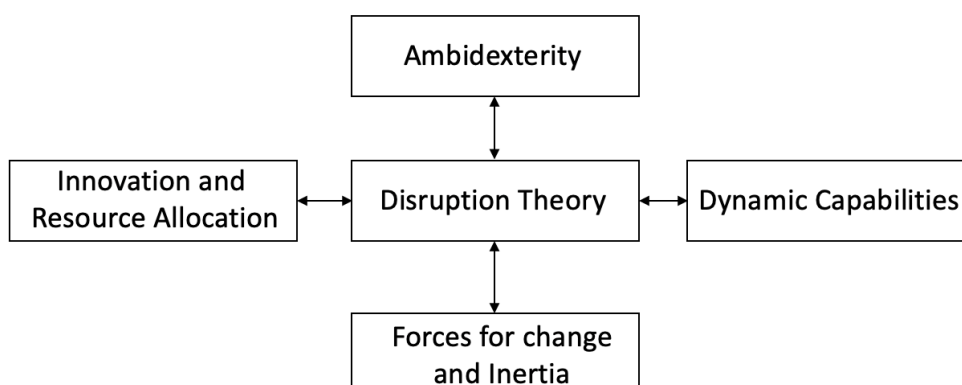


Figure 2.1 - Literature review overview

2.2 Theoretical Base - Disruption Theory

The main contributing author in understanding the theory of Disruptive Innovation has been Professor Clayton Christensen of the Harvard Business School (Christensen, 1997a). Christensen developed a theory “The Innovators Dilemma” that has become a leading book in understanding the flow of disruption. He completed case studies looking at the steel industry and disk drives. Christensen looked at how the integrated steel industry main players were all disrupted by “mini mills” that provided inferior steel products but at a lower cost.

Christensen has a very specific definition of disruption. He explains disruption innovations as a process when an industry is changed by new providers who implement change by creating products at the bottom end of the market and establish themselves by being affordable and accessible through deploying technologies differently or using different business models. These are often inferior products but overtime the technology and business model becomes improved. The product quality improves then it becomes more accessible and affordable to more consumers. As the products improve they take more and more market share and the incumbent firms abandon this market segment to maintain profit margins (Christensen, 1997a).

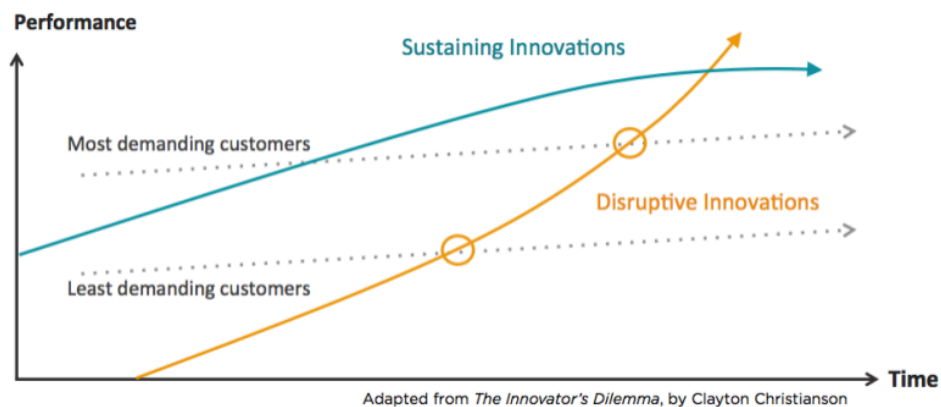


Figure 2.2 - *Innovators Dilemma* – Adapted from (C. M. Christensen, 1997)

Figure 2.2 shows the concept of the incumbents constantly over supplying the most demanding customers, the disruptive innovations taking on the least demanding customers first and then improving to the point where they then start taking on the more demanding customers and more marginal clients. This is how inferior products and services can get a foothold into an industry and then move to higher margin clients as the products and services improve (Christensen & Raynor, 2003).

Not all innovations are disruptive. Christensen sets out different innovations; efficiency, sustaining and disruptive innovations. Efficiency innovations are those where new innovations are deployed to reduce costs and increase capital. These enable the company to compete but with less cost, and to create more capital. These focus on the existing products and existing customers. An example would be the deployment of automation tools to reduce human effort and the use of computers instead. The focus is not on growth; just doing the same for less cost.

Sustaining innovations improve the current products with a focus on continuously improving products for existing customers. The performance continues to improve over time and can over supply even the most demanding customers. This leaves an opportunity for the disruptive innovations as they can supply the demanding customers with a product that's just good enough but at less cost.

Christensen criticizes firms who over shoot the customer's needs (Christensen, 1997a). However, it is important to note that he is not suggesting customer focus isn't important, rather that the focus on existing customers should not mean other

innovations, business ideas, customers or other areas of growth are not assessed at the same time. Sustaining customer innovations are important and are needed to enable a firm to compete with other competitors. However, the cost of over supplying the needs of the customer, increases complexity and therefore costs and price points (Price, 2017).

This thesis looks into the extent to which financial services are coming up with new models on the back of new technologies, deploying the technologies to reduce costs and increase capital, or just retaining the existing customer base. There is no doubt that financial service incumbents spend a significant amount on change investment but this thesis examines what that spend is on. The average being 10% of revenues according to research (Kappelman, Johnson, Maurer, Guerra, McLean, Torres, Snyder & Kim, 2020).

There were several key observations as to how new entrants were able to disrupt markets, industries and how market leading positions were lost. Firstly, he observed that new entrants trying to compete with market leaders with better or comparable products would nearly always fail.

Secondly, he observed that new entrants who disrupted did so by starting with inferior unattractive products to existing customers but were attractive to new customers by being accessible and affordable. Over time these products improved enough that they challenged existing company products.

Thirdly, Christensen also identified that incumbents within the market used all their effort in exploiting the current customer set (Christensen, 2000). This means that the level of investment, focus and resources were focused on looking after current customers. Christensen argued that this focus on the current customer was what one expects from seemingly good management. It is management focused on a high margin client, existing customer segment, and their core competences but this can also trap the company into maintaining the status quo and leaving markets open for lower end competitors to enter (Christensen, Kaufman & Shih, 2010).

Fourthly he observed that this focus on sustaining innovations leads to overshooting the actual requirements customers needed and at a cost. Incumbents continue to improve along a trajectory of innovation (Christensen, 1997a). This means that the actual requirements could be met through a less costly product offering.

Lastly, Christensen observed that the incumbents have the resources and know-how but because of the existing processes, resources and values of the firm, they were unable to react to the challenge of disruption (Christensen & Raynor, 2003). Christensen proposed that when the processes, resources and values of the existing enterprise are not aligned to making the new explorative enterprise a success, then a spin off organization is needed (Christensen, 2015).

2.2.1 Disruption Theory - Challenges to disruptive innovation

Responding to the challenges that Christensen set out and reviewing authors critiquing Christensen's work makes it clear there is still hope for incumbents (Akiike & Iwao, 2015; King & Baatartogtokh, 2015). There are a several writers who have investigated the issues of David vs Goliath and the reasons why market leading companies fail. Some authors have looked into the lack of radical innovations (Chandy & Tellis, 1998) and some recommended open innovation (Geroski & Machin, 2013; Laursen & Salter, 2006) as being part of the solution. The fact that large incumbents incrementally innovate or as Christensen suggests they focus on sustainable innovations (Christensen, 1997a).

Other authors have blamed the lack of learning (Levinthal & March, 1993) as being a key problem incumbents suffer by being over focused on existing clients or products. Others blamed the failing on incompetence, inaction and arrogance (Henderson, 1993). Solutions have been proposed to try and tackle this issue. Christensen suggested that to create focus on new disruptive innovation, you must create a new organization set up free of the rules of the existing incumbent that will continuously hold the new adventure back (Christensen *et al.*, 2010). This builds on earlier work completed regarding how structure follows strategy (Chandler, 1990). Other authors believe that the secret behind how successful companies adapt and evolve is to do two things at the same time through dynamic capabilities and ambidexterity. This way the new idea uses the full resources of the current incumbent (Benner & Tushman, 2003; Henderson, 1993; Henderson & Clark, 1990; O'Reilly Iii, Harreld & Tushman, 2009; O'Reilly Iii & Tushman, 2004).

In a paper revisiting the innovators dilemma the theory is recognized as providing a useful framework to help understand the causality and impacts through disruptive change as explained above (Danneels, 2004). However, the work was also criticized for not helping to explain some other key elements of the theory in more detail. Other

academics challenge that all incumbents fail to meet the challenges of disruptions and the incumbents curse is overstated with a number of innovations and successes (Anthony & Christensen, 2012; Chandy & Tellis, 2000). The theory doesn't cover sufficiently why some incumbents are able to be successful, or how useful the theory can really be used by businesses to predict the future. Disruptive technologies are always easy to spot once successful but rarely easy to see before the disruption itself (Doering, 2000).

Christensen's work and other academics point the finger at the way resources are allocated and controlled (Bower & Christensen, 1995), the rigid routines that help efficiency and effectiveness hinder disruption (Benner & Tushman, 2003) and culture including the way financial processes hinder the decisions towards disruptive investments (Christensen *et al.*, 2010). Changing large successful incumbent firms can be very challenging in the face of new technology (Christensen, 1997a; Cooper & Schendel, 1976; Henderson & Clark, 1990; O'Reilly *et al.*, 2009; Utterback, 1994) due to firms' inertia, this has been examined by a number of academics looking at routines, core rigidities, processes, culture, leadership, shorttermism, shared successful history and organisational structure (Leonard-Barton, 1992; Nelson & Winter, 1982; Teece, Pisano & Shuen, 1997).

One of the reasons this has had so much attention is the increased failure rate of incumbent firms and the inability to adapt to disruptive change. It is often difficult for incumbents to adapt to changes in the environment despite the incumbent firms having customers, resources, financial resources and experienced leaderships (Christensen, Anthony & Roth, 2004). Empirical evidence supports that if the technology change is competent destroying then failure of incumbent firms is more likely. This is because a large amount of technology investment goes into technology complementary enhancements that are designed to either help with efficiency or sustaining the current customer base. This is much easier for organisations to adopt as the resistance to change from the organisation's customers and shareholders is much less (Anderson & Tushman, 1990).

With disruption comes elements of the unknown. It is also more risky for senior executives to take on disrupting its own business model. There are a number of external stakeholders who send signals to firms that make it even harder for senior executives to disrupt themselves. This includes sellside analysts, customers,

employees, shareholders and business press. (Benner & Tushman, 2015; Mitchell, 1989; Tripsas, 1997).

Sell side analyst advice has been shown to influence shareholders so they are taken very seriously by Chief Executive Officers (CEO) and Chief Finance Officer (CFO) who always have a watchful eye on the shareprice. The increase in shareprice is a key indicator showing how much value is being created for shareholders. So sell side analysts are listened to and they have been shown to influence how CEO's react to dealing with disruption (Benner & Tushman, 2015).

This thesis will look into what extent the financial services industry is being disrupted in the ways highlighted by Christensen and to also assess how robust the incumbents are in defending the status quo.

2.2.2 Disruption Theory - Ability to predict disruption

One of the criticism of the work completed by Christensen is the theory can help understand what has happened looking backwards but isnt able to be used to predict or look at the early warning signs of disruptive change (Danneels, 2004; Sood & Tellis, 2011). However in the work completed by colleagues of Christiensen's, in the book Dual Transformation (Gilbert, Johnson & Anthony, 2017a), they list a number of techniques to understand the potential disruption that might come ahead (Anthony & Schwartz, 2017; Gilbert *et al.*, 2017a).

They list 7 key elements to monitor for disruption. The first is changes in customer loyalty (Saparito, Chen & Sapienza, 2004). Will customers move to other competitors for better products or services easily? In financial services customers are known for not switching banks despite poor quality of service.

The second is the level of venture investments into an industry (CBInsights, 2018a; Gomber *et al.*, 2018; Philippe Morel, 2018). These fund change and the investments are only made if significant payback is expected. This is often a sign of new start ups entering an industry and we have seen that this can be linked to competence destroying innovations leading to significant distruption for incumbents.

The third element relates to policy changes that open up markets, these change the competitive landscape. An example of this in financial services would be the legislation in the European Union Payment Service Directive (EU PSD 2) allowing for

open banking (Cortet, Rijks & Nijland, 2016). This legislation allows for customers to allow companies to use their banking information through Application Programme Interfaces (API's) into the bank. This opens up the banks hold on a customer's data and allows other institutions to use or aggregate banking data from a number of other banks.

The fourth element relates to new entrants into a industry. There are alot of new players with Bigtech and Fintech (Bloomberg, 2018; Gomber *et al.*, 2018). This will change the level of competitve dynamics and threaten banks existence as new technology can enable the disintermediation of the banking services themselves (Haycock, 2015). Clearly the more competition there is could threaten the levels of revenues and margins a company can make.

The fifth element is customer habits. This looks at changes in the way customers consume produces or services or move away from products that were once popular. This could be for example customers moving to online retail vs high street shopping.

The sixth element is business model innovations. This is where new entrants change the way that a product or service is delivered through a business model change, Financial services has seen signficiant changes in the way payments, cross border payments and FX translations are completed (Saparito *et al.*, 2004). Mainly through innovative business models other instituions are able to deliver the same or better services even more cost effectively.

Then the final warning sign or seventh element is margin decline or growth. Obviously this later one can be linked to the other disruptive warning signs but again is an indicator that something is going wrong. These 7 warning signs shows that companies need to be very vigilant and not just look at what is happening today.

Extending this model, changes in technology can enable new markets to emerge or facilitate the development of products that exploit the changes this may bring (CBInsights, 2018a). Examples for financial services would be developments in crypto currencies or Blockchain (Nakamoto, 2008). Clearly this is linked to business model changes and the ways that customers consume services but the technology itself can lead to fundmental changes in the way that financial services can be delivered. New technology adoption rates have never been faster and this can lead to rapid changes in market conditions.

2.3 Resource Allocation and Innovation – Resource Allocation

Resource allocation is important and has a direct impact on and even determines strategic outcomes. The yearly investment cycle is one of the ways firms can drive different strategic outcomes if executed effectively (Bower, 1970). Operating managers play a key role in helping to scope the planning processes but there are challenges if not effectively controlled. The structure of firms influences how groups and individuals work and interact. Hence, structure has an impact on strategy (Bower, 1970).

Bower a Professor at Harvard who is the leading author on resources allocation impacting strategy, outlines 3 parts of the Resource Allocation Process (RAP). The first part is definition. This is where the basic technical and economic components are defined including investment levels and benefits and what exactly is being achieved. Often the input into such a planning process is impacted by behaviour science.

Bottom up processes are driven with the inputs from operating managers or Chief Operating Officers (COO) teams and will be based on what they are currently doing, being asked to do and what they believe they can do or be rewarded for (Bower, 1970; Bower & Gilbert, 2007b). The challenge is that the operational managers or COO teams knowledge will be local, specialised and content dependent with silo'ed roles. Their perceptions will be focused on what needs to be executed with the narrow focus they have. If there is a bottom up process there can be gaps between local business strategies and the corporate strategic intent.

The second part is impetus and is the force that drives a project from idea to funding to execution including which ones get approved and which ones not and by what basis. The energy of operating managers to drive an agenda will be key as often what gets approved is less about the economics but the trust and reliability of the operating manager or power within a specific function (Bower, 1970).

Structural context is the last part. This relates to how the final decisions are made. Now the projects are defined and there is a push to get them done. The final selection is often made based on past record for execution (Bower & Gilbert, 2007a). This tends to be focused on more short-term costs and deliverables often driven by the needs for short term sustainable financial results. Hence Christensen believed that a bottom up process crowded out disruptive innovations, in favour of more predictable

sustaining innovations (Christensen, 1997a). The theory of resource allocation using microeconomic theory, states that resources are allocated on the basis that the investment will payback the maximum possible value creation from the scarce investment resource.

Resource allocation is at the heart of strategic execution as without resources being allocated to a strategy, then it's just intent (Mintzberg, 1978). Reinganum argues that if the investments made by an incumbent changes the core business within a dominant position in the market, then the firm's resources and employees would resist investment. This could be linked to preserving the status quo or just focusing on what it delivers well, these issues provide very strong forces for inertia (Gilbert, 2005; Reinganum, 1983). However, resource allocation isn't as rational or focused on economics as logic would first think. Papers based on 50 years of research show that the process of resource allocation hasn't really matured that much despite the way businesses operate today. Resource allocation is often based on what people believe they are being asked to complete or what they think they will be rewarded for, instead of the strategic plans of the firm (Bower, 1970).

This disconnect between what should be invested in and what is being invested in is significant. Incumbent firms are very complex organisations and changing hypercompetitive markets are very uncertain. This uncertainty leads organisations to rely on the track record of the managers posing the investments and often the financial numbers are not relied on to make the final decisions (Bower, 1970; Bower, 2017; Gilbert, 2005). It maybe that financial numbers into the future are uncertain and can easily be manipulated. Instead of rational processes, the planning process is often dominated by organisational design tensions, the budgeting process, measurements and incentive systems.

Linked to what people think they need to deliver and decisions made down in the organisation away from the board can lead to significant disconnects from the corporate strategy and a lead to short term decisions (Bower, 2017; Christensen, 1997a; Gilbert, 2006). Clark Gilbert also reviews the context as to how and when key investment decisions are made (Gilbert, 2005). He explains that businesses invest inefficiently if it believes it is under threat and also if it is not under threat it often doesn't think about the investments of the future as they perceive it not to be necessary. Early

defending of the current business model can be too aggressive and sometimes too soon.

Sometimes the investment is to create a new business but trying to fit this into the old model. An example mentioned would be Kodak. It eventually invested \$2 billion into what it saw as being a threat but did this at the wrong time and in the wrong way (Gilbert & Bower, 2002). Defending the current business with the old ways of doing things. The concern being that new threats will cannibalise the current business threatening the profitability of the firm. New ventures at the beginning, have more uncertainty and often lower margins as the technology is costly and adoption low.

The great irony of this is that if investments were made as opportunities into new cost structures, business models, customer networks and new product applications, the disruptions do actually create greater levels of growth (Gilbert *et al.*, 2017a; Harrel, O'Reilly & Tushman, 2007). A simple example would be the mini computers taking on the mainframe. At first this will not be a huge business but overtime as the mini computer become more sophisticated, affordable and therefore accessible, the firms who invested into this area and moved their business models into selling mini computers won very big within the market (Christensen & Raynor, 2003).

2.3.1 Resource Allocation - Issues through bottom up planning

There are a few challenges with bottom up planning (Bower, 1970): decisions that need to change what people are doing. Operating managers will not decide to do themselves out of a job or reduce their power or potential reward mechanisms. It is much harder for operational managers or COO's to make divestments decisions. Their natural focus is on making the current business work effectively. Admitting that business products are not working and best value to shareholders is to divest, is very challenging for operating managers to do.

Bottom up planning processes take a lot of time to gain consensus and navigate the internal processes. The gathering of cases takes a lot of administration as does the prioritisation of investment projects. Big changes to organisations can't be made by lower level bottom up processes. Operating managers will only make decisions they feel are within their own authority levels. They will not make decisions that risk their roles with no or little reward. Hence managements will focus on more short term and

predicable projects. This will push out more risky disruptive ideas with longer payback periods (Bower & Paine, 2017).

Bower and Eisenmann set out that under these conditions, the CEO must move away from just a navigator to making the key investment decisions a firm needs to make (Eisenmann & Bower, 2000). There are some decisions that only a CEO can make. However, this is not straight forward as the CEO is only one person and may be running very diverse organisations. Under these conditions the company decisions will be also challenging for the CEO but there is no other place these decisions can be driven from. To get around some of these challenges, Christensen discussed the need for stand alone companies with their own decision making capabilities and resources (Christensen, 1999). This would speed things up and move the decisions away from the current operating managers who will be reluctant to make large scale decisions as discussed above (Forsgren, 2018).

This thesis at the key factors influencing how resources are allocated, how and why they are assigned to projects, is the focus on short term or long term payback, disruptive technologies or more complementary and look to see if this is focused on sustaining innovations or more disruptive growth seeking initiatives.

2.4 Resource Allocation and Innovation – Innovation

Schumpeter stated innovation at rare and irregular occurrences "command a decisive cost or quality advantage and that strike not at the margins of the profits and the outputs of the existing firms, but at their foundations and their very lives". This quote is very relevant today (Schumpeter, 1942). Since then there have been significant discussions on technology and the impacts on organizations. Technology refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes (Anderson & Tushman, 1990).

This can impact performance of businesses, industries and countries. Predicting these changes are problematic as technology often changes in an exponential way and not linear. In 1964 Gordon Moore described the doubling of price/performance in computing (Forsgren, 2018) and this has led to the huge reduction in computing costs and therefore the availability of computers to mass populations. Starting with large mainframe computing, PC's that only the very rich could afford to now computers in the pocket with smartphones. This has reduced the costs of compute and power

enabling the spread of new applications, tools and data that has changed the way that business models have worked traditionally. Technological advancements can be both competence destroying and competence enhancing (Tushman & Anderson, 1986). Although these are very different they can follow on from each other in different phases. Phases can interchange between sometimes being destroying competence enhancements followed by enhancing competencies in different combinations.

Change happens through predictable patterns. After initial periods of design uncertainty, dominant designs appear and then incremental change through competence enhancing technology improvements occur (Sahal, 1981). This is further explained as the era of fermentation followed by the era of incremental change (Anderson & Tushman, 1990). Competence destroying technologies are those that completely substitute and change the existing established technology (Anderson & Tushman, 1990). This will result in new processes, routines and skills being needed to master the new approach. Examples would be digital photography replacing film or streaming music or video replacing DVD's and the need for DVD players. They are so different the core production is completely different and they render the existing competences obsolete (Barley, 1986; Noble, 1984).

With these being fundamental changes that challenge the very existence of the company, the theory by Tushman and Anderson is that discontinuity is triggered by outside firms entering the incumbents' markets. There are competence improving discontinuities lead by technological changes as well. Companies can rapidly absorb these complementary technologies through re-training and adaption. Both of these discontinuities significantly change the price and performance of the products. Leading to different market segments being able to afford them.

As new discontinuities are driven by new entrants to the market, the changes in technology leads to a phase of increased competition. However, the competition is quite different depending on if its competence enhancing or competence destroying. Incumbent firms will be able to master the competence enhancing technology with new entrants that help service the incumbents and not to compete with them but more to utilize the new technology (Mitchell, 1989). This can be seen with Fintechs.

Destroying competence technologies challenge the status quo and market conditions and studies suggest new entrants look to take advantage of new technology opening up new market opportunities. An interesting view is that growth is higher after a period

of discontinuity. Examples of iPhone or Android driving growth in smart phones or the growth of the Internet leading to extraordinary growth in computing and related companies. These are heavily connected to the capabilities that companies have to transform.

Radical vs incremental innovations to help refine the existing business model or move away completely to a new business model exploring new products and services. New capabilities are costly to create and challenging to change and so careful planning is need to get this right (Hannan & Freeman, 1984). Innovations can reinforce the existing business models and core competencies through incremental innovations or change part of a business model through modular innovations or overturn the existing business models through radical changes (Henderson & Clark, 1990).

Companies who innovate have been shown that they drive superior profits compared to companies who do not. The challenge is not only what to do but how. How to create and emphasize on speed, courage to deliver while keeping a focus on the delivery of existing products and services to existing clients. Protecting the space to innovate is critical especially the problem of managing risk or fear within organizations. Incubators are examples where companies can innovate through investments but the culture for these areas need to enable them to take some risks or feel safe to innovate (Price, 2017).

Increasingly firms outsource the innovations through open innovation. This means that the advancements that firms make don't need to be thought of or created internally. This is not new with the first IBM computers outsourcing the developments for peripherals, this meant that they delivered changes far quicker than other competitors including Apple. The iTunes platform allows for millions of applications to be created than deliver greater value for the platform, users and Apple (Ghazawneh & Henfridsson, 2013). This open innovation is also happening in Financial services with Fintech firms in effect being innovations arms for incumbents who are not innovating at the right pace to take advantage of existing technologies (CBInsights, 2018b).

This thesis will be looking at how innovation as a process happens, is it top down or bottom up driven process. It will consider to what extent there is an extension to third parties who can drive innovation for the firm.

2.5 Dynamic Capabilities

The field of strategic management focuses on how firms can deliver sustained competitive advantage in the face of disruptive change. There are of course a number of different views or lenses that this problem can be seen through. For many years the strategic thinking related to structure and positioning leading to superior performance. Industrial positioning looked for either cost advantage or superior differentiated products.

Industrial competitor analysis then looked at the industry dynamics that allowed for these competitive positions. This world of strategic thinking was dominated by positioning theory led by professor M Porter, who set out frameworks to help firms position themselves against the rest of the competition. His framework helps understand how to find or analyse a position in a market and that this is unique according to the differentiated service or product or the cost of the product vs the level of competition, barriers to entry, how the products can be substituted, power of buyers and sellers in a particular industry and market (Porter, 1980a; Porter, 1980b).

However the competition and market is continuously changing and at an increased rate (Foster & Kaplan, 2001; Schumpeter, 1942). Strategic theory has moved on, the decisions to focus on one thing or another to avoid competition has evolved. The need for ecosystems and ability to connect with others has driven different thinking in a technological world. Apple both delivers superior products and services with cost advantage driving profits. Its not limited to one or another strategic thinking (Heracleous, 2013). Another view to competitive advantage is that it refers to a strategic conflict approach using game theory. This relies on the capabilities of the firm to keep the competition off balance and win battles through investments or pricing (Shapiro, 1989).

These are more external perspectives of how competitive advantage can be gained. Resource based views look at how the internal capabilities and resources deliver competitive advantage. The value comes from if the resources are valuable, rare, inimitable or non substitutable (VRIN) as these would make it difficult for others to copy. Its not just the way the firm has these resources, but the way the efficient configuration of these capabilities are arranged (Barney, 2017; Barney, 1986; Teece *et al.*, 1997). These previous works led to an extension of this work and

dynamic capabilities. These are defined by Teece et al (1997) as “the firms processes that use resources specifically the processes to integrate, reconfigure, gain and replace resources to match and even create market change. Dynamic capabilities thus are the organisational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die” (Teece *et al.*, 1997). Dynamic capabilities are specific and can be better product development, ability to build alliances, greater strategic decision making or even transform resources within a firm into something else (Eisenhardt & Brown, 1998).

Dynamic capabilities can therefore be technology and change over time. It is important that firms who are heavily linked to products and services using technology continuously develop these capabilities, however these capabilities take time to develop and therefore the ability to change or adapt resources to meet new challenges is a key skill for companies (Dierickx & Cool, 1989). IBM seemly have a resource based strategy where they have in the past aquired new capabilities and changed these over time demonstating responsiveness and being flexible to changes in the environment (Harreld *et al.*, 2007; Teece, 2011).

So there is a need to continiously assess market conditions and changes in technology but also the need to build potentially new dynamic capabilities that will help firms move to the next level of competitive strength.

This thesis will look at how dynamic capabilities are created including how decisions are made and how quickly they are made. This will be tested between different technology capabilities.

2.6 Ambidexterity

Back in 1978 Abnernathy identified that incumbent firms that showed higher levels of focus on productivity, efficiency and effectiveness caused problems for the firm to truly innovate (Abernathy, 1978; Abernathy. W. J., 1978). The paper also went on to explain the complexity of the firms pressures for organisations to meet multiple but often inconsistent demands (Abernathy, 1978; Christensen, 1997a).

In 1991 James March explained the concept of exploring and exploiting. This is essentially the conflict at the heart of incumbent organisations creating challenging tensions in the organisation around exploitation and exploitation of opportunities. The

concept is that companies who have exploit strategies focus on existing products and services with existing customers. Innovation tends to be incremental in nature and focused on current customers. The focus is on refinement, production, efficiency, execution and implementation. Exploitation strategies focus on looking at new products, services, markets and business models. The focus is regarding risk taking, new business models or new products and new markets or customers (Benner & Tushman, 2003; Christensen, 1997a; March, 1991; Tushman & Anderson, 1986).

The ability of firms to build new capabilities or improve on existing capabilities is linked to resource allocation processes and innovation processes within the firm to help learn new capabilities (Gilbert, 2005). To deliver new exploration capabilities, firms will need to challenge the existing routines, structures and cultures of the incumbent firms (Henderson & Clark, 1990; Leonard-Barton, 1992). Studies completed by Michael Tushman and Charles O'Reilly studied successful incumbent firms and looked to see how they managed to survive over time tackles some of Christensen's criticism for not learning from firms who have managed to navigate the innovators dilemma (Danneels, 2004). Their view is that although very challenging, a firm's best way of survival and adaptation is through ambidexterity and to explore and exploit at the same time. Although this was stated that the two can't co-exist by some academics (March, 1991), but their theory is that they can through either structural ambidexterity or contextual ambidexterity. Doing both explore and exploit raises significant challenges to cope with.

The ability of leaders to be efficient and effective but adaptive, productive but innovative, to sustain profits but to also invest into more risky ventures. The ability of leaders to invest resources into exploring new ideas and away from current customer thinking. The ability to invest in technology, products and services that might be destructive for the current incumbent firm (Benner & Tushman, 2003). These are all extremely challenging for senior leaders to complete. Structural ambidexterity is the need to create a structure that allows for different routines, incentives, processes and resources to be invested that is separate and distinct.

This could mean a separate part of the business within an umbrella organisational structure (O'Reilly & Tushman, 2013). Christensen's view was that a spin-off would be required to be able to cope with the conflicts outlined (Christensen, 1997a). Structural ambidexterity looks to cope with the conflicts within an overall organisational

construct. Contextual ambidexterity is ability for a firm to create processes and systems that allow the business unit to move between alignment and adaptability through use of judgement (Birkinshaw & Gupta, 2013; Gibson & Birkinshaw, 2004). Both are trying to tackle the complex challenge of how to adapt to tackle threats ahead and explore new uncertain opportunities for the future (Henderson & Clark, 1990; Leonard-Barton, 1992). An example of the work completed by Tushman and O'Reilly was to look at these conflicts in IBM. IBM is one of the companies that have been able to change and adapt overtime. In 1999, Lou Gerstner, CEO of IBM, was under financial pressure to discontinue funding new initiatives. He commissioned a report that looked at the key factors explaining why IBM was missing out on new opportunities (O'Reilly *et al.*, 2009; Raisch *et al.*, 2009). They came back with 6 key themes:

1. The existing management system rewarded execution directed at short-term results and did not value strategic business building
2. The company was preoccupied with current served markets and existing offerings
3. The business model emphasized sustained profit and earnings per share improvement, rather than actions oriented toward higher prices and earnings
4. The firms approach to gathering and using market insight was inadequate for embryonic markets
5. The business lacks established disciplines for selecting, experiencing, funding and terminating new growth businesses
6. Once selected, many of the new ventures failed in execution

These themes link directly with the Innovators Dilemma (Christensen, 1997a). Short term, current customer focused, driven by current routines cultures and processes of the incumbent exploiting firm. Additionally the work completed by Bower into the inefficient or dysfunctional way resources get invested likewise links to the Innovators Dilemma (Bower & Gilbert, 2007b). The problem is even more complex as the internal workings make it hard to explore and exploit at the same time, there are external pressures from shareholders and analysts, and pressure to take account of external customers views who have significant power over an organisations strategy (Benner, 2007).

This thesis will look to discover to what extent there is evidence that the firm is not only looking to reposition its current business to tackle immediate challenges and investing in sustaining innovations, but as well as investing in future ideas that will drive growth.

2.7 Inertia

There are many forces at play impacting inertia. These are examined below.

2.7.1 Inertia – Short-termism

In the paper by Graham et al, it surveyed over 400 CFO's across a number of industries. The results showing that 78% of CFO's would sacrifice value to the firm for short term smoothing of earnings (Graham, Harvey & Rajgopal, 2005). This means that short term predictable earnings are preferred to increased overall cashflow over time.

This short term thinking is driven by a number of human impacts including predictable earning helping the reputation of CFO's who place a 92% importance on this factor, plus short term share price performance and bonus performance. Short term earnings focus can led to decisions and behaviour that help in the short term at the cost of long term success of the firm (Stein, 1989).

Exploring new uncertain ideas are likely to have business cases that are of a more long term nature than focusing on current markets with current customers. These exploring business cases will be more difficult to prove as factual data is not available and therefore harder to convince. However, the unfortunate truth is that capabilities are built overtime, an example being K-Mart trying to catch up with the superior technologies of Walmart who had invested for many years before. It was hard for them to catch up as Walmart continued to invest as well and therefore always kept a competitive advantage gap (Bower & Christensen, 1995; Christensen, 1997a; Graham *et al.*, 2005).

There are also factors outside of the firm that often get overlooked for example analysts have significant influence over how senior management invest. If companies are seen as a dividend stock and they try to invest in uncertain ventures, the stock analysts have been seen in the past to challenge the thinking of the board and

influence strategy. As discussed previously there are two challenges that technology can bring; complementary and disruptive (Benner, 2007).

As new technological advances enter a period of fermentation there are significant levels of uncertainty while new entrants and incumbents battle out for dominant logic designs (Anderson & Tushman, 1990; Christensen, 1997a; Tripsas, 1997; Tushman & Anderson, 1986; Utterback, 1994). This change and uncertainty can be challenging for analysts to understand. The second challenge relates to when technology is introduced that is competence destroying and threatens the business itself or requires it to gain new capabilities to change the business and fend off new challenges. Incumbents need new capabilities to adapt but these take time to mature leaving opportunities for new entrants or competitors who have been investing for periods before (Benner & Tushman, 2015). As incumbent firms try to cope with the uncertainty or invest to cope with new capabilities there will be reactions from analysts. These reactions impact the judgement of the senior management board.

Depending on the level of change the incumbent business is trying to introduce, the analysts will react by giving sell, buy or hold recommendations. These can change the direction the firm is taking and can provide misleading projections (Benner, 2007). As companies try to adapt to the changes in technology unless the analysts fully understand the new technology and understand its potential. It can punish businesses who want to adapt to the changes but negatively reporting on the strategy of the firm. Kodak and Polaroid analysts' share price models used the razor blade model i.e. it's the razor blades that make the money and not the razor itself. This is the same as looking at film as being the money maker and not the camera. This had always been the case until digital technology came along (Tripsas & Gavetti, 2000).

Short-termism has been a characteristic of financial services for many years. The years prior to the financial crisis of 2008, were preceded by periods of short-termism at the loss of long term consequences (Rajan, 2006). This myopic behaviour led to the focus on short term quarterly results, short term portfolio results, share price and bonuses in excess of what they should have been valued. This risk taking was heavily driven by incentives that existed for short term behaviours. Inadequate governance and regulation allowed banks to risk the long term future for gains today (Dallas, 2012; Flammer, Sampson, Henderson & Samuelson, 2016). This behaviour of investing in short term projects that pay back helps executives deliver personal agendas or

bonuses. This goes across industries and has not changed much in 50 years according to a study completed by Bower (Bower, 2001; Bower & Gilbert, 2007b).

This thesis will look to see what extent short term financial goals are preventing the investment into future growth and if this is driven by analysts and shareholders.

2.7.2 Inertia - Agility and risk

As discussed previously, the rate of change is increasing. We can see the obvious signs by the level of failures of firms or the churn within the S&P 500 (Foster & Kaplan, 2001). The pace of technology adoption is also increasing by consumers. The rate of adoption of telephones took decades vs televisions that took a decade vs the adoption of WhatsApp that took months.

The speed of adoption on one hand can be incredible and overwhelming. Therefore, the time it takes for some firms to change needs to decrease so that they can increase their ability to be agile, so that they can be open to new opportunities as they become clear. This connects to Christensen's work; disruption is speeding up and the impacts can be fatal to firms if they don't change and adopt new ways of working (Price, 2017).

However, the disruption needs to be taken into perspective but so does the timeline and the timeline is the major unknown for how disruption will change each industry in many cases. In Christensen's case studies changes happened to markets overtime but many businesses could not adapt even when they had the time to do so (Christensen, 1997a). Leaders need to balance the need to focus on current client needs whilst having a view on new opportunities that could arise, they then need to exploit the opportunities when they can by ensuring the firm is ready. Acceleration and the ability to spot opportunities, then execute on them to drive competitive advantage are key core capabilities that could be dynamic enough to drive superior profits (Teece, 2011).

A balance needs to be made between the focus on the current while looking for new opportunities. Focusing on customers is described in the book by Colin Price as one of 4 critical execution activities to be delivered. However Christensen has stated that the focus on existing consumers and products can be detrimental if the focus is so extreme it means the ignoring of longer term opportunities. These seem contradictory but Price goes further to explain the need to laser beam focus on consumers but for

ability to explore new ideas or opportunities. Focus on consumers should not reduce the ability of the firm to capitalise on new opportunities (Price, 2017).

Price defines agility as the ability to spot and respond to new opportunities and threats. It's the ability to decode signals, and be nimble enough to redeploy talent, financial resources and appropriate processes in a timely manner. In the annual report for Toyota, Akio (the CEO of Toyota) in 2016 stated that the firm had "become too big to respond speedily to serve changes." Research completed by MIT concluded that firms that were genuinely agile, earned 37% more revenue and 30% more profits as the firms profited from the ability to meet new demands (Price, 2017). It is easy to recognise the need to be agile but there are complex processes needed to ensure a firm can execute agility well. Christensen highlighted that processes, resources and culture worked against firms to deliver the needed changes for long term survival, or the ability to take advantage of the growth opportunities (Christensen, 1997a). The growth engine in the industrial revolution was driven by doing the same thing in a standardised way as efficiently and effectively as possible. Growth now will be driven by the ideas and ingenuity of people. Ensuring that a firm attracts and gets the very best out of its talent is critical. Leaders must enable a firm to collaborate and execute without fear. This doesn't mean that poor performance and conduct will not be measured and punished but more that the organisation is given the space to innovate, fail and learn. In a poll by Galop in 2017, only 3 out of 10 employees felt engaged (Edmondson, 2019).

Fear in the work place can be a problem when good people don't speak up when issues exist, or have a fear of trying new ideas as they think there is no upside of trying anything new. Edmondson sets out a number of areas to review and look at to ensure that organisations are able to learn quickly and take opportunities in an agile way (Edmondson, Bohmer & Pisano, 2019). Psychological Safety is the ability of the work force to speak up and raise concerns; how safe the employees feel they are to raise issues and how well they feel those feelings will be acted upon. The example Edmondson uses is regarding NASA. An engineer working on the Columbia Space Shuttle mission thought that something was wrong and asked for additional satellite photos of the space shuttle to ensure the outer protective perimeter was ok.

This request was rejected by the line manager and it was felt there was no way of dealing with this issue. All 7 astronauts lost their lives as this was an avoidable failure

(Edmondson, 2019). To really appreciate difference, organisations need to foster the environment for diverse opinions to ensure there is a forum where people are listened to. Group thinking where all members of the group think the same, can lead to sub-optimal decisions as the decisions are not being challenged or tested to see if they make sense (Edmondson, 2019).

Edmondson highlighted a number of key areas to help execute this effectively.

1. Openness to new ideas - There is no point in individuals thinking of new ideas if they are not being valued by the organisation. If ideas are being ignored or criticised then the very individuals coming up with the ideas will be less inclined to spend their energy contributing creative thoughts. It is important that companies foster the energy and creative talents of the team.
2. Time for reflection - Edmondson explained the importance of reflection in learning. Often at work you can move from one fire drill to another. However its important to both celebrate success but also celebrate glorious failures, if those failures mean that the organisation learns and grows from this.
3. Experimentation - This is the ability of the organisation to get space to allow itself to innovate. Dedicated resources, processes and people are needed to collaborate together. Getting a space and time to allow this to happen is important. This may mean that the work is separated from the normal business as usual work, to ensure that it has the correct focus.
4. Collect, analyse and transfer learning - This ensures that the proof of concepts and ideas are collected, tested, analysed and learned from. An example would be JP Morgan released FINN, an internal challenger bank focused at younger segments of the market. This was later closed but this was seen internally as a success in the way the bank learned from the segment and experiment.
5. Leadership reinforcement - Leadership time is finite but you get what you reward. If the leadership doesn't take time to listen, reward, help support and nurture new ideas then it is unlikely the subordinates will see this as important. With the time pressures to deliver business as usual work, leadership will be critical in supporting new and innovative ideas.

This thesis will look at how the incumbent is investing in new agile methodologies and the behavioural barriers that might be preventing this being realised quickly.

3 Research Conjectures

This thesis will use 10 research conjectures that have been linked to both the research questions and the theories coming from the literature review. This helps structure the investigations and ensure that the theory is correctly reviewed in a financial services context. These conjectures have been linked in the table below. The research questions can be seen along with the themes, then the conjecture and key authors associated with each theory. These will be reviewed in detail as per the research design.

Table 3.1 – Conjectures from the literature review and to be tested as part of the research

Question and theses of analysis	No.	Conjectures	Leading Authors
Research question: How and why disruption impacts incumbent firms within Financial services including an assessment of how these impacts can be anticipated?	1	New Entrants into the market will do so by using inferior products/services but becoming more affordable and accessible	C Christensen
	2	Disruption can be predicted and assessed	S Anthony
	3	Technological changes could disintermediate existing traditional banking services and put financial services type transactions in the hands of non traditional banks	J Haycock
	4	Profit erosion and market share price impacts will happen to incumbent banks unless it explores new ideas to exploit opportunities from disruption	PWC assessment, CBInsights
Understanding what investment decisions are being made to combat the growing threat of disruption within the financial services industry and why	5	Incumbents focus their investments resources to service existing customers needs - Not enough is being invested in disruption innovations	C Christensen, M Tushman
	6	Incumbents have the resources and knowhow to change and take advantage but are unable to react due to the culture of the firm, its complex processes and routines designed to maintain efficiency	C Christensen
	7	Resource allocation is made in a suboptimal way and driven by political issues, driven bottom up and operational in nature. This is not driven by maximising economic benefits	J Bower
Investigation of the forces driving action and inertia to help understand the ability to respond to the changes in the industry	8	Focus on current customers leads to high costs and over servicing clients this will leave the incumbents at risk of exposure to disruption	C Christensen
	9	Business processes and routines are complex and can take time to navigate reducing flexibility to drive changes quickly	C Christensen, S Anthony
	10	There are significant levels of inertia within large organizations driven by risk, fear, regulatory changes, incentives, shorttermism, financial rules and shareholders. These combine to hold back the organisation taking on new and more disruptive opportunities	A Edmondson, C Christensen, S Anthony, M Tushman, M Benner, C O'Reilly

3.1 Conjecture 1: New Entrants

The full conjecture is: New Entrants into the market will do so by using inferior products/services but becoming more affordable and accessible.

New entrants to the market will do so by using inferior products and services that become more affordable and accessible overtime. This is stated in Christensen's theory covered in the literature review. Is this applicable within financial services? Interviews will assess the impacts and external documentation and include a review of examples. New entrants will be highlighted along with an impact assessment of any disruption on the associated part of the financial services industry (Christensen, 1997a).

3.2 Conjecture 2: Disruption can be Predicted and Assessed

According to Anthony et al work within his work on dual transformation (Gilbert *et al.*, 2017a), there are 7 indicators of disruption which will be tested as part of the document review and expert interview process.

These are:

1. Changes in customer loyalty – historically customers of financial services have been sticky but with new entrants offering new ways of doing business, are we seeing customers adopting new services?
2. Level of venture investments – are there new investments into new businesses and new technologies that could impact incumbent banks?
3. Policy changes – are policy changes increasing or decreasing competition within financial services or impacting margin levels for parts of financial services?
4. New Entrants – are we seeing different players now operating in traditional financial service product and service areas? What is the impact of this for incumbents?
5. Customer habits – digitalization and the way customers are using technology in their private lives could impact the expectations of how they interact or consume business products and services. This includes the increased access to market information and data

6. Business model changes – are business model changes occurring? Are firms able to service the lower demanding customers in a different way? Are they offering different price points forcing incumbents to react?
7. Decline in margin and stagnant growth – are incumbents seeing declining margins or stagnant growth?

3.3 Conjecture 3: Technology help new firms to disintermediate

The full conjecture is: Technological changes could disintermediate existing traditional banking services and put financial services type transactions in the hands of non-traditional banks.

Technological changes could disintermediate existing traditional banking services and put them in the hands of non-traditional banks. This is nicely outlined in a book “Bye bye banks?” by J Haycock. Bill gates famously stated in 1997 “we need banking but we don’t need banks anymore.” It is over 20 years since this prediction was made but incumbent banks have continued to evolve they haven’t been disrupted significantly, apart from changes forced on the industry as part of the financial crisis of 2008. In other industries we have seen incumbents being disrupted and disintermediated. The music industry, video rental or retail as a whole are examples. These have changed due to the rise of technology platforms like iTunes or Amazon that have caused significant disruption. Will this happen within financial services? New Technology and access to data has seen payments, FX, lending, savings and cross border payments being displaced to other providers, diminished and disintermediated (Haycock, 2015). With new technologies like cloud, AI, blockchain and crypto currencies, we could see even more significant disruptions in the future.

3.4 Conjecture 4: Profit Erosion and Share Price

Full conjecture is: Profit erosion and market share price impacts will happen to incumbent banks unless it explores new ideas to exploit opportunities from disruption.

Profit erosion and market share price impacts will happen to incumbent banks unless they explore new ideas to exploit opportunities from disruption. This theory linking to Porter states that even with increased competition and more new entrants attacking parts of the business incumbents that are making profits, will reduce margins and stagnate growth. This will be examined to see if there are examples of disruption

within financial services. A PWC report (PWC, 2016) showed that margins have fallen significantly and will continue to fall if they do not reposition the current business and look to exploit new businesses models and technologies (Porter, 1980a).

3.5 Conjecture 5: Focus on Existing Customers

The full conjecture is: Incumbents focus their investments resources to service existing customer's needs - Not enough is being invested in disruption innovations.

Incumbents focus resources, management time and investments on servicing existing customers with not enough being invested in disruption vs sustaining or creating efficiency innovations. The research completed by Christensen showed that incumbent companies in the steel industry and computer disk drive industry focused on sustaining innovations. Over supplying customers with features only a few customers really require allows competitors to enter the industry and disrupt by making products and services more accessible and affordable. This thesis will assess if this is the case in financial services (Christensen, 1997a; O'Reilly *et al.*, 2009).

3.6 Conjecture 6: Unable to React

The full conjecture is: Incumbents have the resources and knowhow to change and take advantage but are unable to react due to the culture of the firm, its complex processes and routines designed to maintain efficiency.

Incumbents have the resources and knowhow to change but are unable to react quickly due to culture, process and routines. A number of authors have set out that history, the size of the company and its focus on the current customer can get in the way of repositioning for its core business or exploring new ideas. This proposition looks for the dynamic capabilities to see if they are being built. This thesis will ascertain if incumbents spend at the right level of investment and whether these investments are in the right areas (Christensen, 1997a; Gilbert *et al.*, 2017a).

3.7 Conjecture 7: Resource Allocation is Not Optimal

The full conjecture is: Resource allocation is made in a suboptimal way and driven by political issues, driven bottom up and operational in nature. This is not driven by maximizing economic benefits.

The literature review on resource allocation shows that investments are made in a sub-optimal way and are driven by political and organization silos vs rational economic maximization. Based on the work completed by Bower (2017), this thesis will try to understand the process by which companies allocate the financial resources as part of the yearly planning process. The theory states that investment decisions are made lower down in the organization using less rational decision making when deciding if something should be invested in or not. Often decisions are made in silos, away from the board and decisions are not always based on maximizing shareholder value but instead trusting in who is asking for resources. This thesis will examine if this is correct in the context of financial services by looking at historical documentations and observational study (Bower, 2017).

3.8 Conjecture 8: Over Servicing leads to Higher Prices Creating New Entrant Opportunities

The full conjecture is: Focus on current customers leads to high costs and over servicing clients this will leave the incumbents at risk of exposure to disruption.

Based on the work completed by Christensen, the theory is that over time the focus on sustaining innovations leads to an over service of a small number of demanding clients. This creates opportunities for new entrants to enter with less complex and cheaper but inferior products and services. This thesis will look at examples of these within the industry and KPI's (key performance indicators) that indicate complexity with processes and systems (Christensen, 1997a; O'Reilly *et al.*, 2009).

3.9 Conjecture 9: Rigid and Complex Processes Reduce Flexibility and Speed to Transform

The full conjecture is: Business processes and routines are complex and can take time to navigate reducing flexibility to drive changes quickly.

Business processes and routines are complex and rigid. This can take time to navigate reducing flexibility to drive changes quickly. A number of authors identified that processes, focus efficiency and effectiveness can reduce the levels of innovation and agility within incumbents. This thesis will look at the process for technology adoption and the time it takes to make critical decisions to move from ideas or

education to strategy to execution (Christensen, 2000; Gilbert, Johnson & Anthony, 2017b).

3.10 Conjecture 10: Inertia Reduces the Pace of Change

The full conjecture is: There are significant levels of inertia within large organizations driven by risk, fear, regulatory changes, incentives, short-termism, financial rules and shareholders. These combine to hold back the organization taking on new and more disruptive opportunities.

There are significant levels of inertia within large organizations driven by risk, fear, regulatory changes, incentives, short termism, financial rules and shareholders. The levels of inertia are important for companies to understand if they are to put mitigating factors in place. This thesis will look at these inertia factors and ascertain if these are holding back innovation and the speed of implementation. The ability to be agile when the pace of change is increasing will be critical.

Through an observational case study, this thesis will look at how banks are changing, adopting new dynamic capabilities, responding with decision making timeframes in order to take advantage of disruption. Each part of the multimethod research study should be able to look at different parts of the propositions outlined (Benner, 2007; Christensen, 1997a; Graham *et al.*, 2005; O'Reilly Iii & Tushman, 2004).

3.11 Using the Conjectures

The conjectures link the questions to the research and the key authors coming out of the literature. These conjectures have also helped in the design of the interview questions and focus of the observational study. The findings from both will be linked back to the conjectures to help reinforce, challenge and extend current theories.

4 Methods

4.1 Introduction

This method section outlines the research methods reviewed, the choices, process and actions that have been completed. It is important that all researchers can understand the methods chosen, the design followed and understand how and why they arrived at the data analyzed. This chapter looks at the step by step process taken from method research, research design, data collect processes and analysis. Justification of the path and the pros and cons of the decisions made will be shared. Boundaries and limitations of the research are also stated.

Previous studies into the specifics of disruption of financial services are not available as this is a contemporary subject. This gives the opportunity to contribute new thinking to the subject but also apply theory from other industries to incumbent banks. As this is a contemporary subject a pragmatic, deductive approach using qualitative and some quantitative data gathering methodologies is appropriate.

It is important that the research methodology bridges both high levels of theoretical and academic input with the ability to help solve what is a very practical problem. The research questions set out are real practical challenges, facing real businesses today. This thesis builds on the work already completed and therefore is not a new theory but instead incremental to the existing theory (Saunders, 2016).

The "Pasteur's Quadrant" looks at not only relevance of the work but also the rigor needed to deeply assess a practical issue. As this is a DBA, its important that this paper looks at organisational phenomena and provides practical solutions that have been rigorously assessed (Tushman & O'Reilly lii, 2007).

		Relevance: Considerations of Use	
		No	Yes
Rigor: Quest for Fundamental Understanding	Yes	<i>Bohr's Quadrant</i> Basic disciplinary research	<i>Pasteur's Quadrant</i> Professional schools Business schools
	No		<i>Edison's Quadrant</i> Consulting firms

Figure 4.1 – Pasteur's Quadrant – Research and Relevance

Source: Extract from Tushman and O'Reilly (2007)

This DBA paper is not just looking to be useful like a consulting paper or just to have rigor in research, but both. The focus is therefore very much positioned in the top right hand part of the 4 box grid.

4.1.1 3 Year Study

The research timeline was nearly 3 years including initial internal discussions. This is a critical period as it follows the very start of the disruption process. During this period a lot of things changed and we can see through the incumbents decision making results, ideas that were in strategic review at the start of the study have now begun to be executed. The timeline is also interesting as banks are just getting over the financial crisis of 2008. Banks needed to recapitalise, change business structures, and deal with the implications of new regulations. Finally as they are coming through this they have been hit with disruptive forces that threaten their revenues further.

This research falls within the boundaries of advanced knowledge, addressing the business issues, while applying disruptive theory to the financial services industry context. (Creswell, 2018; Saunders, 2016). This is moving beyond basic research and moving into applied research as defined by Easterby Smith et al. The purpose of applied research is to improve the understanding of a particular issue and it's

solutions, coming up with practical solutions for an organisation to help them understand this phenomena (Easterby-Smith, 2012).

The next section looks at the methods research used and the decisions made.

4.2 Methods Approach

4.2.1 Framework used

Completing doctorate level research of this size and complexity required the use of a structure that illuminated the process to follow and informed choices along the way. The Research Onion framework by Sanders et al is well cited and understandable. This Research Onion framework designed by Saunders et al helps to frame each of the key stages needed when completing research. Using the Onion informed a final decision on the data collection process (Saunders, 2015). It is understandable that researchers want to just get on and start to collect data linked to a research question but its important to first ensure that the most effective approach is being taken (Crotty, 1998). Only when each of these layers have been examined can the data collection deisgn and process be clear. In this framework there are 6 layers of research and through each layer understanding will be gained which will ensure that clear choices are made in a sequential order.

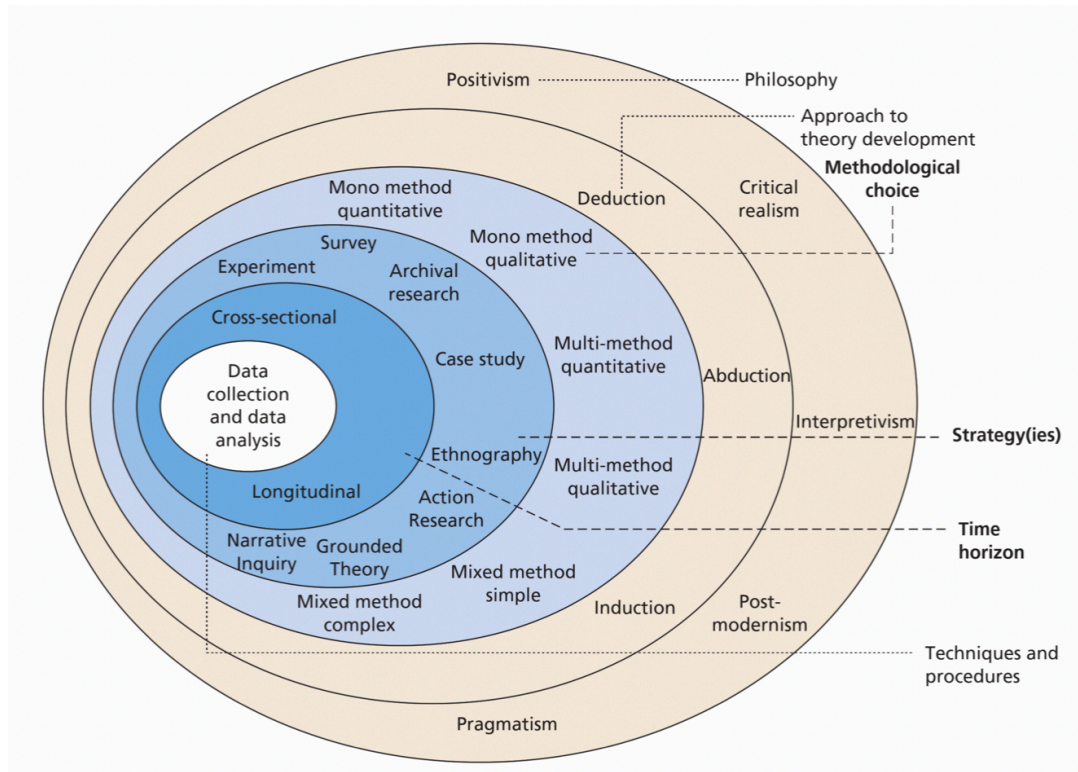


Figure 4.2 - The Research Onion

Source: (Saunders, 2016)

There are 6 layers to the research design leading to the data collection process and data analysis. Each layer is important within the context of the whole; what follows is a discussion of the relevant theories pertinent to this study in sequential order.

1. Research philosophy
2. Approach to theory development
3. Methodology
4. Strategy
5. Timeline
6. Data collection and data analysis

4.2.2 Research philosophy

Research philosophy refers to the system of beliefs and assumptions about the development of knowledge. It is important to ensure that the assumptions being used are clear for all to see and therefore understand where the researchers position is.

Looking into the beliefs of the researcher involves self reflection and an awareness of personal actions (Saunders, 2015). Ontology refers to the nature of reality. These assumptions shape how the researcher looks at the world, including the way they look at organisations, management, and groups or individuals within these constructs. An example stated by Sanders et al is a useful way to bring this alive based on a case study regarding resistance to change. The example is that historically resistance to change has been seen as a problematic issue and was seen as a blocker in the organisation that stopped change happening. Resisting change research focused on the identification of people who are likely to challenge the change so mitigation actions can be put in place to ensure the change is executed effectively. However the latest thinking states that people resisting change are useful as issues can be understood early so that changes can become more successful. This can feel more abstract in nature (Creswell, 2018).

There are other theories not cited on the Research Onion that should be mentioned as relevant are included below.

Epistemology refers to the assumptions around knowledge. There are different types of knowledge and researchers can use different epistemologies including archival research or stories, data, visual and numerical data (Burrell, 1979). Whilst epistemology accepts fictional stories and narratives it is more linked to facts so tends to lead to quantitative research methods with outcomes that are likely to be more objective and general in nature.

Axiology refers to the value and ethics within research. This includes the values of the researcher and the participants. Values relate to what a researcher thinks is important. An example of a value could providing data for readers, and allowing them to make up their own minds about what the data shows. A summary of the data is not provided in advance or at all.

Ontology (nature of reality or being)	Epistemology (what constitutes acceptable knowledge)	Axiology (role of values)	Typical methods
Positivism			
Real, external, independent One true reality (universalism) Granular (things) Ordered	Scientific method Observable and measurable facts Law-like generalisations Numbers Causal explanation and prediction as contribution	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance	Typically deductive, highly structured, large samples, measurement, typically quantitative methods of analysis, but a range of data can be analysed
Critical realism			
Stratified/layered (the empirical, the actual and the real) External, independent Intransient Objective structures Causal mechanisms	Epistemological relativism Knowledge historically situated and transient Facts are social constructions Historical causal explanation as contribution	Value-laden research Researcher acknowledges bias by world views, cultural experience and upbringing Researcher tries to minimise bias and errors Researcher is as objective as possible	Retroductive, in-depth historically situated analysis of pre-existing structures and emerging agency Range of methods and data types to fit subject matter

Figure 4.3 - Ontology, epistemology and axiology

Source: Extract from Saunders et al (Saunders, 2016) which helps to summaries the main research philosophies.

Figure 4.4 - Continued - Ontology, epistemology and axiology

Ontology (nature of reality or being)	Epistemology (what constitutes acceptable knowledge)	Axiology (role of values)	Typical methods
Interpretivism			
Complex, rich Socially constructed through culture and language Multiple meanings, interpretations, realities Flux of processes, experiences, practices	Theories and concepts too simplistic Focus on narratives, stories, perceptions and interpretations New understandings and worldviews as contribution	Value-bound research Researchers are part of what is researched, subjective Researcher interpretations key to contribution Researcher reflexive	Typically inductive. Small samples, in-depth investigations, qualitative methods of analysis, but a range of data can be interpreted
Postmodernism			
Nominal Complex, rich Socially constructed through power relations Some meanings, interpretations, realities are dominated and silenced by others Flux of processes, experiences, practices	What counts as 'truth' and 'knowledge' is decided by dominant ideologies Focus on absences, silences and oppressed/repressed meanings, interpretations and voices Exposure of power relations and challenge of dominant views as contribution	Value-constituted research Researcher and research embedded in power relations Some research narratives are repressed and silenced at the expense of others Researcher radically reflexive	Typically deconstructive – reading texts and realities against themselves In-depth investigations of anomalies, silences and absences Range of data types, typically qualitative methods of analysis
Pragmatism			
Complex, rich, external 'Reality' is the practical consequences of ideas Flux of processes, experiences and practices	Practical meaning of knowledge in specific contexts 'True' theories and knowledge are those that enable successful action Focus on problems, practices and relevance Problem solving and informed future practice as contribution	Value-driven research Research initiated and sustained by researcher's doubts and beliefs Researcher reflexive	Following research problem and research question Range of methods: mixed, multiple, qualitative, quantitative, action research Emphasis on practical solutions and outcomes

Source: Extract from Saunders et al (Saunders, 2016) which helps to summaries the main research philosophies.

4.2.3 Positivism

Positivism is a research philosophy that works with an observable social reality to produce generalised law like outcomes. The word means 'given' and is a scientific, data driven approach designed to yield pure data that is not influenced by interpretations. Epistemologically researchers focus on the gathering of measureable facts and use already existing hypothesis to guide the collection of the required data. As human interaction is not the key priority, data collection processes like

questionnaires are common. Outcomes that can be generalised via a more inductive approach using statistical qualitative data approaches (Crotty, 1998).

4.2.4 Critical realism

Critical realism focuses on explaining what is seen and experienced. The experimental part is key; knowledge or what is observed is not enough to fully understand what is happening. Reality is the key and the only way to make sense of reality is to fully experience the real world we live in. However our senses can deceive us so not only do we need to experience, but then we need to reflect on the experience to make full sense of it. This reasoning of the backward processing defines the critical realism (Reed, 2005). The research therefore focuses on in-depth historical analysis. It is important that the researcher in these cases is aware of the socio-cultural background they have, and their life experiences as this bias could influence the research findings.

4.2.5 Interpretivism

Interpretivism studies the meanings in things. Humans have different social backgrounds, experiences and upbringings; they can create different social realities. The purpose is to interpret based on context. For example the different layers of an organisation might have different ways of looking at the very same firm. Different genders or ethnic backgrounds, might have different experiences of the same reality; researchers need to understand this to interpret the differences and connections of the experiences.

There are different strands of interpretivism. Phenomenologists focus on the lived experience with a collection of recollections to interpret. Hermeneuticists look at the cultural context, looking at the stories, text or symbols. Symbolic interactionists look at interpretations from the interactions of others with a focus on language, culture and history (Crotty, 1998; Saunders, 2015). The business world is complex and rich and outcomes will be explicitly subjective by nature. A researcher who has a business background or relationship with the company they are researching needs to ensure this is understood and stated.

4.2.6 Postmodernism

Postmodernism believe that to understand the sense of things, emphasis must be placed on the importance of language. It tries to give a voice to more marginalised views and seek to focus on the question of power relationships that sustain dominate realities (Saunders, 2016). This focus on deconstructing, through looking at silences or absences vs the focus on what is observed as a whole could be misleading it is possible to miss out the views of more silent groups that are less visible. Like interpretivists, postmodernism they do look in depth into phenomena but focusing on the power relationships to observe and interpret reality.

4.2.7 Pragmatism

This philosophy concept becomes real when helping create action. It considers theories, concepts, ideas, propositions and research findings as they play roles in supporting actions. Pragmatists start with a problem and aim for a practical solution to be tried and implemented. The focus on practical outcomes from the outset leads to practice based research questions (Kelemen, 2008). There are many different approaches and ways to research the world under this philosophy, leading to both subjective and objective view points. To get a rounded view of this complex world, different view points and data collection methods are needed, as one approach will not be able to cope with the rich complexity of the problem at hand.

4.3 Approaches to theory development

The second layer of the Research Onion framework was used to understand the different approaches to theory development. This section explains the different options reviewed before deciding on an approach.

Understanding the correct approach to theory development is important for a number of reasons. Firstly, it enables a researcher to think through the choices of research design including data collection processes that are needed to analyze data. Secondly it helps the researcher to think about strategy and methodology choices to correctly describe what is happening. It is important to know whether if theory or data is the starting standpoint. Furthermore, the researcher is able to think about the constraints in the data collection process before beginning the work.

There are 3 main theory development approaches summarized in the below.

	Deduction	Induction	Abduction
Logic	In a deductive inference, when the premises are true, the conclusion must also be true	In an inductive inference, known premises are used to generate untested conclusions	In an abductive inference, known premises are used to generate testable conclusions
Generalisability	Generalising from the general to the specific	Generalising from the specific to the general	Generalising from the interactions between the specific and the general
Use of data	Data collection is used to evaluate propositions or hypotheses related to an existing theory	Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework	Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection and so forth
Theory	Theory falsification or verification	Theory generation and building	Theory generation or modification; incorporating existing theory where appropriate, to build new theory or modify existing theory

Figure 4.5 - Deduction, induction and adduction

Source: Extract from Saunders et al (Saunders, 2016) which helps to summaries the main research approaches

4.3.1 Deduction

In simple terms the deductive approach starts off with a theory, and applies this to a situation, data is then collected to prove or disprove the theory. The logic being, that if the premise is true, the conclusion must also be true. Deduction begins with a generalised theory and applies a specific context to it to ascertain if that generalised theory works or not. Often the data collection is used to prove a number of propositions that have been formulated as part of the literature review. The key is to see if the data proves the theory or not, comparisons to existing logic are made and data collected to prove one way or another. If results are not consistent then the premise test is false, if the results are consistent then the theory is corroborated. These conclusions can be added to current theory and the body of knowledge can be extended in light of the research findings. Information needed can be qualitative or quantitative data.

4.3.2 Induction

Induction is a different approach and begins with the collection and analysis of data, understanding the connection of different variables within the data follows with a view to establishing a theory to try and help answer the research question itself. This is quite different from deduction as this starts off with a theory, but looks at the evidence that is gained in the context of the research question, to establish a theory to answer a research question. This makes induction a less rigid approach, and leaves the evidence to suggest what the theory should be (Creswell, 2018).

4.3.3 Abduction

Abduction is a cross between induction and deduction. So therefore, it is not necessarily starting with data as deductions do or going from theory as induction does, the abduction approach moves between the two. It begins with an observation and then works out what a plausible theory might be. These observations may happen at any point during the project which means the researcher needs to start collecting data, then go back and look at the theory and then collect more data. This oscillation between the two previously explained approaches is an explanation of abduction. This can often be used to explain phenomena and to identify themes and patterns as they are happening in reality (Saunders, 2015).

4.4 Methodological choice

The third layer of the Research Onion framework looks at methodological choices. This section looks at the different approaches to collecting data. There are a number of approaches including the two main categories of qualitative and quantitative data gathering and analysis. In reality many businesses and management research designs are a combination of both data gathering processes, this approach is called mixed methods.

4.4.1 Quantitative

Quantitative research is based on the ability to scientifically predict based on a set of interrelated variables, what the future will be and if a theory is correct. This is often using historical data to understand the interrelated connection of variables to test a theory. Quantitative research often falls into three categories; experiments, structured

interviews and surveys. The experiment for example could be where the performance of two teams is analysed and compared to understand the independent variables, dependent variables and intervening variables including what relationship they have. This experiment is often useful when testing a theory using deduction (Saunders, 2015). Another example of the ability to collect data is a survey. The survey is designed with a specific set of questions and sent to the specific group of individuals, who will hopefully fill in the survey with a certain level of completion and give enough data to test if a theory is correct. A similar approach is a structured interview. This is very similar to the survey but is done face-to-face.

The researcher needs to know if they will use a single quantitative method or multiple methods that use a combination of structured surveys, structured interviews and/or experiments. (Saunders, 2015).

4.4.2 Qualitative

This research is based more on finding out what is really happening by understanding the phenomena in detail. It does so by building trust, participation, and an in-depth understanding of the topic at hand. The key to qualitative research is trying to understand the meaning of how and why things are going as they are. Often this will require deeper understanding of the subject using non-standard questions and observations. This approach is often linked to pragmatist philosophies.

This approach is appropriate for this thesis as the aim is to understand what is going on and therefore be able to use this more practical application to solve problems. Examples of research design would include structured and semi-structured interviews. There are different data collection processes including in-depth interviews, diary accounts and observations (Creswell, 2018).

4.4.3 Mixed methods

In reality mixed methods uses a combination of qualitative and quantitative techniques. Internal and external data including primary and secondary data are used. These methods can happen concurrently or sequentially and it is important as part of the research design to ensure that this is designed correctly (Creswell, 2018; Saunders, 2015). The main reason for using mixed methods is typically to help

triangulation of the data, give confidence to the results, add a diversity of thought and help reduce the risk of bias when otherwise having just one approach.

4.5 Research strategy

The fourth later of the Research Onion framework is the research strategy. There are a number of strategies that enable collection of quantitative and qualitative data as set out by Saunders et al (Saunders, 2016).

These include:

1. Experiments
2. Survey
3. Archival documents
4. Case studies
5. Ethnography
6. Grounded theory
7. Action research
8. Narrative enquiry

4.5.1 Experiments

This is where the researcher tries to prove a connection between changes in independent variables impacting a dependent variable. Experiments therefore tend to be used in exploratory and explanatory research. An experiment is trying to ensure that once the connection as found, this could be used to explain future behavior or events. An example of how this works is that a control group and an experimental group is selected and assigned randomly. Dependent variables are measured and then interventions are used within the experimental group only. The dependent variables again are reviewed. The idea is to then compare the control group against the experimental group to see what has changed. Experiments are often useful for quantitative research, with the ability to repeat the experiment many times (Creswell, 2018; Saunders, 2015).

4.5.2 Survey

A survey is a structured way of collecting answers to questions that can be given to a very sizeable population. It is therefore an economical way collecting significant amounts structured data. Surveys are another quantitative technique allowing the researcher to analyze this data's patterns and trends. The challenge of surveys is that it requires the goodwill of the people filling in the survey. It is therefore important that the sample used is representative of the population as a whole (Creswell, 2018; Saunders, 2015).

4.5.3 Archival documents

Past documents are a good way of researching what has happened, there is often deep levels of data available for review in these sources. Examples can include emails, contracts, presentations, government sources, diaries, national statistics, media sources and online articles. With the invention of the Internet, an industry of archival documents and research has been created. Documents can be a secondary source but it has to be understood that the data in the document this hasn't been collected with this specific research in mind. However, these documents can be extremely important to show what has happened in the past if their limitations are understood. (Creswell, 2018; Saunders, 2015).

4.5.4 Case studies

The multimethod research study can generate in depth analysis of a phenomenon. The difference of the multimethod research study is that this operates within a real-life setting or context that helps distinguish it from other research strategies. The intensity of the depth and the richness of the approach provides a real opportunity to create new or test existing theory (Eisenhardt & Graebner, 2007). Case studies often require a mixed methods approach including quantitative and qualitative research, this strategy is well used by researchers.

Single case studies are often criticized when the sample size is small; data can be limited when compared with large quantitative research data. Can a simple case study really be used to generalize using a deduction approach? Single case studies should represent a critical case or a unique case then it can be argued that it does represent similar areas of the industry.

It will be important to explain why using a case study in this context is appropriate. Case studies use a number of techniques to collect data including records, documents, observational research, questionnaires and unstructured and semi-structured interview (Yin, 2018).

4.5.5 Ethnography

Ethnography is often used to study some of sort group or culture. It was developed in the 1700's to study primitive societies. This requires the researcher to embed themselves within a certain culture to understand how it works, observing the interactions and documenting it through talking to people and observing what is going on. The researcher then tells the story of what is really going on within the culture. The challenge with this type of research is to ensure that work is representative of the overall culture. Although this technique was developed hundreds of years ago, it is still relevant to today's workplace. Modern day organizations have complex cultures often require someone to objectively observe what's going on to make sense of the complexity. This is qualitative research and is often completed through fieldwork where detailed notes are taken on a consistent basis (Creswell, 2018; (Saunders, 2015)

4.5.6 Grounded theory

This theory is used to explain social interactions in a wide range of contexts including business management. It is a systematic approach to collecting and analyzing qualitative data. The researcher collects and analyses data at the same time, instructor codes emerge as data is being collected. These codes are reorganized and evolve over time; therefore, the information becomes emergent by its very nature. There are a number of coding techniques with two principal stages called initial coding and focus coding (Corbin, 2008; Strauss & Corbin, 1998). Data is collected and coded throughout the process so it is important for the researcher to understand how changes occur through the process. They must appreciate how this interrelates and how the codes can be used to help develop and analyze the data into theory. This is very much an inductive theory technique (Creswell, 2018; (Saunders, 2015)

4.5.7 Action research

Action research is an approach where through a number of iterative cycles, data is collected and diagnosed to see what trends are emerging. This starts out with the researcher trying to understand the issue, understand the impact and then act on that knowledge. The participation of the researcher within the research is a critical part of this approach. This is different from other research processes which will require the researcher to be independent and objective. Participation involvement will change as the data and understanding the issues evolve over time (Creswell, 2018; (Saunders, 2015)

4.5.8 Narrative inquiry

This is a technique whereby the researcher believes their experiences can be best portrayed by the narrative. The researcher in this case is the narrator, who then tells the story of what they saw to bring to life what they've seen in terms of the interactions. A better understanding of what is going on is created as the narrator is able to bring some real color and depth to the discussions and meaning to the analysis.

4.5.9 Timelines

Researchers tend to use one of two categories of time horizons. The first is cross-sectional, where researchers look into phenomena at a particular time providing a snapshot. This is different than the other category known as longitudinal studies that progress over a longer period of time.

4.6 Selected Research Methods

4.6.1 Introduction

The framework of the Research Onion provided a useful step by step guide to walk through and understand the options available. Layer by layer choices were made in the context of the research questions and the most appropriate research method. Below the research methods used in this doctorate research are justified.

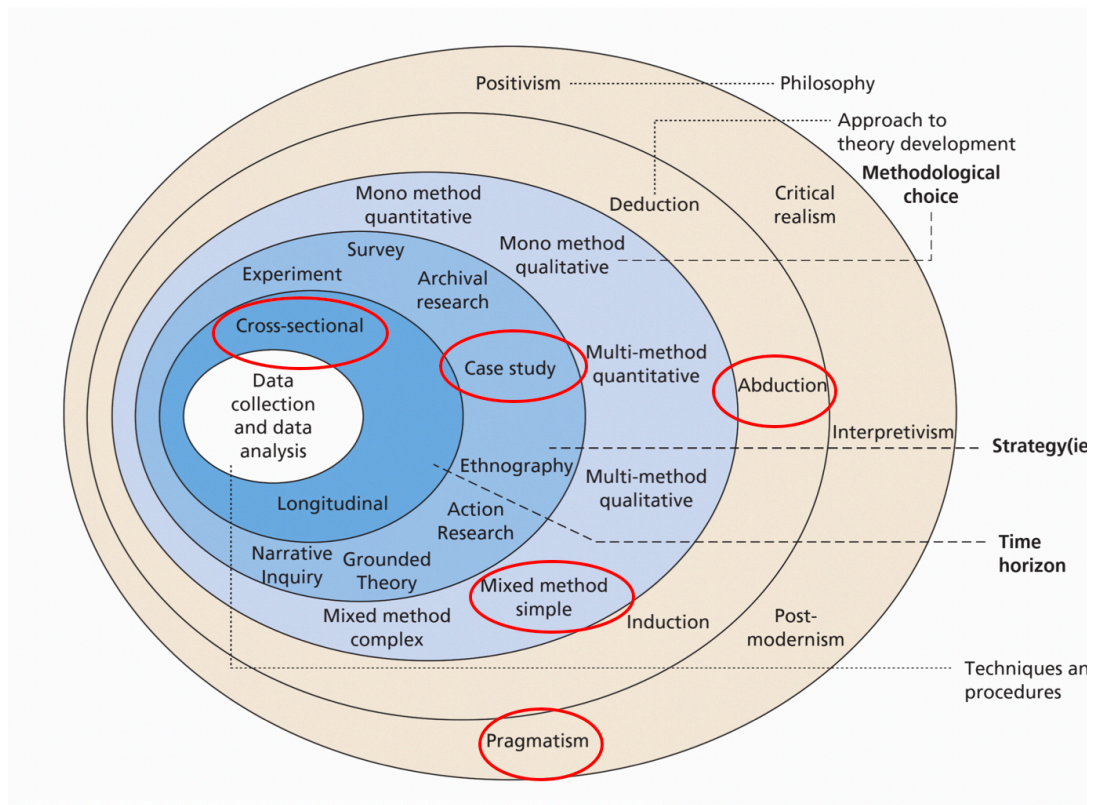


Figure 4.6 - The Research Onion is used was to structure the methods used in this thesis

Source: (Saunders, 2016)

Doctorate research methods levels:

1. Philosophy - this is pragmatism
2. Approach to theory development - the approach is an abduction
3. Methodological choice - the use of mixed methods
4. Strategy - a case study
5. Timeline - this is cross sectional

4.6.2 Philosophy choice pragmatism

This research is very much designed and guided to promote action; using the latest theories that are applied to problems that exist in the real world. The starting point is

a problem and the problem in this case is that incumbent banks are at risk of disruptive change. Pragmatism helps to understand the theories and concepts, then goes on to understand what is going on before moving to provide real solutions and actions to real problems. This is very much what this thesis does so was a logical choice. This thesis will not only provide greater understanding of how and why disruptive change is impacting incumbent banks but also offer a conceptual framework for the potential disruption to be assessed and combatted.

The HARP technique with a questionnaire used with the framework was completed and used to confirm the appropriateness of the pragmatism method in relation to the topic (Saunders, 2015).

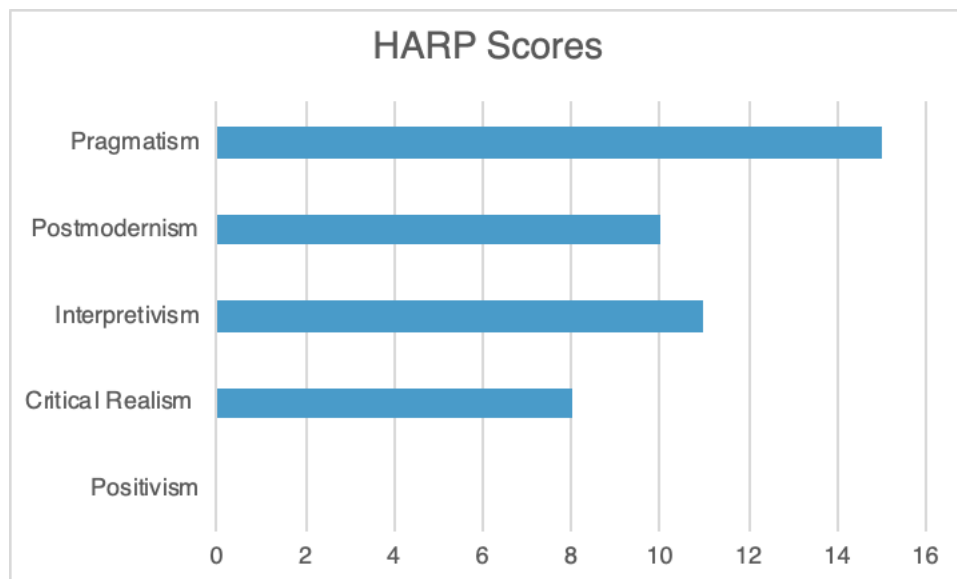


Figure 4.7 - HARP scoring

Source: (Saunders, 2015).

4.6.3 Approach to theory development choice - Abduction

Following on from the research into methods, unlike philosophy, the approach was less clear from the beginning but having revisited this many times of the last 3 years, the approach to theory development is justifiably abductive. Abduction is a cross between induction and deduction. So therefore, it does not necessarily start with data

as deductions do or going from theory as induction does, the abduction approach moves between the two. The starting point has very much been with the problem, trying to understand this through understanding the literature and conducting observational research. Being part of a company that is going through these changes made observation as well as theory application possible additions to theoretical understanding. This can often be used to explain phenomena and to identify themes and patterns as they are happening in reality (Saunders, 2015).

4.6.4 Methodological choice - Mixed methods

This thesis uses a combination of mixed methods. Both qualitative and quantitative research has been used to understand the phenomena happening within financial services. As part of the multimethod research study, semi-structured interviews were used as the main source of data to understand what is happening within a modern contemporary phenomena. This is the most effective way of understanding what is going on from the words of experts that provide significant insights, as they are grappling with the issues today. On top of this a structured observation study was carried out that focused on the collection of information relating to the response that incumbents are making to address the challenges over time. The level of disruption changes over time, so just a interview at a point in time doesn't capture the nature of the response over a 3 year period. The qualitative study enables facts to be provided on what incumbents are doing and also how this has changed over time. The possible reasons that explain these changes are also considered. The last parts of the multi-method study is external reports on the subject and also internal documentation over time. It should be made clear that some of the documentation is confidential but used to substantiate the categorisation of the observations.

4.6.5 Research strategy choice - A case study using multiple methods

The case study seeks to both understand the phenomena but also provide a guide as to why and how this is happening. The outcome is both insightful but also a practical bridge between theory and practice through a conceptual framework. The case study includes a market review looking at investment levels, new entrants to the markets and changes in policies that are opening up markets. Access to a world leading incumbent bank has provided access to this kind of indepth of knowledge; it is a real opportunity to apply, extend and challenge existing theory (Eisenhardt & Graebner, 2007).

This research uses a number of methods; a 140-week structured observational study, interviews with industry experts across banking and Fintech as well as internal documents. Through this case study unique access and insight into a world leading incumbent bank and its experts along with their decision-making processes.

Each part of the case study and research design is focused on answering the research question and the themes of analysis. The interviews will help understand the phenomena the industry is facing. Access to world experts in their fields and practitioners who are dealing with the very real issues in a real-life setting. The interviews also help to understand the barriers to change that unaddressed will cause significant challenges. The observational study will help with understanding of how incumbents respond over time, investing in which alternative technologies/capabilities, and why it is making these decisions. The multimethod research study has been chosen as the research method to identify if, how and why disruption is impacting financial services in a real world setting (Yin, 2018).

4.6.5.1 Single case study or multiple

This thesis uses a single case study approach. There are 5 main reasons why a single case study can be selected. The single case is a critical one, its unusual, common and therefore represents others, revelatory or longitudinal (Yin, 2018). It is important that I justify the basis of a single case. The single incumbent used in this case offers a critical case. This is a world leading bank with all the elements that may be disrupted or not. This access allows a researcher to look through the lens of product domains to really see how and why disruption is happening. The single case study approach is justified on the basis that this bank is a leading global bank; it is a relevant and significant player and it provides a significant contribution to the field through the reinforcement, challenge and extension of existing theory. It will also helps to reinforce future studies into this industry and field.

However, there are issues with single case studies. There are over 300 significant incumbent banks worldwide I reviewed (see appendix for the list) and one case study could misrepresent the others (Yin, 2018). However, the positives of unique access to experts and decision-making processes makes this critical case outweigh the challenges.

4.6.6 Timeline choice - Cross sectional

The thesis will use a cross sectional studies approach. Even though the research extends over a 3-year period it is still providing a snapshot of a phenomenon in a critical period of change for financial services. This is at the very start of the disruption process and therefore this thesis has the opportunity to influence a banks' future approach.

4.7 Research Design Framework

To proceed through the research, it is important to follow a design framework that logically moves through stages whilst linking the research questions. There are 5 parts of the design to review. It starts with the research questions, then moves to the research conjectures, then follows a review of the case and its components, a link to the data and the conjectures comes next along with criteria to interpreting the findings. This was adapted from the Yin (2018) research design approach (Yin, 2018).

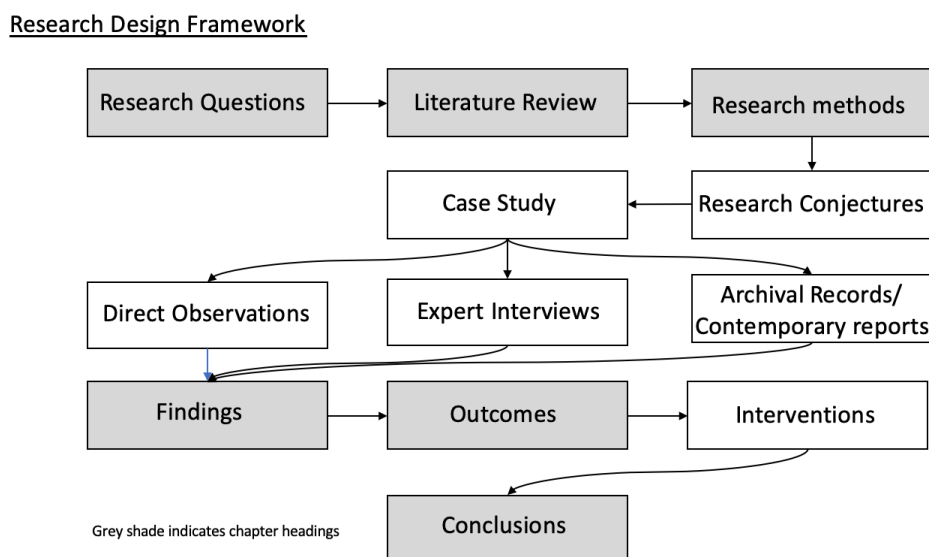


Figure 4.8 - Research design framework

4.8 Interview Data Collection

4.8.1 Introduction

Qualitative data collection is a very time-consuming process. Time is needed to understanding the questions, the techniques and the selection of interviewees, then there is the time taken to interview, transcribe, edit transcriptions, carry out initial coding and secondary coding, to then create themes and implications. This process took significantly more time than was anticipated. A summary of how the process worked follows below.

4.8.2 Semi-Structured interviews

As part of the case study, semi structured interviews were conducted on a 1 to 1 basis. These were informal interviews that helped to build a connection with the interviewees. It is important that they trust you and can open up in the process (Saunders, 2016). This approach was selected as disruption in financial services is a new and contemporary subject. After reviewing the different options available, semi structured interviews help best with the research needs in this project; exploring a topic, explaining the topic and evaluating the topic (Saunders, 2016).

The interview script was first tested on a small sample of interviewees and then developed in line with the knowledge from the literature review, the research conjectures and research questions. A copy of the interview script can be reviewed in the appendix. It is important to note that although there was an interview script additional questions were often added depending where the conversation went.

From the literature review a list of themes relating to disruption, barriers to these disruptions and the ability of incumbent firms to change emerged. Having a base knowledge of the context of the subject and situational awareness is fundamental to be able to understand the answers people give and then ask follow up deeper questions (Saunders, 2016). Open, closed and probing questions were used to get as much context as possible.

Some of the interviews were completed face to face which was the preferred option but due to the COVID outbreak and the global location of some of the interviewees,

some were completed via Skype or Facetime. The records and interviews themselves were unaffected by this but the informal before and after discussions were not as rich.

4.8.3 Software for the coding of interviews

Throughout this research, the use of key tools has been incredibly important. For referencing, Endnote has been very useful to keep a full and accurate bibliography.

Likewise, for the interview process the software NVivo was important. The software was used under the Warwick University license. NVivo is Computer Assisted Qualitative Data Analysis Software (CAQDAS). This helps to structure work, explore the data and code and retrieve information, as the data can be searched and categorized into themes (Saunders, 2016). The amount of data and transcripts to analyze, code and record meant that this process was very time consuming and challenging even with the use of this tool. Without the software this process would have been even harder. Using the software allowed the content of the interviews to be synthesized into nodes. The categories and themes emerged from the data with the visual help of the tool. Excel was used to download the codes and create categories. NVivo is useful as it has download capabilities that allow further analysis of the data in Excel and Word. All transcripts were anonymized before being uploaded into the tool, an ID code was used to replace names. Confidential information was removed from the text.

4.8.4 Candidate selection

The interview candidates selected needed to have the right experience, involvement and grasp of the subject. A list of 50 individuals was compiled through a network of contacts, collating this list took several months to finalize. It was important to ensure that the candidates were chosen from a cross section of the workforce, had connections to and insights of the incumbent firm. They also needed extensive knowledge of banking and Fintech with an understanding and connection to group strategy (Creswell, 2018).

Candidates from different geographical locations, seniority, roles and companies were selected. However, it became clear from initial discussions that the data needed to test the research questions against the theory linked conjectures was more likely to come from senior banking executives. Senior in this respect means experience and

rank. The depth and complexity of the topic meant that questions could only be answered by individuals who had some exposure to these areas or who had worked on solutions to combat problems. Other qualified candidates were employees of companies who were themselves part of new entrants coming to attack incumbent banks.

The interview cohort were a purposively chosen group selected for this critical case based on knowledge, insights, closeness to the topic and ability to contribute to this complex subject matter (Saunders, 2016). 30 candidates were selected. It is commonly suggested that the interview sample size should be between 5-30, and that interviews should use unstructured techniques. Carrying out 30 interviews was not a particular target but was necessary to research data a saturation point (Saunders, 2016).

4.8.5 Transcripts and interview data handling

All interviews were recorded using iPhone recording software and this was made clear to all participants. Each recording lasts between 30 minutes and 1 hour. The 30 transcript scripts were made using a third-party online transcription service. Each recording was saved using a code number before being sent. Despite being double checked for quality purposes, the transcription text still needed significant edits as syntax mistakes were made. Before this text was loaded into NVivo for coding, it would be further checked to ensure anonymity.

4.8.6 Consent and right to withdraw

All interviewees were sent the consent and withdraw consent forms as a part of the interview process. The consent form example is attached in the appendix. All participants were made aware that their contributions would be complete anonymized, be recoded, and that they could withdraw from the process at any time. All participants gave their permission and agreement, knowing that the purpose of the interview was for thesis research. The consent forms have been stored in a document with password security protocol.

4.9 Anonymity and Confidentiality

All interviews were anonymized before loading into NVivo. In fact, specific confidential details or name inclusion does not add to the merit of the interviews. As part of the pre-discussion it was made clear that the intent was more to understand disruption and its impacts and not learn specific details. All quotes used in this thesis use an ID number only and the associated consent forms are kept in secured files. The interview scripts at no point have the full name of the candidate within them. This anonymity allowed the interviewees the freedom to speak openly about the disruption and the issues this poses.

4.9.1 Interview ID and attributes

The ID replaces the names of the interviewees and is referenced in any quotes used within the findings part of the thesis. As previously stated all interviewees were people who are involved in the execution of actions to reposition a firm in the face of disruption or are involved in some way in the setting of corporate strategy. The table of candidates below summarizes these attributes as an interview cohort.

Table 4.1 - List of candidates that have been anonymized

Table of candidates - Anonymized

	ID Name	Years of Experience	Bank/Non Bank	Strategy Involvement	Execution	Technology Knowledge	Involved in disruption
1	DBA7_ALLDAY	25	Bank		Yes	Yes	Yes
2	DBA8_DISH	25	FinTech	Yes	Yes	Yes	Yes
3	DBA18_GON	15	FinTech	Yes	Yes	Yes	Yes
4	DBA12_DOM	20	Bank		Yes	Yes	Yes
5	DBA11_AJAX	20	Bank	Yes	Yes	Yes	Yes
6	DBA13_ALL	25	Bank	Yes	Yes	Yes	Yes
7	DBA17_CAR	25	FinTech	Yes	Yes	Yes	Yes
8	DBA20_BARC	15	Bank		Yes	Yes	Yes
9	DBA4_SING	20	Bank	Yes	Yes	Yes	Yes
10	DBA10_JSJ	10	Bank	Yes	Yes	Yes	Yes
11	DBA9_BAT	5	Bank		Yes	Yes	Yes
12	DBA14_AUS	20	FinTech	Yes	Yes	Yes	Yes
13	DBA15_HK	20	FinTech	Yes	Yes	Yes	Yes
14	DBA3_MELE	20	Bank		Yes	Yes	Yes
15	DBA16_SU	10	Bank		Yes	Yes	Yes
16	DBA19_CR	15	Bank		Yes	Yes	Yes
17	DBA5_LYE	15	Bank		Yes	Yes	Yes
18	DBA2_IKA	10	Bank	Yes	Yes	Yes	Yes
19	DBA1_NAN1	20	Bank		Yes	Yes	Yes
20	DBA6_IES_1	20	Bank	Yes	Yes	Yes	Yes
21	DBA21_JCA	15	Bank	Yes	Yes	Yes	Yes
22	DBA22_FIN2	15	Bank		Yes	Yes	Yes
23	DBA23_CO	10	Bank		Yes	Yes	Yes
24	DBA24_LONG	15	Fintech	Yes	Yes	Yes	Yes
25	DBA25_TRUM	20	Bank		Yes	Yes	Yes
26	DBA26_FIN7	20	FinTech		Yes	Yes	Yes
27	DBA27_JEDI	20	Bank	Yes	Yes	Yes	Yes
28	DBA28_MIS	30	FinTech	Yes	Yes	Yes	Yes
29	DBA29_GA	30	Bank	Yes	Yes	Yes	Yes
30	DBA30_LEF	20	FinTech	Yes	Yes	Yes	Yes
		550					

4.10 Interview Data Analysis - Coding of Interviews

4.10.1 Introduction

Coding is used to reduce the amount of information gathered as part of the interview process. Codes are a way of assigning a summarized code that is symbolic of the interview script. It assigns a summative, salient, essence capturing and evocative attribute to the text to the interview script (Saldana, 2016). The process is not a precise science as it is taking primary data and turning this into codes, categories and themes through a process that interprets the data. This can be criticized as this

summarization process moves away from the detailed content of the data and can risk losing important information that may be overlooked by the researcher (Saldana, 2016). To combat risk, it's important that a methodical process is followed in the coding processes. Going through a process of open coding or initial coding, followed by a second coding round that includes Axial and selective coding takes place before synthesizing the data into themes (Strauss & Corbin, 1998).

4.10.2 Coding vs themes

The codes are the starting process of reducing and summarizing the data from interviews into patterns. This enables the researcher to deal with a huge amount of data. After initial or the open coding process there are a lot of codes are gathered. These through the second round of coding reduce down further and finally create categories. Implications are a theme from the coding and categorization processes.

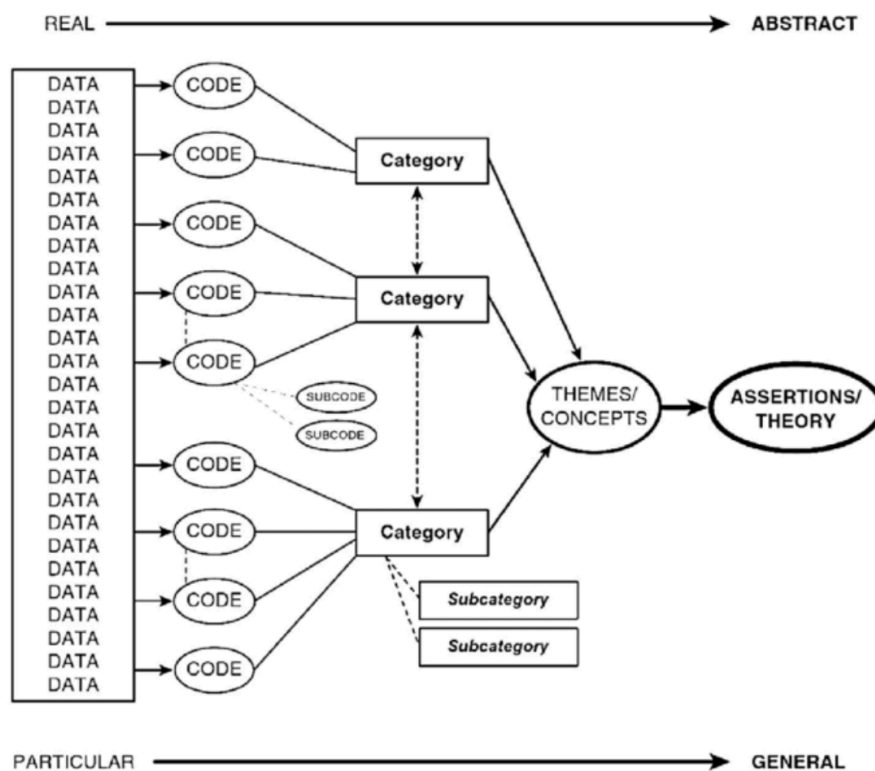


Figure 4.9 - Codes to categories to themes to theory

Source: (Saldana, 2016)

The use of NVivo as a tool to help both the categorization of codes but also the creation of themes is very important. The visualization of the codes and linkages is important to understand the major themes and connections coming out of the process. In reality the codes to categories to themes looks more like the below visualization from NVivo.

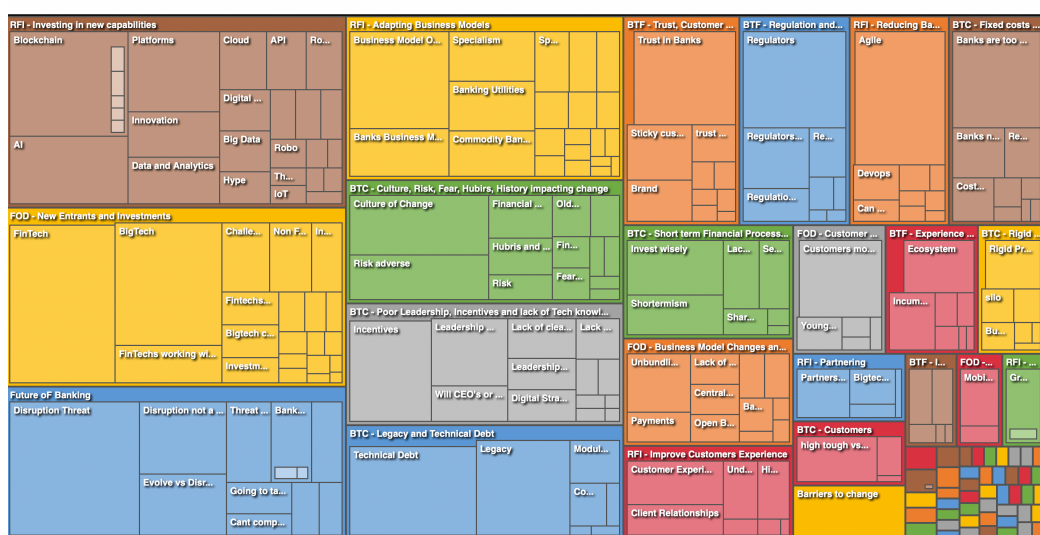


Figure 4.10 - Example of the visualization from NVivo.

4.10.3 Initial coding – Open coding

Using an open coding process begins means the researcher has an open mind as to what the data might show. This is a great opportunity to reflect on the data but not restrict the findings. This is a very useful starting point but the initial codes were too many even when a number of duplicate codes were removed. The initial coding used NVivo coding, concept and descriptive coding.

4.10.4 In Vivo

In Vivo means to label literally, where a word or short phrase in the text is labeled as a node in NVivo. For some parts of the text this makes sense e.g. interviews relating to new technology AI would be coded “AI”. This is one of a number of techniques that get used during the initial coding phase (Saldana, 2016).

4.10.5 Conceptual coding

This is where a code is assigned to text to help explain the meaning of the passage. An example to explain this could be to understand that clock hands move but that the concept of this relates to the code of “time”. This type of coding helps to bring context to the text and is a very useful coding technique (Saldana, 2016). This method became very important when reducing the long list of initial codes down in the first reduction.

4.10.6 Descriptive coding

This method takes a part of the text and summaries this into a word or short text to explain the meaning of the message (Saldana, 2016). This method of coding text was used the least and was used sparingly.

4.10.7 Results from first round coding

The first round of coding resulted in over 250 codes and took months to complete. Almost all the interviews were fully coded and all codes were then reassessed. This open coding process worked to be able to see categories of codes coming out of the data. This is not an easy process to complete. Once the initial list was completed, techniques as described above were used to consolidate the list and reduce duplication. For full transparency the initial list of open codes is in appendix.

Having reviewed the data further and de-duplicated the data, the following 60+ codes and initial descriptions of the concepts associated to these codes was produced.

Table 4.2 - Table of consolidated codes for first round coding process

Initial Coding -	
Consolidated list from intial coding	Concepts explained
1 Adapt to change	Intenal Change
2 Advisory high touch could be disrupted	Difference in Products
3 Aggregators	A service being offered now
4 Agile	New Tech approach being adopted
5 AI	New Tech approach being adopted
6 Ambidextrous	Need to think on explore and exploit
7 API	New Tech approach being adopted
8 Automation	New Tech approach being adopted
9 Banking hasnt changed	Intenal Change
10 Banking Utilities	Business Model
11 Banks are too costly	Banks need to change
12 Banks Business Model will change	Banks need to change
13 Banks needed	They are still relevant for some things
14 Banks not making same money as before	Banks need to change
15 Barriers for Fintechs	New Entrants and Barriers
16 Barriers to change	New Entrants and Barriers
17 Big Data	New Tech approach being adopted
18 BigTech	New Entrants and Barriers
19 Blockchain	New Tech approach being adopted
20 Branches Not needed	Banks need to change
21 Brand	Helps as a barrier and important
22 Business Model Opportunities	Banks need to change
23 CEO and Board relationship key	CEO and Board are key. – Tech knowledge
24 Commodity Banking	Business Model
25 Culture of Change	Intenal Change
26 Customer Experience	New Tech approach being adopted
27 Customers more digital	Customers are changing
28 Data and Analytics	New Tech approach being adopted
29 Disruption not a threat	Some products are not at threat some are
30 Disruptive investments are crowded out	Investments an issue -Banks not as profitable
31 Ecosystem	There is a complex financial ecosystem
32 Evolve vs Disruption	Change or be disrupted
33 Financial Crisis	Context to regulation and barriers plus investment
34 Greenfield	New Tech approach being adopted
35 high tough vs Commodity	Some products are not at threat some are
36 Incentives	Barriers to change
37 Innovation	Process wisely
38 Invest wisely	Banks wasting money
39 Lack of long term investments	Short term focus
40 Leadership Technology Knowledge	Lack of Technology a major internal issue
41 Legacy	Legacy systems a barrier internal barrier
42 Machine learning	New Tech approach being adopted
43 Mobile Banking	New Tech approach being adopted
44 Modular vs monolithic	Legacy systems a barrier internal barrier
45 New Entrants Advantge is no Legacy	Legacy systems a barrier internal barrier
46 Non Financial Service Companies	New entrants - Regulation advantages
47 Partnerships	Ways of innovation of incumbents
48 Payments	First product being disrupted
49 Platforms	New Tech approach being adopted
50 Regulators	Major issues internally but a real barrier
51 Regulators as a protection entry	Regulation as a barrier
52 Risk adverse	Internal issue to change
53 Robotics	New Tech approach being adopted
54 Sell Side Analysts	Driving short term thinking
55 Shortermism	Driving short term thinking
56 Specialism	Business model changes
57 Spin Off	Approach to change to get around internal barriers
58 Sticky customers	Customers are a barrier for new entrants
59 Technical Debt	Internal barrier due to its hard to fix
60 Threat and opportunity	Threat and opportunity
61 Trust in Banks	Trust is important still for some things
62 Unbundling Banking from Universal Banking	The attack is at a product level - slice approach
63 Understand Client Segments - Focus on Higher Margin	Different products relate to different clients
64 Will CEO's or Boards Disrupt	CEO and Board are key. – Tech knowledge

4.11 Second Round Coding

4.11.1 Introduction

The goal of second round coding is to move from codes to categories into themes. This is a process where the original codes are rearranged and analyzed into smaller batches of categories that will eventually link through into themes (Saldana, 2016). For this thesis the resulting categories and themes will form the basis of the findings and will be the foundations for the conceptual framework. As codes reduce into smaller categories there is danger that the details of the issues get lost. This process requires a balance between reducing down the detail while keeping the core components.

4.11.2 Axial coding

The Axial coding “Axis” is a category. The purpose of this is to see what categories and sub-categories relate to each other to answer for example “if, when, how and why” something is happening (Saldana, 2016). Axial coding does this by distinguishing which codes are the most important and which ones are not. It then looks at the best way to rearrange the data until no further new data is coming from the data anymore (Saldana, 2016; Strauss & Corbin, 1998).

4.11.3 Theoretical coding

Theoretical code become an umbrella that covers codes and categories. This coding technique starts to integrate around a central theme, it brings some structure to the theory by bringing the concepts together. The key to this process is connecting the relationships between the categories that are relevant. Theoretical coding moves the story beyond interesting categories into theory setting (Strauss & Corbin, 1998).

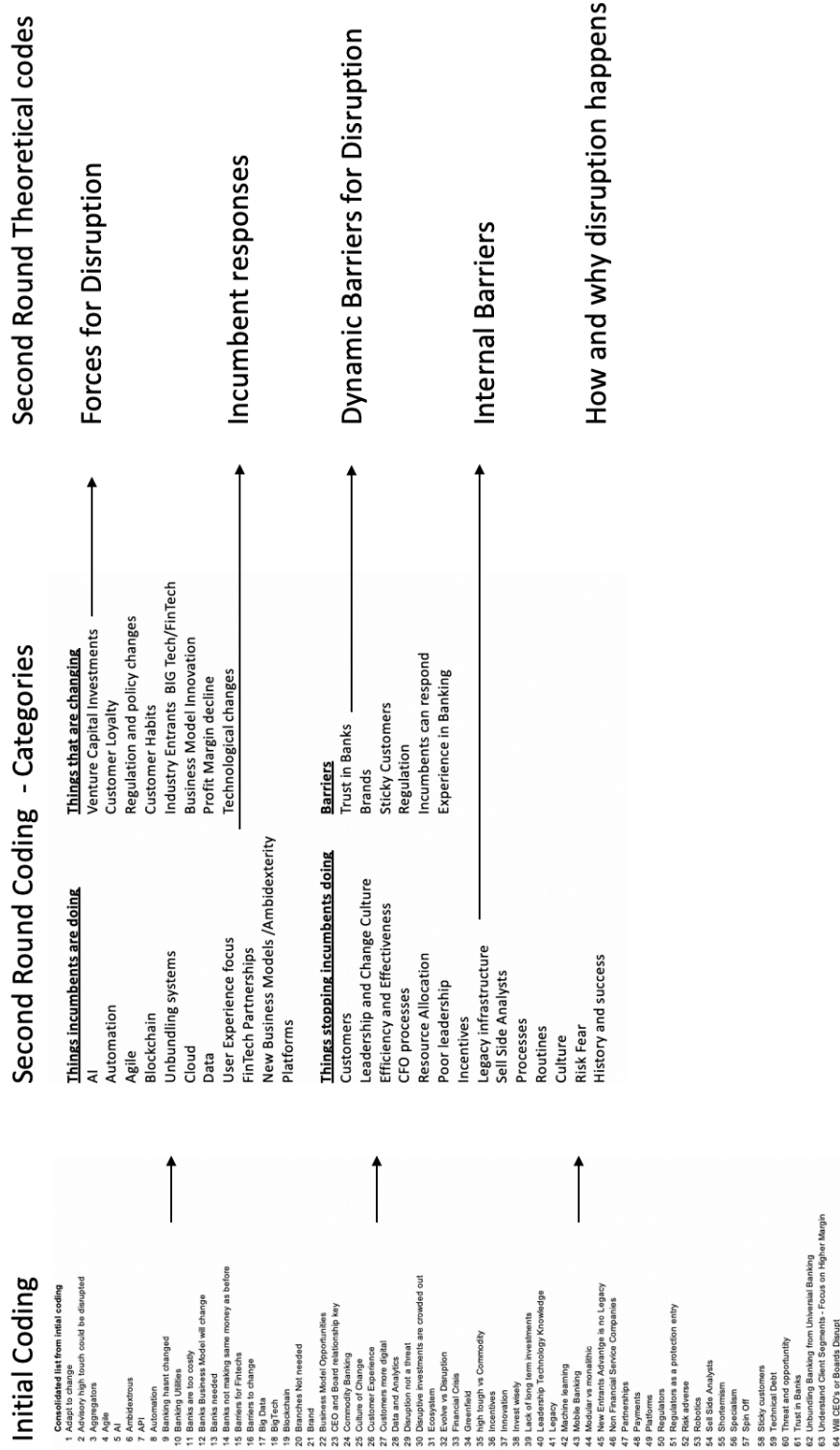
4.11.4 Results from second round coding

The revisiting of the text and second round of coding was critical in the reduction of the interview data into categories that were the most relevant for my thesis. This could not be done just by looking at the codes from the initial review but by looking again at the text itself. The concept text (derived from the interview data) applied as part of the

initial coding, was a really useful tools to use to help understand the context of the categories. The codes reduced into 40 key categories. These were reduced further, especially relating to codes dealing with incumbent responses. Sometimes codes were reduced and then on reflection changed back again. For example, the technology implementations are listed out as AI, Blockchain, later they were combined into an IT change category. Later they were changed back into individual categories because those issues were very important to the thesis and have disruptive forces of their own relating to that type of technology change. The categories were loosely grouped into related buckets. A number of attempts were made before the below buckets were confirmed in the second-round coding. From there the themes became clearer and the headings were renamed. This sounds like an easy process but this took several weeks to refine and review, this was because of the volume of data gathered and complexity of the subject matter. The below shows the initial coding and second round categories, the loose buckets and themes. In reality this was less sequential than the graphic suggests.

This forms the basis of my potential disruption equation and conceptual framework.

Table 4.3 - Second round coding and categories forming themes



4.12 Observational Study

4.12.1 Introduction

The observation study is a key part of the overall case study design. The aims of the study are to illustrate what is being done to build dynamic capabilities to combat the threat of the disruptive forces. This includes understanding the process and timeframes involved when incumbents react. A fundamental part to understanding the potential of disruption is also understanding response, the process of response and how agile the incumbent is to that threat. This study is therefore helping to investigate the two sub themes of analysis. This is not looking at the level of disruption but the internal works and how this is combatting the potential threats.

There are two sub themes of analysis:

- A. Investigation into the forces driving action and inertia to help understand the ability to respond to the changes in the industry
- B. Understanding what investment decisions are being made to combat the growing threat of disruption within the financial services industry and why

4.12.2 Structured observations

This started with a predetermined structure for the collection of data. This was formed from initial observation prior to the formal review where a number of key attributes came up on a frequent basis. The advantage of this technique is that it can explain what is being done, it explains the process and provides relevant and detailed useful data. It is not possible to gather this type of data without access to an incumbent firm. A disadvantage of this is that it is very time consuming and means that as a researcher and the closeness of the subject can lead to bias interpretations of the data (Saunders, 2016). Data recording in this way sometimes means subjective interpretations of this information are made. Business meetings have many agendas and the outcomes are not always clear. However, the application process was consistent meaning comparisons will be still valuable.

4.12.3 Observational study collection

The observation study is designed to look at how dynamic capabilities are implemented; which capabilities are the priorities and how quickly they move from ideas to implementation and why. The observation study completed between May 2017 and Dec 2019, lasted 140 weeks. This was an interesting period for incumbent banks. It was just as the banks were coming out of the worst of the financial crisis but then being confronted with new disruptive forces. The observational study only covers observations the researcher was able to witness and therefore not conversations held by others.

Data was captured during each week on a number of key dynamics, insights into discussions and decisions made during that week were recorded. These set fields helped to structure the data and complete the study in a structured way.

Each record contains the categories listed below. The categories were not predetermined, appropriate terms taken from the literature review that link to academic theory were the most appropriate. The key categories systematically recorded were:

1. Topic - normally related to technology or the capability being built within the organization
2. Level of organization - the level of organization the discussion or decision was involving
3. Stage - a choice between education/information sharing, strategy defining and/or execution focus
4. Payback period - are the investments related to shorter- or longer-term payback
5. Size of the project - what is the level of investment and the size of the project, this is also a proxy for complexity
6. Maturity of the technology - an interpretation of the maturity based on the conversations. Some technologies are more mature than others and some are ready to be fully implemented
7. Alignment to the strategy - is the discussion or decision aligned to the existing strategy, or is a new topic introduced

8. Perceived risk - an interpretation of the discussions with a listing down of the level of risk the decision the discussion relates to.
9. Dependency - the level of dependency needed to implement the change. Are the parties internal or external? The theory being that more dependencies would increase levels of complexity
10. Technology - complimentary or disruptive – is the technology or capability helping to sustain the existing business or provide new capabilities to help with new business models or products/services
11. Levels of internal support for an idea - what is the level of support the decision or discussion has generated internally. The backing for ideas can make or break an idea when there are very limited resources

Table 4.4 - Summary of key technology implementation criteria

1. Technology Maturity	2. Payback Period	3. Clarity of internal support
4. Aligned to Strategy	5. Complementary or Disruptive	6. Investment size
7. Dependency level on others	8. Perceived risk	9. Sustaining Efficiency - Disruptive

4.13 Observational Study Handling

At no point does the observation study look at individual decisions or name any individuals as part of the observation study. The capabilities are the study's focus and therefore it is not possible to identify who commented on any technology over the 140 weeks. Some discussions are listed as confidential, this is clear in the log. Confidentiality does not change or skew the data from the observation study.

The data was collected in a excel template and an example of the data and fields is copied can be found in appendix

4.13.1 Observational study analysis

On completion of the observational study, a number of tables looking at the capabilities being invested in were created; it was possible to compare which factors were influencing execution and which ones seemed less important. These results are analyzed within the findings section.

The technologies being invested in over the observational period were:

1. Agile and DevOPS
2. AI
3. Blockchain/Distributed ledger/Cryptocurrencies
4. Cloud
5. Data
6. Digital
7. Greenfield
8. Legacy Resolution
9. Machine learning
10. Platform
11. Robotics and automation

I have selected 6 of the most relevant capabilities that have the potential to disrupt as mentioned in the interviews. This will cover the understanding of the capability and its advantages to firms to invest. There will also be a comparison against external firms on what they are also investing in.

5 Interview Findings

5.1 Introduction

Using the interviews of the experts discussed in the methods section, the findings from the interview process will be discussed. This is a key part of the thesis, where the topic of disruption is discussed in detail. Forces for disruption, barriers to these forces, incumbent responses and internal barriers for changes are all discussed to try and bring together a holistic view of the dynamics at play.

We will start with the barriers for disruption. To protect the identity of the interviews, each one has been given an ID code and which will be used throughout these findings. The quotes are kept using the NVivo tool and referenced back to the transcription.

5.2 Forces for Disruption

Based on the themes coming from the interviews, this section will look at the forces for disruption, beginning with the most significant ones. The numbering shows the ordering of the force for disruption by the number of times this was mentioned in interviews. Abstracts from the leading expert interviews have been used to better illustrate and illuminate the disruption factors.

The forces for disruption are an important part of the disruption potential equation as this drives the level of force behind the disruption. Without these forces the industry and incumbent businesses will only be impacted by the normal macroeconomic changes.

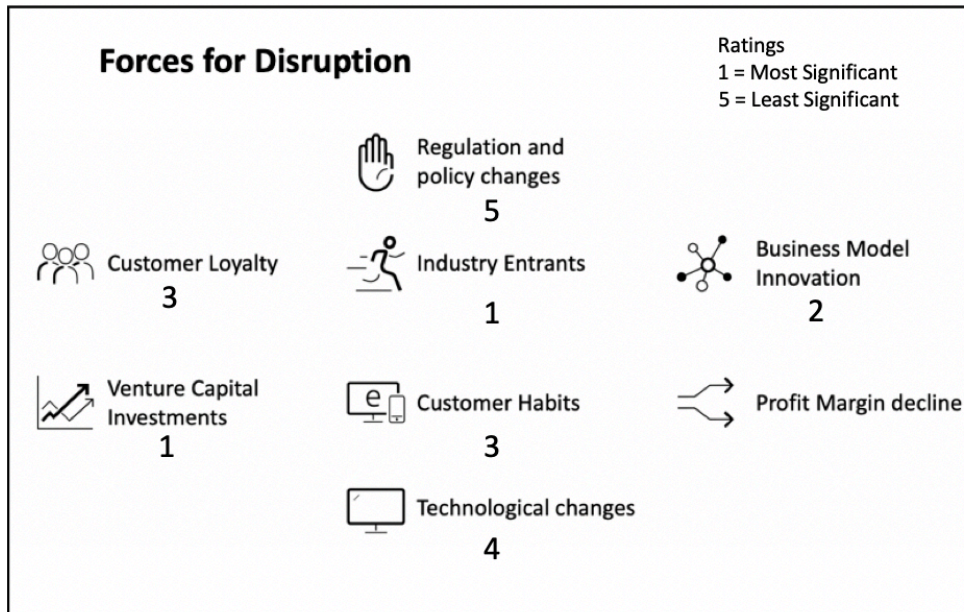


Table 5.1 - Forces for disruption

This shows the key forces and the significances of these relative to each other

5.2.1 Industry entrants and investments in venture capital

Through the interviews the subject of change was examined in detailed. New entrants coming into the market came up as the number 1 force for disruption that is impacting and changing financial services. There are 2 main conversations. Fintech and Bigtech. During the past 5 years there has been a growth in a new industry impacting financial services called Fintech (Financial Technology). These are start-up companies that combine financial service knowledge and technology to provide innovation solutions to clients using easy to use interfaces. This has been driven by significant levels of investments from Venture Capitalists and post the financial crisis, regulation and technology changes have combined to create the ability of the new entrants to enter a market that traditionally has not seen change in this way before. The second category is where a large established technology firm has started to enter and examine the financial services market. These companies have been classified as Bigtech (Big Technology Firms) and contain some of the largest global firms in history with significant resources and technology knowledge at their disposal.

5.2.1.1 Fintech

The chart below shows the levels of venture capital from 2010 that has been invested into this new industry.

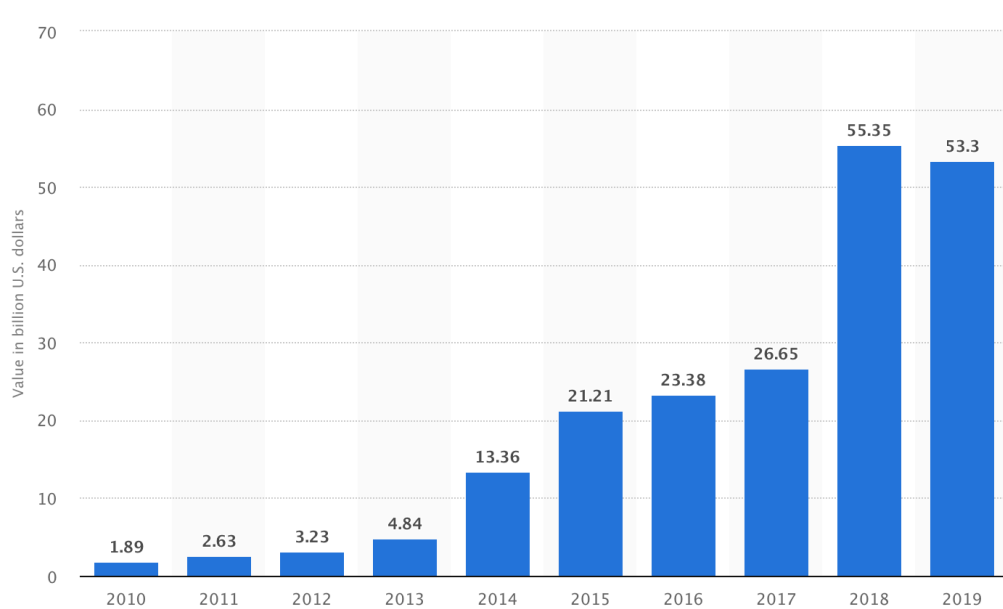


Figure 5.1 - Value of global venture capital investment in Fintech companies from 2010 to 2019

Source:(Worldwide, 2020)

Figure 5.1, shows that there is a significant inflow of financial investments that help set up and fund companies to attack the financial services markets and get a foothold in the market. \$53.3m in 2019 alone. Funding these new ventures doesn't seem to be a constraint as investors see the opportunity to attack large revenue pools and take business from incumbent banks.

One of the expert DBA30_LEF stated that *"Money is not the showstopper anymore. . . . you can collect a lot of money in the market if you have the right ideas and you get your stuff funded. And they can even accept not being profitable for a pretty long time"*. This shows that not only is there funding in the market but also that Fintech often have different success criteria to a traditional bank often measured by growth in customers than for profit. They have time and funding to build up market share and penetration.

The impact, although not huge on the scale of the \$7 trillion scale business, is not at the moment material however this should not be underestimated. A senior banking executive stated when asked about the potential risk Fintech offers, DBA24_LONG stated *"I would say there is very high risk. I mean, the simplest case to discuss it to the bottom line is that we are losing more than X million (actual impact is confidential) revenue per month, I think, quarter due to the fact that the techs have disrupted the way on how we deal with the credit card"*. The expert was referring to the loss of revenue due to challenger banks introduction of innovative credit card solutions.

There seems to be 3 main approaches that Fintech's are using to enter the market. One is partnering with banks to help them accelerate change for the bank. This can be through funding from banks to the Fintech but also a partnership agreement to work together to develop new ways of servicing clients. This approach seems to be symbiotic. Technology approach is purchased as a form of open innovation from the Fintech and the bank helps by bringing banking knowledge, experience and funding. The second is an approach whereby the Fintech uses a banks regulatory platform as a way of bypassing the need for a banking license. The Fintech partners with a bank but launches not as the bank but as product or set of products with a link into an incumbents banking infrastructure. This was covered in banking as a service earlier in the thesis. The third approach from Fintech's is to directly enter the market and compete with the incumbent banks. Well known examples of this are challenger banks. These are new start up banks often fully digital, that enter the market and take market share through innovative ways of interfacing with clients. The first and third examples will be covered in some details and the second has already been examined.

First, the partnership model. Fintech's are coming together with banks to help drive forward the digital transformations in the market. The interviews discussed these in detail. Interviewer DBA13_ALL said *"I don't know that Fintech's, even with Venture Capital (VC) funding are capitalized enough to start taking on that much risk and I mean that they'd be much better off finding a partner and finding a part of that transaction"*. The changing form of Fintech was discussed by Interviewer DBA12_DOM and highlights how they recommend for some to have a business model that partners with a bank saying *"If you think about the trajectory of a Fintech, it could be that they stay a standalone thing that makes money. It could be that they get bought up and then integrated into an existing bank. It could be that they consolidate with other service without a Fintech offerings"*.

This focus is the need to form an alliance with a bank and give a Fintech an advantage to gain a foothold in the market, but also gain valuable insights into the challenges that banks have already solved, including the regulator burden. The quotes also mention the expectation that not all Fintech’s will survive through the set-up stages. Forming alliances with banks gives a key advantage.

Figure 5.2 is an extract from CBInsights that looked at the number of Fintech investments from major banks. The market has moved on since then but this shows that investments into Fintech are a core part of the digitalization plans of banks with significant investment plans. Goldman Sachs showing to be a huge investor in FinTech’s but so many banks are also investing in FinTech’s as well.

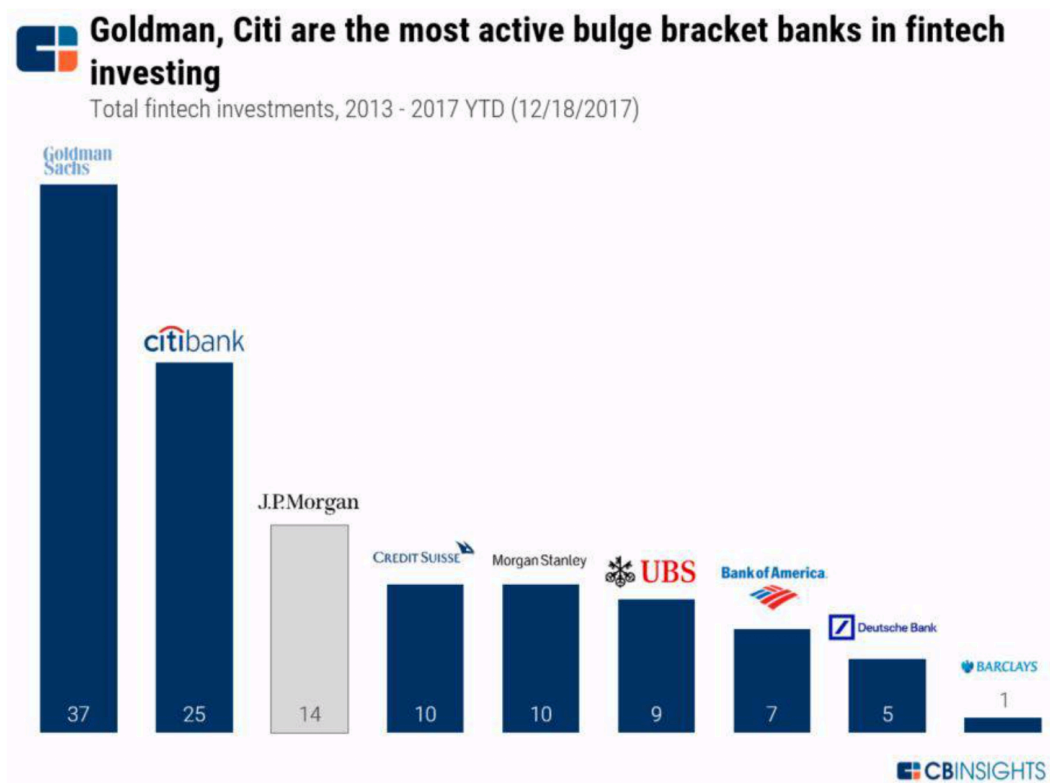


Figure 5.2 - Investments into fintech firms by some leading banks.

Source: (CBInsights, 2018b)

The lack of financial knowledge is summed up from interviewer DBA24_LONG stating “To be very blunt, what we call Fintech in my opinion lacks the word fin and I mean it very seriously, but they do look at Revolut, they go and take what we say or what we’re doing as fin and packages it in new tech, this is so called copycat”. This points

to the fact that the new startups are not looking at something new but delivering in another way the same services in a smarter, low friction way. This has the impact of lowering prices for all.

Christensen highlighted that to have profits in an industry you need a high price incumbent (Christensen, 1997a). He observed that for a while the prices lowered as new entrants came into the steel industry market. New entrants made returns by under cutting the incumbent products until the incumbent left that product. The prices then fell and a shakeout of the market naturally happens. This point was examined by an expert in the interviews. A quote from DBA23_CO states *“I think the profits are going to continue to squeeze unless there's a shake out of the Fintech companies, because their motive is very, very clear. They are driving the transaction cost down to grab a larger piece of the customer”*.

The other way Fintech's are getting into the markets are to compete directly with incumbents. The best known of these are the visible challenger banks and payment providers. Interviewer DBA30_LEF states *“Smartphone banks, right, the Monzos, the Revolut, the N26, those kinds of things, um, what I personally enjoy with them is the easiness of how you do it, right. Can, can traditional banks do this as well? Yes, but they have a complex landscape in the back”*. The last comment around new entrants have more streamlined systems and incumbents have complex legacy estates. This will be examined further in the barriers to change section.

These challenger banks are new and growing rapidly compared to incumbents who have been around in some cases, for hundreds of years. The below shows the market values of 4 well known challenger banks vs traditional European bank brands values. Given the newness of the challengers, the growth has been remarkable.

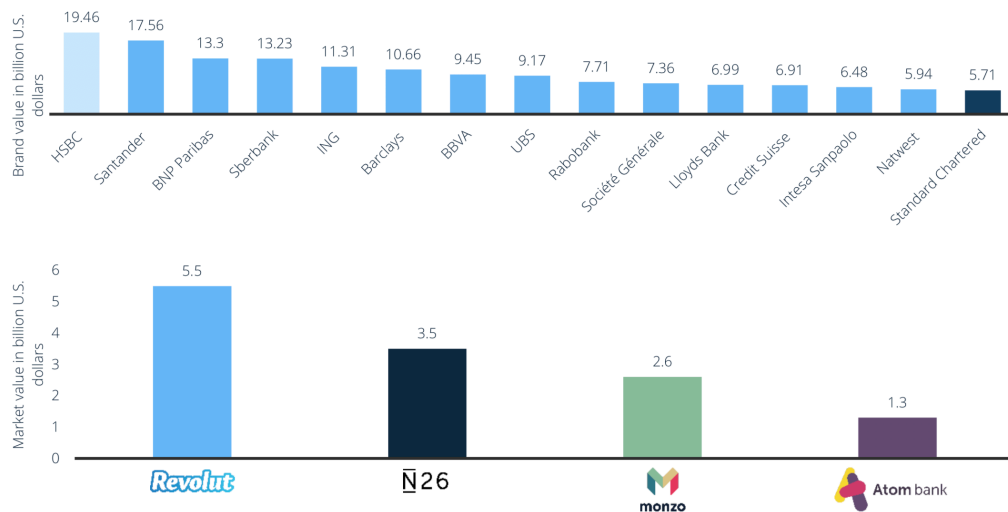


Figure 5.3 - Banking brands market value in Europe 2020 (in billion U.S. dollars)

Source:(statista, 2020)

Figure 5.3 show how after just a small period of time, the challenger banks have got traction in market places and have valuations well into multiple billions. Revolut (\$5.5 billion market value) is only a few years old but is 10% the value of much bigger and long-standing incumbent banks like Barclays. It can be seen from the below graph that shows customer acquisitions rate over time, that there is momentum in the number of customers gained during a very short period of time. In figure 5.4, Revolut passed 10m customers in 53 months and continues to expand.

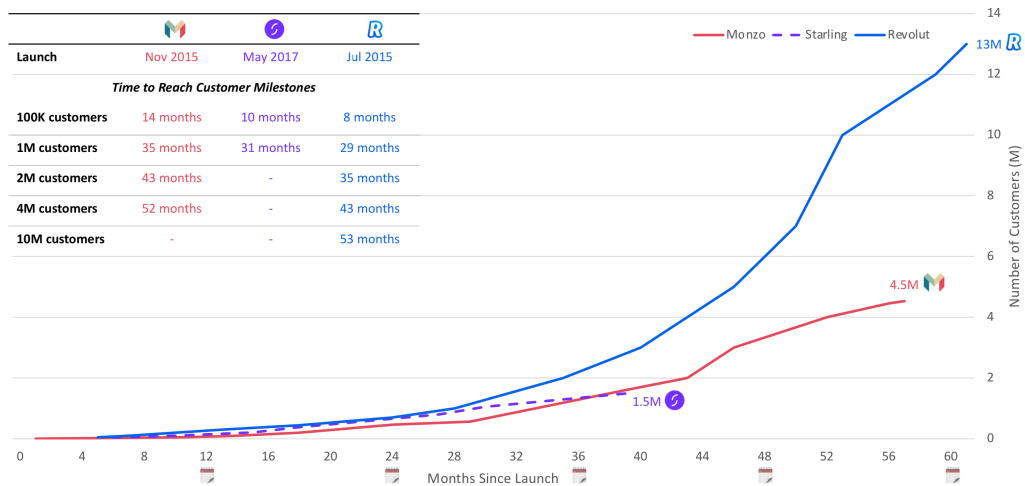


Figure 5.4 - Customer acquisitions - 3 UK challenger banks

Source: (Dadan, 2020)

Despite this acquisition rate, banks are still reliant on funding to support the business operations and look to continue growth plans to secure scale. The banks are digital, meaning that the costs of new customers will be more on a margin cost basis as the infrastructure and applications are already designed.

Figure 5.5 shows how the challenger banks first start with limited simple products and then grow the portfolios over time, offering more and more. They focus on traditional retail, individual and everyday banking products like cards or current accounts. They have all extended the product reach, focused on individuals and small businesses as well as extending their geographical footprint.

		At Launch			At Present		
P R O D U C T	WHAT	<ul style="list-style-type: none"> Prepaid Account Prepaid Card 	<ul style="list-style-type: none"> Current Account Debit Card Overdraft 	<ul style="list-style-type: none"> Multi-currency Travel Card 	<ul style="list-style-type: none"> Current Accounts Premium Subscriptions Personal Loans Savings Marketplace Business Banking Partner Products 	<ul style="list-style-type: none"> Current Accounts Personal Loans Marketplace Business Banking Business Loans Banking-as-a-Service 	<ul style="list-style-type: none"> Multi-currency Card E-Money Account Premium Subscriptions Travel Insurance Trading & Investing Business Products
	WHO	<ul style="list-style-type: none"> Individuals 	<ul style="list-style-type: none"> Individuals 	<ul style="list-style-type: none"> Individuals 	<ul style="list-style-type: none"> Individuals Small Businesses 	<ul style="list-style-type: none"> Individuals Small Businesses Institutions (Baas) 	<ul style="list-style-type: none"> Individuals Small Businesses
	WHERE	<ul style="list-style-type: none"> United Kingdom 	<ul style="list-style-type: none"> United Kingdom 	<ul style="list-style-type: none"> United Kingdom European Economic Area 	<ul style="list-style-type: none"> United Kingdom United States 	<ul style="list-style-type: none"> United Kingdom Ireland 	<ul style="list-style-type: none"> United Kingdom European Economic Area United States Asia Pacific
	HOW	<ul style="list-style-type: none"> Partnership with Licensed Providers 	<ul style="list-style-type: none"> Own Banking License 	<ul style="list-style-type: none"> Partnership with Licensed Providers 	<ul style="list-style-type: none"> Own Banking License (UK) Partnership (USA) 	<ul style="list-style-type: none"> Own Banking License (UK) 	<ul style="list-style-type: none"> Payments Licenses Banking License (Lithuania) Partnerships (Global)
C U S T O M E R							
C H A N G E R							

Figure 5.5 - Product mix and how this is changing for challenger banks




This shows the progression in product roll out

Source: (Dadan, 2020)

Figure 5.6 explains the financials from 3 challenger banks. Taking Revolut as an example, it can be seen that the revenues are impressive, nearly 163m, but they are still making a loss due to the operating expenses. There is also a comparison to the UK's 4 big banks. This shows that the net interest margin (difference between deposits and interest charged on bank products) is much higher for the top 4 banks. This may be due to the level of deposits being held with the major banks that makes it easier for bigger banks to earn profits. The growth is much higher in the challenger banks but the efficiency ratios are still too high. If growth continues and the challenger banks can control operating expenditures then profits should be achieved.

FINANCIALS

Compared to the UK Big 4 banks, the neo-banks lag in terms of pure-play financial metrics like net interest margin & loan to deposits. While their revenue growth is high, they operate at net loss due to high operating expenses.

Financial Metrics (£ '000)				UK Big 4 Avg.
Total Revenue <i>(Gross Income from Operations)</i>	67,182	18,741	162,722	2.39%
Total Income / (Loss) <i>(Revenue less Cost of Sales)</i>	35,658	9,901	(15,189)	N/A
Operating Expenses <i>(Staff, Administrative & Other Expenses)</i>	(151,068)	(83,241)	(92,249)	166%
Post-Tax Loss	(113,816)	(52,064)	(105,900)	-14%
Total Customer Deposits	1,721,408	1,007,282	2,269,194	303%
Total Loans & Advances	123,913	54,290	N/A	509%
				180%
				89%
				N/A
				0.7%

Financial Ratios

Net Interest Margin
(Net Interest Income / Interest Generating Assets)

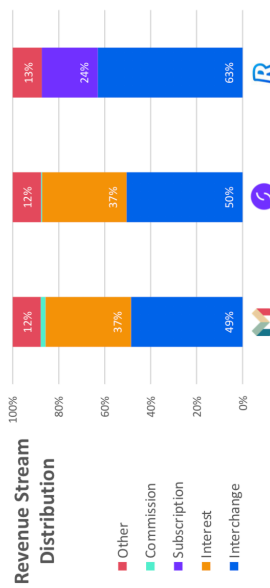
Efficiency Ratio
(Non-Interest Expenses / Revenue)

Operating Leverage
(Growth % of Revenue / Growth % of Non-Interest Expense)

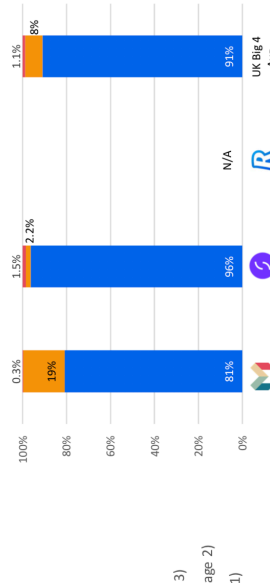
Revenue Growth
(Increase in Gross Income from FY2018)

Loan to Deposits

Provision for Credit Losses



Asset Quality



(HSBC, Barclays, RBS & Lloyds have been considered for the UK Big 4 Banks Average)

Figure 5.6 - Examples of financials for fintech startups

This shows the progression in product roll out

Source: (Dadan, 2020)

5.2.1.2 Bigtech

The other major set of competitors entering the financial services markets over the past few years are the mighty Bigtech firms. The threat and impact of these firms will be examined first. Players like Amazon, Facebook, Google and Apple have entered the financial services traditional markets utilizing their huge customer base, platforms and abilities with technology.

This is covered in a number of interviews, how the threat of Bigtech is believed to be getting worse. DBA19_CR stated *“Apple and Amazon offering any kind of financial services, we’ve got something to worry about and to be mindful of. I see over the future that’s probably only going to get worse as more and more new entrants with plenty of capital behind them, plenty of cash behind them, enter the market. So yeah, certainly under threat and there has been a nibbling away for some time in my opinion, yeah”*.

The below chart from CBInsights shows how the Bigtech firms have entered financial services. The majority of the focus is on payments with all of them providing offerings in this area. Amazon has also been offering loans to individuals and small businesses using its knowledge of customers to help underwrite the loans. They have already issued \$5 billion in loans to Small Businesses by 2020 (CBInsights, 2020). Apple launched its credit card offering and continues to roll out ApplePay while partnering with banks. The partnering with banks was stated by DBA8_DISH *“Tech companies have eventually come in and still they are only really on the surface. I mean, you know, what Google is doing, what Apple is doing are primarily payments, right. They’re facilitating the payment and even then, they are working with the banks, in tandem with the banks today”*.

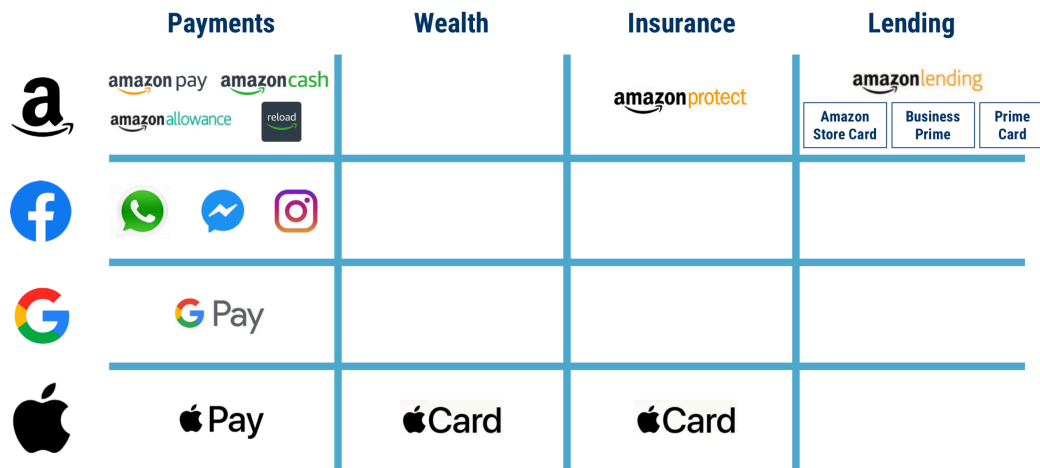


Figure 5.7 - Where Bigtech are attaching financial services

Source: (CBInsights, 2020)

Figure 5.7 shows that although the Bigtech’s are mainly focused on retail payments, as part of their product mix they are continuing to expand into other products to get a foothold into the markets. Their threat is very real and growing. This is stated by a senior banking executive DBA4_LYE “so say Amazon, or Google, or somebody decided, this is it. It’s time to hit banks, if they could get the regulators in their pocket, if they could sit and understand what the regulators want, look at it with fresh eyes, figure out a way for technology to prove to the regulators, at any point in time, what they’re doing, they could do it. They really could.” This shows a few points. Not only the threat is real, they have the technical knowhow to worry bankers but there are barriers in place stopping something from happening. These will be examined more in the barriers section.

The treat of Bigtech is not just their understanding of technology and vast cash resources but also the consumer relationships they have. Brand and trust are very important to banking customers and will be discuss in barriers. Figure 5.8 shows the Bigtech have customers who use their systems every day. An example of the reach of Bigtech firms and consumer reach is Facebook. Over 2.3 billion active users every month with the Facebook application alone. This has huge reach and implications if banking applications become fully integrated with existing platforms. Facebook has a number of social media and social interaction tools within the overall Facebook family. You can see the vast numbers shown below.

Most popular social networks by monthly active users (MAUs), as of April 2019

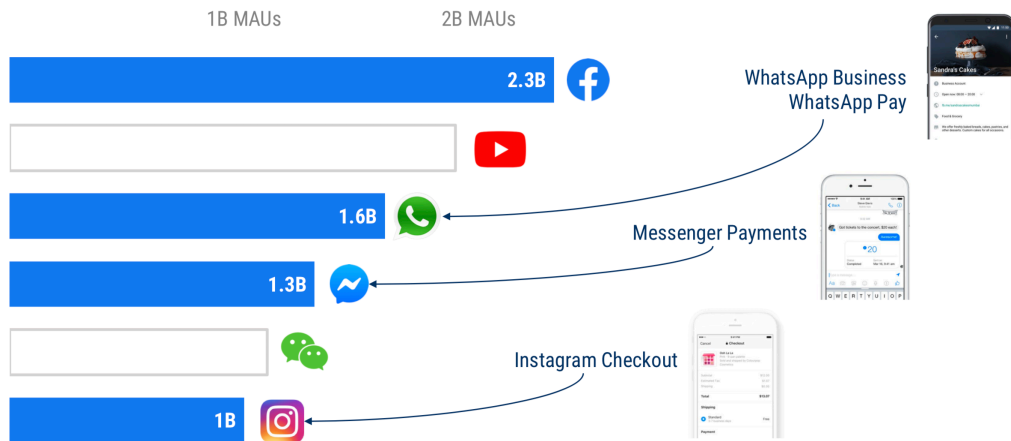


Figure 5.8 - Facebook family - Monthly interactions

Source: (CBInsights, 2020)

Facebook are going a step further with their development of a crypto currency that will enable the transfer of wealth between users using a digital currency and potentially bypass credit cards and even banking infrastructures. The current set up with Bigtech firms is that they are reliant on the partnership with banks. This new development could transfer peer to peer wealth but bypass the banking system all together. The technology is there today but Facebook have been caught up in red tape with the regulators.

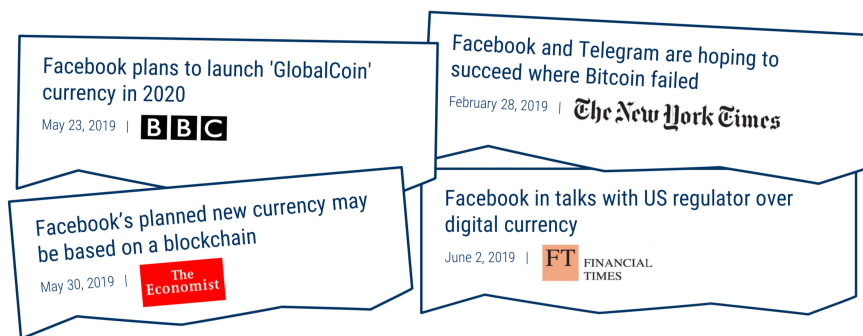


Figure 5.9 - Press cutting on Facebook and financial services

Source: from a CBInsights report: headlines 2019 (CBInsights, 2020)

5.2.1.3 Bigtech/Fintech potential can be seen in Asia

The Fintech companies in Asia have grown so much they are now huge technology and financial technology companies. The largest are well known global payment engines; Visa and Mastercard. However, over the last few years there has been rapid growth in Fintech's with Alipay and Tencent in China. Alipay is the financial services arm of Alibaba. In figure 5.10, this shows the market cap of Fintechs. Visa being the largest. You can also see that new Fintechs are on the chart with larger valuations.

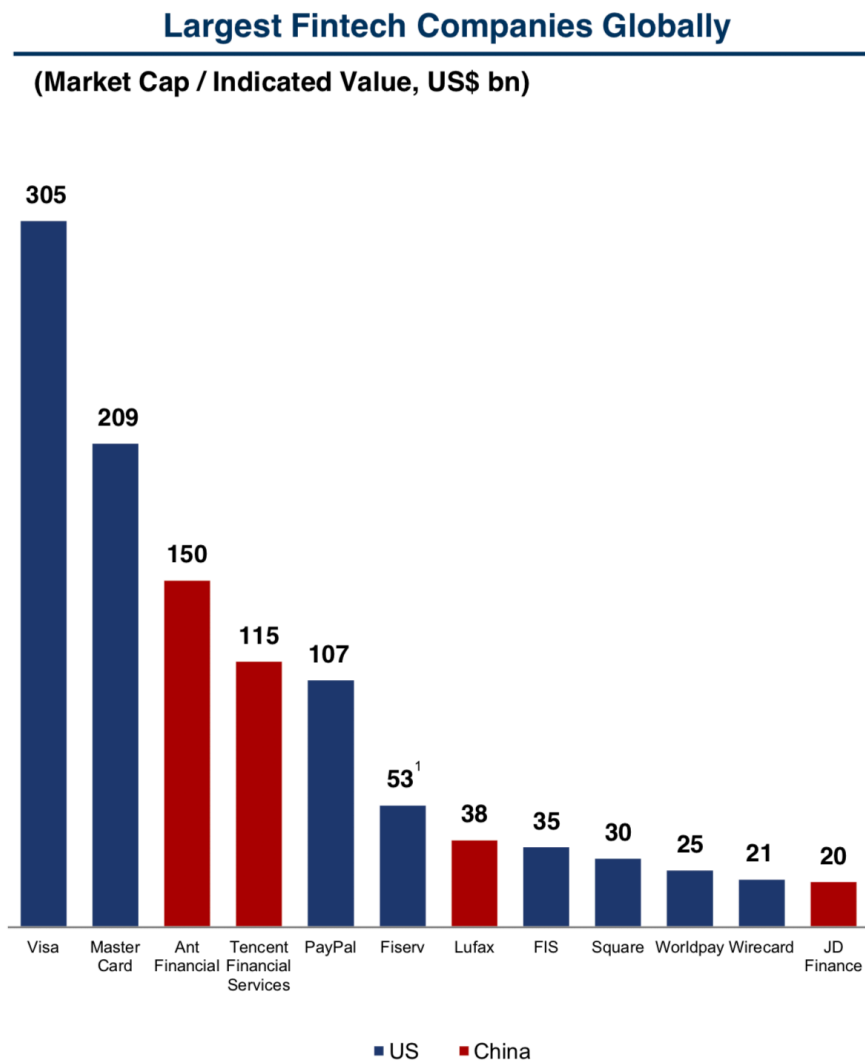
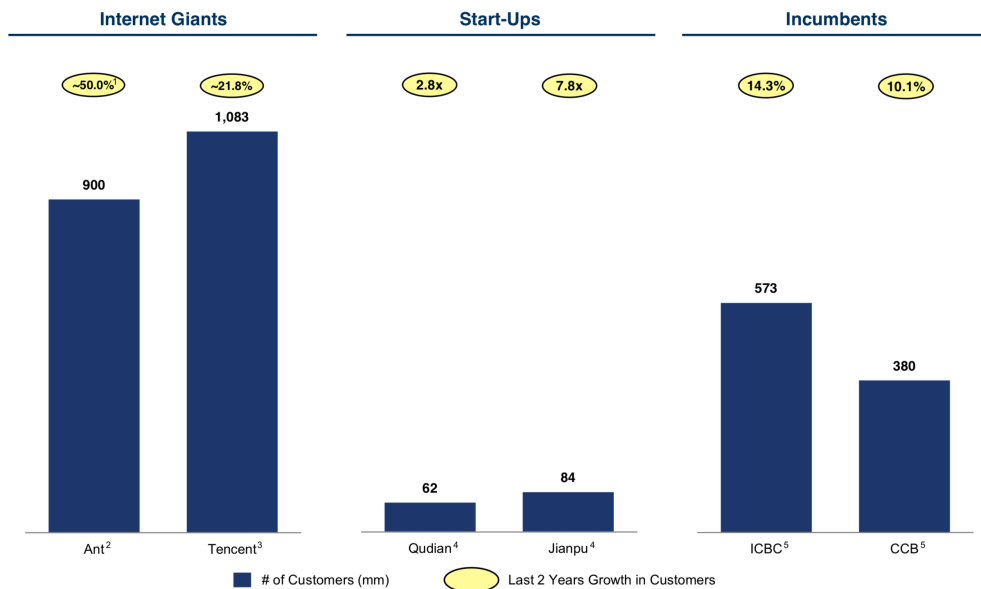


Figure 5.10 - Largest Fintech companies globally

Source: (Mahoney, 2019)

The internet giants Ant Financials (Alipay a part of Ant financials) and Tencent's (the payment application WeChat owned by Tencent) have significantly higher numbers of users than the incumbent banks. Figure 5.11 shows the huge size of the customer base for Ant Financials at 900m users and Tencent has 1083m users.



¹ Assuming flat growth from 2015 to 2018; ² Number of annual active users during the twelve months ended November 30, 2018; ³ MAU of Weixin and WeChat as of 3Q2018; ⁴ Number of registered users as of 2017 year end; ⁵ Number of customers as of 2017 year end.

Figure 5.11 - Users of Fintech's in China vs Incumbent banks

Source: (Mahoney, 2019)

The main applications being used is payments as shown in figure 5.12. This is via an easy to use application allowing for peer to peer payments. The figures are truly incredible. Ant Financials process \$10.3 trillion payments and Tencent process \$7.1 trillion in payments.

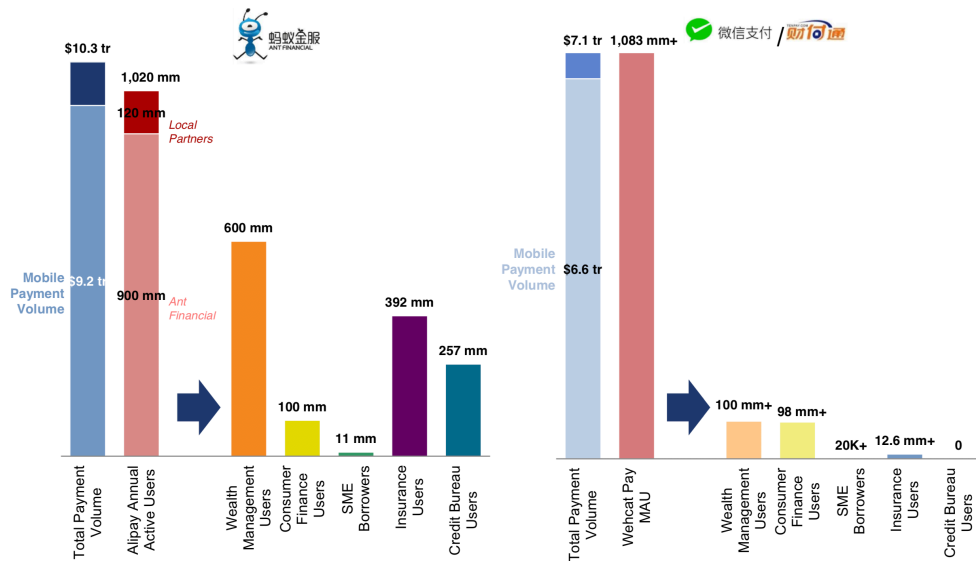


Figure 5.12 - Ant Financials and Tencent volume numbers for payments

Source: (Mahoney, 2019)

The payments are the start but this leads into Wealth Management, Lending and Insurance as client interactions and a brand is built with its clients. The impact in Asia should reconfirm the potential threat that Bigtech firms offer, as they are starting with dominating payments and then moving to other products.

A key banking executive in Asia DBA15_HK commented on WeChat and WePay, “Alibaba or Pingyang do want to back up their massive data platforms and I think they’re interested, because they’d become so insidious, but that’s a negative word. They’ve become so ingrained in people’s day-to-date use of technology, that it’s kind of natural for them to start offering all the services and they are very directed services, because they know so much about that market. They could be quite threatening to banks, initially on the retail side, but then once you got the licenses the platform and the technology in place, it starts to become a more interesting option for people to talk about the investment banking kind of activities, data capital markets stuff.”

5.2.1.4 Implications:

The implications of new entrants are clear. As new entrants come into the market with lower cost solutions and better innovation with solutions customers like, the price of products will be under extreme pressure. The potential for disruption is there but the

actual disruption so far is less than many predicted. Just looking at the above suggests that incumbent banks are doomed and its game over. It is important to note that the demise of incumbent banks has been over hyped for many years. This is not a complacent statement; the threat is now and very real but the disruption predictions have been over hyped. Some industries have been under hyped and some over hyped as illustrated in the below figure 5.13. The barriers section of this thesis explains some theory as to why the disruption has not happened as quickly as some predicated.

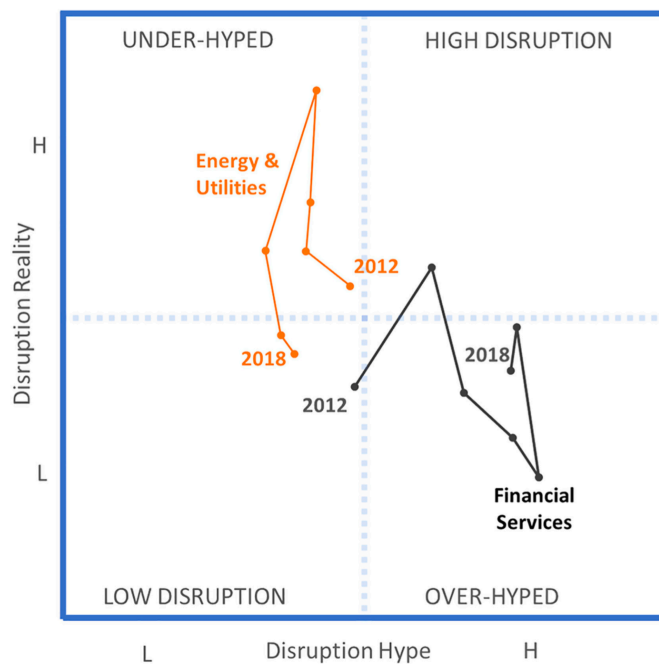


Figure 5.13 - Disruption being over hyped for Financial Services

Source: (Wade, 2020)

5.2.2 Business model innovations

This section looks at the ways new entrants or incumbents are looking at delivering financial service products. These are changing the conventional way the industry is working. There are two main themes here. One being the unbundling of the universal banking model and the other, the role of central banks and both have the potential for disruption.

5.2.2.1 *Unbundling and structural changes*

Large incumbent banks like Barclays bank, JP Morgan, HSBC or a Lloyds Bank have a bundle of products they run within different business lines. These include retail banks, investment banks, asset management and wealth management. Most run universal banking models that have combinations of these businesses. They might be focused in different places but need a combination of business to offer complete coverages to clients.

New entrants are focusing on product by product. They are looking at the revenue pools of these banks and are seeing where to enter the markets, where they have the skills to do so and the market conditions allow them. Banking Executive interviewee (DBA1_NAN1) stated *“New entrants in the Fintech world. The technology allows people to come in, so the barriers are lower, and also, you've had the incentive to come in because the governments are saying, “We don't want to have to bail out the big boys ever again. Those two combined means that, now, you've had a slicing of the universal banking model”.*

This slicing away of products that are profitable by new entrants have caused revenue loss for incumbent firms as new entrants' lower prices to win business. The new business models are offering lower prices, quality or product and speed so you no longer need universal banks to perform some of these services. Interviewee DBA2_IKAI stated the following *“I think the magic lies in helping people cope with the over choice effect because there's a global, very board, very hard to understand offering available to them, which you don't need universal banking services anymore because you can get the pieces from everywhere. You just go by price, or quality, or speed”.*

Another banking executive DBA21_ICA stated the following *“the decomposing of what the bank has been. The fully vertical through front to back integrative banking model is one that doesn't seem to work anymore. It might potentially in some niches, right, or specific markets, but not as a universal banking model”.* The new entrants are not challenging at an industry level but product by product domain. This then leads to business and then industry disruption. DBA_LYE stated *“The whole thing can be automated. There's no reason, at all, for retail banking to exist in any traditional means in 10 years. I actually get the feeling, for the first time ever, that the platform's burning under the IB now with conversations I'm having with them, and having had*

conversations with them five years ago, and four years ago, and three years ago, and then in two years, they were like a different beast”.

We are seeing that branches are being used less and less as mobile banking becomes more embedded in the way we transact. Interviewee DBA30_LEF stated “The personal interaction will be reduced, right. There will be a cost, uh, it will be a lot of more cost sensitive. The younger generation is anyhow more used to the smartphone kind of banking stuff and it's a pure commodity, right. It's about payments and then, then receive some transactions. This is not, uh, rocket science. It will be really primitive thing, however a very profitable thing if you think about mortgages and things like that”.

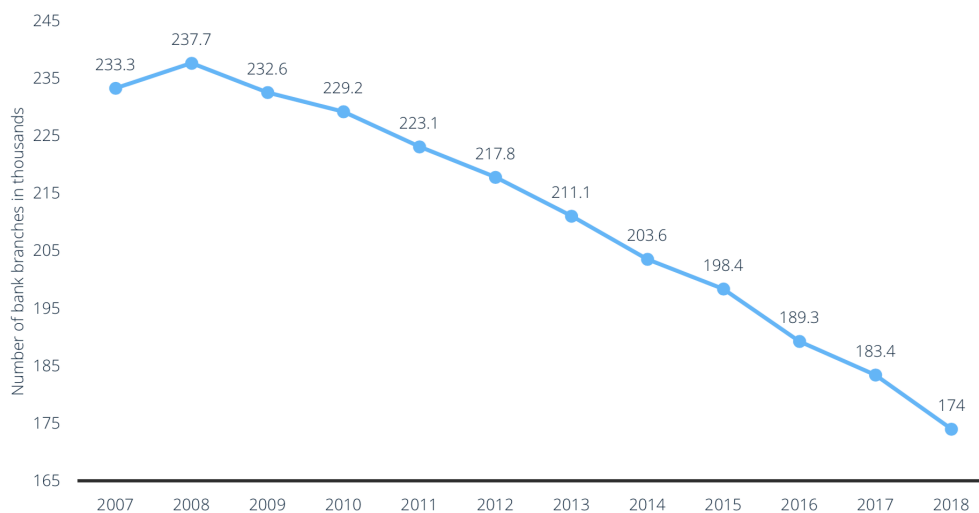


Figure 5.14 - Number of bank branches in Europe 2007-2018 (in 1,000s)

Source:(Worldwide, 2020)

You can see from figure 5.14 that the number of branches has fallen dramatically from 233000 to 174000 over the last few years and this is expected to continue as more and more digital players continue to enter the markets and consumers change their behavior which will be covered in the next section. Interviewee DBA21_ICA stated that “back to customers quickly, are they ready to move now or do you see changes in behavior depending upon generation. You know, the olden days, you

know, you're going to a branch. Now I've never been in the branch and I can't remember the last time I've been in a branch and where's that going to go, how far is it going to go. It's like I don't even shop anymore. I just get it off Amazon".

5.2.2.2 Central Banks

The role of central banks came up as a major theme, instead of Bigtech or Fintech coming in to disrupt the markets it could be a central bank like the Bank of England. Interviewee DBA12_DOM stated *"It could be a sovereign, so nation states and whatever they provide as an alternative. And it could be large organizations who already have assembled a critical mass membership, they would simply expand their services to also comprise financial services just as an add-on to something that people think is more important. And then financial service becomes the other, like, Alibaba or Amazon or Google or Facebook but with their own currency".*

Although having a central bank to complete the transactions on a utility type platform would sound appealing interview DBA15_HK has concerns that it would not be market focused and entrepreneurial to pull it off stating *"We wouldn't think Central Banks have got necessarily the same level of motivation to do a kind of entrepreneurial level. So, I'm talking about as investing in things that will generate capital, moving things around, enabling people to raise capitals, supporting that kind of stuff. So, the more it's Central Bank doing. I think also just in terms of security and providing as a service to run basic retail banking and if you're talking about broader banking environment".*

With new technologies being developed like distributed ledgers and crypto currencies, the role of the central bank will be reexamined as they both could be possible solutions to ensuring regulation is maintained and the whole banking systems are not completely disintermediated, meaning that criminal elements have access to move monies to fund illegal activities. Interviewee DBA24_LONG stated *"I mean, it starts with the most obvious where the regulator at the moment is very excited. Money laundering so you need somewhere control of the flow for very, very obvious reasons".*

5.2.2.3 Implications:

Incumbent banks have provided front to back services and products. This model is under change by the new entrants that are attacking product domains. This is lowering down the price of products, impacting revenue flows and at the same time banks have complex processes and systems. The model is not sustainable and now being reviewed as to what banks do to address these challenges.

5.2.3 Customers habits changing

For years now, we have become used to computers being in our pockets. There have been significant changes in networks, mobile phone technology and the rise of platforms that have increased significantly the mobile penetration. In this section the impact this is having on financial services will be discussed; the growth of mobile banking and how this is changing banking and allowing the new entrants to attack the sticky customer relationships.

5.2.3.1 Growth of e-commerce

The consequence of the internet and smartphone generation, is that everyday actions can be completed using the computer in your pocket rather than in physical interactions. This has had a huge impact on industries like retail but is also having an impact on financial services in a couple of ways. Electronic ways to transact are becoming everyday activities to pay for goods or transfer funds to others. The second is a move away from tradition branch interactions and a move to online banking.

The below shows the penetration of smartphones in the US and China and how this is leading to significant growth in E-commerce businesses as you can see in figure 5.15. This had led to new entrants entering the market to meet the demand for such online growth.

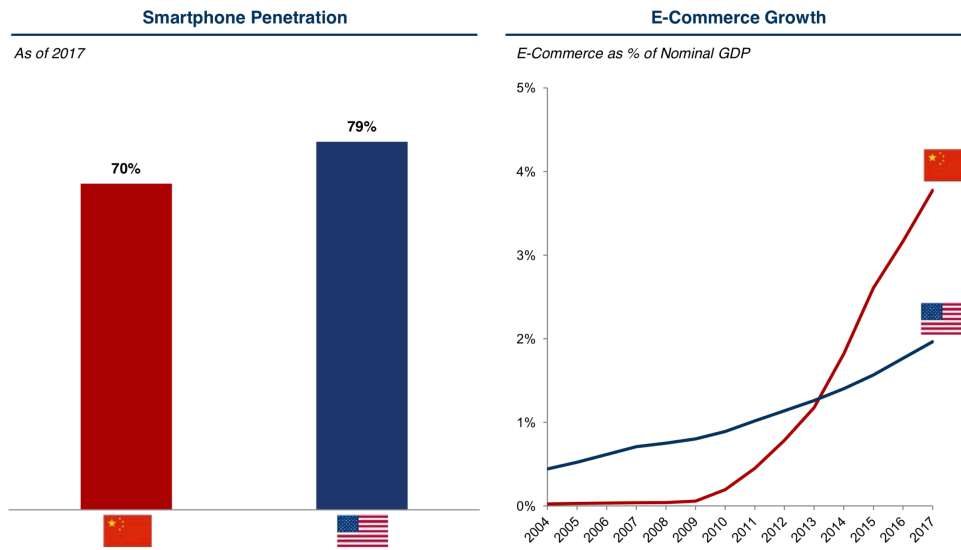


Figure 5.15 - Mobile penetration in China and USA

Source: (Mahoney, 2019)

Figure 5.16 shows a number of computer advances has enabled these types of changes in consumer behaviors. Internet penetration globally has reached nearly 60%. This is the percentage of the global population that uses the internet on a monthly basis. Networks, speed and roll out of broadband and 4G (soon to be 5G networks) has enabled the growth and penetration of computing worldwide. Without networks connecting computers together, a number of products in financial services just could not be delivered. As you can see from Figure 5.16, global smart phone penetration is around 54%, but in China and the United States (US) where we have seen significant adoption of Fintech and Bigtech products and services we see a much bigger adoption.

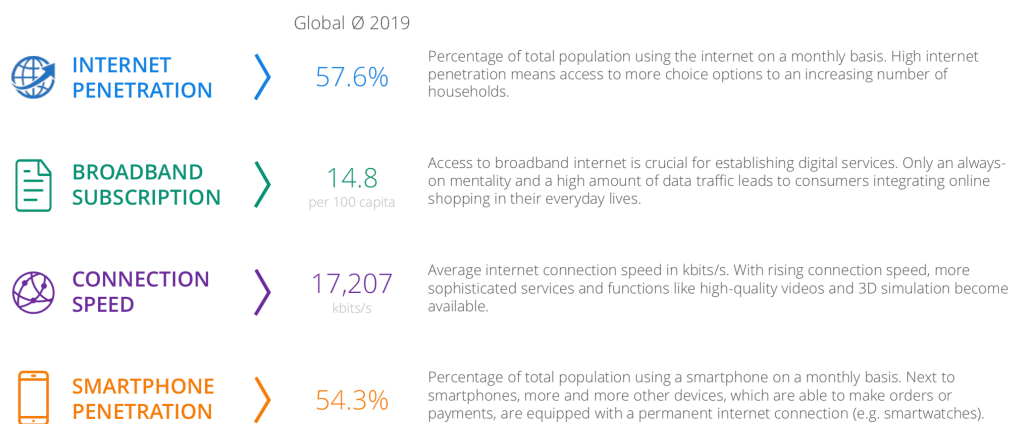


Figure 5.16 - Changes in technology penetration impacting technology usage

Source: (Worldwide, 2020)

These trends link to have an impact in the way banks interact with their clients. Interviewee DBA14_AUS stated *“I don’t carry a wallet around with me anymore, I just carry a phone. Most people in like their 30’s and under do the same and so the banks really do need to up their game, because the mobile aspects of banking are really running away at the moment. Everyone just wants to be able to tap a phone”* This was further confirmed by banking executive DBA16_SU *“The generation that’s coming through in that sort of, I don’t know, 35 to 50-year age range, they are comfortable with technology, they’ve grown up with it – the younger (generation) that’s how they’ve grown up, with iPhones and iPads”*.

The rapid Asian expansion was covered by banking executive DBA2_IKA who discussed Asia leap frogging the use of technologies to the next modern version as their gross domestic product (GDP) expands stating *“Asia had seen faster growth, so there was just natural tendency to adapt faster, maybe, and there’s some other digital giants that obviously have forced a different user behavior that’s also probably influencing banks’ decisions”*. Interviewee DBA19_CR stated that *“I think, are people generally ready? Yes. And I know from some of the products that we built, particularly for Asian markets where most of the millennials - they’re all the richer younger billionaires that we service, that we are doing a lot using iPads and iPhone’s to much more extent than their parents and ancestors that we might have begun our relationship with”*.

5.2.3.2 Implications

The changing in business models can mean new entrants who don't have large legacy footprints or technical debt can design specific products and services for clients without focusing on universal banking offerings. Banking executive DBA17_CAR stated *"I think the cost to income ratio is between 20% and 30%. Most of the retail banks are in the mid-50's, the good ones and many of the top ones are below 50, but nobody is reaching 30, or 35. The latest study from City said, if you're not an established bank, if you don't digitalize, your revenue loss would be significant if you don't have additional footprint that can absorb the revenue loss and then the huge impact also on return of equity too"*.

The second implication of the changes to a more digital world is relationships and the creation of sticky client relationships. The barriers to entry section that follows shows how this is a very important part of traditional banking. Banking Executive DBA21_ICA worried about the erosion of relationships stated *"managers (are) trying to just kind of contain that advisory model, personal relationship, and how that's important. So, that works if you already scale and have all those relations. If you don't, it's hard to attack. The question is what happens with the next generation and will they want to have the same treatment on their planned relationship, or can parts of the demand be covered in a more digitized world to make a way, and then you're open to disruption"*.

5.2.4 Technology changing allowing for disruption

New technology changes over the past 10 years have enabled new innovative ways of delivering client services in more and more convenient ways. This section somewhat overlaps with the consumer behavior changes and therefore the changes in mobile technology will not be restated, instead this section will focus on the new changes that may disrupt the financial services industry.

Blockchain technologies including crypto currencies and digital ledgers have the ability for the financial services industry to be disintermediated. We saw this with the introduction of Bitcoin and the whitepaper written by Satoshi Nakamoto in 2008 (Nakamoto, 2008) that introduced the Blockchain concept and Bitcoin was created. Since then there has been enormous hype regarding blockchain and its potential

uses. This will be covered in depth in the observational study results including attributes, benefits and hype curve. This section will just look at the ability to disrupt.

More fundamental changes being possible in the future was commented on by banking executive DBA12_DOM. Banks are trusted to ensure that transactions are processed correctly, however a distributed ledger can also do this *“blockchain on one hand, because it fundamentally changes the notion of how do you establish trust and what is required if you need some form of intermediary activity or mediation activity between different business partners”*. This is important as wealth is transferred from one party to another via a distributed ledger. This confirms that the person has the funds to transfer and that they can't be tampered with. This role is completed by banks at the moment. The distributed ledger attacks the notion of trust that is a fundamental component for banks (Flinders, 2018). This means that the core role banks undertake regarding trust, could be bypassed by technology.

However, Blockchain is still some way from meeting its true potential as a way to drive disintermediation as covered by Banking Executive DBA11_AJAX *“There's a lot of discussion around AI and even blockchain in a way, to be able to, Bitcoins and those kinds of stuff. To be able to do that, you need to have the processing power. At the moment that is not available. We can talk about all these hypes around AI and blockchain, but it's going to remain in its infancy until we have solved quantum computing. I think there are only like two quantum computers at the moment live on the planet. I think there is a lot of hype before it actually becomes reality”*. However as computing power changes, this may change rapidly as we saw the introduction of Bitcoin back in 2010.

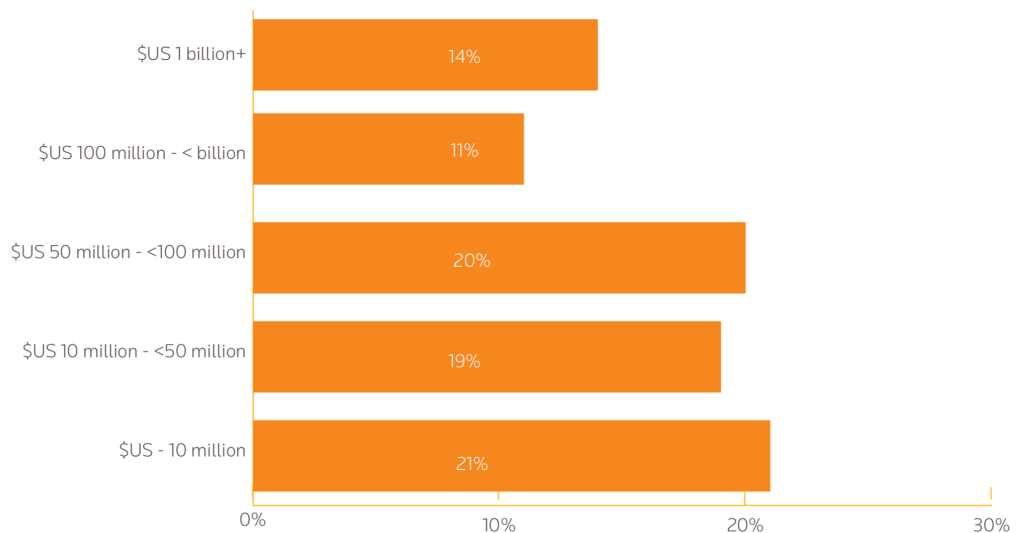
5.2.4.1 Implications

Technology has presented a solution that can disintermediate the banking systems core role of trust. Its usage is only for certain products and services but this is the start of the process and not the end. If scalable, then this could challenge the core role of banks.

5.2.5 Regulation

Regulation appears in the conceptual framework in a couple of places. Forces for disruption and also barriers. This seems to be counter intuitive but there are different

points being mentioned by the experts. The last amount of discussion regarding regulation discussed this as a barrier overall for new entrants, and the regulations increase the bigger the bank. The price tag associated with compliance increases likewise with these regulations. This is demonstrated by the below figure 5.17, which explains the huge costs associated with the compliance costs of regulations. This shows the % cost of compliance depending on the revenue size of the organization.



Source: The International Federation of Accountants (IFAC) 'Regulatory Divergence: Costs, Risks, Impacts' (April 2018)

Figure 5.17 - Cost of compliance as a % of revenues for small to large firms

Source: (Reuters, 2018)

However, a number of the experts interviewed believed that regulations have opened up markets and in some cases the regulations are asymmetrical and penalized the incumbent banks. Expert DBA4_SING stating an example where the incumbent banks have the regulatory issues and Fintechs cherry pick products and services leaving the burden of compliance with them *“We can’t be the one that’s doing all the heavy lifting work and then all these Fintech’s come along and like the wallet’s space is super-duper messy out and that’s how I’m trying to shape that in the industry. And everyone wants to get into the payment space, the wallet space and I don’t want a situation like China”* The reference to China was in reference to the Fintech’s being dominate and transacting more than the incumbent banks.

The asymmetry of the regulations unfairly impacting incumbents was also covered in a consulting paper.

Regulatory Area		Traditional FS firms	FS subsidiary of big techs or Fintechs (under FS license)	big tech with material FS business (may not be under FS license)
Areas of cross-sector regulations	Competition/Anti-trust	Competition standards are cross-industry but entity-focused, and not adapted to network externalities (e.g. dominance in specific parts of value chain; "closed" platform environments; "data" monopolies)		
	Data privacy/management	Standards existing and enforced in FS; but new, enhanced regulations becoming cross-industry		
	Corporate governance	High standards applied and enforced to financial institutions (with proportionality)	financial institutions	Limited standards applied and enforced outside FS licenses
	Economic/financial crime	AML standards applied and enforced to financial institutions (with proportionality)	financial institutions	Limited AML supervision and enforcement
Areas of FS regulations	Financial systemic stability	Global principles and national frameworks applied for financial stability		Traditional framework excludes non-FI entities (companies, techs)
	Prudential/firm resilience	Stringent capital and liquidity requirements applied and enforced to financial institutions (with proportionality)		Traditional framework excludes non-FI entities (companies, techs)
	Conduct/customer protection	High standards applied and enforced to financial institutions (with proportionality)	financial institutions	Lower standards applied and enforced outside FS license
Areas of tech-only regulations	Standards not clearly applicable to traditional financial services activities (e.g. e-commerce, advertising, geo-blocking, fake news)		Regulations targeted and applied to tech platforms	

Areas of regulatory asymmetries
 ● Areas of gaps within financial regulation itself ● Areas of differences in monitoring and enforcement
 ● Areas of imbalance across entities and activities ● Areas of inconsistency across countries and industries

Source: Oliver Wyman analysis

Figure 5.18 - Areas of regulatory asymmetry (global view)

Source: (Wyman, 2020)

Figure 5.18, shows what the experts have highlighted; there are differences between the way a product or service is being regulated within traditional financial service companies and other non-financial service companies. This creating some advantage for the new entrants.

Regulations in the United Kingdom (UK) and Europe with PSD2 regulations on Open Banking has been designed to increase competition by forcing banks to allow third parties to access banking data on clients if the clients wish this to happen. This means the data is not the property of the bank but the client. This has opened up a market for new Fintech's to come into the market and act as account aggregators and pull all banking accounts and positions together across many banks. However, this has not been that successful as yet but it is early days as observed by DBA20_BARC who stated "I still think customers need a proposition and a hook and a reason to do whatever the industry might want them to do. And open banking is another example

(that) isn't being used by hardly anybody at this point in time. So that's probably the big player that might open or probably still, but I've yet to see that happen as well". This was an attempt to lower the powers of banks as stated by expert DBA1_NAN1 "That's from governments who don't like the power of the banks, and that's from the people who don't like the power of the banks to kind of control the marketplace. Because of that, you've now had all these new entrants in the Fintech world".

So, governments are trying to lower the powers of banks post the financial crisis and the regulators seem to have a greater focus on their compliance than non-financial players entering traditional financial service markets.

5.2.5.1 Implications:

Regulation is a huge barrier for new entrants into Financial Services. However, it is changing and the burden is more on incumbent banks. This is giving some advantage to new entrants or at least entry points to drive greater competition.

5.3 Barriers for Disruption

The second major theme coming out of the interviews relates to the barriers for disruption. In this section these barriers in order of significance, based on the number of mentions in the interviews will be explored. Extracts will be used from the interviews of industry experts to explain the points they raise and bring expert opinions on this subject.

The numbering shows the ordering of the force for disruption by the number of times this was mentioned in interviews. The lowest number is the most significant and the highest number the lowest significant Abstracts from the leading expert interviews have been used to better illustrate and illuminate the disruption factors.

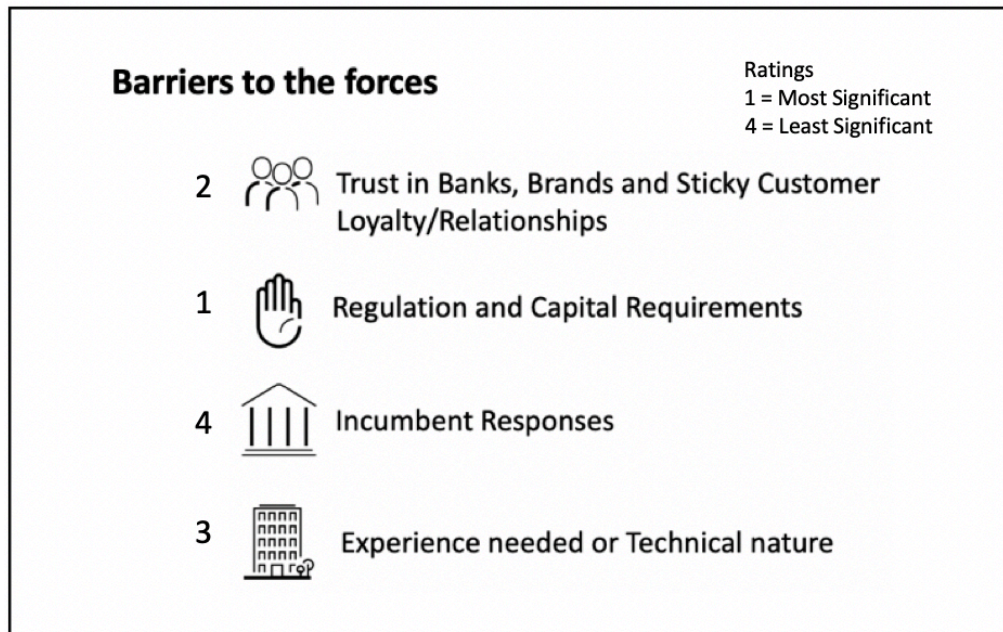


Figure 5.19 - Barriers to the forces

5.3.1 Regulation and capital requirements

Regulation was cited as the most significant barrier to the forces that are trying to disrupt the financial services market. Regulations have increased significantly since the financial crisis of 2008, as have the costs of meeting these regulations. A number of banks acted irresponsibly by using deposits of clients and then packaging up high risk subprime mortgages into A rated products. Once defaults in the housing markets increased, banks who were exposed to these collateralized debt obligations had major liquidity problems. This resulted in some incumbent banks failing or having to be rescued by their respective governments. They were bailed out by the tax payers. Since then there has been regulation after regulation ensuring banks hold more capital to protect against future shocks to the markets and regulation prevents firms from taking so much risk again (Mahoney, 2018; Schoen, 2017).

5.3.1.1 Protection for customers

When asking why regulation is important and its role in financial services, banking expert DBA16_SU stated *"I guess the regulatory environment. I mean obviously we*

know the regulatory environment has changed since the financial crash 10 years ago and we know that that regulatory environment changes with – well, new requirements come in with a reasonable degree of frequency”. Regulation is there to ensure there is trust in the system and protection of people’s wealth. This sounds like something you would expect to just happen by responsible professionals but the financial crisis showed that something ungoverned can create global financial recessions.

Banking executive DBA5_LYE stated that *“The regulations are designed to force the banks to keep enough capital to cover their assets, but at the same time, if you think about it, so many regulations are there to stop us killing ourselves in the first place, and then if we do kill ourselves, we have the capital requirements to keep them off the hook from a government perspective”*. The view was that ungoverned banks cannot help themselves by taking too much risk for personal gain. Banking expert DBA11_AJAX stated *“we have embarrassed our regulators, because banking likes to be self-regulated. They can’t help themselves. Now what the regulators ask us to do is common sense. We complain about this common sense because we feel that it is being restrictive, but a lot of the things that they ask us to do is common sense”*.

One banking expert explained that the regulations were taken away for years by Allen Greenspan then head of the Federal Bank. Expert DBA8_DISH stated *“So, regulation is good, but I mean, you know, I think incumbent banks complain the regulation is bloody complaint only. They have let themselves be butchered by the regulators, because they have gone too far, I mean Alan Greenspan took away all the regulations, they screwed up and then they have to get back into the regulation’s era now”*.

There is also a knock-on impact on the entrepreneurial spirit of banks that got out of control as part of the banking crisis. Expert DBA22_FIN2 explains that *“All the red tape, all the regulation stops them from being able to be nimble. And I think also they could be quite entrenched in . . . so there is some cost fallacy that, you know, we’ve already spent so much, we have to commit and, you know, squeeze as much out of our investments as we can”*. This means that risk taking in banking post crisis will have serious consequences and hence the ability of the bank to innovate and fail is limited.

5.3.1.2 *Too big to fail*

The banking system in the financial crisis showed how critical it is to ensuring that business and individuals have the finance they need to cope with their requirements now and in the future. When there was a problem in the system, investments, loans and mortgages slowed or stopped due to reduced liquidity in the markets. Governments stepped in with a number of stimulus to get cheap money in the systems to ensure business continued. Interviewee DBA12_DOM stated that *“I think, a certain interest in retaining financial stability by retaining (what) they understood and known players. Nobody loves them and we hate the fact they are big to fail, but we kind of know what we're dealing with”*. This was a discussion on the role of banks. They are not liked but everyone knows the role they play is also key.

The regulations were put in place to ensure that banks were not too big to fail and could be relied on to sort their own issues out. Banking Executive DBA16_SU states *“If there was a run on the bank, something like that. So, they to me aren't really looking at where financial services in banking are going in the future. They're more about protecting not quite the status quo but almost that point”*.

5.3.1.3 *Barrier to entry*

Regulations are often a source of complaint at incumbent banks, who believe they are unfairly treated. But banking experts also explain the other dynamic they play is to create a barrier for new entrants. Banking expert DBA16_SU states *“regulations, if applied consistently and everyone adopts (them) obviously seems the right regulation, it's not a threat and maybe you could say that we can work with a regulator to deliver something in a way that our competitor can't, and so it costs us less and perhaps that's an opportunity”*.

These barriers seem to change depending on the product or service but also the size of the financial services company. Interviewee DBA13_ALL states *“I can tell you there is no more heavily regulated entity. You don't just start a bank, you need to be approved, you need to get a charter, you need to get a license and there are different tiers. When you cross \$20 billion in a bank and then \$50 billion in a bank, there are all kinds of testing”*.

The barriers are not just financial regulations but also pressure in the US and Europe that the Bigtech firms are getting too big and powerful as explained by expert DBA12_DOM stating *“Bigtech I think will run into a cartel regulation challenge, at some point people will start getting really worried about the size and influence. And so, there's going to be potentially political barriers to further expansion”*.

This was further expanded on by DBA17_CAR stating *“So I think that's something that Amazon has to be very careful with is where they want to push their financial service industry. It means also small regulated business which they are trying to stay away from. The Apple card business is a natural fit, but it's almost like copying the Revolut topic. You have a virtual credit card, you have a nice, new design credit card. The concept itself is not new, but Amazon and Apple have a huge distribution. So that's something that could be easily done and the biggest challenge for the bank is that they will lose the payment part”*.

The Bigtech firms and Fintech firms are skirting around the regulations or building alliances with banks who are regulatory compliant to avoid the worst of the regulations. Banking expert DBA21_ICA states *“They can just buy whatever bank that they need if they want to. But of course, they are looking very cleverly at how far do they actually want to get into the finance game because as soon as regulation hits them, they have to modify the way they work as well. So, regulation is protecting, to a degree”*.

Regulation seems to be one of the only key barriers that have stopped big tech firms entering the financial services industry in a very big way. Banking Executive DBA11_AJAX states *“They can, they haven't done it for a reason. That reason is that a banking license comes with an enormous regulatory burden, which I don't think that they want (it) because that also means that they have to open, like their infrastructure to regulators to look at what they are doing”*.

5.3.1.4 Implications

The implications of regulations are huge. Regulations are very expensive to comply with but are a key part of the banking framework to ensure the system has trust and security. The building block of banking. This act is a barrier to new entrants as the regulators post the financial crisis are looking to ensure no firm risks the possibility of

failing. This has also had a knock-on impact on the ability of banks to change and innovate that will be covered further in internal change barriers.

5.3.2 Trust in banks, brands and sticky customers loyalty/relationships

Trust is one of the key fundamental parts of the whole banking system. The trust that you can rely on regulated entities to safeguard your money and assets. Without trust that a bank will safeguard your assets or make a payment effectively, then people would keep their money themselves and the whole market liquidity would stop. Fractional bank model of deposits of customers are then loaned out to people needing finance has been around for hundreds of years (Arnold, 2014).

5.3.2.1 Trust

Trust has to be earned. Long standing relationships with banks are well known as being very sticky. Customers stay with banks over lifetimes despite sometimes poor service as they secure the wealth of individuals. Banking strategist DBA10_JSO states that *“I guess people will always need a trusted way to exchange services, products, what have you, for money and so therefore we need some kind of banking services”*.

Some experts have less faith in the challenger banks systems that are less robust and tested than incumbent banks DBA1_NAN1 states *“I think there is a risk with some of these challenger banks that they will screw it up. You just have to look at Metrobank. Last quarter, they've just now had to restate their earnings and take a massive hit because they've taken on a load of loans, which the capital requirements on those loans, they got wrong”*.

A leading Fintech expert DBA14_AUS stated that *“Look, I think that ironically the things that could save banks is like as reputation, but the things that could destroy the reputation as well. People feel safe with a bank, so when you're looking at these newer banks now, the one thing that people may hold them back are people don't feel safe putting their money in anything other than a big brick and mortar-based institution”*.

It's clear from the experts both banking experts and Fintech experts that trust is a key critical component and can't be lost.

5.3.2.2 Brand and relationships

Brands representing large existing and often successful banks are still important to clients especially when you move away from transactional processing. This means that the barriers are dynamic depending on the type of banking product. Banking expert DBA13_ALL made the following observation *“I don't know what it's like outside of the US, but in the US brand recognitions (are) worth a lot. No one wants to hand over \$500,000 to a company they just saw the name of on top of a taxi two minutes ago. So, knowing that you've got a mature institution and partnering up with people, you find very few people that have been successful in wealth management and even in some of the banking spaces that have gone in alone Business to Consumer, a lot of have done – the ones that have made it in the thinning of the herd have gone Business to Business to Business to Consumer”*.

There seems to be different requirements for brands depending on the level of trust needed with the banking product or service. For payments or commodity banking a brand seems to be less important, as risk of loss of wealth is low. However, as the products or service gets riskier, then the brand and relationship become more important.

Expert DBA10_JSO stated in the *“wealth management space, I guess the long-established history that you have with some clients, particularly with the older generations, will in the short, medium, maybe in longer term likely to be less impacted given, that comes back to trust”* and then followed up by banking executive DBA11_AJAX stating *“I think the Revolut or the TransferWise, they provide a service of a bank. I think a bank is a combination of multiple services. So, would you take your mortgage with Revolut? No. Would you use Revolut for simple payments? Yes. Would you trust, let's say you're going to make a big equity transaction, would you give that to Revolut, no. So again, it comes to a trust. Maybe if Revolut over ten to 15 years becomes bigger and builds up that trust, then yes”*.

The brand itself helps individuals understand what the firm standards for and know its values, to ensure they align with the customers. Banking Expert DBA4_SING made the following observations *“I suppose if they're going to invest the money with an institution, they probably want to have a sense of the bank's culture, the value, the people that they know that there is at least a flagship bank if anything they can go to the bank and they can always go and check on their investment”*.

Customers are still staying with existing traditional banks due to their brand and trust despite poor services to the surprise of banking expert DBA28_MIS *“Brand seems to be important and . . . I mean, I am, I am surprised myself. I mean, how I would say bank . . . banks have treated their clients are still well-regarded brands. So, it's . . . that trust the brand thing is”*.

In less developed countries the brand and relationship can sometimes relate to the size of the organization and its perceived financial strength. A banking expert DBA23_CO stated *“That is still a very, very big reason why at least in countries like India, banks will continue to be existing because the trust factor is not there in the payment intermediaries or the transaction processing companies, which are outside of the bank. It's just the feeling that the banks are far better regulated and our deposits are much safer there”*.

Trust is a key component of banking especially when you move beyond basic transactions. Brand and reputation still have an influential role when people are assessing if they trust financial institutions. This change depending the product of service.

5.3.2.3 Implications

Brands and relationships matter at the moment. It has a key link to trust and trust is important when it comes to looking after people's wealth. Reputation, values, brands and trust are all interlinked and important. This will take time to build up for new entrants.

5.3.3 Experience needed or technical nature

Traditional banks have built up years of being able to serve clients and have robust stress tested processes. This is an advantage but can lead to issues of technical debt. However financial services are a complex and highly regulated industry with years of experience needed.

5.3.3.1 Experience needed and linkage with ecosystems

A leading Fintech expert DBA14_AUS looking at the banks experience observed *“Perhaps what they've got is hundreds of years of banking experience and that's what these newer banks don't have. They've got real regulatory knowhow, that's what*

these banks don't have". This is often underestimated by the existing banks themselves but not by new entrants into the market. The Fintech expert followed up by stating "They've invested heavily in Information Technology (IT) Security... really important and also invested quite heavily in the digital side. So, from a digital product perspective they're quite good. Starting an organization from scratch is challenging and even more challenging is starting to raise that bar as you grow and I can relate to that myself, you call it broadening the base; you call it a foundational change but having bare minimum for a small organization and then growing the infrastructure that's required is much, much bigger. And so, I think that you shouldn't underestimate the amount of work that's required to provide a level of stability".

Banks not only have the experience of servicing clients for hundreds of years within changing environments. They have complex intrabank relationships and are linked into ecosystems as observed by DBA22_FIN22 who stated *"And as I mentioned before from, sort of, a platform marketplace perspective, there's an enormous ecosystem where, you know, the big banks have garnered a sense of trust and a reputation and, obviously, capital strength and the like where, you know, they can . . . they can be there from a stability perspective to enable that, you know, innovation to foster and those sorts of things".*

This is further expanded on by expert DBA9_BAT *"This is the part where you need trust, but also knowhow and experience and network. This is the thing that okay, this is still your competitive advantage, but even that is under threat by AI trends, where social media people trust their friends more than authorities and institutions".*

Banking senior executive DBA24_LONG went further to say *"To be very blunt, what we call Fintech in my opinion lacks the word fin and I mean it very seriously"* this was in the context of abilities beyond transaction type activities where you need balance sheet funding leverage or complex banking arrangements.

It's clear that banking is made up of many products and services to clients worldwide. They range from simple products to extremely complex ones, from low risk for customers to high risk and where experience matters more or less. This is also linked to reputation and brand values.

5.3.3.2 Implications

Some products and services need less technical finance expertise and some need a lot of experience, infrastructure, international footprint and knowledge. This is expensive and challenging to replicate.

5.3.4 Incumbent responses

As covered in the forces for disruption sections, there are significant levels of change happening. New industries entrants with Bigtech and Fintech, changing regulations, changing expectations and new technologies that may disrupt the markets even more in the future. It is obvious that to survive the incumbents need to react. This reaction will form in part a barrier to sustain the attacks from others. The competition is serving as a warning but also to put in urgency needed by the incumbents to invest into change.

5.3.4.1 Incumbents make switching hard

Fintech's have come up with innovate applications and digital offerings that have lowered the price of products for clients. Banking executive DBA4_SING states that *"the bank has to invest. I don't think they have a choice, okay? If you're talking about speed to market my view is that I don't want to – I don't need to be the first. I don't need to be in the leading edge of the technology, but I want to be a fast follower"*.

Banking executive DBA6_IES1 explains that *"I think everybody recognizes technology as a critical factor and an investment in the future success and viability of the organization, so I think it's recognized. I think some firms have been more aggressive about it than others"*. This was followed up by a banking strategist DBA20_BARC who stated that they can copy the Fintech apps within months and get back on a par re service stating *"We've built an app through IBM at the space of three months. For me that means we can act fast. We're aware . . . and again, this is more in the card space"*. The context was that he believed that they were behind the innovation curve but that this could be caught up quickly if needed. Especially the client side while recognizing the bank office system challenges.

Another banking expert reflected on the need for speed and agility that will be looked at in the barriers to charge section. However, DBA29_GA recognized that banks can make decisions quick and if they can remove inertia barriers can get things done in

record time. They stated “COVID which is a classic example where this was put into the fore, into the melting pot, things moved super-fast. They absolutely happened within months, no problem at all. Things often have taken, like, seven years, eight years, or more to do, and suddenly it just happened because the urgency was there”.

5.3.4.2 Implications

As the new entrants use technology in innovative ways, the incumbents are not standing still. They are looking to replicate the experience and technology the new entrants are introducing but also have a wider range of products and services plus long established brands. The question is how quickly can the incumbents change and keep up with their new challengers.

5.4 Internal barriers to change

In this section internal barriers to change will be examined as this was key in the interview responses. There was concern expressed about the forces for change and the barriers to them, but one of the areas of most concern was the inability of banks to change quickly and get out of the way of themselves. Internal barriers to change was flagged by experts in the literature review reading.

1. Rigid process, routines and culture – C Christensen (Christensen, 1997a; Leonard-Barton, 1992)
2. Poor leadership – R Henderson (Henderson, 1993; Leonard-Barton, 1992)
3. Fear in the organization. – A Edmondson (Edmondson, 2019)
4. Influence of shareholder – M Benner (Benner, 2007)
5. Short-termism driven by incentives or financials – J Graham & C Flammer - (Flammer *et al.*, 2016; Graham *et al.*, 2005)
6. Monolithic vs Modular infrastructures – M Schilling (Schilling, 2002)

Through the interview process the views of experts on the challenges of internal change was discussed. The most significant to the least significant are ordered by the numbering. We will start with the most significant culture, risk, fear, history and success.

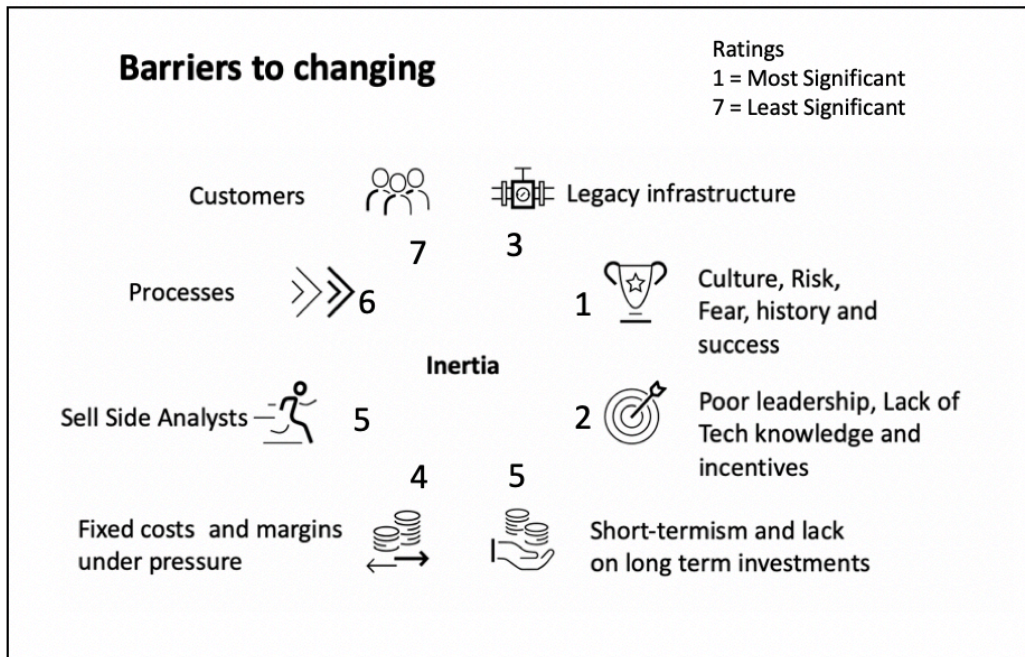


Figure 5.20 - Barriers to changing

5.4.1 Culture, risk/Fear, history and success

A number of topics fit under this heading. The biggest concern to the future success of change and viability of the incumbent models was culture, risk, fear and the fact that there didn't seem to be a strong sense of urgency within the business due to its history of success.

5.4.1.1 Culture, history and success

The first sections are based on culture. This came up a significant amount of time through the interview process with experts. There is some overlap between risk and fear the quotes selected try to illustrate this as clearly as possible.

The first quote comes from banking expert DBA5_LYE who summed up the state of working for a large successful incumbent bank stating *"Nobody wants to do things differently. There's a comfort factor. I think they've sat in a very, very comfortable place for a very, very long time, and I think, culturally, it is incredibly difficult to change something that has, so long, been exactly the same and so long been comfortable"*.

The context being incumbent banks have been successful and unchallenged up to now. The financial rewards and bonuses for performance are significant and he was commenting on how hard it is to change people who are being rewarded well as they are.

Another banking expert DBA10_JSO commenting on the lack of change from another angle stated that *“From a cultural perspective, I think it's very hard to change culture, particularly in such a big organization. Change the people or change the people. I think it takes an immense amount of bravery, particularly if you look back to one of the earlier questions you were talking about, like is it about looking to your peer organizations and what they're doing? I think it takes an immense amount of bravery to step out in line and it's not something that we're historically keen to do, which is a tricky point, one risk”*.

They also comment on the successful and long history of banks as being an additional challenge DBA10_JSO stated *“I guess the longer your history, the more ingrained your approach to things are and I think that's a key thing to overcome”*.

Culture is driven by leadership, interviewee DBA6_IES1 observed that *“I think that there are a lot of big cultural challenges at a lot of banks, but I think it's about the leadership driving and supporting that change, how committed they are to it, . . . more than just the commitment, but really understanding how to start to drive that change. Let me put it to you this way. I think it is one of the biggest challenges, but do I think it could be overcome? I think, with the right leadership, it could be overcome”*.

The final quote came from expert DBA22_FIN2 stating that *“Culture eats strategy for breakfast, so unless the company is willing to adopt its culture, then I think the answer is very clearly no”*. This is reflecting that the focus internally is not really on making significant change to tackle the disruption factors but instead more focused on sustaining the status quo.

5.4.1.2 Risk and fear

This section delves deeper into why it is so hard to change the incumbent banks. The culture section pointed to ingrained ways of doing things and that it is in some people's interest to get rewarded for maintaining that status quo. This has been

embedded deep into the culture of many banks. Risk and fear were mentioned a significant amount of times and these will now be looked at in more detail.

Banking expert DBA10_JSO explained *"It's historically a very risk-averse environment particularly since the credit crisis, right? By design it is purposefully risk-averse and that is particularly difficult when you're in a tech innovation space"*.

The financial crisis and its impact on the banks risk appetite was mentioned by a lot of the experts. The overall points linked to the risk adverse nature of banking post the financial crisis and the impact that this is having on behavior and innovation. Innovation being linked to failing and learning from these to then try again. Interviewee DBA22_FIN2 explained *"I think it's risk aversion, right. I think historically in the past that's probably different for more traditional investment banks for sure. It's certainly a lot more risk-forward, if I can call it that. But I think because of all the regulations and all the challenges over the past few years, culturally, everyone is so risk-averse and I think if they were thinking about managing risk as opposed to trying to avoid it, I think that would sort of change the behavior"*.

This is further explained by banking executive DBA19_CR who explained the impacts of financial crisis on the people who came into banking to be risk advise they explained *"yeah, but to be honest I think they've almost paralyzed with fear and I see so little progress; it's almost like seeing where the fads will go and then we'll jump onto the bandwagon once it's established, once the technologies are established but that might be too late. The people that we've hired now - especially since the financial crisis - are just not geared up to operate with the speed and with the mentality that goes with the freedom, if you like, of innovation that we need to go forward with. We just got the wrong people"*.

This is not just about personal risk and reward. There are technical reasons for not changing and being cautious. Banking expert DBA15_HK explained *"So, people are quite risk averse to changing some of those platforms and then again that's the fundamental. Some of the stuff that needs to be done is big ticket of investment in areas where the NPVs (Net present values of business cases) not clear"*. This was in relation to very old platforms that banks are running.

Another point that was raised was linked but moved the point forward. Previously the culture was one of control and efficiency. However, with new entrants and

technologies driving technological changes in the market, there is a need for different thinking and approach. Banking expert DBA12_DOM states that *“The system was immune to this injection of different thinking. And maybe also because the agenda has moved on. It's not about industrialization anymore. It's not about digitalization and agile and blah, blah, blah. And what these industries would have taught financial services is not any longer what they now think they need, which isn't industrialization, it's be like Google”*. The Google like comment refers to the fast-paced development that is highly client focused and easy to use.

This then comes down to people. Since the financial crisis the focus has been on control, needed due to the mistakes of the crisis and regulators impacting the business. Moving away from this into more risk activities that may not always work is therefore challenging for individuals who have been in a tightly controlled environment or may not be the right people. Banking senior executive DBA7_ALLDAY explains *“there's no exponential element that I see in our strategy. And I think there's an element of it, but there's a personal risk and look, you know, if you're 57 years old coming to the, sort of, end of your career, how much . . . honestly how much personal risk do you really want to take by making some of these big bold decisions? It's difficult. I've seen individuals, it's difficult for people to do it, right?”*.

The last point regarding risk and status quo related to the people in banking. The context was the ability to change and interesting points were made around diversity. A banking expert DBA2_IKA mentioned that *“I have a strong belief that an old school type -- what I would call the old white boys club, the old school bankers, can live happily until they're 85 playing golf even if their prior employer goes bust, as long as their pension is safe”*. Although this was not a politically correct comment it did point to a problem of diversity and this was expanded on by DBA9_BAT who stated *“A lot of banks are having a complete lack of diversity. You need to have different people with different skills with different competences working in collaboration. Banks are notoriously competitive and folks on winner takes all, but corporation working together in collaboration brings a lot of more sustainable results”*.

5.4.1.3 Implications

The implications of not having the right change culture and running a business through fear will lead to reduced experimentation and learning. Culture embeds behavior into the organization and takes time to change. If not tackled this could be

an issue for companies who now need to innovate to stay with competition. This was examined by interviewee DBA22_FIN2 who explained *“I don't see a lot of organizations experimenting, you know, hypothesis testing, creating an environment of, you know, what's referred to as safe to fail experiments”*. If this continues while the forces for disruption are high, can lead to the inability of the company to change and even that the company has the wrong people to change.

5.4.2 Poor leadership, lack of technology knowledge and incentives

Leadership, the lack of technical knowledge and incentives were mentioned as real issues that will stop the firm transforming. They are somewhat linked to risk and the fear of failing so were combined into a separate category due to the amount of times the topic came up.

5.4.2.1 *Being out of touch*

The experts were really concerned that the pace of change in technology was not being kept up to by senior executives and they feared that wrong or late decisions would be made.

A banking expert DBA7_ALLDAY mentioned that they believe that *“there are a number of senior leaders of the firm that I think are still a little bit out of touch with the new world, you know, the new world order of fourth industrial revolution”*. This was followed up by expert DBA5_LYE who explained *“All their experience in banking, all their experience, all of it, none of it works in this scenario, and none of them have a clue what to do”*. The context was how trained the senior leadership is to face the disruption challenge. They have banking knowledge but no disruption or technology knowledge.

Having the right skill set at the top of the organization that can identify future opportunities will be important if incumbents are to exploit current markets and explore new revenue growth potential. Banking executive DBA29_GA explained *“what is going to make it a threat is that if people aren't open, and potentially leadership and boards at that level do not understand the future or are not aware of the digital future.... the digital savviness of execs and boards... they haven't got the right lenses on to assess this properly”*.

5.4.2.2 Lack of Technology skills

Senior transformation expert DBA18_GON stated *“I think that there is the lack of technologists at the top table, because the people at the top table are old. They don't know about this. It's not their job. They are producers (Bankers). What we need to say is we need different people at the top table”*. This was further expanded on by senior banking executive DBA24_LONG who stated that it was not disruption they feared but instead the boards lack of knowledge of technology stating *“Is it the disruption coming from others that kills you. I'm very convinced no.... The biggest threat is our board”*. Banks are basically technology companies selling banking products, the lack of knowledge of technology at the top of the incumbent would not happen in other industries.

The need to understand what the next 10 to 20 years could look like and position the business towards a more digital future is clear. Banking expert DBA2_IKA explained that *“if you don't understand the lever that technology is, it leads to underestimate the design opportunities you have with technologies”*. However not all incumbents struggle with this *“there are very good players like BlackRock and others out there that sent their senior levels to mandatory coding, or Python classes, or something like that, and it does show an effect because banks are technology companies”*.

A possible solution mentioned is to have the Chief Information Officer (CIO) role at the top integrated and responsible for the technology and business functions together. This is more aligned to Agile practices like Devops stated a banking executive DBA24_LONG *“first of all (in)changing the culture, IT should be at your table every day. It's not like we have an IT meeting (at the) end of next week and then we talk to our IT and investment (separately)...I would merge IT and ops”*.

This was further expanded on by banking expert DBA29_MIS stating *“I mean we're oscillating back and forth with putting a CIO on the executive board”*. This is needed to stop bad decisions impacting the long-term survival of the firm.

The level of knowledge is one thing but also the commitment senior leadership has towards the disruptive changes needed will be important in the future. Senior banking executive DBA6_IES1 stated *“I think that there are a lot of big cultural challenges at a lot of banks, but I think it's about the leadership driving and supporting that change, how committed they are to it... (it's) more than just the commitment, but really*

understanding how to start to drive that change. Let me put it to you this way. I think it is one of the biggest challenges, but do I think it could be overcome? I think, with the right leadership, it could be overcome”.

Another possible solution that came up was for boards to use advisory technology and disruption boards to help with the more technical aspects as they do in other disciplines as outlined by expert DBA28_MIS *“That probably would start on the board of directors. I mean you have...(a) risk committee there or a compensation committee there, you need a tech committee there with a few people that know what this is”.*

5.4.2.3 Incentives and focus

The last theme that came up was relating to the motivation and focus of senior management to make the necessary changes in the organization.

Banking expert DBA21_ICA discussed that the focus post crisis was more about risk than looking for new growth. *“So, I would argue that specifically the financial crisis has put senior management into play, but culturally have to be very much focused on risk management and regulatory compliance as opposed to top management that has looked at the growing businesses”.*

How senior executives are being rewarded is pertinent here. Interviewee DBA9_BAT stated *“You have an average vesting time of three to four years for your shares, so you maximize everything you do for that, even if it's against a long-term interest. You still do it and you're trying to maximize for a four-year period. So, you see a lot of CEOs when they start the job, they have a huge restructuring process around year two or three they need to make a turnaround and then in fourth year they need to show the promise of growth again, which will then be picked up by the share prices and reflected in a premium”.*

Interviewee DBA9_BAT stated that incentives are a key leadership issue stating *“traditional banks rely on their sales people and their connections to do their business. These people have no incentive to change. Again, it's a leadership question and second, it's a strategy question. This is where those two meets. If that is your specialization and reputation and your bank and people have absolute trust, okay. These guys, they don't change, they – you know it's safe with them, they know what they're doing, you can resist the change”.*

5.4.2.4 Implications

If senior leadership don't understand technology then bad decisions can be made. This could mean key opportunities are missed or transformational change is delayed to meet the challenges of disruption. Its suggested that this awareness should start from the top down and that careful thought given to how incentives drive behavior. These should be focused more on exploiting the current position or driving new explore activities.

5.4.3 Legacy and technical debt

In this section the impact of legacy and technical debt will be introduced. Can banks make the necessary changes needed to meet the challenges of disruption?.

5.4.3.1 Technical debt has been built up over many years

This section refers to years and years of systems and processes that have been incremental built upon or through acquisitions, been bolted together. The consequence is highly complex and interrelated systems architecture. Some of this create huge monolithic systems that are hard and expensive to change and update. Keeping the systems updated and not end of life is a battle at the same time the banks need to transform in the face of disruption.

One senior executive DBA25_TRUM stated *"the larger banks, they've grown through acquisition. They followed up different companies. Like anything else, you have choices at this point. You could either put Band-Aids on it, or you can evolve and you can change, and you could make it efficient"*. The context here was that large organizations made decisions in the past to short cut remediating the architecture and this will now be costly to fix.

Banking expert DBA17_CAR stated that *"So you have these systems 30, 40 years old (where the) customer is not the center of the legacy system, and it's more the product. They have a product driven architecture. The new systems absolutely (have) the customer in the middle and the software is being developed in the cloud, even sometimes in the private cloud. So, the architecture is much more agile, open and very cost efficient."*

Interviewee DBA19_CR explains further the issue and starts to introduce some of the implications by explaining *“they've grown through mergers and acquisitions, they paid and they've crashed things together. The imposing of new regulations on these bankers has actually shined a light on the fact that these platforms have been crushed together. Even some massive global banks and players, they are unable to cope, if you like, with the requirements, and aren't flexible enough to be able to cope with requirements of regulations and I'm sure they'd rather not pay the billions in fines but it's just technologically incredibly difficult to bring these platforms together and to make them flexible enough to adapt, and if they can't adapt to regulations, they're not going to be able to adapt to new entrants.”*

Banking executive DBA22_FIN2 explained the importance of fixing the technical debt but also building the remediation into everyday culture. They explained *“I think tech debt is certainly a manifestation of either shortcuts taken or, you know, decisions made focused on the short-term rather than the long-term. So, yeah, that's a tough one...you can't fix technical debt unless you fix the other problems first. So, you know, depending on what people mean by technical debt and it's obviously quite a broad topic, right, but in my mind, it's taking shortcuts and not paying back over time, you know, almost like good hygiene, right, kind of having a culture of prioritizing that hygiene”*.

5.4.3.2 Problems with agile

The old architecture of high interrelated and tightly coupled systems was discussed by Fintech and banking expert DBA14_AUS who explained *“...it's funny because I just see it as this false veneer, because you can't be agile when you've got a 20-year-old banking platform underneath. You can't be rolling out change...every 10 minutes when you got to do a 30-day regression cycle for a mainframe computer”*.

Key to the implementation of Agile is also sorting out the monolithic systems that are high interrelated and tightly coupled. This makes it difficult to change, test, recover and develop on a continuous basis. This was further examined by DBA13_ALL who explained *“Initiative are moving to agile, are moving into these digital factories and the unbundling more than any of the other ABCDs, the unbundling is a very big deal. Because what it does is allows you to actually create new products and services out without having to rip apart and change these monolithic applications”*.

It's not just an application problem but also the complexity of the underlying infrastructure that can mean product becomes end of life, if not focused on. Banking expert DBA21_ICA states that *"banks have established highly sophisticated rails and infrastructure that isn't going to be replaced in the short term completely. Other niches, other attempts, and other initiatives going on will actually eat part of those activities away, yes...but it is a system that's grown over 20, 30 years and it's just not that unfit for purpose"*.

5.4.3.3 Chain around the neck

It is clear that the problems of legacy infrastructure and technical debt have built up over many years and are due to poor decision making at the time. It will take time and money to fix these issues.

This has been described as a chain around the neck by banking expert DBA13_ALL *"we're sitting on all of these, that is the chain around our neck and until we can actually get the business to understand that unless you're going to make another large capital investment, it's going to take us a very long time to get this anchor off our neck and you have no choice but to pay"*.

Another interviewee DBA14_AUS explained that *"tech debt is a huge problem and I think it's going to be a problem, because it's going to swallow up more dollars just when banks don't need it. I think the tech debt will also result in system instability, when they don't need it"*. This also introduces the issue of cost to maintain but also to fix the challenges, as well as potentially causing instability on old systems.

The cost issue was covered by a number of banking experts as described by DBA1515_HK who stated that *"it's very difficult to invest in the right places because such enormous infrastructures have been built to deal with the regulatory agenda. The renewal agenda also has to be factored in just to keep things current, making sure those things don't break. They are spending a phenomenal amount of money on that"*. This shows the multiple agendas that incumbents have at the same time to hold things together and keep up to date with regulatory issues.

Expert DBA26_FIN7 states *"they've tried to change legacy systems over a couple of times and it cost them hundreds of millions of dollars...only a few people actually know how that's a big problem"*.

The added challenge is that new entrants can use the latest and most modern infrastructure and techniques that release new functionality faster and are much cheaper to maintain. Fintech expert DBA15_HK states *“it's what was better described (as) your margin is my profit...they're able to see without the incumbent legacy costs”*.

Banking senior executive DBA28_MIS stated that *“I think you can overcome it . . . if you take a more systematic approach. I mean this is a problem everybody has...if all tech companies have that, then some are more successful than others. I mean Microsoft almost died from its legacy...and then tackled it. I mean this is, this is normal. Everybody has it. Google has it. Everybody has it. I mean some are more successfully managing it than others”*

5.4.3.4 Implications

The implications of technical debt are that this could slow down development and potentially risk stability as systems become old and they take up significant levels of investment to maintain and to fix. The challenges also go into the fact that legacy systems costs are significant. They absorb a significant amount of the banks investment funds just to maintain the existing functionality.

5.4.4 Fixed costs and margins under pressure

The technical debt challenge and the cost of fixing this or maintaining this is a huge drain on the financial resources of incumbent banks. This is happening at the same time as competition is attacking revenues and regulators are requiring significant implementations also taking up valuable development spend.

5.4.4.1 Costs

Incumbent banks being too costly and being more fixed in costs came up in the interviews. If revenues reduce and costs are fixed, this will put pressure on margins quickly. The incumbents not only need to replace lost revenue streams but to also look to reduce the costs or at least make them more variable.

One banking executive DBA19_CR stated banks can implement *“New structures, new products, new cards can be set up really quickly if it means that we can capture revenue. When it comes to managing costs and cost bases, they're just simply not agile, and my take on that is (that) they have to control the cost base. And then with*

the pressure on margins, it's been about achieving economies and crushing things together”.

A Fintech and banking expert DBA14_AUS explained how the change investment, the most significant investment that banks have at their disposal is being eaten up by challenges. He explained *“we're going to spend this amount of money and you know what, 40% of that is going into regulation portfolio, 25% of it is going into the IT security and that now gives you 35% and on top of that. We've got Fintech coming in...and so you've actually got 5% for change. So, (if) you look at that combination it's a perfect storm. You ask how they're going to actually defend themselves, because I doubt they're going to (have) huge amounts of money to do that”.*

Banking executive DBA21_ICA explains *“I think banks are really caught in the middle. Somebody said yesterday, we have the regulatory change every 43 minutes or something like that, so 26,000 or something a year...a huge amount. So high regulatory pressure, no margins from the interest side, so really not making money anymore”.*

Another Fintech and Banking expert DBA17_CAR explained that new entrants have cost income ratios much lower than traditional banks *“I think the cost to income ratio is between 20% and 30%. Most of the retail banks are in the mid-50's, the good ones and many of the top ones are below 50, but nobody is reaching 30, or 35. The latest study from City said, if you're not an established bank, if you don't digitalize, your revenue loss would be significant. If you don't have additional footprint that can absorb the revenue loss then (there can be a) huge impact on return of equity too.”*

IT can however be implemented to lower costs. Traditional banks have much more to gain from new technologies to lower costs as new entrants already have these advantages. This was explained by banking expert DBA13_ALL who stated *“I think there's probably more of the promise of the cost savings and that's not what I said AI that's real AI, not robotics. I think robotics has hit the mass market already. I think the most lift we can get out of that, I think there's – that was the low hanging fruit taking, so what did we do”.*

5.4.4.2 Revenues

It is not just costing that is an issue and opportunity. Revenues are being attacked that makes the cost/income ratio even more challenging to fix. Costs are a change to reduce but revenue are under attack at the same time.

Interview DBA12_DOM explained *“I think the more immediate impact is going to be on transaction fees, I think. And again, there there's going to be a bit of a race between the banks' abilities to lower their transaction costs by mergers and costs and automation and whatnot and the incumbent . . . and the attackers trying to provide on a completely different cost per transaction level”*. This is in the context that the Fintech's or Bigtechs are lowering transaction costs reduce the revenues or taking revenues off incumbent banks.

This was elaborated on by DBA13_ALL who stated *“I mean I don't see that big thing that's going to drive significantly more revenue. I mean, the cost will come down and that will continue, so we'll get more efficient, will have more technology. That'll drive down costs, which may drive on margin, but I just don't see the revenue side, the tops aren't growing that much”*.

Technological changes help all to become more efficient however this lowers costs for clients as competition increases, as summarized by banking executive DBA28_MIS *“the absolute spend will probably not increase because the revenue comes down. Because I mean successful digitization makes you more competitive, and therefore . . . and others also more competitive, so they're driving probably the revenues down”*.

5.4.4.3 Implications

It's clear than the cost structures of incumbent banks need to reduce to compete with more competitive entrants. However, while keeping up with regulatory changes and reducing technical debt, the investment left to invest in exploring new revenue growth opportunities is reduced. We will be seeing if the focus therefore is just sustaining investments or if disruption investments are being made.

5.4.5 Short termism, lack of long-term investments and sell side analysts

The point around incumbent banks taking short term investments driving by incentives or the need to satisfy sell side analysts came up in interviews. These topics will be examined in detail using the feedback from interviews.

5.4.5.1 *Fintech's and Bigtech's invest differently*

There seems to be pressure on banks to invest in a different manner than our new competitors. This was explained by a banking executive DBA11_AJAX who explained *"I think it's a business case question. There's this whole drive for business case and it needs to be a positive, the bottom line needs to be positive. If you get Amazon, I don't think that Amazon made any money the first ten years. That won't fly in the existing corporation"*. This was in the context that long term business cases kept getting rejected but Fintech's or Bigtechs' plan longer term and manage expectations around this.

This was further expanded on by banking expert DBA12_DOM who explained *"they may be judging Bigtech's or Fintech's differently, with a greater willingness to basically price the upside whereas in banks, I think they're looking for a lot more concrete evidence of what is your profit, your cashflow, your next three quarters outlook on net new money. There may be less of a willingness to engage in longer horizon"*.

5.4.5.2 *Shareholders influencing*

The influence of shareholders and sell side analysts requires there to be a short-term focus on quarter by quarter results. This is explained by banking expert DBA16_SU who explains that *"We find that they're not investing enough and they're not investing enough, because there is pressure from the shareholders to deliver back on their investment"*.

Banking expert DBA23_CO explains that *"think banks have very few of those kinds of visionaries right now on, as CEOs who can go in and convince you know the larger investor population that even though it may be quite negative for the banks in the – in the short term, the returns that they could have –could be multifold"*. The context leads on from senior leaders not having grasped the opportunities to even be able

to pull together a convincing story around the need for great and more long-term investments.

Interview DBA25_TRUM then added *“Along with the board, and then we try to implement the strategy that fits that direction, right? So, on some level, if you think about this disruption or you think about where we're going to be in 5, to 10, 15 years, right?”*. This just highlighting that the resolution of the technical debt and then pulling together a plan to invest in digital disruption to defend and reposition the company into the future will take much longer than 5 years.

5.4.5.3 Incentives

The point around short-termism and shareholders quarterly results is heavily linked to the share price. Executive pay structures tend to be linked to the price of shares over a 4-year period.

A number of leading banks are taking part in share buyback schemes despite the need for additional investments or longer-term investments as per the interviewees. One Banking executive DBA9_BAT observed *“If as an incumbent bank, you're doing a share buy-back program, basically they're selling to the market, I don't have better investment opportunity, so here's your money back. I can't believe that with the amount of old back office systems, the amount of change required, that's not a sensible thing to do. Any other industry, any other firm will be slaughtered for it”*.

This was linked by banking expert DBA2_IKA to short term gains *“I know, of course, some measures like staggered payouts of bonuses have a certain incentive that the bank performs well even after your departure, but no the incentives are still too short-term oriented”*.

5.4.5.4 Implications

Incumbent banks are judged differently than the new entrants. They are required to produce more stable and short-term earnings. They are looked at as being dividend stocks that will pay an annual return for keeping the stock. This puts pressure on investments and the length of time they are allowed to pay back. However, disruptive investments take longer to payback and can get overlooked. This will be examined in the observational study.

5.4.6 Processes and Routines

Processes and routines were mentioned in the context of being slow and bureaucratic. Incumbent banks are large organizations and are often organized on a way along business divisional silos. These structures have been around a long time and designed around efficiency and effectiveness. This helps control the business but also slows down change.

5.4.6.1 Too slow

The topic of slowness was well covered by banking executive DBA3_MELE who stated *“though they say they’re not risk averse, they are bureaucratic and hierarchical and the approval of the process, and we’re just too slow in our decision making”*.

Another interviewee DBA13_ALL reflects on how this would kill any Fintech by explaining *“so, internal audit would go in and not treat them like a partner. They treat them like an extension of the business. We would kill that place. They would need seven times the people to do what they do now”*.

Banking expert DBA7_ALLDAY stated that *“I think right now, we just operate with so much rigidity and so much process around us that we don’t have the agility as much as we wanted”*.

And DBA10_JSO believes this is a cultural issue that they need to challenge. They stated *“I think you need to challenge every process or approach that pose a delay into the system. I think you need to have a culture where that’s expected. Anything that seems cumbersome and doesn’t make sense, be allowed to ask why and expect to get an answer. I think you have to find a way to erode hierarchy and seek good ideas from wherever they come”*.

However there maybe hope. In a crisis processes and friction can be bypassed as explained by banking executive DBA29_GA who stated *“I think they should be agile enough. COVID-19 has shown us that things can move on a dime it’s only through either whether it be politics or internal . . . I was going to say egos”*. The context here was that during the COVID crisis, quick decisions and investments were made very quickly by missing out the huge processes that normally govern decisions.

Another point of view was made by Fintech and Banking expert DBA14_AUS who added a different perspective saying *“So I would say that in summarizing it that the sweet spot is probably in the middle, but much more towards the Fintech’s, but the Fintech’s need to up their game and move a bit move to the left”*. The context was that Fintech’s move too quickly and need some of the rigor that incumbents have. Incumbents need to be more like Fintech’s. The right way is somewhere in the middle.

5.4.6.2 Politics and Silos

Some of the challenges large incumbents have is internal battles or working in silos. This was covered by banking executive DBA22_FIN2 who stated *“challenges are sort of the organizational silo mentality. Knowledge management is, something I care about personally quite a lot and people just don’t think to share their failures and their learnings throughout the organization, because of that, you end up with people failing with the same mistake over and over again and not learning as an organization”*. They expanded the point stating *“So you tend to see people being very competitive within their own organizations and even teams where I think what’s more important is the performance of the team rather than the individuals. And I think, unless people start changing the approach to that, the incentives are going to drive the wrong behavior, right”*.

5.4.6.3 Implications

If routines and processes get out of hand, then the business can become too slow and frustrate innovation efforts. These tend to be very costly as well. There needs to be a blend of appropriate processes and routines with entrepreneurial drive. Some of the challenges are driven due to the organization being large, silo’s driving politics and with incentives that results in internal competition. However, incumbents can move in a crisis so it’s not impossible.

5.4.7 Customers

The last of the internal barriers to change was the focus on the existing customers. This was mentioned the least. This could be due to the fact that the interviewees just don’t recognize this as a barrier to change or it’s the least influential issue. This is counter to the work completed by a number of academics (O’Reilly Iii & Tushman, 2013).

5.4.7.1 Sustaining Innovations

Banking executive DBA1_NAN1 stated *“You're still concentrating on your old business, and you know you should really be looking into other things”*. This was further expanded on by banking specialist DBA15_HK who saw that the existing spend was on sustaining innovation stating *“spending \$1.5 billion or \$2 billion on change of the existing platform, are sustaining innovations”*.

Banking executive and Fintech Expert DBA19_CR stated *“I see long term as developing a relationship with the bank, I see that as being where banks will focus on the future. It almost seems that that the mass retail banking is almost like a loss leader so they can maintain a relationship with a customer as they get, you know, later on in life, as they get into more high income”*.

Banking specialist DBA15_HK states that its *“very difficult for themselves to invest in the right places, because they built such enormous infrastructures that with the regulatory agenda, the renewal agenda just keeping things current, making sure those things don't break. They are spending a phenomenal amount of money on that”*. This is in the context of maintaining both the existing customers and regulatory requirements.

5.4.7.2 Implications

Just focusing on sustaining innovations and regulation could mean that the opportunity of exploring new markets, products and services are missed. The investment process needs a top down and bottom up approach that looks at new opportunities and existing ones. This explore and exploit is important for the long-term sustainability of the bank during times of disruptive change.

5.5 Incumbents are Reacting

We have already looked at the changes in the industry through the forces of disruption. We have also looked at the barriers to these forces. The last section looked at the barrier's incumbents have internally to change. Now we look at the step's incumbents are doing. These are decisions and actions they are proactively driving. This doesn't mean they are easily implemented because of the internal barriers to change but these are the capabilities incumbents are driving. As part of

the observation study we have looked into what is actually being done and the pace of this change. This section is based on the interviews of experts who have set out the item's incumbents are or should be doing.

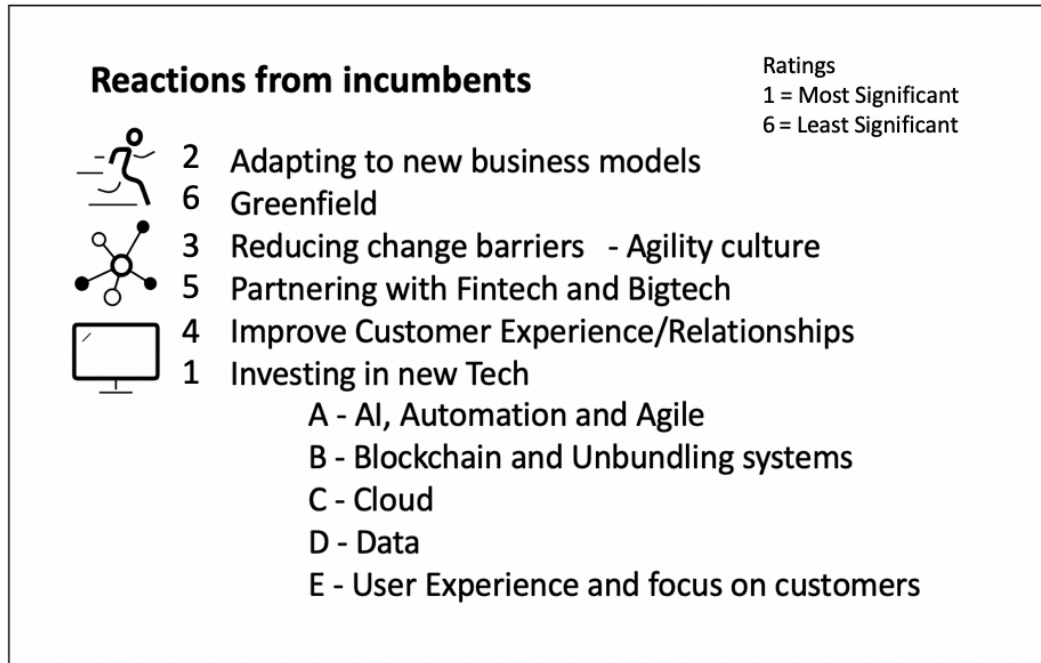


Figure 5.21 - Reactions from incumbents

5.5.1 Investing in new technology

The biggest reaction from incumbents that was mentioned is the investment into new technology. These are strategies, decisions and actions to drive the bank towards a more agile and digital force to meet the changes of disruption.

In financial services products and IT have been linked for years. The industry is one of the biggest investors in IT compared with other industries, however banking executive DBA30_LEF doesn't think this is always invested correctly. They stated *"banks spend a lot more money on IT than any other industry. Right, on revenue. So, do they do this in a smart way? You can answer yourself. Probably not, otherwise they would not be where they are. But I don't think you, you can double the money. I don't think it will help. Actually, you probably should force them to reduce the money. I would significantly cut budgets and see what comes out of it"*.

Banking executive DBA11_AJAX challenged that investment budgets are all taken up by sustaining innovations and not enough on disruptive technology. They stated *“True innovation funds I think is sub 5%. I wouldn’t even probably put my money on that. It’s probably 1%. The rest is just around digitalization of existing processes, but not through innovation. When we went through the list yesterday, I don’t think that I saw anything that was true innovation”*.

5.5.1.1 Customer Experience

Banking executive DBA19_CR explained the urgency to respond and to match the customer experience Fintech’s are introducing. They explained *“Unless banks respond very quickly, by offering the same flexibility that the new entrants are offering, with ease of doing transactions in each transaction, yeah they’re going to find the competition increasingly more difficult to cope with. And they’re going to have to respond very fast with very high-impact and useful user platforms, internet-based platforms because that’s where the new entrants are going to come from”*.

This may require the ability of the bank to link in and integrate with other Fintech providers stated interviewee DBA12_DOM. They stated *“If you think about open architecture by fund providers or by wealth managers, you can search up a similar thing more broadly for financial products. Why wouldn’t there be something like an open architecture for different financial products, where the architecture and the platform and the core is provided by a bank and through that kind of saves its role, and it offers the integration of different Fintech’s and their specialized offerings”*.

5.5.1.2 Cloud

Some of the investments are purely just fundamentally needed investment to tackle technical debt but also to add infrastructure capacity. Banking expert DBA29_GA explained *“the fundamental stuff about cloud technologies and security and artificial intelligence and the machine learning side of things, you know, how to deliver this stuff robustly, Internet of Things, you know, the managing of many, many components and orchestrating them to deliver a service”*.

5.5.1.3 Blockchain

With new technologies that could disrupt or change financial services, there is also a lot of hype that comes with the potential. Leading banking expert DBA11_AJAX stated

“There’s a lot of discussion around AI and even blockchain in a way, to be able to, Bitcoins and those kinds of stuff. To be able to do that, you need to have the processing power. At the moment that is not available. We can talk about all these hypes around AI and blockchain, but it’s going to remain in its infancy until we have solved quantum computing. I think there are only like two quantum computers at the moment live on the planet. I think there is a lot of hype before it actually becomes reality”.

New technologies are being looked at in proof of concepts in most banks Interviewee DBA12_DOM explained *“blockchain on one hand, because it fundamentally changes the notion of how do you establish trust and what is required if you need some form of intermediary activity or mediation activity between different business partners”.*

Another banking executive who commented on digital currencies DBA1_NAN1 stated *“If I looked at it 10 years' time from now and say . . . the big one they're talking about is digital currencies, and I have my own opinion about cashless society, I don't think it's a great idea in any shape or form, the government knowing exactly every single penny you've ever spent in your life and taxing you on it”.*

Specialist banking and Fintech expert DBA28_MIS stated *“Interesting but probably in the trough of disillusionment at the moment is the blockchain. I believe it may have, it may . . . I mean, it may have impact but obviously it's not going to completely change. I don't think so. So, it may have impact in two ways. I believe it can change the banking models in various ways. I mean, obviously currencies become investible. I mean, this is . . . there are a number of banks that offer Bitcoins as an investment product. And to be very honest, the wilder the policies of the central banks become, the more interesting that becomes”.*

5.5.1.4 Data, AI and Machine learning

Another technology that was mentioned to be overhyped but also got a lot of mentions by experts was AI and Machine learning.

Banking executive DBA13_ALL explained applications are being used successfully in areas like risk and fraud protection *“So for those of us that are surveilled like our financial advisors between natural language and machine learning, they can literally pour through hundreds of thousands of emails per second, looking for things and over*

time with the help of humans training it, they're getting better and better and better to the point, where it is the same thing with trade surveillance or looking through hundreds of thousands of cash transactions”.

AI has the potential to lower barriers to help new entrants bridge the experience gaps mentioned in the barriers to disruption section. It also could solve issues for incumbent banks. Interviewee DBA19_CR explains *“I think that is where artificial intelligence could give new entrants a march over our current legacy bank offering. I think AI and the advancement of AI is something, I don't know about exciting but I just find it really worrying from a banking perspective. I see the threat is coming from there”.*

The fundamental building block to AI, will be the access to data. Expert DBA21_ICA stated *“I think it's all about the data. So, the moment that you have multi banking, you get an oversight about the real wealth of your client. You see what products they have, where they have it, when they expire. Gives you an opportunity to give them a better offer for where to put their money next, right. So, if you're active and you're the first one and you have the best customer experience with somebody to look into open banking and to getting in, then you get the data”.* Companies and incumbents are investing significant funding in sorting out their data.

5.5.1.5 API's and Open Architecture

One of the challenges highlighted in the barriers to internal change was the legacy architecture. Expert DBA13_ALL explained the investments need to break up the large monolithic systems stating *“I got to tear open that monolithic personal lending application and put commercial lending into it, when the right way is going to get that large scale application, pull the services and API's out that you need, and just stitch them together with a loosely coupled rules engine so that you can change it as the business evolves. And no one in the business is really thinking about that, that's what tech brings to the table, that's what cloud and unbundling are really going to bring to the business but it's not going to take us nine months and three months of QA regression testing to make a change to move into a parallel segment like commercial lending, when I can do that in three months including testing”.*

5.5.1.6 Platforms

The largest firms in the world are platform companies and some are attacking financial services. The largest financial service company is also a platform player called Visa. Platforms are effective within banking. Banking executive DBA28_MIS stated *“So the platform businesses are also the most valuable businesses. And their relative value has also increased versus the traditional players. So, in a way, in other fields, there you can see that very, very strongly seen the asset management. You're either a boutique or you're a, you're a super-duper mega tycoon like BlackRock”*.

Another interview DBA7_ALLDAY explained that *“payment utilities to clear payments using Fintech ecosystems like a WhatsApp, or a Facebook or an Amazon, or a WePay, WeChat platform to distribute your products to your consumers, because your consumers are already attached to an ecosystem”* could be way to distribute your services to a much bigger mass distribution and therefore linking with a platform maybe an opportunity.

All these technologies that are being invested in gather data. Although very valuable, this need to be used very ethically and securely. Banking executive DBA9_BAT said *“Platforms have so much data but they need to be very careful Amazon, Facebook, Google can combine it with the data analytics and scale and they have the relationship, but the funny thing is here you come back to the distinguishing feature of trust. Facebook is very much under pressure now because of its privacy and banks have been brutalized by many things. But privacy, so far, has been upheld what's going to happen if banks start selling the data which is a goldmine. There would be huge reputational risks in that”*. This is a reminder that trust can very easily be lost if companies do not use their data ethically. These comments were off the back of Facebook data scandals that hit the press in 2018.

5.5.1.7 Implications

Banks are looking at an array of investments from improving customer experiences, linking with Fintech's, making their systems more modular, sorting out their data, investing in AI and looking at the over hyped Blockchain. They are doing this while investment levels are significant but huge proportions are invested in regulations and sustaining the current complex systems that have been built up over time.

5.5.2 Adapting to new business model

The new forces for disruption are forcing the incumbent banks to look at new ways to organize themselves and also look at new opportunities. In this section we will look at some of the opportunities in new business models coming out of the interviews will be discussed.

The changes in the industry are forcing banks to think differently and this could lead to new ways of delivering the products explained DBA7_ALLDAY. They explained *“what it forces banks to do is to think about their products and think about their consumers in a very different way and come out of the traditional branch, physically bounded banking system that we've traditionally come from to an unbounded system where products can interchange across platforms and you leverage partners to promote your platforms”*.

At the moment each incumbent bank operates front to back services. They do the client engagement, product design, delivery, processing and services. The new Fintech's are not trying to do everything themselves but instead offer a platform and partner with others. The new challenger banks provide some services and through API's they knit many suppliers together into an aggregation of services for the customers. This offers choice to the clients, new innovative offerings and spreads the development costs.

As the universal banking model is attacked, it is unlikely that current banking structures will remain viable. Non-value adding services could be completed together for all banks for certain products to share the increasing costs of compliance. These utilities could focus on commodity transactions and ensure that the cost is reduced through scaled platforms. The model of each bank doing their own solution, doesn't make sense anymore. There were many comments around the changing nature of the banking structures as business is eroded. Will banks be aggregators of services, platform players or just specialists who hold the relationships with clients? These are fundamental questions that are uncertain now but understanding how disruption is working may provide some insights into the future.

Banking expert DBA28_MIS stated *“I think the large banks have to decide what they want to be. Should they be specialized to platforms or do they want to be aggregators. Personally, I believe if they are well positioned to be good aggregators”*.

The topic of bank consolidation was addressed by DBA28_GA who stated *“I think it's a stepping stone to some consolidation really, because the winners will become very clear then, you know, everyone talks about it, but how do you differentiate yourself, how do you make sure that, you know, you're distinctive”*. There has been very little banking consolidation since the banking crisis when banks were deemed too big to fail. This has resulted in inefficiencies across the industry.

One interviewee had a view that mergers were important to reduce down the cost of banks. DBA12_DOM stated *“I think the more immediate impact is going to be on transaction fees. There's going to be a bit of a race between the banks' abilities to lower their transaction costs by mergers and costs and automation”*.

As new entrants disrupt the structure of the incumbent markets, reducing prices and impacting revenue flows, incumbents will need to react. DBA6_IES1 stated *“I think there's opportunities to partner with other banks, for sure, and there are certain things that are really necessary for the industry or for the world overall where there aren't really competitive advantages”*. This relates especially to low relationship, standard and commodity banking products such as payments.

5.5.2.1 Implications

The forces of disruption will likely result in the incumbents looking to new ways to operate to cope with the changes. These could include utility type services for non-value adding services, looking to new opportunities maybe internally reorganizing to reduce friction points and speed up decision making.

5.5.3 Reducing change barriers

One of the change barriers is the fact that it takes a long time to get anything done. This was mentioned in the internal barriers section. Silo organization, rigid process and routines, lots of politics and other factors combine to slow and frustrate in the system.

5.5.3.1 Agile

Following on from Fintech and Bigtech companies who are developing software and changing in a more agile and nimble way, incumbent banks are looking to introduce

new techniques to speed up processes. This is not straight forward as it crosses into some aspects of culture.

Banking executive DBA7_ALLDAY states *“I think right now, we just operate with so much rigidity and so much process around us that we don't have the agility as much as we wanted. It's just where it was almost, we rank it a little bit because of our history. I don't think it's something we're not able to sort of capsulize and then multiply with. We sort of almost anchored a little bit with it”*.

This is confirmed by interviewee DBA10_JSO who explained *“I think there is a risk we share as an industry with the major corporations and it's most likely smaller, more agile companies that are likely to find ways to overcome their hurdles quickly. I think there is much bigger focus on agility and modernization and cleaning up legacy and what have you that is all the right stuff to be doing or to the bigger spend”*. This is showing the ambition to move to more empowered agile processes. DBA11_AJAX explained this ambition *“I think a lot of these banks are also becoming much nimbler, leaner, quicker, so they will call back. Are we agile enough, I think the answer is no. Can we react quick enough? The answer is yes. I know that sounds contradicting. I am sure I think we can be agile if we want to be agile”*.

Some banks are going even further as discussed in the last section on business models. Interviewee DBA12_DOM mentioned that some banks are co-locating together, *“One of the banks has gone radically agile and with co-location and co-development, I think it's ING is equally compared and it's incredible what it does to speed up bringing out new products, agility to adjust and innovation, but I think it was a very top-down decision to say no more IT over here, heavy expensive and you throw requirements over the fence and then you complain that you didn't get where you want to stop it”*.

However, it's not as easy as just saying you've become agile if the legacy and technical debt doesn't allow for fast release deployment methods. Interviewee DBA14_AUS explained that *“Okay, so I'll tell you that I think that you use the A word agile. So, the one thing that every bank is doing that I'm aware of is they are trying to introduce agile practices and so much they are spending millions and millions on consultants, who are coming in and talking about how adopts from methodology continue this or the other. And it's funny because I just see it as this false veneer, because you can't be agile when you got a 20-year-old banking platform underneath”*.

The other large challenge is that this can cut across the culture of the bank. Banking and Fintech expert DBA28_MIS explained *“I mean a key; a key element of agility is that you distribute responsibility. I mean you can't have agility and complete control at the same time. I think that's the key, that's the key dilemma banks are in. I mean if you . . . and I think partially it's the culture, but partially it's also the regulation...we have learned in 2008 and earlier as well that single mistakes somewhere in the large organization can jeopardize the enterprise as a whole. Therefore, we've created a system that controls good behavior into the organization or at least detects bad behavior quickly enough. As a consequence, we've lost agility”*.

Not everything needs to be agile. Books and records need to be strong and stable while front client facing systems need to change more regularly. Expert DBA4_SING explained that *“Agile is an overused word. Okay. I always tell my business what can be agile, what cannot be agile. There are certain things that can be agile. There are certain things that cannot be agile”*. So, when I look at my system platform I have to say, *“Look at what are systems of differentiation, system of innovation and the system of records.” For system of records where they are accounting and financials it can't be that agile. If you build your APIs fast enough, then you can be agile on the front end. So, it's a fine balance what can be agile, what cannot be agile”*.

5.5.3.2 Implications

It's clear banks need and want to move to more agile and nimbler practices. It's not that straight forward and technical debt and culture can slow this down. It will be interesting to see how incumbents move from command and control processes to nimbler empowered distributed operating models.

5.5.4 Improve customer experience and relationships

It is clear from the disruption forces that new entrants are providing new friction free technology that makes them easy to use, cool but lowers prices as well. It's also clear from the barriers to disruption, that the client relationships are key in retaining the banking relationships and services in the long term. It's important that incumbents match the experiences and better them. This challenge is explained by interviewee DBA13_ALL who states *“I think some of these Fintech's and other newer players in the market will build great apps. Take a look at PayPal; take a look at Venmo built*

great apps, but those great apps will likely interface more and more tightly with banks”.

The opportunity is there not only to match the experience but to use the intelligence of data to help provide more adding value services. Interviewee DBA22_FIN2 explains *“So I think the biggest thing there is removal of friction and enabling the customers to access the services that they need and I guess ultimately some level of intelligence that provides value to the customer”.*

The reaction has already started with the big players investing to match the experience. Banking expert DBA10_JSO explains that *“I think the big companies are already reacting. I think there are already signs – well, it's clear that the big players are already talking about technology, how to embed and how to engage with clients differently and multichannel and dealing with legacy and greenfield opportunities”.*

A lot of the interviewees mentioned the need to sort the frictionless front end for transactional banking but going a step further a continue to build deeper relationships beyond transactions. Banking expert DBA13_ALL talked about this *“I look at that at the upper end of the market and say, it's always been there. I don't know that technology is going to change that. Again, it's back to what a bank's appetite is and how they can find value in the client beyond just that one transaction. I think that's where some of the technology players aren't going to have that view of the client's relationship”.* This is echo's by DBA19_CR who said that embedding trust in the relationship and focus on areas that drive value *“I see long term as developing a relationship with the bank, I see that as being where banks will focus in the future. It almost seems that that the mass retail banking is almost like a loss leader so they can maintain a relationship with a customer as they get, you know, later on in life, as they get into more high income, but if they can't compete with the low-cost providers in terms of service and cost, that will move away and they will focus on the customers who are giving them higher margins”.*

The client wants the banks to operate in the best interest of them and not themselves. Expert DBA9_BAT *“What is it that makes you better in the eyes of the clients than the others? Or maybe not better, but to think that they say, okay, this is when we think your guys are really good at, but one is, where can I differentiate?”* this focus will lead to more client focused products and services.

5.5.4.1 Implications

It's important that the experience that new entrants are able to achieve are matched by the incumbents by building life time relationships which we know is a key barrier to the forces of disruption.

5.5.5 Partnering with Fintech and Bigtech

One of the Fintech and Bigtech business models is to work and partner with incumbent banks. This is also a potential barrier to their forces. Incumbent banks are in effect using Fintech's to complete their innovations for them. This open innovation model can help incumbents close the gaps in customer engagement or the way they provide for products and services.

5.5.5.1 Learning

Banks have significant knowledge of finance, having been around for hundreds of years but not always the top knowledge on technology. This was discussed with DBA10_JSO who stated *"I see that the tech companies have advantages they put the technology at the center of their business. They put engineering practice at the center of their business. They have therefore much cleaner more modern infrastructures to be dealing with, meaning they can plug and play much easier. They can leverage from the new upcoming Fintech's and the like"*. They can learn from each other and both learn.

5.5.5.2 Business impact

Partnerships and easy of use of products and services can have a real impact on business as explained by banking and Fintech expert DBA14_AUS who gave an example of Applepay stating *"So, they refused to -- if you have Apple Pay in the payment chain, I think an Android pathway, I think they charge 1.5% and the big fall is like bank pay and admin, we can't afford that. They said no. One bank said yes and that was ANZ and that was the best decision they made, because everyone, if you want to actually pay for anything with your phone, you either need to have an Apple Pay or Android or Google Pay and a lot of people started to leave to join ANZ"*. This forces banks to partner whether they want to or not.

5.5.5.3 Scale

Scale does have some advantages in banking as it spreads the overhead costs of compliance and governance across more transactions. Banking expert DBA19_CR explained *“Let just do it with a partner, achieve better economies of scale, better technologies, and the partner could most likely be other banks to be honest, for that but I certainly won't be giving away my, you know, doing joint ventures on the front end or anything like that”*.

5.5.5.4 Open innovation

Fintechs can be a great source of innovation and able to improve products better than incumbents. Partnering with Fintechs could result in a form of open innovation stated DBA26_FIN7 *“I think that banks, as long as the incumbents are, you know, have their incubators and there, the bank that is really focused on new tech, such as technology. And so, they're not just keeping the blinders off “*.

5.5.5.5 Alliances to drive technological changes

Bigtech have mastered some of the latest technology trends. Banks can use this expertise and outsource some of the work to them through alliances. Banking expert DBA7_ALLDAY – stated *“The alliance is an enabling alliance which allows us to pull our services and our applications and our products onto a micro service architecture using a hyperscale environment. Okay, that's great, but just imagine now taking that and being able to pull that into an API type of environment into older platforms that dominate market or consumers where the consumer over time”*.

This was further expanded on by DBA8_DISH *“So I would say that there is one option for the banks to really like, tie up with the Bigtech and then, you know, do a lot of things in a, collaborative manner, so sort of co-partition you know, sort of an approach to get things done, because I think what they can do is they can come from a tech angle and think versus banks will always think from a financial”*.

5.5.5.6 Implications

Incumbent banks can learn from new Fintech organizations. New development techniques, client experiences, speed of decision making and focus on outcomes. They can help bring needed innovation ideas into incumbents who are distracted by

many current topics. These partnerships are important for the incumbents to combat the challenges ahead.

5.5.6 Greenfield

Greenfield is simply starting a new digital setup from scratch instead of trying to fix the existing legacy system. The customers are then migrated over time. The advantages of new technologies and starting from scratch is appealing. RBS and JP Morgan tried this but then stopped them after a short period of time. However, this continued with the existing business models instead of replacing them. It's clear than incumbents are trying to make changes.

Banking expert DBA10_JSO explained *"I think the big companies are already reacting. I think there are already signs – well, it's clear that the big players are already talking about technology, how to embed and how to engage with clients differently and multichannel and dealing with legacy and greenfield opportunities"*.

Another banking executive who believed this might have opportunities DBA11_AJAX explained *"I would probably start a Greenfields bank for short and profitable pieces of the bank. I think wealth management is a good example where we can do a Greenfield bank. IB is always going to be chasing technology, so I'm not too worried about that piece"*.

There are some banks who are aggressively pushing this more than others DBA21_ICA explained *"we've seen some banks being much more aggressive about building Greenfield infrastructure, investing into new banking models, or already 10 years ago, completely starting to redesign their operating model and their tech stack. And those that haven't done are now very late to the party with a gross income ratio"*. This implies that not only do incumbents need to be watchful of Fintechs but also what other incumbents are doing. This was followed but by DBA5_LYE stating about other banks *"They have this thing. It's Greenfield, it's been built from scratch, it's using new technology"*.

5.5.6.1 Implications

Greenfield could be away to reducing the barriers of legacy and technical debt. However, other banks have tried it and reversed back including RBS Bo that was at the time, talked about the way others should go by consulting firms (Carrick, 2020).

6 Observation Study Findings

6.1 Introduction

As part of the interview process and results, it is clear that incumbent response is a critical component in repositioning firms to be able to tackle the challenge. A number of reactions incumbent banks could explore have been suggested. The observational study has been able to record actual reactions for an incumbent. External perspectives can be compared to an internal reaction in this case. As part of the observation study, unique access to the actual reactions and if this match to external perspectives on what other firms are doing.

This observation study will help to review and analyze the final sub theme: Understanding what investment decisions are being made to combat the growing threat of disruption within the financial services industry and the reasons why.

The interview stages highlight the reactions of incumbent. The focus of this observation study is to assess the reactions in more detail, understanding how and why decisions are made in the context of disruption is important. The resource allocation process is the biggest investment that incumbent firms have to invest in capabilities. Understand this helps understand the ability of incumbents to combat the forces of disruption.

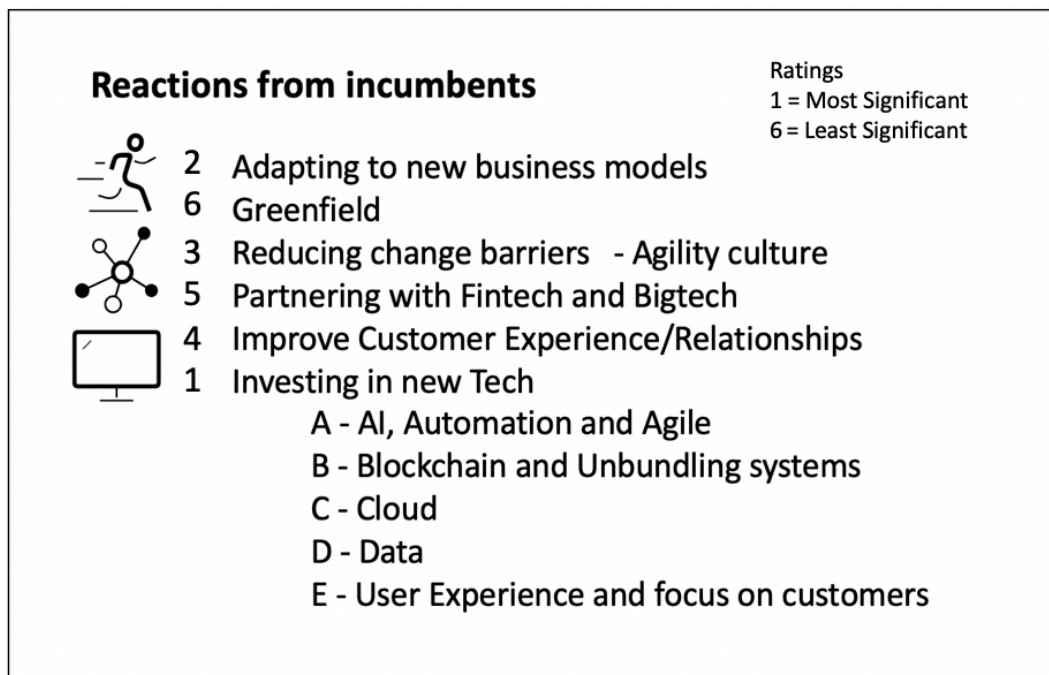


Figure 6.1 - Reactions from incumbents

This study shows how quickly an incumbent bank can react but also looks into the factors that determine this. This study looks deep into the decision-making processes and all the factors that govern decisions. Quick assessment could result in the wrong impression without understanding all the factors involved.

6.1.1 Investments by Incumbents

Each year incumbents invest significant investment funds in new capabilities that will drive future economic benefits. According to benchmarks around 10% of revenues each year are invested for the Financial services industry (Kappelman *et al.*, 2020). This investment could be used to create new dynamic capabilities, drive disruption within the industry, invest in risk mitigation, sustain innovations or efficiencies. This broadly aligns to the framework, Christensen discussed around investments in disruption, sustaining innovations or efficiency investments. Christensen discussed disruption as being the launch of often inferior products and services, but that were more accessible and affordable than the existing markets products or services. Overtime by learning customer requirements, disruption investments would mean a firm could continue to attack market share as the incumbent is complex and unable

to react due to internal and external factors as discussed in the interview stage (Benner & Tushman, 2015; Christensen, 1997a; Eisenhardt & Martin, 2000).

A major component of this case study and the associated data collection process is the 140-week observation study recording how the bank built and developed its dynamic technology capabilities. The observation study approach requires placing the researcher in the center of the investment education, strategy and execution process. As part of the study, the researcher needs to gain unprecedented access to the resource allocation and decision-making processes. It is further necessary to keep a clear and methodical record of meetings updated weekly in a observation study document.

6.2 A Review into the Key Factors Influencing if a Capability Moves to Execution

Three themes became clear in completing the complete the analysis. These became the three core investment stage categories to simplify the analysis. Decisions and discussions were categorized into one of three themes educational, strategic and execution stages.

Explanations of each:

- The educational stage is where the organization is assessing, reviewing and educating itself regarding technology. The maturity level, potential application, level of disruption, investment level and strategic alignment with the direction that the firm is heading is considered.
- The second stage is strategy stage. The assessment of the technology has been completed and the decision is to add this to the strategy of the bank. Technology may stay at this stage for some time while the case for investment is made, the resources are made available, the technology matures or the organization is ready to move to execution stage.
- The final stage is the execution stage where human and financial resources have been dedicated in sufficient levels to ensure that the implementation of the project will happen. At the execution stage decisions have already been made and implementation is happening. This still may take many years to

implement, this is of no concern as the issue is how quickly the technology moves through the different stages.

For each of these discussion and decisions, I needed to understand why certain decisions were moving forward and some were not. Was this down to reasons mentioned in the interviews regarding short-termism, maturity or not enough funds. What is being invested in and how long it takes to make key decisions was highlighted as a key point to becoming more agile and combating the forces of disruption. The additional dynamics will now be discussed.

6.2.1 Key factors in the decision-making process

First an initial period was used to gather information on investments. As part of this initial period, a record was kept of the dynamics being used to drive decisions. These were not always formally captured but these came up in most repeatedly. Over this initial period the factors were changed and substituted to get a consistent list. Over a 140-week period decisions and discussions would be recorded including 9 key factors shown below. This shows if the investment discussion/decision was linked to educational discussion, strategy or a decision to execute and linked to these 9 key factors. This provides insights into why some decisions moved forward more quickly than others.

1. Technology Maturity	2. Payback Period	3. Clarity of internal support
4. Aligned to Strategy	5. Complementary or Disruptive	6. Investment size
7. Dependency level on others	8. Perceived risk	9. Sustaining Efficiency - Disruptive

Figure 6.2 - 9 factors to help understand why some decisions move forward

6.2.2 The 9 dynamics

This section introduces each dynamic and how information was recorded. How these 9 dynamics impact the ability to execute on a key technology is important.

- Technology maturity is when the technology is or will be ready for use within a highly regulated industry. Low maturity indicates that the technology may have potential but needs to be mature before execution is ever possible. The observation study assessed this via the conversations that were being held. As this is subjective it has also been checked against Gartner hype curves to so there is alignment.
- Payback is looking at the period a project is supposed to payback its investment. A 3 year payback indicates that the project will pay its investment back by the third year post go live. The assessment was made based on the internal business case being created or if one was not in place the discussions being held.
- Clarity of the support is the level in the organization that supports the implementation. The study simply recorded the where the support was coming from. This could change over time so each entry recorded the perceived support level and an average was taken.
- Alignment to strategy looks at if the capability is within the boundary of the existing strategy or if this has been added new or came through later. The assessment is a simple yes or no.
- Complementary or Disruptive looks at if the technology supports the existing products or services and therefore complementary or disruptive by changing the business models or products/services.
- Investment size was captured and looked at the financial size of the project. For confidential reasons this information is not disclosed but just recorded consistently to help compare.
- Dependencies internally relates to the level of internal collaboration needed to get the project implemented. The larger the number of dependencies, the

higher the entry was captured. This is subjective but backed up through informal discussions with the project or product leads.

- Dependencies external relates to the need of collaboration of others external to the company. This refers to the need for an ecosystem of firms needed to enable a technology to meets its full potential. This is subjective but backed up through informal discussions with the project or product leads.
- Perceived risk is a cumulation of comments lead me to an entry against each capability discussion and decision. This could be due to complexity of the project, the length of time or dependencies on others to make it happen.

6.3 Findings: Education, Strategy and Execution

The capabilities being discussed or decided on are listed in the table. These will be looked at in the next section regarding invested capabilities. In this section we focus on what is affecting why some capabilities are being invested in and if these are the right capabilities. To do this we need to look at what stage the investment is at over time. The key stages are explained at the start of 6.2 as being education, strategy or execution

Every time a discussion happened on a capability, a record was kept for this in an observational database. I recorded the core themes and entries against the 9 dynamics. In figure 6.1, this shows the number of entries for the key theses. Each capabability has been mapped this in a time series chart that will be included the next section. It is possible to see which capabilities have moved to execution and which ones have not.

This shows the relative importance and helps distiguish the results. So the number of discussions are important to demonstrate the importance of the topic, but also how many there are in the key theme categories is important too. Example is Cloud that has high scores in the execution stage showing this is being executed. The scores are shown below. I also even weighted these scores with giving a 1 to education, 2 to strategy, 3 to execution. The reason being is that execution is more important hence a higher score. This was purely to just a look to see if this changed the weighting ranking. Cloud is no 1 under both views.

Table 6.1 - Observation study findings: Education, strategy and Execution

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	WEIGHTING Ranking
Robotics / Automation	4	9	4	17	4	2
Agile	0	5	4	9	7	6
Platforms	3	1	3	7	8	8
Cloud	1	8	11	20	1	1
Decommission / Legacy	1	4	7	12	6	3
Digitalization / User Experience	1	9	4	14	5	4
Data	5	10	3	18	2	2
Machine Learning	3	3	0	6	9	7

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	WEIGHTING Ranking
Greenfield	0	4	0	4	10	9
ERP Hana	0	1	0	1	12	11
AI	5	10	1	16	5	5
Blockchain	6	12	0	18	3	3
Fintech/Investments	0	3	0	3	11	10
Crypto	3	3	0	6	9	7

The higher scores show something was discussed many times and indicates how quickly technologies stayed in each stage. As entries were logged every week, it is possible to see the time in each stage and see how quickly decisions were made.

The table 6.1 shows that some technologies moved to execution and some got stuck in the strategy stage. Cloud is a good example where the technology moved through to execution very quickly and the peak of activity represents when deals with vendors were made at the very highest level of the bank. Blockchain is a topic that is a key part of the strategy and continues to be assessed. However, the technology is still maturing and needs significant collaboration from many peers. The large value representing discussions shows that these have happened over time and maybe due to the hype that followed the release of the technology.

In table 6.1 the number of decisions and discussions for the Cloud was higher than any other capability. Cloud also had the most points for execution. During the capability findings this study also looks at the length of time it takes to move from education to execution. Blockchain ranks third but that the majority of the scores here are in strategy. These are two good examples. Both are ranked very highly but they are at different stages of implementation. Blockchain is in strategy but Cloud is into execution.

Looking through the 9 dynamics, will attempt to give insights into the reasons why some technology capabilities are moving forward faster than others.

6.3.1 Implications

We can clearly see what stage each technology is in but at this stage don't fully understand why this is the case. Establishing what is being invested in and the stage is the first step only to understand the decision-making process.

6.4 The 9 Dynamics Impact Decisions

The 9 dynamics will be reviewed against the capabilities being invested in to get greater clarity on what is happening.

6.4.1 Complementary vs disruptive technology

6.4.1.1 Introduction

It matters if the technology is complementary to the organization's current technology, products or services or if the new technology changes and disrupts the existing products and services. Anderson and Tushman showed how it was easier for companies to implement complementary technology as it helped the current organization meet the demands of existing customers (Anderson & Tushman, 1990). This means the rewards, incentives and strategy as well as the personal goals of individuals are more easily aligned making implementation easier. This also aligns to the notion of who decides what should be invested in. The resource allocation processes tend to be more bottom up in nature. Disruptive investments need a different approach as often the operating managers making the decisions are unlikely to vote for disrupting their own roles or businesses. Sometimes disruption investments will take away from the focus on current customers, the payback might be much later but overall drives greater value for the firm.

6.4.1.2 Results

Entries logged whether the discussions concerned more complementary technology implementations or more disruptive options. These entries subjective in nature and applied the work of Anderson and Tushman (Anderson & Tushman, 1990). As this was consistent over 140 weeks, it is possible to compare technology discussions to

give insight into why some implementations have moved to execution and some have not.

Table 6.2 - Complementary vs Disruption

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Complementary/ Disruptive
Robotics / Automation	4	9	4	17	4	Complementary
Agile	0	5	4	9	7	Complementary
Platforms	3	1	3	7	8	Complementary
Cloud	1	8	11	20	1	Complementary
Decommission / Legacy	1	4	7	12	6	Complementary
Digitalization / User Experience	1	9	4	14	5	Complementary
Data	5	10	3	18	2	Complementary
Machine Learning	3	3	0	6	9	Complementary

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Complementary/ Disruptive
Greenfield	0	4	0	4	10	Disruptive
ERP Hana	0	1	0	1	12	Complementary
AI	5	10	1	16	5	Disruptive
Blockchain	6	12	0	18	3	Disruptive
Fintech/Investments	0	3	0	3	11	Disruptive
Crypto	3	3	0	6	9	Disruptive

The below table shows a summary of the discussions. Most technology lines listed have many discussions logged. The final column in the table summarizes an outcome for that technology as 'complementary or disruptive. This is derived from the comparative higher number, e.g. 17 entries in total for robotic. The conclusion of complementary vs disruption was made by using the mean average of the entries. This method was consistently applied and should enable insights into what is happening and if complementary technologies or disruptive technology implementations are a factor in moving to execution or not.

The table clearly shows that most of the technologies in the execution stage are all complementary. This means they support the current business models, products and services and will be more supported by the existing incumbent staff as they support the delivery of objectives. Technologies in the strategy stage are a mix of complementary and disruptive. There are 4 disruptive technologies that will change the business models, products and services and 1 are complementary.

Looking at cloud implementation; a complementary technology that improves the way that infrastructure is deployed. Compute, storage and databases can be deployed at

rapid speed, lowering the time to market for new features while being safe, secure and cost effective. This helps deliver the existing business models and solutions in a far more effective way. Blockchain however is a system that disintermediates the banking systems. This changes the existing models that have been around for many years. Blockchain is a threat that could reduce revenues for incumbents in payments and cross border FX transactions. This isn't moving forward at the same pace as the other technologies.

6.4.1.3 Implications

Just based on this information, there seems to be a bias towards more complementary technologies that sustain the current business models and not disrupt them. This seems to support the theories from academics who propose this will be a bias in incumbent firms.

6.4.2 Payback period

6.4.2.1 Introduction

The financials are just one consideration when investing in a new technology and capabilities. Net present value or internal rate of return are considerations. However, for years now, the business community has been frustrated by the lack of clear links between technology spend and return on investment. It can be seen that those who invest first in innovation and technology are more likely to be successful than the ones who don't (Geroski & Machin, 2013). It seems logical that projects that return the highest levels of free cash flow returns after considering the cost of capital, should be the investments that are prioritized first. However, often shorter projects with less payback are prioritized because of short-term focus bias of the CFO's. This is even more challenging if investments are focused on sustaining innovations or make changes to existing products and services. These investments ensure that the firm continues to be competitive and results in revenue protection or cost avoidance benefits. Essentially this is investment to stand still hence there isn't much growth in the top or bottom line. This is challenging to explain and justify that it would have been worse if you had not invested.

6.4.2.2 Results

The observation study assesses the payback period as short (1-2 years), medium (3-4 years), long (5 to 7 years) and very long (7 to 10 years or more). Table below looks to isolate this dynamic to see if this is a key conservation in why some technologies are in the execution phase.

Table 6.3 - Payback execution/strategy analysis

Capabilities being implemented

	Education	Strategy	Execution	Total	Ranking	Payback
Robotics / Automation	4	9	4	17	4	0-3
Agile	0	5	4	9	7	0-3
Platforms	3	1	3	7	8	5-10
Cloud	1	8	11	20	1	3-5
Decommission / Legacy	1	4	7	12	6	0-5
Digitalization / User Experience	1	9	4	14	5	3-5
Data	5	10	3	18	2	5-10
Machine Learning	3	3	0	6	9	0-3

Capabilities under Strategic Review

	Education	Strategy	Execution	Total	Ranking	Payback
Greenfield	0	4	0	4	10	5-10
ERP Hana	0	1	0	1	12	5-10
AI	5	10	1	16	5	3-5
Blockchain	6	12	0	18	3	5-10
Fintech/Investments	0	3	0	3	11	3-5
Crypto	3	3	0	6	9	5-10

Over the duration of the observation study a record of the payback periods of each technology implementation was kept. This was based on discussions, estimates and business cases depending of the maturity of the technology itself. The payback period is logged against each discussion. This was more difficult if the discussions related to more than one technology at the same time, some implementations related to AI and Data or Cloud and decommissioning for example. However, when applied consistently over the duration some interesting comparisons can be made.

The table suggests that the payback period for the items in the execution stages have a shorter payback period; mainly 0 to 3 years or 3 to 5 years. Platform implementations are much higher at 5 to 10 years, but this is an exception. The average payback for items in the execution stage is much lower than the technologies in the strategy stage. It is possible to conclude therefore that it is easier to move to

execution mode if the payback period is lower. This may be due to the governance and finance processes requiring shorter term paybacks as Christensen observed. This is also supported by Graham et al who identified 78% of CFO's would prefer short term results over longer term increases in value for firms. It is very difficult to make conclusions as to why this is, but it supports the literature conclusions.

There is a weighting of more short-term payback but the bank is not against large longer-term payback projects so there may be more other more impact factors to consider.

6.4.2.3 Implications

On its own, payback seems to be a factor in the implementation of technology capabilities. From the table it's clear that technologies in the execution phase are more shorter-term payback.

6.4.3 Technology maturity

6.4.3.1 Introduction

Overtime technologies will progress and mature. Especially within financial services, it is important that incumbents use technologies that have very high levels of certainty of working due to the regulated nature of the business. Issues can quickly cause reputational damage or issues with regulators. A number of technologies have matured as the processing power of infrastructure increased exponentially in recent years. For example, Cloud offering within financials services, or Agile tooling, Dev ops or AI. We have seen all of these mature over recent years.

6.4.3.2 Results

The observation study assesses the level of maturity perceived from the meetings. This study looks at the maturity change over time and more importantly if this maturity level impacts the decision-making process. This should give some insights into why some technologies progress at a faster pace than others.

Table 6.4 - Technology maturity - execution/strategy analysis

Capabilities being implemented

	Education	Strategy	Execution	Total	Ranking	Maturity
Robotics / Automation	4	9	4	17	4	High
Agile	0	5	4	9	7	High
Platforms	3	1	3	7	8	High
Cloud	1	8	11	20	1	High
Decommission / Legacy	1	4	7	12	6	High
Digitalization / User Experience	1	9	4	14	5	High
Data	5	10	3	18	2	Medium
Machine Learning	3	3	0	6	9	Low

Capabilities under Strategic Review

	Education	Strategy	Execution	Total	Ranking	Maturity
Greenfield	0	4	0	4	10	Low
ERP Hana	0	1	0	1	12	High
AI	5	10	1	16	5	Low
Blockchain	6	12	0	18	3	Low
Fintech/Investments	0	3	0	3	11	Low
Crypto	3	3	0	6	9	Low

A subjective but consistent comparison has been recorded. Each week the maturity level of technology discussions has been logged, each log has been recorded without reference to previous entries. This should result in more consistent results and allow comparisons.

The below table shows a summary of the discussions. The level of maturity in the execution categories are much higher. The areas that are not in the execution stage are judged as being less mature. If there were many lines per technology, then the category that had the most consistent entry is used. Most lines for Cloud have high maturity noted. As you can see all categories in execution mode have high maturity. In the strategy stage the maturity level is mixed. Four categories have low levels of maturity, 1 has high maturity and 1 has medium maturity. We can see that automation has high maturity meaning the technology has been implemented, proved and works. In comparison AI is less mature and is still being reviewed, and so in strategy. This does not mean that all AI is not mature but there are limited examples of where AI is implemented to drive value especially in the risk and fraud protection space. However, given the huge transformational nature of AI we are still very much at the beginning of the potential impact. ERP implementation is an outlier, this is likely to be linked to other reasons for its delay in implementation, and not maturity. The large

size and cost of projects coupled with the long payback time could be greater considerations than the maturity of the ERP systems.

6.4.3.3 Implications

It's clear that the maturity of a technology seems to be a key consideration as to why one capability has been implemented ahead of another. This means that the maturity of a technology seems is a key influencer regarding how quickly a technology can be implemented.

6.4.4 Aligned to technology strategy

6.4.4.1 Introduction

Within the incumbent bank there is a strategic roadmap. This is conceptually a high-level directional document that highlights the direction the firm moving towards. This enables the firm's projects to be aligned so anything misaligned will be examined to ensure it is really worth doing. The observation study notes if there are any technologies that are progressing outside of the strategy roadmap. Is this a factor related to how quickly new technology capabilities are implemented within the incumbent bank? This is a straight forward assessment to make as it is either in the strategy or not. This has been easy to record because the CIO (or Head of Technology) and the CEO have both been consistent throughout the study period.

6.4.4.2 The results

Table 6.5 - Technology strategy aligned - execution/strategy analysis

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Aligned
Robotics / Automation	4	9	4	17	4	Yes
Agile	0	5	4	9	7	Yes
Platforms	3	1	3	7	8	Yes
Cloud	1	8	11	20	1	Yes
Decommission / Legacy	1	4	7	12	6	Yes
Digitalization / User Experience	1	9	4	14	5	Yes
Data	5	10	3	18	2	Yes
Machine Learning	3	3	0	6	9	Yes

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Aligned
Greenfield	0	4	0	4	10	No
ERP Hana	0	1	0	1	12	Yes
AI	5	10	1	16	5	Yes
Blockchain	6	12	0	18	3	Yes
Fintech/Investments	0	3	0	3	11	Yes
Crypto	3	3	0	6	9	Yes

A record of the strategic alignment of the technology discussions was kept. These observations are less subjective as the technology implementation is either part of the strategy or not. For each line, a consistent record was made based on the strategy and discussions within the observation study timeframe.

If there were many lines per technology, then the category that had the most entries was identified and used. However, for strategic alignment there is full consistency as the assessment is much easier. The vast majority of the implementation discussions were on items that aligned to the strategic directions that had been set. This is no surprise and as you would expect and predict. Both the execution and strategy stages had high levels of strategic alignment which means that even the strategic items were part of the overall strategy. Only one item was not part of the strategy, this was identified as a trend during the observation study following a paper by Oliver Wyman (Chavez, 2019) stating that it was time for incumbent banks to start again and build new digital banks as part of a Greenfield strategy. A number of banks including RBS with Bo (Carrick, 2020), and JP Morgan with Finn, created new digital offerings. During the timescale of this study both new offerings were closed and were absorbed into the existing incumbent. It is difficult to assess if these were complete failings or if

these new experiments raised important learning points that the incumbents will use in the future to combat the rise of challenger banks.

6.4.4.3 Implications

It is clear from the findings that strategic alignment is not a key reason why some capabilities are being implemented more quickly than others as they are nearly all strategically aligned.

6.4.5 Dependency on others – Internal collaboration

6.4.5.1 Introduction

Whether projects required significant levels of collaboration was recorded as part of the observation study. If the project was more stand alone and could be implemented with limited involvement, this was also recorded. Do projects need significant levels of collaboration and does this determine if the project moves forward at pace or not? Blockchain is a suitable example. On paper this could replace the payment system of banks with a secure, reliable and cheap way of doing payments and cross border flows. It however needs a significant number of departments to work together to set up the standards and governance processes to ensure all the technology works. This would include legal, compliance, security, risk, finance, front end business, marketing, operations and technology.

6.4.5.2 Results

The observation study assesses each technology capabilities to see if there are dependencies in their implementations. This could increase the level of implementation risk and slow down implementation if reliance on others.

Table 6.6 - Internal dependencies - execution/strategy analysis

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Dependencies Internal
Robotics / Automation	4	9	4	17	4	Low
Agile	0	5	4	9	7	Low
Platforms	3	1	3	7	8	High
Cloud	1	8	11	20	1	Low
Decommission / Legacy	1	4	7	12	6	Low
Digitalization / User Experience	1	9	4	14	5	High
Data	5	10	3	18	2	High
Machine Learning	3	3	0	6	9	Low

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Dependencies Internal
Greenfield	0	4	0	4	10	High
ERP Hana	0	1	0	1	12	Low
AI	5	10	1	16	5	High
Blockchain	6	12	0	18	3	High
Fintech/Investments	0	3	0	3	11	Low
Crypto	3	3	0	6	9	High

Internal dependencies being high or low is subjective but completed in a consistent way across the whole observation study and therefore comparisons should be deemed valid. The results are mixed. For items in the execution stage, you can see that there are four low dependency entries and two high dependencies. For the strategy stage, there are four high dependences and two low dependencies. This shows that the execution stage has less internal dependencies than the strategy stage. You could therefore conclude that more items have less organizational collaboration complexity in the execution stage and can therefore move forward at pace. There are a few high dependencies at the strategy stage. Data and Blockchain require significant levels of cross functional and business coordination. This is one of many factors resulting in these being still at the strategy stage.

6.4.5.3 Implications

The level of internal dependencies results are mixed as its not clear how significant this is. It doesn't not seem to be the critical factor as to why a technology capability is implemented or not.

6.4.6 Dependency on others – External collaboration

6.4.6.1 Introduction

Records were kept to see if projects required significant levels of external collaboration or if projects were more stand alone and could be implemented with limited external involvement. This thesis set out to see if projects need significant levels of external third-party collaboration, and if this determines whether projects move forward. Blockchain is an example used previously but similarly relevant here. Blockchain could disintermediate the existing banking system, or if banks work together and get there first then they could replace the existing payment, FX, cross border transactions or trade finance processing. This needs a significant number of banks to work together to set up the standards and governance processes to ensure that all the technology works and give reassurance around regulations.

6.4.6.2 Results

The observation study assesses each technology capabilities to see if there are dependencies in their implementations. This could increase the level of risk and slow down implementation if reliant on others. Is external collaboration being a factor in how quickly technologies get implemented?

Table 6.7 - External dependencies - execution/strategy analysis

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Dependencies external
Robotics / Automation	4	9	4	17	4	Low
Agile	0	5	4	9	7	Low
Platforms	3	1	3	7	8	Low
Cloud	1	8	11	20	1	Low
Decommission / Legacy	1	4	7	12	6	Low
Digitalization / User Experience	1	9	4	14	5	Low
Data	5	10	3	18	2	Low
Machine Learning	3	3	0	6	9	Medium

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Dependencies external
Greenfield	0	4	0	4	10	Low
ERP Hana	0	1	0	1	12	High
AI	5	10	1	16	5	Low
Blockchain	6	12	0	18	3	High
Fintech/Investments	0	3	0	3	11	High
Crypto	3	3	0	6	9	High

The results show that for technologies in the execution stage you can see they all have low dependencies. For the strategy stage, there are three high dependencies and three low dependencies. This shows that the execution stage has fewer external dependencies than the strategy stage. It could be concluded that more items have less external collaboration complexity in the execution stage and therefore can move forward at pace. There are a few high dependencies at the strategy stage. Blockchain and Fintech are both examples of technology and innovations that will need more external collaboration than automation of internal processes. This makes sense. There are some items within the strategy stage that have low external dependency levels but are still recorded at this stage. For these items the levels of dependencies are not the key factor why they have not moved forward. For Greenfield, the lack of maturity and lack of strategic alignment maybe bigger factors. For AI, the level of disruption and low level of dependencies could be bigger factors. For Data maybe maturity levels and longer payback periods are responsible. Further work needs to be done here to gather greater insight.

6.4.6.3 Implications

It is clear that the level of external dependencies might have an impact on the ability of the company to execute on plans. The need for a ecosystem to be in place and the need for critical mass players to also implement the same technology capability all at the same time seems to be an impacting factor.

6.4.7 Perceived risk

6.4.7.1 Introduction

People will only focus on doing what they are currently doing, being asked to do, being rewarded for and believe they can deliver (Bower, 2017). Executives will also only execute within their perceived level of authorization and hence focus on items they are comfortable they have the remit to deliver. Going outside of what they believe they can deliver or going beyond their remit will increase personal risk. In financial services the financial rewards and therefore personal risks of making mistakes is high, especially given the financial crisis mistakes of the past and the high focus of regulators. Assessing the relative (and perceived) risk profiles of different technologies is an important part of the study. This is relatively subjective but consistent through all technologies. The problem is people will only take on what they

believe they will be successful at and what they will be rewarded for. This is especially the case within financial services that has a significant level of regulatory control.

6.4.7.2 Results

Technologies in this study have been classified by the researcher as low, medium or high-risk implementations throughout the duration of the study.

Table 6.8 - Perceived risk - execution/strategy analysis

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Risk level
Robotics / Automation	4	9	4	17	4	Low
Agile	0	5	4	9	7	Low
Platforms	3	1	3	7	8	High
Cloud	1	8	11	20	1	Low
Decommission / Legacy	1	4	7	12	6	Low
Digitalization / User Experience	1	9	4	14	5	Low
Data	5	10	3	18	2	Low
Machine Learning	3	3	0	6	9	High

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Risk level
Greenfield	0	4	0	4	10	High
ERP Hana	0	1	0	1	12	Low
AI	5	10	1	16	5	Medium
Blockchain	6	12	0	18	3	High
Fintech/Investments	0	3	0	3	11	High
Crypto	3	3	0	6	9	High

Each discussion relating to the implementation of technology was placed into a risk category. Risk is now independent from the other factors that have been reviewed; like the size of the project, payback or maturity. However, risk looks at this through a different lens. Risk can be a collection of a number of reasons why something is more at risk or not. In this case the final outcome based on the discussions is recorded. Where there were multiple lines relating to the technology, the category with the most same items is used as the final summarized view. This has been consistently applied and therefore should be useful to compare. The findings are quite clear as compared to other more mixed categories.

Items in the execution stage are rated at low risk and at the strategic stage can be seen to be higher risk. Maybe this is obvious that within a highly regulated business the only lower risk projects will be in the execution stage as the technology has been

proven. There however could be more to this; more disruptive technologies that upset the status quo could come with personal risks. Projects that are not complementary to the existing business may not have the same levels of support, and therefore will come under pressure and scrutiny to perform. It seems clear that risky projects stay in the strategy stage until risk or perceived risk has reduced.

6.4.7.3 Implications

It seems clear that the level of risk either technical or personal to the person sponsoring the project, does seem to impact the implementation speed. This also could just be linked to other framework categories like technology maturity or external dependencies hence this may not be fully independent and instead just a combined view of risk from the other categories.

6.4.8 Clarity of support

6.4.8.1 Introduction

This is about who in the organization is backing the investment project; who they are and their track record and power within the organization. It is also about who is not supporting the initiative, their role and their power within the organization. The energy, position, track record of delivery, alliance of backers and top-level support is very important if significant levels of finite resources are being invested. If investments are being made in one area they are not being invested in another, and therefore will have some potential challengers to the initiative, especially in highly siloed organizations like banks (Bower, 1970).

6.4.8.2 Results

As part of the observation study the level of support the technology has over time is assessed. This is expected to change as the case for investment grows, but the level of decision making within the organization and power base for and against any implementation has been recorded.

Table 6.9 - Support - execution/strategy analysis

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Internal support
Robotics / Automation	4	9	4	17	4	Operational
Agile	0	5	4	9	7	Operational
Platforms	3	1	3	7	8	GEB
Cloud	1	8	11	20	1	Operational
Decommission / Legacy	1	4	7	12	6	Operational
Digitalization / User Experience	1	9	4	14	5	Operational
Data	5	10	3	18	2	GEB
Machine Learning	3	3	0	6	9	Operational

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Internal support
Greenfield	0	4	0	4	10	Operational
ERP Hana	0	1	0	1	12	Operational
AI	5	10	1	16	5	Operational
Blockchain	6	12	0	18	3	GEB
Fintech/Investments	0	3	0	3	11	GEB
Crypto	3	3	0	6	9	GEB

The level of support a technology is receiving and if this impacts the speed of implementation of this technology was recorded throughout the duration of the 140-week observation study. If there were multiple line entries in the log relating to internal support, the most entries have been used for the summary report. For example; Automation has operational support the most within the observation study log. This is subjective but it has been consistently applied across all entries over the time period. The findings are interesting and a little surprising.

Most of the entries in the execution stage have operational support. This is the Chief Operating Officer level support of the business divisions. The areas within the strategy stage has more Executive level support. This at first seems counter intuitive. The higher the level of executive support for a project then the easier it should be to gain support. So, there must be other factors stopping these projects. The possible reasons for this could be that these technologies are more disruptive in nature and need more high-level oversight. They tend to be more long term and strategic in nature and again need more senior support due to the potential risk and impact on the current business. It could also be that the people setting the innovation programme of work tend to be operational level staff, who just focus on delivery within their risk remit and focus on more short-term projects.

6.4.8.3 Implications

It is not clear how impactful the level of support has in the implementation speed. This doesn't make initiative sense as it is logical that the higher the level of support for a project you would expect the implementation to be quicker.

6.4.9 Investment size

6.4.9.1 Introduction

Some investments that are very large take significantly more time to review and see if the benefits of such a large investment is really worth it. Large scale investments increase risk when compared to smaller short-term projects. The case and benefits need to be clear and risk adjusted. Time and time again business cases get approved based on a set of assumptions that turn out to be incorrect in the future; by which time the damage is done. The reality is that the future is uncertain and therefore there will always be an element of risk for investing in new ideas. However, large investments come under additional scrutiny.

6.4.9.2 Results

As part of the observation study, the investment size is assessed. For confidentiality reasons, these will be placed into small, medium, large and very large categories. This consistent approach allows comparisons and to see if there is any bias.

Table 6.10 - Project size - execution/strategy analysis

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Size
Robotics / Automation	4	9	4	17	4	Low
Agile	0	5	4	9	7	Low
Platforms	3	1	3	7	8	High
Cloud	1	8	11	20	1	High
Decommission / Legacy	1	4	7	12	6	High
Digitalization / User Experience	1	9	4	14	5	High
Data	5	10	3	18	2	Low
Machine Learning	3	3	0	6	9	Low

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Size
Greenfield	0	4	0	4	10	High
ERP Hana	0	1	0	1	12	High
AI	5	10	1	16	5	Low
Blockchain	6	12	0	18	3	Low
Fintech/Investments	0	3	0	3	11	High
Crypto	3	3	0	6	9	Low

Over the 140-week period the size of the project was recorded. This is essentially making a call regarding the investment level and resources dedicated to the implementations. When there were multiple entries per technology line, the one with the most same entries was selected for the summary of the results. This was consistently applied and therefore should enable comparisons.

6.4.9.3 Implications

There are more largescale projects within the execution stage of implementation but the results are every mixed. Technologies in the strategy stage have more smaller sized projects. This could appear counter intuitive as you might think that larger projects would be delayed due to the potential risk. However, the size of the resource investment does not seem to be a factor in determining if a project will move from education to execution to strategy.

6.4.10 Sustaining Innovations, efficiency or disruptive investments

6.4.10.1 Introduction

This section looks to see what type of investment is being made and what the investment is trying to do. This directly tests the theory of Christensen. His view was

that companies would priorities existing customers' needs and forgo the potential new disruptive investments. The focus on customers is needed, but can lead to oversupply of functionality, products and services that can become costly to maintain. If new players come into a market, they have the opportunity to meet the customers' needs but at a far cheaper price using inferior products, but these may become good enough for the price being charged. Is there any bias with the implementation of technologies between these categories?

6.4.10.2 Results

Table 6.11 - Efficiency/Sustaining/Disruptive - execution/strategy analysis

Capabilities being implemented						
	Education	Strategy	Execution	Total	Ranking	Sustain/Efficiency /Disrupt
Robotics / Automation	4	9	4	17	4	Efficiency
Agile	0	5	4	9	7	Efficiency
Platforms	3	1	3	7	8	Sustaining
Cloud	1	8	11	20	1	Efficiency
Decommission / Legacy	1	4	7	12	6	Efficiency
Digitalization / User Experience	1	9	4	14	5	Sustaining
Data	5	10	3	18	2	Sustaining
Machine Learning	3	3	0	6	9	Efficiency

Capabilities under Strategic Review						
	Education	Strategy	Execution	Total	Ranking	Sustain/Efficiency /Disrupt
Greenfield	0	4	0	4	10	Sustaining
ERP Hana	0	1	0	1	12	Efficiency
AI	5	10	1	16	5	Disruptive
Blockchain	6	12	0	18	3	Disruptive
Fintech/Investments	0	3	0	3	11	Disruptive
Crypto	3	3	0	6	9	Efficiency

Over the 140-week period each entry contains a record of whether the discussion related to sustaining innovations, efficiencies or disruption. Sustaining innovations are projects that enable the company to keep up with the existing customers' needs through continuous change of products and services. Efficiencies is where the bank identifies opportunities to deploy technologies to reduce the cost of the existing work being completed; automation is a good example where there are time/speed advantages of moving work from a human to a robot. However, the main reason is overall efficiency of time, resource deployment and cost. The last category is disruption, this is where technology is being deployed to access customers who cannot access the current product and services due to costs. Often the service

deployed is an inferior product to the existing products but will access a much bigger pool of revenue. An example could be the automation through AI of wealth advisory. The ability to choose a selection of shares based on risk and performance criteria can now be completed purely by computers. This doesn't have the same personal touch as a personal client advisor but is significantly cheaper and therefore accesses a new segment of the market.

The findings show that projects in the execution stage are mainly efficiency and sustaining innovation led. Sustaining projects that keep up with current customers' needs with the potential of over supplying the customer requirements at cost. The other projects are efficiency led, driving down the costs of the banks. In the strategy stage this is far more mixed, three of the lines are Disruptive but all in Strategy with no Disruptive within Execution. This does seem to be a factor in how quickly projects move from education to strategy and then into execution.

6.4.10.3 Implications

It is clear from the analysis that the focus of the current projects that are in execution are more focused on efficiency and sustaining innovations. Its also clear that the strategy section is more focused on disruption.

6.4.11 Summary overall findings – Some are more important than others

Each category has been reviewed separately and now to gain more insights this section will look at the overall position, look at the most significant ones and look to see if there are connections between the categories.

Table 6.12 - Overall tables showing what is being executed vs not being executed

Capabilities being implemented											
	Execution	Complementary/ Disruptive	Payback	Maturity	Aligned	Dependencies Internal	Dependencies external	Risk level	Internal support	Size	Sustain/Efficiency /Disrupt
Robotics / Automation	4	Complementary	0-3	High	Yes	Low	Low	Low	Operational	Low	Efficiency
Agile	4	Complementary	0-3	High	Yes	Low	Low	Low	Operational	Low	Efficiency
Platforms	3	Complementary	5-10	High	Yes	High	Low	High	GEB	High	Sustaining
Cloud	11	Complementary	3-5	High	Yes	Low	Low	Low	Operational	High	Efficiency
Decommission / Legacy	7	Complementary	0-5	High	Yes	Low	Low	Low	Operational	High	Efficiency
Digitalization / User Experience	4	Complementary	3-5	High	Yes	High	Low	Low	Operational	High	Sustaining
Data	3	Complementary	5-10	Medium	Yes	High	Low	Low	GEB	Low	Sustaining
Machine Learning	0	Complementary	0-3	Low	Yes	Low	Medium	High	Operational	Low	Efficiency
Capabilities under Strategic Review											
	Execution	Complementary/ Disruptive	Payback	Maturity	Aligned	Dependencies Internal	Dependencies external	Risk level	Internal support	Size	Sustain/Efficiency /Disrupt
Greenfield	0	Disruptive	5-10	Low	No	High	Low	High	Operational	High	Sustaining
ERP Hana	0	Complementary	5-10	High	Yes	Low	High	Low	Operational	High	Efficiency
AI	1	Disruptive	3-5	Low	Yes	High	Low	Medium	Operational	Low	Disruptive
Blockchain	0	Disruptive	5-10	Low	Yes	High	High	High	GEB	Low	Disruptive
Fintech/Investments	0	Disruptive	3-5	Low	Yes	Low	High	High	GEB	High	Disruptive
Crypto	0	Disruptive	5-10	Low	Yes	High	High	High	GEB	Low	Efficiency

There are the following observations:

- Complementary vs Disruptive
- Payback
- Maturity
- External Dependencies

6.4.11.1 Complementary vs disruptive

You can see from this chart, that the majority of the implementations are focused on sustaining the existing business products and services or driving efficiencies. The disruptive capabilities are still in the strategic category and more focused on growth or changing business models.

Table 6.13 - Complementary vs Disruptive significance

	Execution	Complementary/ Disruptive	Payback	Maturity	Aligned	Dependencies Internal	Dependencies external	Risk level	internal support	Size	Sustain/Efficiency /Disrupt
Robotics / Automation	4	Complementary	0-3	High	Yes	Medium	Low	Low	Operational	Low	Efficiency
Agile	4	Complementary	0-3	High	Yes	Low	Low	Low	Operational	Low	Efficiency
ERP Hana	0	Complementary	5-10	High	Yes	Low	High	Low	Operational	High	Efficiency
Platforms	3	Complementary	5-10	High	Yes	High	Low	High	GEB	High	Sustaining
Machine Learning	0	Complementary	0-3	Low	Yes	Low	Medium	High	Operational	Low	Efficiency
VR / AR	0	Complementary	3-5	Low	No	Low	Low	Low	Operational	Low	Efficiency
Cloud	11	Complementary	3-5	High	Yes	Low	Low	Low	Operational	High	Efficiency
Data	3	Complementary	5-10	Medium	Yes	High	Low	Low	GEB	Low	Sustaining
Decommission / Legacy	7	Complementary	0-5	High	Yes	Low	Low	Low	Operational	High	Sustaining
Digitalization / User Experience	4	Complementary	3-5	High	Yes	High	Low	Low	Operational	High	Efficiency
Greenfield	0	Disruptive	5-10	Low	No	High	Low	High	Operational	High	Sustaining
AI	1	Disruptive	3-5	Low	Yes	High	Low	Medium	Operational	Low	Disruptive
Crypto	0	Disruptive	5-10	Low	Yes	High	High	High	GEB	Low	Efficiency
Blockchain	0	Disruptive	5-10	Low	Yes	High	High	High	GEB	Low	Disruptive
Fintech/Investments	0	Disruptive	3-5	Low	Yes	Low	High	High	GEB	High	Disruptive

You could conclude that the business is just focused on sustaining innovations that complement the existing customers and business models through the current product and services. However, the firm is driving the strategy for the disruptive elements at the same time and is looking to both invest in both disruptive capabilities and sustaining. However, it is clear that at the moment the executing projects are focused on sustaining, shorter term payback and more complementary to the existing business models.

6.4.11.2 Complementary/disruptive and payback

Firstly, categories that don't seem to show correlation between implementation at the execution stage will be disregarded and therefore we can focus on the more significant categories. Size of project, internal support and internal dependencies have mixed results across execution and strategy and therefore there will be no further focus on these categories as the outcomes will also be mixed. We are also discarding the impact of strategic alignment as all apart from 1 are strategically aligned and therefore cannot be a significant reason why some are being implemented and some are not so will also be discarded.

So, the remaining part of this section will be focused on complementary vs disruptive technologies, payback, maturity of the technology, risk and external dependencies. We will start by looking at the complementary vs disruption correlation and payback. This will add more insights to see if there are significant trends here.

Table 6.14 - Complementary vs Disruptive and payback by execution/strategy Split

	Execution	Execution/ Strategy	Complementary/ Disruptive	Payback	Maturity	Aligned	Dependencies Internal	Dependencies external	Risk level	Internal support	Size	Sustain/Efficiency /Disrupt
Robotics / Automation	4	Execution	Complementary	0-3	High	Yes	Medium	Low	Low	Operational	Low	Efficiency
Agile	4	Execution	Complementary	0-3	High	Yes	Low	Low	Low	Operational	Low	Efficiency
Platforms	3	Execution	Complementary	5-10	High	Yes	High	Low	High	GEB	High	Sustaining
Cloud	11	Execution	Complementary	3-5	High	Yes	Low	Low	Low	Operational	High	Efficiency
Data	3	Execution	Complementary	5-10	Medium	Yes	High	Low	Low	GEB	Low	Sustaining
Decommission / Legacy	7	Execution	Complementary	0-5	High	Yes	Low	Low	Low	Operational	High	Sustaining
Digitalization / User Experience	4	Execution	Complementary	3-5	High	Yes	High	Low	Low	Operational	High	Efficiency
Greenfield	0	Strategy	Disruptive	5-10	Low	No	High	Low	High	Operational	High	Sustaining
AI	1	Strategy	Disruptive	3-5	Low	Yes	High	Low	Medium	Operational	Low	Disruptive
Crypto	0	Strategy	Disruptive	5-10	Low	Yes	High	High	High	GEB	Low	Efficiency
Blockchain	0	Strategy	Disruptive	5-10	Low	Yes	High	High	High	GEB	Low	Disruptive
Fintech/Investments	0	Strategy	Disruptive	3-5	Low	Yes	Low	High	High	GEB	High	Disruptive
ERP Hana	0	Strategy	Complementary	5-10	High	Yes	Low	High	Low	Operational	High	Efficiency
Machine Learning	0	Strategy	Complementary	0-3	Low	Yes	Low	Medium	High	Operational	Low	Efficiency
VR / AR	0	Strategy	Complementary	3-5	Low	No	Low	Low	Low	Operational	Low	Efficiency

It can be seen from the chart below that the executing capability trends to be more focused on complementary technologies supporting the existing customers with existing products and services, and these technologies are more easily adopted by the organization as it does not threaten the status quo (Anderson & Tushman, 1990). The implementations will likely be more easily backed by the organization who require the changes to stay on track with competitors or get ahead. These support what is going on in the organization today and will be widely supported. They tend to be more short term focused. This enables the return of the investment to be approved quickly internally.

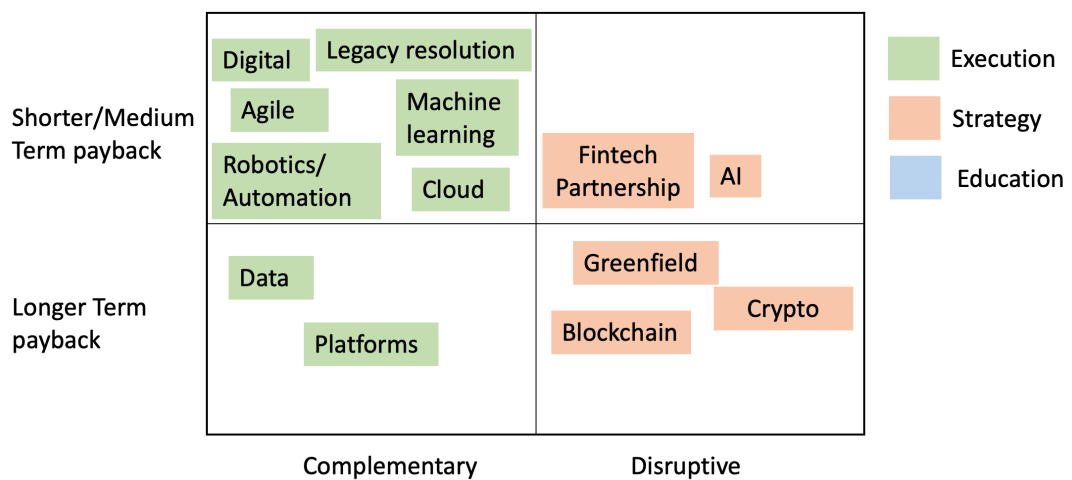


Figure 6.3 - Complementary vs Disruptive and Short vs long term payback

6.4.11.3 Maturity and external dependencies

Attention will now be turned to the maturity of the capability and readiness to implement.

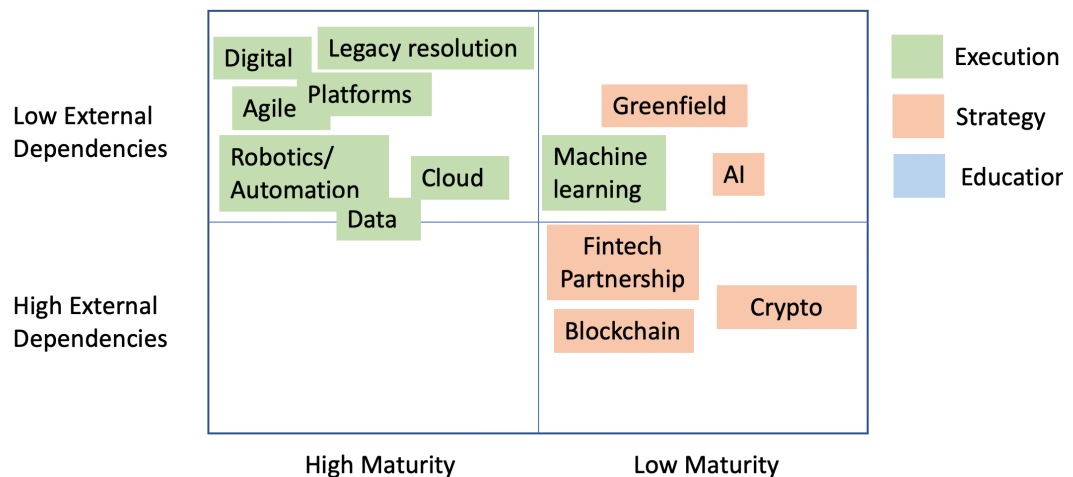


Figure 6.4 - Maturity vs External Dependencies by execution/strategy Split

It can be seen from the chart that the execution phase tends to be based on more mature technologies. This makes sense as a highly regulated business is likely only to implement technologies at the right time in their life cycle. They are implemented when the technology is proved and sometimes this will need regulatory approval. The executed capabilities have very low external dependencies. This enables the technologies to be executed using the existing internal resources and processes. This enables the implementations to go at the pace of the incumbent organization and does not need to coordinate across different cultures. The capabilities not being implemented have higher external dependencies and are less mature and not therefore ready.

6.4.11.4 Conclusions

At first glance incumbents are making short-term investment decisions focused on efficiencies. The focus being complementary technologies that continue to sustain the current business models. However, the reasons maybe not be as clear as just investing short-term just for efficiencies and sustaining current customer needs. The level of maturity of the new technologies are not there yet and monitored and strategized.

6.5 A review of the investment decision making process

6.5.1 Introduction

The investment process starts by operating committees planning for each individual division separately within their silo's. The level of investment as a base discussion starts with the previous year's investment. Looking through the benefit profile over the past 3 years, the benefits are skewed to being revenue protection benefits in the main and risk mitigation. Given the regulatory environment post financial crisis, all incumbent firms have been hit with increased regulatory requirements. These have been focused on banks providing greater levels of transparency to regulators, reducing the risky types of trading that banks previously participated in and ensuring banks are more financially stable by forcing them to hold increasing levels of common equity tier 1 capital. The benefits are therefore more focused on revenue protection due to the sustaining nature of the investments, or risk migrations due to these changes regarding regulation.

The analysis shows we are not seeing as much investment into efficiencies or disruption. As per the overview of the findings, the reasons are complex and highly interconnected. It could be due to the lack of maturity of the technology or dependencies on others to get things completed, the size of the project and lack of clarity of payment.

To add to the insights one of the potential reasons is the process to determine the investment itself. Christensen suggested that the processes of incumbent firms were focused and biased to maintaining the status quo, focused on over servicing current customers and the processes would always stifle new innovative disruptive ideas focused on growth (Christensen, 1999). This coupled with the work completed by Joseph Bower, that looks at how a bottom up process might be led by people who have boundaries with no reward for completing other more ambitious work.

Extract from Joseph Bower (Bower, 2017)

"The behavior of the executives in these corporations is governed by the organization design, the planning and budgeting systems, the measurement and information systems, and the incentive systems used to manage activity. The framing of business plans and capital budget proposals reflect what executives believe they are being

asked to achieve. Rather than the words on paper that top executives' issue in strategic plans or published in annual reports, operating managers try to succeed in the jobs they have been given and for which they are paid, where, as is often the case, they are paid for meeting short-term financial objectives, that is, how they use the resources available to them".

6.5.2 The process and potential issues

This raises a number of interesting points. The organization design will have a huge impact on the way the resource allocation process works. The investments will be based upon what the individual is being asked to do, and not necessarily on the strategic plans of the firm. The focus tends to more focused on short term financial objectives (Christensen, Kaufman & Shih, 2008; Dallas, 2012) and not long-term value growth.

The ability of organizations to learn and continue to grow by challenging itself to be better is based on the need for learning teams who can implement what is needed. The more complex the organization and the presence of senior executives who don't listen to the suggestions or even push back negatively, will reinforce organization boundaries and ensure individuals focus on personal risk (Detert & Edmondson, 2011; Edmondson, 2013).

The observation study assessed and documented the investment decision making process. Below is a simplified process design to represent what was observed.

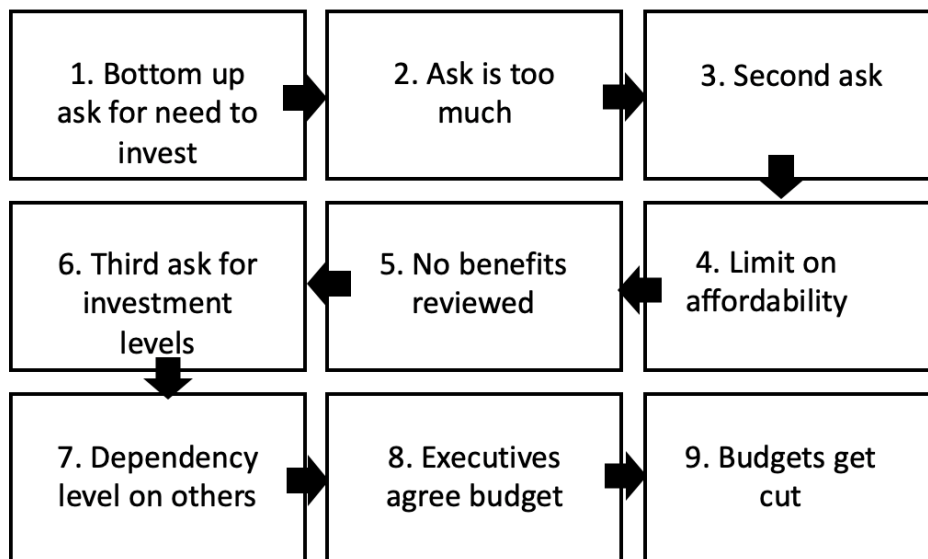


Figure 6.5 - Simplified process map

There are hundreds of people involved in different business divisions. The start of the process begins with a request that goes out to portfolio leads, who gather the need for investment within the functions or businesses the portfolio leads represent. This means the process is highly distributed across the organizations and lower down within the organization.

Most of the portfolio leads are executive director level and many layers below board layer. This involves the gathering of demand based on perceived needs. Part of this need is the carry forward of existing projects that need to be completed in the following year and some is new demand that is not required to be completed.

The focus of the portfolio lead is to get as much resource allocation as possible as they are competing for an unspecified finite investment level. This is why the amounts delivered in step 2 are always too much for the organization to spend. Despite a target being set, the amounts or need will always outstrip the financial reality. The CFO's tend not to be involved so there is no challenge or assessment pre-consolidation. The original ask is rejected and the teams are asked to come back with something more realistic. The second submission is also too high and then after a review session, targets are set for the portfolios to deliver. This is based on previous targets adjusted for any new risk or regulatory items.

6.5.3 Key observations

The shape of the portfolios has been focused on revenue protection and risk mitigation. Post target setting, the portfolios are asked to resubmit again in line with targets, this goes to the executive board to rubber stamp. 3 years in a row after 10 months of going through a bottom up highly distributed process, the budgets are cut to a more sensible and sustainable level.

Key observations:

1. The exercise was bottom up and driven by operational teams with sign-off by the COO's of the respective business functions or business divisions
2. There was little or no top down strategic guidance given to any function or business division
3. The focus was on what each function or business division perceived was the investment needed
4. The focus on benefits was secondary to coming up with an investment level that sounded right
5. The cross divisional collaboration regarding resource allocation and resource optimization was limited.
6. The agreement at an executive level was based on bottom up approval from the teams who created the investment portfolio
7. Tension existed primarily in the level of investment versus what was perceived to be affordable due to economic conditions

Looking through the benefit documentation from the last 3 years, a common trend is seen through this process. The focus on the benefits is predominately revenue protection and risk mitigation. This means that post the spend of all investments in Technology, the best outcome is that costs will increase but revenue stays the same. The investment in projects tends to result in more functionality being supported, they get capitalized and amortized over the useful life of the asset. This means that costs increase and revenues are protected. Over time if this continues, growth will stagnate and costs will increase or at least the costs will be under pressure.

In figure 6.6, it shows how the bottom up process has resulted in sustaining innovations, short-term efficiency or risk mitigations (this was the need post financial

crisis) as this is the focus of the operational staff. The level of investment is mostly invested in projects and programs that will be important to the operational teams. To truly deliver long term sustainable performance, a balance between exploiting current capabilities with current products and services and longer term exploring new opportunities should be reviewed. This would provide more of an ambidextrous approach. Changes in the approach, leadership involvement and a more agile approach will be needed now post financial crisis.

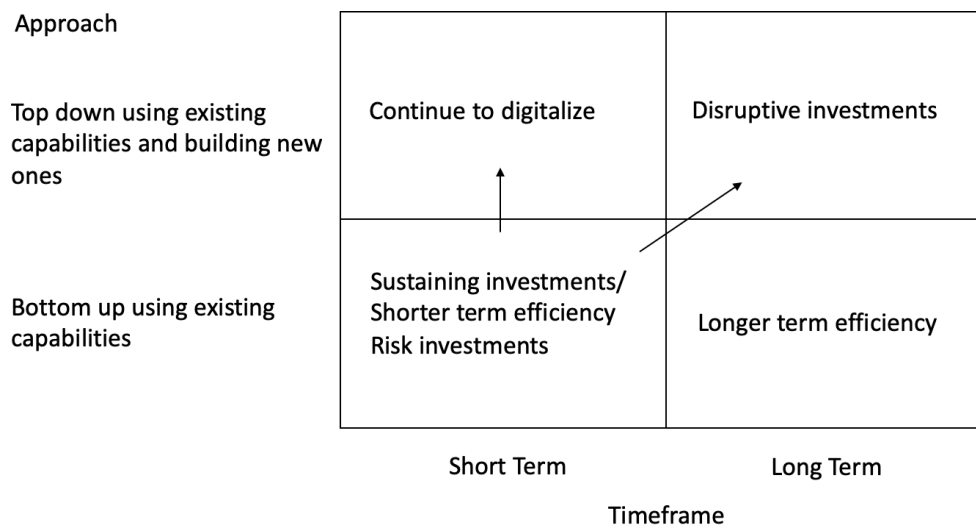


Figure 6.6 - Impact of just a bottom Investment allocation process

6.5.4 Conclusions

The process of just focusing on bottom up asks from operational managers will lead to more short-term decisions and focus more on sustainable innovations/investments. This aligns to leading academic theory. As disruptive technologies mature, a different process may be needed including more top down drive, however this is reliant on the knowledge of technology at the highest level of the bank. The process is designed in a way that will lead to a nature bias on exploitation of existing products and markets with innovations focused on more complementary capability improvements. The lack of a more ambidextrous (exploiting and exploration) approach is concerning and changes will need to be made to the process and senior management involvement,

if greater levels of exploitation of new growth opportunities is to be achieved (O'Reilly *et al.*, 2009).

6.6 Capabilities Investment Deep Dives

6.6.1 Introduction

This section includes a deep dive into 6 capabilities. 4 are being executed and 2 mainly in the strategy section. In this section, we will be looking at each capability in detail. This will include the benefits of each capability and why this is important plus how this is impacting externally. We will also be looking at how quickly each capability has moved to execution stage where real resources and commitments are being made.

6.6.1.1 Introduction to cloud

In 2003, Amazon decided to build Amazon Web Services (AWS) and provide core deep infrastructure services to other third parties. Overtime Amazon had become very good at running these services and worked out that others didn't have the same internal expertise. It had become great at not only managing efficient and reliable infrastructure but also its API's enabled others to interface with it. However, the start of the journey was in fact how to help a developer be more efficient, more productive and ensure projects were delivered more quickly. When they assessed what was going on with the projects, they found 80% of the work was undifferentiated tasks that took 80% of the time. AWS as a business was born. As of April 2020, AWS revenue was 10bn for the first quarter (Chan, 2020). This was up 33% from the previous year showing the growth of the business.

When you google AWS cloud you get a website showing not just compute but also robotics, AI, Blockchain, machine learning and analytics as well as compute. Cloud is here, cloud is growing and the race to get to cloud has begun. This paper will explain what cloud is to ensure there is a base understanding of the underlying technology. Once established there is an increased focus on cloud through surveys and increasing commentary in academic papers and citations over the last few years.

This paper will look at the benefits that cloud technology can bring to an organization and how this can enable different business models. An example being how changes

within the market driven by the increased use of cloud enables new entrants to enter a challenging financial services market.

The first layer (top) is the characteristics of cloud; the first characteristic listed is Broad Network Access. This is the ability to access the information, system or data using standard mechanisms and protocols using any mobile phone, laptop or desktop.

The second characteristic listed is rapid elasticity. This is where compute capacity and storage can be scaled up and down quickly. This rapid increase in compute capability means users don't need to wait months for new servers to be bought or installed. The capability is already being provided by vendors within huge data centers waiting for the call down of virtual capability. This means that developers don't need to wait for development environments but instead they just spin up environments when they need them and then can spin them down when they are finished with these for example. This is linked to the measured service.

Using cloud capabilities for Measured service allows you to understand exactly what is being used and being paid for. This allows the consumers of the services to understand what is really going on. Previously the compute being used vs being paid for would not be the same, and therefore difficult to assess and understand. On demand Self-service is the ability for the infrastructure teams to be by-passed to the end user who needs the resource.

The last essential characteristic is resource pooling. This is the ability to share resources together with other consumers of the same needed resource. This sharing splits fixed costs over greater demand but also increases overall utilization of the resources. This includes the pooling of resources to drive economies of scale benefiting all users, rapid electricity helping to scale up and down quickly on a pay as you go basis with tight monitoring of utilization, and all of this being self-serviced by the development community and not infrastructure engineering (Ali, Khan & Vasilakos, 2015; Lodge, 2020).

To complement the work completed by Ali et al, this paper looks at the work completed by Iyer and Henderson which highlights how cloud helped with building 7 competencies (Iyer & Henderson, 2010). There are some overlaps and some additional focus within the 7 competencies especially with controlled interfaces and sourcing independence.

1. Controlled interfaces - This is the ability to interface with new and changing services as and when the company changes. This could be through third parties who could offer new services for the company. This will then create an open innovation model that allows innovation services to be completed but using the core platform and data from the incumbent bank. This becomes even more important as Fintech start-ups create new services that can be interfaced with the main incumbent applications.
2. Location independence - Google created a built to build infrastructure that allowed the development of applications without needing to know the exact location of the data itself. This is location independence capability and works as long as located country's laws are always followed.
3. Sourcing independence - Cloud applications should enable the ability for self-contained, modular and cloud adapted data to be moved from one infrastructure to another set of infrastructures. This means that there should be the ability to move from one vendor to another. However, in reality vendors are also integrating their own microservices including project management tools, natural language processing, AI and data mining tools.
4. Ubiquitous access users will be able to access the firm's applications through an internet web browser, this provides the ability to log in remotely to applications from any device or location. This has become very important given the increases in at home working we have seen recently driven by the COVID 19 pandemic.
5. Virtual business environments - Business processes can be run virtually. This creates the ability for anyone in the business to understand what is going on with a process. CEO, CFO, programme or project managers can all see the same processes built for a specific purpose.
6. Traceability - The cloud enables every part of data or information to be traced and tracked to ensure that history, location and items can be documented. This is important for compliance and security processes.

7. Rapid elasticity - The ability to ramp up demand for compute very quickly and at low costs is hugely important to stay competitive. This helps lower costs but more importantly increases the speed to market.

There has been a focus on capabilities as it is these that will be used by businesses to drive change within the organizations. The need for dynamic capabilities that can be used to change and adapt to a market or business model changes are very important, and were discussed in the literature review (Bhatt & Grover, 2005) (Eisenhardt & Martin, 2000).

6.6.1.2 *Benefits of cloud*

The cloud offers the outsourcing and sharing of infrastructure and engineering services to lower costs. Costs are lowered by the increased utilization or pay as you go offering vs under-utilized machines, lower siloed engineering but more importantly the reduced costs of development and faster service deployment to market that can be so critical to attract or retain customers (Iyer & Henderson, 2010).

The financial benefits of cloud are: (Ali *et al.*, 2015; CĂTinean & CĂNdea, 2013; Gartner, 2017; Microsoft, 2017; Schmidt, Wood & Grabski, 2016) (Lodge, 2020);

1. Reduced costs of development. Reduced time to spin up development environments reduces wasted time significantly. Developers are often waiting around for the right tools and cloud can spin up environments in seconds. Another key aspect is the ability to implement agile development tools on the cloud that will enable automated testing and automated deployment into production.
2. New business innovations could digitalize business processes with new microservices added or enabled on top of the basic cloud offering. One of the key aspects that cloud enables is the digitalization of front to back business processes. Digitalization requires both speed and agility; both provided by cloud. Many high-volume transaction-based businesses, have and could have cloud enabled infrastructure solution.

3. Cloud is an enabler for Data and AI. Cloud providers are not just providing a way to deliver the same infrastructure but in a more efficient way. The cloud also comes with other microservices like AI or data mining. Microsoft Azure for example already has natural language processing capabilities that allows the intimidation of structured and unstructured data. These services on top of the infrastructure capabilities enable rethinking of business models or services. They can even simplify the application layers by unbundling these services from the application layer and provide a single service from the cloud provider.
4. Scalability - Legacy on premises, compute and storage has been built up over many years with incumbent financial service companies. A few years ago, when a new development project deployed into the environment it would require new dedicated servers and storage. Often this was over sized for the average usage, as the infrastructure was need to work during peak times. This build up over time has resulted in 90% of capacity being idle 90% of the time. Scalability allows for this peak demand to be called upon only when it is needed so companies only pay for the demand used and therefore utilization should be nearly 100% nearly 100% of the time.
5. Agility and limit to market- The ability for companies to call upon computer infrastructure needs when they are needed is very powerful. If there is an increase in revenues or processing volumes, then the infrastructure can be set up to automatically be called upon. On top of this environments can be spun up by developers when and where they are needed and so there is no longer a 3 month wait time anymore. As the cloud uses virtual compute technology if something fails the systems will just switch the processing to other virtual servers and therefore down time is reduced significantly. This means that servers and compute should always be available 24/7 a week and 365 days a year.
6. Cost - A number of companies using shared resources at scale reduces overall costs for all. The fixed costs include the data center costs, networks, physical and virtual security, engineering support and maintenance. On top of this cloud uses the latest technology for virtual computing resulting in high

utilization levels. This results in economic benefit by just using what you need and when you need it and reduces the costs of providing for peak demand. These benefits are also good for new entrants. They have access to world class infrastructure that was previously only available to large organizations with deep pockets. They will be able to access the same compute capabilities as larger firms and therefore this evens the playing fields for all. Also new entrants will be able to match demand of resources to revenues. This reduces the risk of cash flow problems when they are starting or growing. A huge reduced barrier to entry.

7. Security - One of the largest overheads for any company is trying to protect its data is security, no one is fully secure. If a business is connected to the internet and the outside world, then it has the possibility to be being hacked. There are a number of physical and virtual risks. The physical risk is that someone historically will have the ability to remove a storage disk and therefore get data that would be in a data center.

The other risk is someone getting access through a hack or disrupting business through malware. Three examples of security challenged companies follow. The first is an incumbent bank and one the largest breaches of its kind. At the end of October 2014, JP Morgan the huge US financial services firm was breached. This meant that 70 million household account details and 7 million small businesses had private data compromised (Crowe, 2015). It is not just the incumbent banks themselves who are open to attack but also some of the extended vendors they are using.

The IT giant in April 2020 also informed its clients that it had been the victim of ransomware and that hackers had been crawling its networks for weeks, and would have stolen data and administration credentials (Zitter, 2020). Software providers are also at risk. During the pandemic, one of the 'winners' was a video conferencing system called Zoom. This allows groups of people to interact with each other through online facilities. In April 2020, 500,000 accounts were hacked and the personal details sold on the dark web. All 3 are examples of breaches that can have huge implications for firms if security is not handled correctly. Therefore, moving data to a public cloud using external vendors will make a number of businesses concerned about security data.

The very best cloud providers are spending billions on security, their physical security protocols will be better than internal ones and they create virtual data systems that prevent all of the data being stored in one place but will instead spread out. The challenge of security remains whoever provides the cloud, the main difference is the best providers have very deep pockets to invest what is necessary to protect data.

8. Future proofing - This is linked to security, hardware and software constantly become old and obsolete and need to be continuously upgraded to the latest hardware and latest security requirement. Sometimes this is also needed to get additional capacity. There has been an explosion in data over the last few years. Incumbents will soon be forced into a choice of building new data center capacity, new power supply to meet this new demand or move legacy applications and new ones to the cloud. Once on the cloud then the responsibilities for the updating the hardware and security surrounding the applications becomes the challenge of the cloud owners.

There are other benefits to cloud above and beyond the technical capabilities it creates for firms as listed below. An area that is often over looked by the literature is the knock-on impact of the development community. Cloud, if developed correctly can create a brand new developer experience (Turley, 2020).

6.6.1.3 Observation study findings - Cloud

The observation study tracked decisions regarding cloud over a three-year period. The results show the organization can make strong and decisive decisions regarding emerging technology when the case is clear.

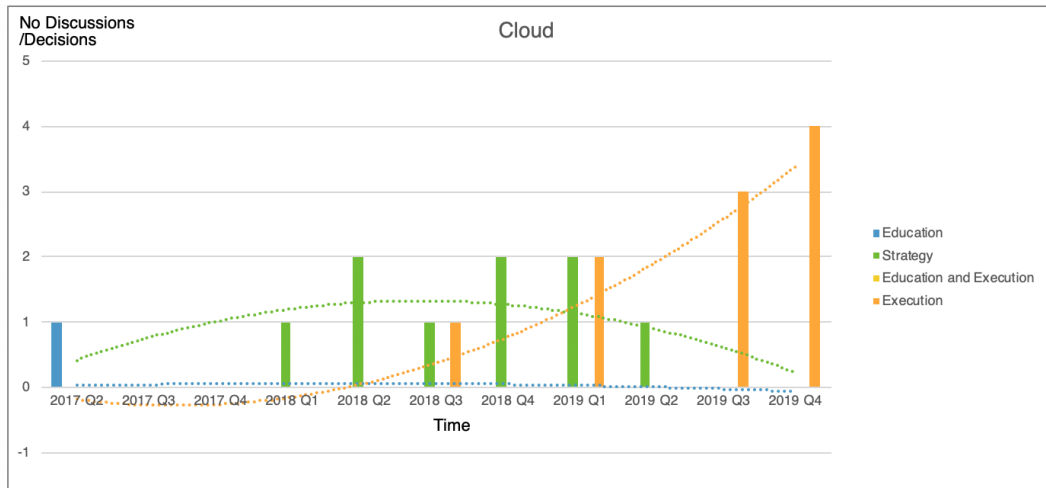


Figure 6.7 - Cloud Education to strategy to execution results

Figure 6.7 shows that Cloud is in execution model and moved quickly from strategy to execution. The strategy discussions continue while the technology matured. This seems to be a critical component in the implementation of new capabilities. During 2017 to 2018 the organization prepared for cloud knowing that this was the strategic direction. This included moving to use Infrastructure as a Service (IaaS) on premises solutions and creating end user virtual tools.

The data and applications do not leave the data-centers, security and security patching is easier as all the data is in one place versus spread out across thousands of computers. This paved the way for a final cloud-based solution once security concerns were addressed and the associated technology matured through significant investment by cloud providers. Prior to 2017 there were security concerns both within the bank but also externally with regulators. During 2018 activities started to progress to find a solution provider and partner, who the bank can work with to executive it's strategy.

The numbers on the chart below represent the times this was discussed in strategy and execution forums. The peak numbers show when this moved from just discussion and strategy to execution. Overall, the time from education to strategy to signing a deal with a major cloud provider happened very quickly. During late 2018 and 2019 applications were moved to the cloud following internal and regulatory approvals. This is a huge investment case and get approved to move forward very quickly one the technology is proven.

Legacy migration however will still be a real challenge. Technical debt is coming out our interviews are the number one barrier stopping incumbents changing at the pace they would like and will be costly to move. The capabilities that cloud provides moved the discussion from just cost to enhancement of developer tools, elasticity of demand, automatic provisioning, data management, AI tools, project management tools and improved security. The business case remains compelling although costs were not the primary focus anymore. The benefits are reduced real estate, avoiding building new data centers, reduced unit costs for compute, storage and databases, reduced internal engineering and support, plus the avoidance of cost renewal for end of life hardware.

The costs to implement are the biggest challenge. Ensuring older applications are cloud ready and migrated from old infrastructure to cloud is a very expensive business. The legacy systems complexity means this takes a long time to execute with dual run costs initially. These dual run costs are created by moving from a more fixed cost base model to a pay as you go model. This pay as you go model is a key benefit of cloud and makes the costs variable. The challenge however is that the costs will be fixed for a while as the migration happens. This will be slower due to the need to refactor the applications and the complexity of the legacy systems. This migration and dual run costs should not be under estimated. The benefit case still makes complete sense but the benefits will come later due to the upfront costs.

6.6.1.4 Challenges with cloud

Although the economics are intuitive, there are significant challenges for incumbents to move to a full cloud environment. The primary challenge relates to the legacy infrastructure and complex nature of the application architecture. Due to this complexity and need to modernize old legacy, the cost of migrations and complexity of migrating from current state to cloud state is a huge challenge and will take years. To get the maximum benefit from the cloud the applications need to be cloud enabled (Orban, 2017). This means unless the customer just lifts and drops the application from one infrastructure to another, they will need to change the application, unbundle certain aspects of the application to ensure standard services can be provided by the cloud provider, and then migrate to the cloud. This is costly and takes time, focus and management attention. On top of this there will be fixed costs in the legacy environment. Even if applications are migrated, there will be for some time a fixed

cost element that won't go away. This cross over between own it yourself and pay as you go will result in dual run costs for a period of time. Again, this is complexity that needs to be managed carefully and as quickly as possible. Delays in migrations will result in longer and longer dual run costs. The benefits for cloud will pay back in the medium term with cost efficiency and effectiveness of development and infrastructure deployment. Real benefits of AI and Data are in the longer term.

The delay in implementation due to complexity is a key factor in the delay of benefits for the incumbent firms. On top of these migration costs comes the time commitment that is needed for cloud. Often project deadlines are short and the time and cost to refactor the application to be cloud ready could be prohibitive (Orban, 2017). Additionally, there may be time pressures and budget constraints to get projects completed, this puts pressure on the ability to refactor the applications to enable them to take full advantage of cloud possibilities.

6.6.1.5 Implications

There are huge implications for investing in cloud as explained below. The benefits that are available for new entrants adopting this new technology is clear. It is a challenge for all incumbents to move to this model. The interesting part of the study is the speed of decisioning. This is a large and expensive capability, complex to deliver but with clear advantages. This moved to execution stage very quickly. The challenge will be implementing and staying the course because if it does the advantages are clear or there will be a clear advantage for new entrants.

6.6.2 Robotic Process Automation (RPA)

6.6.2.1 Introduction to RPA

Robotics has been around for many years in traditional industries such as manufacturing, in car production or engineering. Computer aided machines complete tasks on a production line that were originally completed by humans. These are often tedious repetitive tasks that employees are happy to lose and focus on more value adding activities. We have seen the increase of robots in the home with automatic vacuum cleaners and grass cutters. With the connection of Internet of Things (IoT), computers are now being embedded in every day compliances than can link with the

internet to automate processes. A simple example would be the reordering of food from a refrigerator.

With the improvements in technology and the wide spread use of computers within the work place, robotics and automation practices are now replacing office staff and not just manual labor manufacturing or engineering work. Instead of large machines, or machines that walk or talk, these robots are small computer programmes that simulate the task a human does. It is estimated that 1 robot can replace 4 people with a saving of between 50%-80% (Lacity & Willcocks, 2016). Examples of the areas that are most suited are data processing activities like invoice processing, data cleansing, order management, payment processing and some report processing activities.

This type of innovation is described by Christensen as efficiency innovations (Christensen, 1997a). If a robot costs 5k USD to run, and an onshore resource is 40k then you can understand the potential need for this as the payback is relatively quick. RPA is most suited to when there are clear rules with structured data and there is a standardized and stable environment. This enables the automation to happen and as it will not need constant updating. The automation should also reduce human error that happens with high volume repetitive tasks. This is a basic use of simple computer programmes to copy repetitive tasks. They can also be deployed in more value adding spaces. An example could be to automate the resolution of IT issues, often these are repeated issues within the infrastructure such as storage or compute capacity limits. Infrastructure can be configured to deploy additional storage and compute when usage limits have been breached and therefore system issues don't happen.

6.6.2.2 Observation study findings - Robotics

Robotics is mainly an efficiency innovation and pays back very quickly. Robotics moved from education to execution quickly, therefore decisions to implement are relatively easy. Robotics became very popular in 2017 as a fix for all broken and time-consuming processes.

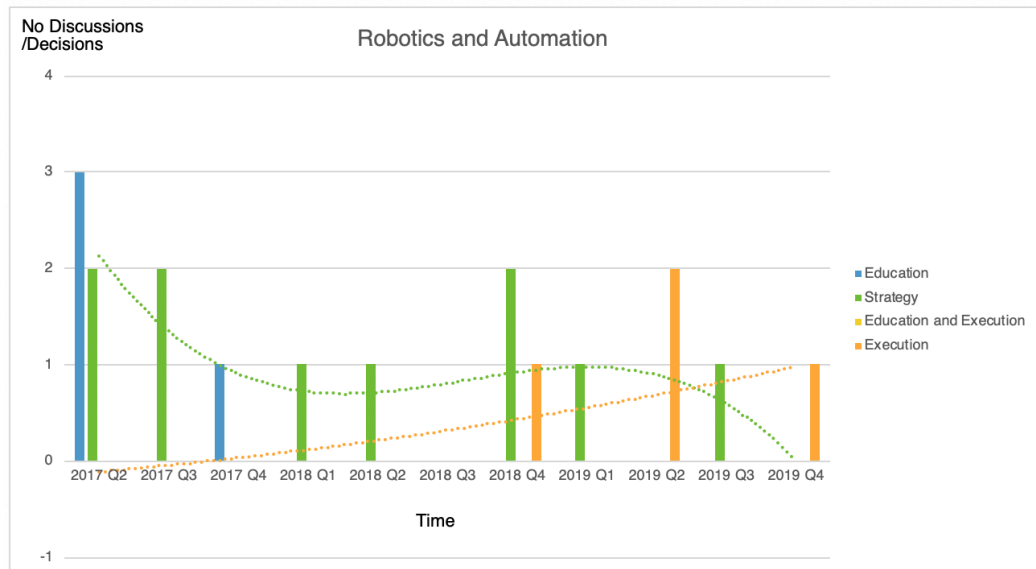


Figure 6.8 - Robotics and automation - education to strategy to execution results

Figure 6.8 shows that the education phase was from Q2 2017 to 2017 Q4 and at the same time the strategy on how to implement this was taking place from 2017 to 2018. Extensive knowledge was gained on how the software to create robotics would work, and the governance and ethics considerations were more understood including how the robots would be supervised. Implementations happened from late 2018 through 2019 and continue today.

Decisions were made to implement and then teams were trained and robots were deployed. As this is both a sustaining innovation and also a complementary innovation that increases the current capability within the organization. However, this was not as straight forward as first thought. New governance and control over what the robots were doing was needed. The robot in effect needs to be supervised like any other employee. Who supervises them and what controls can be put in place to ensure what they are doing is right. Also, regression testing of the computer programmes was needed. To make this happen the robot's process impacts needed to be logged and understood. Therefore, when an application development change was implemented, the bank needed to ensure that the robot still worked effectively and changes to fields didn't mess the whole front to back process up.

Although this delayed implementations there are now over 1000 robots deployed within the bank predominately within operational areas. There are many areas across incumbent banks where the processes are still highly manual, paper driven and inefficient as discussed in the interviews. The programme is fully in execution mode even through it is recognized now that this is not the holy grail that will fix all processes. This merely enables the bank to reduce costs, but this is adding complexity. New Fintech challengers will not have these challenges if they have designed the front to back processes from scratch.

6.6.2.3 Implications

This is a different implementation that cloud. Less complex, less expensive and quick payback. This is not a long-term play and complementary to the existing enterprise. It is no wonder why it has been implemented quickly.

6.6.3 Artificial Intelligence (AI)

6.6.3.1 Introduction to AI

We have seen significant improvement in AI over recent years. In particular machine learning, deep learning and re-enforced learning. We see AI now complete complex tasks previously only humans have been able to master including playing games like Chess, understanding language or have the ability to translate language. In 1997 Deep Blue made history by winning a chess game against Garry Kasparov. The world for the first time understood that machines could beat a human at a game that was highly predictive.

By mid 2018, 90% of the worlds data had been created within the last 2 years (Phalafala, 2019). This exponential explosion of data is now allowing for AI to process these vast amounts of data in a human can't. We are also seeing a number of AI solutions being used every day in the form of assistants either through the likes of Apple or Google (Brynjolfsson & McAfee, 2015).

At the heart of the development in AI is the ability to predict. Prediction vs judgement is when vast amounts of data are used to help predict what will happen next (Agrawal, Gans & Goldfarb, 2019b). Over recent years we have seen an explosion in AI companies and investments into AI by some of the largest companies in the world; the big tech platform players like Amazon, Google and Apple. The explosion is due

to the increase in data and at the same time the dramatic increases in power, with the reduction in costs of that compute power. This means that the cost of prediction itself has reduced substantially (Agrawal & Kirkland, 2018).

Anything that can be predicted is expected to have an AI solution. According to the report from Ajay Agrawal et al (Agrawal, Gans & Goldfarb, 2019a) who predict the impact on tasks that in future will be automated. The current wave of advances in AI aren't true intelligence but more focused on the ability to predict happenings better than humans can (Agrawal *et al.*, 2019b). This doesn't replace the need for humans, as the predictions themselves are not decisions or judgements but instead predictions better than humans can do over large data sets.

Predictions and predictive information are critical. AI is becoming a critical topic as the systems and power of system processors increase dramatically to the point when the economics of implementing it against the cost of humans is becoming clearer (Agrawal & Kirkland, 2018; Byrum, 2018). Amazon uses AI to predict what customers might want from a sales perspective (Agrawal *et al.*, 2019b; Daugherty & Euchner, 2020; Wilson & Daugherty, 2018). Predictions are needed where there is a missing component. Through the use of data and AI algorithms, a program can generate the likely bit of missing information. Examples of use could include predicting how a customer is likely to default based on past cases or whether a cancer image is malignant based on past cases. However, problems do exist with predictions; forecasts and challenges around language or accessing data based on the predictions of voice/data recognition are significant.

Over the last few decades the level of accuracy of predictions when compared to that of humans has changed. In the late 90's the level of accuracy was around 80% compared to 99.9% now (Daugherty & Euchner, 2020). This is a dramatic change in the level of accuracy and therefore effects the types of tasks that can deploy AI. Not only has accuracy changed, but the cost has also reduced substantially. Both of these key factors combine to mean the case to replace humans in the prediction business is upon us. The point is that humans aren't that good at making predictions as they over bias salient information and don't look at statistical data (Agrawal *et al.*, 2019a).

Decision making is based on prediction. Predictive machines need data for training, input to make predictions and feedback on what worked and what didn't. Data is critical in the process at the moment and AI requires a lot of data to ensure that it can

learn patterns. However, the thinking is that if machines are really to have AI, they will need to learn and predict with smaller amounts of future data to make more predictive judgements (Wilson & Daugherty, 2020).

Machines and Humans have distinct strengths and weaknesses. Machines being better at prediction when the number of complex interactions grow based on more and more data, and humans being better at decisions through judgement calls. This means that there can be a change in the way labor is deployed. As the number of predictions made by computers grow due to the vast processing power, the unit cost per prediction can fall significantly as the cost of the machine will be stable. However, the work that humans do is not scalable as they will only be able to complete a certain level of capacity (Wilson & Daugherty, 2018). Tasks can be redesigned to ensure that the role of machine and humans is complementary with the skills both bring being used to find the solution to problems.

Judgement involves the determining of relative payoffs associated with a decision or possible outcome. It is possible to train a computer to predict the judgement humans will make but this will always be limited to the data being used. Computers can't deal with rare events that are not within the data itself. This is why the value of data is so high for companies like Amazon, Apple or Google, they have vast levels of data on customers behaviors and therefore this improves the ability to predict human judgement. However, this does not replace the need for human judgements, especially around the future or scenarios that have no quantity of data.

Mergers, investments and decision making are areas of innovation that require judgement more than prediction, this could have significant impacts of the workforce as we know it today. (Wilson, 2018). These impacts are detailed below:

1. Augment roles - this is where roles are enhanced by the use of AI to give super powers to humans who can now do more due to the enhancements.
2. Replace roles – roles that are repetitive, replicated or have redundancy are more likely not to exist in the future. Machines are pretty good at replacing these types of roles and leaving roles that need more judgement or experience to humans. Examples could be data processing, fraud protection, checking for errors, report production or forecasting.

3. Split roles – some roles can be split. Reporting and analysis can be completed by AI but client engagement and advice would be completed the humans. This would result in humans being able to focus on the clients and without having to do analysis themselves.
4. Emphasis – the emphasis of some roles will change. An example could be a teacher who before provided content but who could in the future be there to ensure the wellbeing of students and not worry about providing the content themselves.

Paul Daugherty goes on further to explain that the future is not just AI or human but instead makes the case for human and machine using a simple model called “The Missing Middle” (Wilson, 2018). Humans and machines have unique roles; humans can lead and can make strategy decisions when data is not fully available. They can guide organizations to success and empathies with their surroundings. Sometimes business decisions need to be made despite business or economic logic, for example firms keeping staff on through difficult times at a cost, or helping sustainable causes. Innovating from scratch is a human trait, creating music, art, technologies and new business models are good examples of tasks better suited to humans.

Judgements are difficult for machines but predictions based on data and historical inputs are easier, machines also adapt more quickly to changes in data. Machines can continuously change and adapt depending on inputs and changes, feedback can reinforce different ways of doing things. The human and machine model goes on to explain that if they combine then humans complement the machines capabilities; using machine predictions to make more effective decisions, more quickly and cheaply. AI has the potential to give humans superpowers because it does things humans aren't very good at, machines have the capability to complete vast amounts of transactions and predictions using data humans would not be able to deal with.

The missing middle



Lead	Empathize	Create	Judge	Train	Explain	Sustain	Amplify	Interact	Embody	Transact	Iterate	Predict	Adapt
 Human-only activity				Humans complement machines			AI gives humans superpowers			 Machine-only activity			
				Human and machine hybrid activities									

Figure 6.9 - The missing middle - “The Missing Middle”

Source: (Wilson, 2018)

To make machine learning work, humans must play a role. Humans train, explain and sustain (or continuously update) the machine to get the very best results. Machines can amplify the skills of humans, they can help humans be more productive, see more clients, analyze more data, help tailor more products and services to clients, understand issues more quickly and so on. This amplification could help to design scenarios, alternative solutions and trends using real time information, personalize offerings and augment decisions. Machines can interact with humans to help nudge them to system solutions or help them solve problems. Embodiment is where machines can be used to extend sight, hearing or touch. These are skills that can be technically enhanced with machines.

The framework below sets up the more comprehensive definitions of AI, machine learning and deep learning as well as highlighting the different applications that use the best of AI (Wilson, 2018).

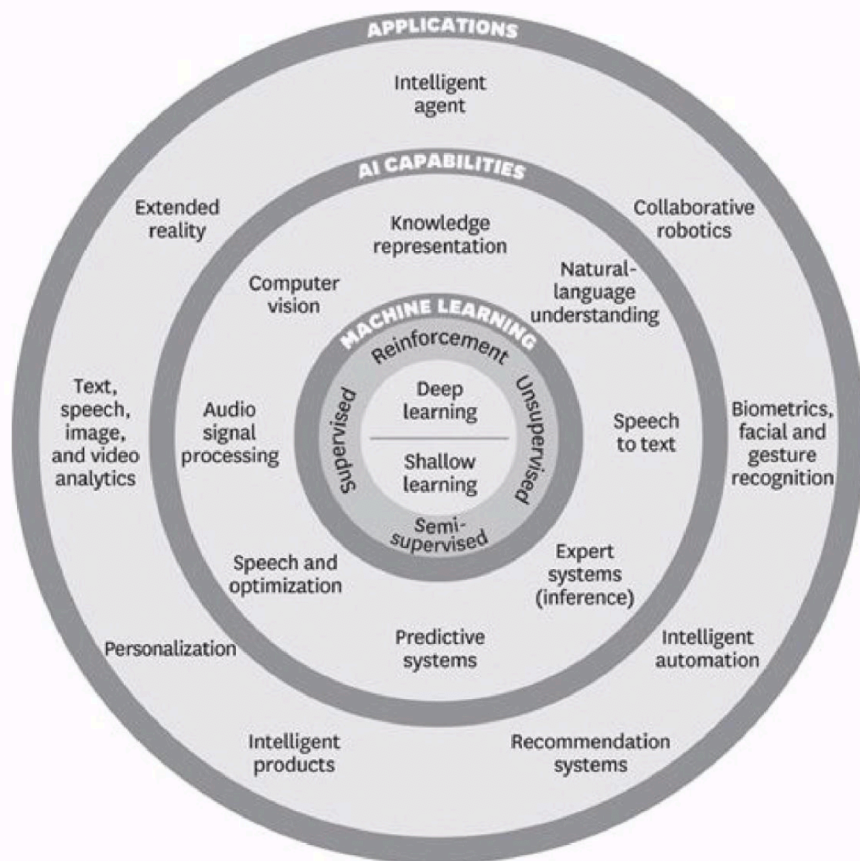


Figure 6.10 - AI framework for applications and capabilities

Source: (Wilson, 2018)

6.6.3.2 Benefits of AI

The case for investing in AI is significant if the technology is mature enough. It is important to understand some key capabilities and how they relate to business applications. Defining these will shed light on the financial services context (Wilson, 2018).

1. Predictive systems help find relationships between variables and data. This is good for the identification of missing information. Through prediction techniques and data, the missing information can be predicted. Machine learning goes beyond the use of traditional statistical techniques and moves

into algorithms that can deal with more complex variable relationships with structured and unstructured data.

2. Expert systems contain detailed knowledge in fields that are known for technical expertise such as legal, pure accounting, tax advice or medical. Using a combination of rules to outcomes can result in the ability to search for possible outcomes without the use of finite and costly professional advice. This allows lay persons who are not experts to get questions answered as per professional advice.
3. Computer visions are systems that understand, identify and categories images and videos and images. The computer is trained to understand what a specific image is and then when it sees another image the same it can categories it. The applications could be significant in for example, medical fields where the interpretation of images can help diagnose cancer. This does not replace the need for human reviews but it can scan significant numbers of images will high levels of precision.
4. Audio and signal processing machine learning can be used to help analyze audio and signals. This could be used to ensure that a person asking for information is actually the person the company thinks it is. If audio patterns are maintained then this could be a used to detect fraud.
5. Speech to text converts speech into text in a variety of languages. This includes translations, transcriptions and voice commands. This is quicker than typing text and allows for a more natural interface with computers.
6. Natural language processing allows human natural language to be used to integrate data, ask questions and analyze sentiments. It is the ability to ask a computer a question in a human language instead of in a computer language. The computer will understand and be able to reply with an answer. For years we have been able to enter questions into Google and get back sensible results despite the question being mistyped or in a grammatically incorrect way.

Having discussed the capabilities, applications as per the Wilson et al framework follow;

1. Intelligent agents are programs that interact with humans using natural language processing. This could be very simple, allowing for humans to

interact with a computer via voice, key strokes or more sophisticated interactions.

2. Collaborative robots are robots that work at slower speeds and are fitted with sensors that enable it to work with humans. Autonomous vehicles could have a significant impact on a number of industries. Will there be the same need to stay over in hotels if you are able to sleep in your car as it drives? Will people need to pass driving tests? Will there need to be car parks in the future as the car could just return home or lends itself out when not needed?.
3. Biometrics is the ability for machines to understand who a person is by using face and eye scans, gestures or trends of activities including key strokes. This allows a machine to recognize that it is really you on a consistent basis, this is important as cyber security becomes a greater challenge for companies. Passwords are still weak links in the fight against identity theft. Instead of passwords being entered once and machines being left alone but still logged in, biometrics will mean the machine is constantly assessing and scanning that it is actually you at all time, move away from the computer then then access is stopped.
4. Automation means that machines are used for the things they are good at. High speed, scale and ability to cut through complexity if set up correctly with the right levels of data. Forecasting is a great example, computers can be used to automate the outcomes and predict missing data.
5. Recommendation systems are used to make suggests based on past preference. They can be used to make Amazon or Facebook recommendations or suggestions based on subtle behavior changes over time. If you look at products and services, then pop ups regarding that product or service will appear when browsing other websites or applications.
6. Intelligent products are products that continuously evolve with the customers' needs overtime as there are changes in circumstances and preferences change. This can mean that the product or services continuously evolve.
7. Personalization means tailored products/services, trends and data are analyzed then customers can be profiled and products/services they are interested in can be linked to specific needs. This increases the possibility the customer is going to pay for the product/service and reduce the general noise in the system that can confuse or even frustrate customers. Blanket marketing that tries to tempt everyone with opportunities can annoy customers. This is

having an impact on credit scoring. Traditional credit scoring works by looking at historical data from both transactions, income and payments of loans. The traditional model uses statistical techniques like regression analysis using structured data to give credit scores to use to understand the likely hood that a person will pay back a loan.

The process has evolved with time but have been around for some time now within financial services. However, there are new techniques coming from the explosion in data and AI/machine learning. These look at data like social media that can help profile the likely hood of the person paying back the loan or their willingness to pay it back. This uses the ability to deal with significant levels of data that is in a semi structured or unstructured way. This can help personalize not only products and services but also the outcomes of items like credit scoring.

8. Text to speech and image allows for computers to interact with humans in a way that is most natural to them. Reading out emails, taking notes by speech, setting up meetings, helping analyze reports and translating documents can now all be done at speeds never before known. Amazon, Apple and Google have electronic assistants built into their devices e.g. Siri for Apple operating system. These started off being partly usefully but over time the AI natural language processing has improved to the point it becoming really useful. They can play music, inform you when you have messages, read emails, tell the time, set alarms and inform you of upcoming meetings. Amazon has Alexa, and Google have home hubs that allow computer assisted interactions (FSB, 2017).
9. Extended reality through the use of computers can create virtual reality or augmented reality. Virtual reality puts individuals into a made-up reality that can be very realistic. An example could be placing individuals who are working from home into a virtual reality boardroom, work place or client meeting. This can also allow you to login to a computer and screen that doesn't actually exist to review emails or notes, complete transactions or to have meetings. Augmented reality is when reality is still the same but enhanced by computers. This can create super human knowledge for individuals. Useful applications are when systems expertise can be augmented to non-experts. This can help with medical procedures, fixing IT infrastructure or car maintenance. The knowledge can be passed on via some personal interface.

6.6.3.3 Observation study findings: AI

Decisions regarding AI were tracked over the 140-week observation study period. It has been shown that the organization can make strong and decisive decisions when the case if the technology is at the right level of maturity. AI is being used in the bank. There are pockets of implementations and this is a strategically important part of building capabilities for the future. Most of the greater impact from AI is still being strategized while the technology matures, proof of concepts allows companies to get a grip of its true potential. There are many uses and cases that are being looked at but the greatest power of AI is to come in the future powered by more mature systems, clearer cases, cloud implementation and data management.

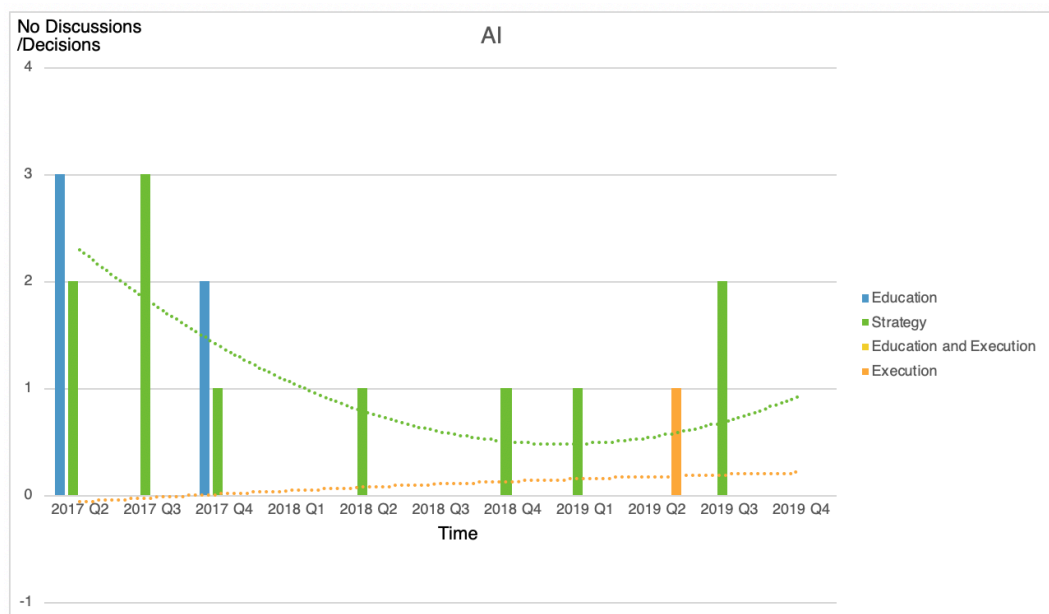


Figure 6.11 - AI - Education to strategy to execution results

AI has been maturing and the bank has continued to understand its potential through the creation of a center of excellence. This is a central team understanding, scanning the external environment, helping to run proof of concepts and looking at how this technology can be deployed at force.

Figure 6.11 shows that AI has taken time from Education to Execution and only a smaller amount of used cases is being executed with more strategic thinking underway. This shows that AI is a complex subject with many used cases and

applications. Therefore, its different than cloud as a concept. Each application or used case will have a need for different strategic input and then leading to execution when the plan has been matured. AI has the potential to move beyond just cost reduction and transform the way the bank delivers its products and services.

6.6.3.4 Challenges with AI

Figure 6.12 hype curve is helps explain how new technologies get over hyped and then over time mature. New technologies can create significant new hype as the applications for the new technologies get over exaggerated. The stages are moving from an initial trigger when the first idea comes out, this moves to a peak in inflated expectation. This is when the technologies hype is at its highest and at levels that will never be delivered by the technologies (Goasduff, 2019).

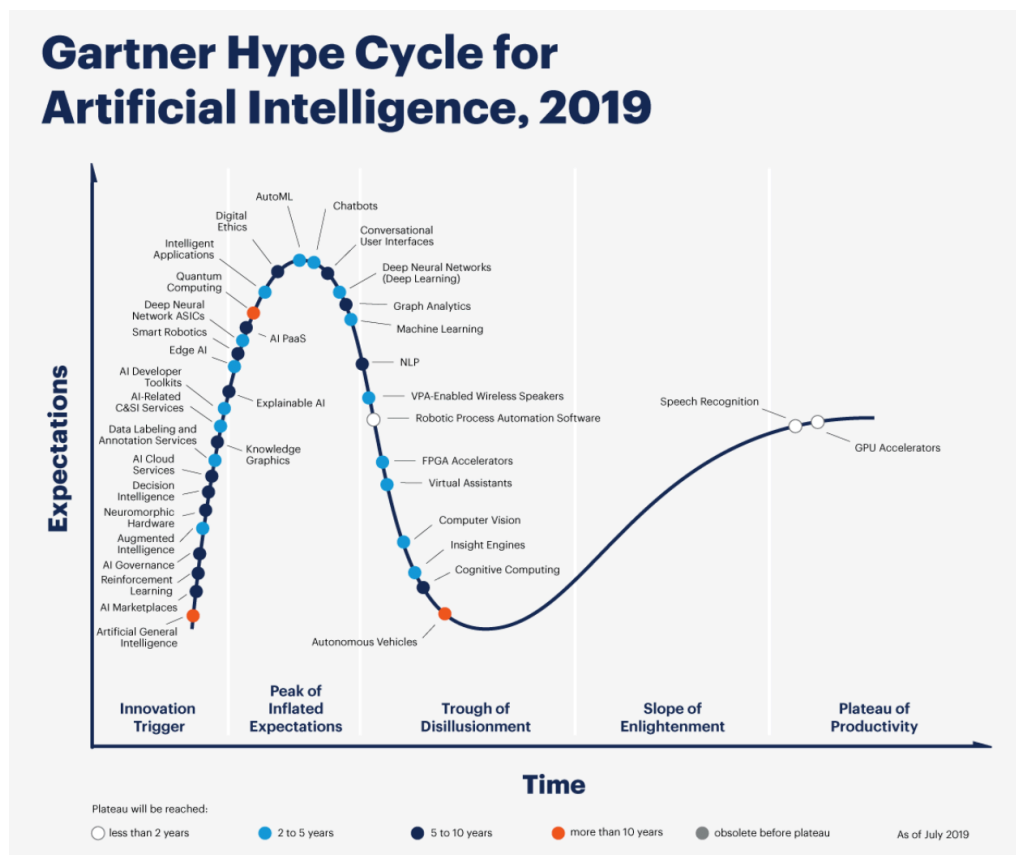


Figure 6.12 - Gartner hype curve 2019

Source: (Goasduff, 2019)

The extension of expectations goes way beyond its maturity as a technology and over extends into ideas that should not be completed by the technology as the technology is not ready. There is then a natural frustration in what the technology can actually do. However, over time the technology improves, proof of concepts become more realistic and then a more realistic view matures. There is then a plateau in the productivity stage, the technology is then implemented and becomes productive. Even within the same technology, the uses of the technology can take many years to go through the hype cycle. You can see that most of the business applications are between 2 to 5, 5 to 10 and even 10 years out from being fully productive. This shows how immature the technology still is but it has significant business applications. This shows also the pipeline of changes that will come ahead. Everything from chatbots, AI developer tool kits, virtual assistants, insight engines, deep learning and machine learning tools are all maturing.

6.6.3.5 Implications

AI has incredible potential to transform the way we work. The capability is maturing fast and this will replace a lot of the work that could be classified as predictive. From forecasting, chatbots to support clients, AI working out what products clients would like to virtual assistants. The products will be embedded in what we do. This is a critical capability that is understand and implemented when matured.

6.6.4 Platforms

6.6.4.1 Introduction to platforms

Over the past 10 years there has been a platform revolution. Platform firms have risen to dominate the corporate world and change the way we interact and consume goods. Platforms are used every day and increasingly. An internal platform pulls together products and services into one joined up systems. These can be called supply chain platforms focused on the optimization of delivery to the end client.

External platforms look beyond just optimizing for the clients but look at this via building an ecosystem that drives value through its external connections (Cusumano & Gawer, 2002; Gawer, 2014). A platform enables the interactions between external parties that through these interactions benefits all. These platforms help match demand and supply of goods, services and social media creating value for all.

Companies like Facebook, Amazon, Apple, Google, Alibaba, SAP, and Microsoft are some of the largest firms ever and are built on platforms.

These platforms enable what we buy and sell, help us connect and have created new ways of consuming traditional products but they have also opened up access to new markets, e.g. Airbnb. The power of platforms has changed industries. Let's review what happened to the mobile phone industry over the last 10-15 years. It's been a remarkable change in fortune for some of the world's dominant phone manufacturing companies.

Back in 2007, there were a number of major players in the mobile manufacturing industry; Nokia, Samsung, Sony, LG and Motorola. These global giants dominated the mobile industry and had 90% of the global profits. That year Apple launched the iPhone with many dismissing the entry into the market and didn't believe that anyone would pay so much for a phone. But they missed the point, miss understood the competition and the changes in the way the industry would evolve (Alstynne, Parker & Choudary, 2016). By 2015 Apple singlehandedly generated 92% of the profits worldwide.

Under traditional strategic theory by M Porter, Nokia had it all to create sustainable competitive advantage. Scale, low cost, large resources, a well-known brand and was profitable (Porter, 1980a). The value chain was optimized and it continued to increase profits post 2007 and remained the largest producer of cell phones using its own Symbian operating system (OS). Afterward it started to lose significant market share, it hired an ex-Microsoft exec and moved to using windows operating systems. It was a huge mistake to think about building its wider open ecosystem (Tiwana, Konsynski & Bush, 2010).

Apple on the other hand with the iPhone had an innovative design and new capabilities, plus it was cool, but the thing that made this radically different was its Apps Store. Applications via this store added huge value to the platform (Ghazawneh & Henfridsson, 2013; Ghazawneh & Henfridsson, 2015). By 2015, the apps store offered 1.4 million apps. This linked developers who made cool apps such as games, fitness programs, cooking tutorials, map and navigations systems, productivity tools, banking apps etc. The phone became much more than just a phone placing computing power in the palm of your hand.

Platforms are nothing new but with the changes and developments in technology, the cost of hardware and storage and the increased network bandwidths, the ability for platforms to be recreated and enhanced via technology became possible (Choudary, Parker & Van Alstyne, 2016). The ability of developers to make applications and then display these in a market place became much cheaper and available (Ghazawneh & Henfridsson, 2013).

The 'network effect' is when the impact of a number of users of a platform effects the value of other users who also use that platform. The point being the more users then the value for other users increases (Eisenmann, Parker & Alstyne, 2006).

Uber is a platform that connects drivers to riders through an application. The app provides for a feedback loop so you know which UBER drivers you can trust or not. When trying to value UBER, the traditional ways of looking at cashflows didn't consider the value driven by users on the organization. It wasn't a linear relationship. The value increased the more users used the applications (Choudary, 2016). This was simply illustrated by a David Sacks sketch of the value driven by demand when he was discussing how to value UBER. You can see that the more people use the platform, the more drivers there are and the lower the prices. The lower the prices then more demand.

This is known as two-sided network effects. One sided would be more simply explained as when you have more people using telephones they attract more telephone users. But with two sided effects, demand increases drive more drivers, lower prices, meaning less downtime and faster pickups. This drives further demand. There can of course be negative networking effects, where more people join but then can't match to its need. IT systems are highly scalable and frictionless entry can mean that they grow quickly.

6.6.4.2 Advantages of platforms

Traditional firms control resources, information, raw materials or intellectual property. Large companies like banks, oil companies, retailers and manufactures generated profits by controlling markets, products and services. However, the platform revolution has changed this. Airbnb, Uber, Amazon and Facebook don't actually own anything. They just orchestrate the matching of service, information and products via platforms that are designed in a way to create positive network effects.

They de-link assets from value. Airbnb allows you to book and stay in someone's home when they are not using it. This turns idle capacity into value for the owner, consumer gain by staying in a home away from home at good value rates and Airbnb takes a margin for the trouble (Cusumano & Gawer, 2002). Feedback in the system gives the seller some reassurance about the people and likewise the buyer can read reviews to ensure they are staying in a place clean and safe. Amazon is perfect example of where you can bring sellers and buyers together (Shapiro, 1989).

This world-wide market gives the buyer increased choice which in turn brings more and more buyers and the sellers gain through having access to such a large market (Parker & Van Alstyne, 2018; Parker, Van Alstyne & Jiang, 2017; Van Alstyne & Parker, 2017). Once more feedback is built into the system to ensure that everyone gets the value they are promised. Amazon is always there to step in if issues arise.

Platforms have reduced the need for middlemen and created the ability for consumers to go directly to the seller. This disintermediation has happened to various degrees across different industries. In the retail industry we have seen retail shops closing at rapid pace due to Amazon and other online retail alternatives. However, this has not done away completely with the need for middlemen.

The ability of a firm to get external expertise to add value to its platform bringing in new users who in turn add value to the platform is external optimization. The Apple OS is a closed system; the developers of applications need to stick to very strict guidelines because only Apple approved apps can be accessed via their OS iTunes apps store. Control is maintained. But, this has created the need in some users to bypass this to allow other apps to be used on the OS system (Gawer, 2014).

In contrast, Google released Android under open source license which attracted more developer interest as it is open to other hardware manufacturers who want to use the Android OS system platform (Alstyne *et al.*, 2016). Consequently, it has grown into the number 1 mobile OS system, in turn it was able to create the platform for Google Play that is Google's market platform. The methods of both companies are different but create advantages for each firm.

Apple retains control of its OS as it can only be used on Apple hardware, but it allows others to participate on this platform. Google allows more hardware manufactures to use it, creating a bigger platform for it to sell apps on its Google play platform. Both

are using externals to add to their base and create positive network effects (Eisenmann *et al.*, 2006; Parker *et al.*, 2017).

6.6.4.3 Observation study findings: platforms

During the time of the observation study, the platform that the incumbent was building was already built and being implemented. The platform was an internal platform focused on driving internal efficiencies and optimizing value chain for the end clients. It cost \$1bn to implement and was focused on amalgamating all products and services into one platform.

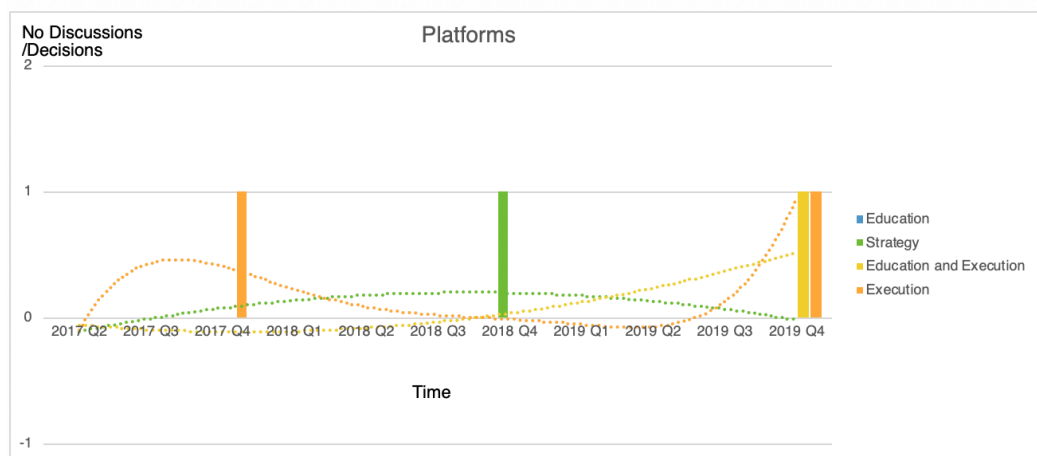


Figure 6.13 - Platforms - education to strategy to execution results

Figure 6.13 shows that this is at the tail end of an execution phase hence low or no other categories apart from the extension of the platform into more regions.

It took 4 years to implement focused on Europe and Asia. State of the art tools enabled the bank to consolidate hundreds of software components into one platform. The system was built internally and in a bespoke manner. The advantage of scale meant that the bank could service new clients at marginal costs giving significant cost advantages if volumes increased. During the COVID 19 crises such increases were seen with trading increasing 300% above normal levels. The platform discussions looked at the ability to “white label” the platform but this discussion was not pushed further.

The bank did not look much into the option of using third parties to add their systems and networks to the platform to create additional functionality for the businesses. This was partly due to the need for security at the highest levels. The ability of driving more than one sided network effects was not possible due to regulation requirements and the need for heightened security. The focus was not on an external ecosystems value chain but more the optimization of internal efficiency. The graph is green, in execution mode with implementation success delivered on time.

6.6.4.4 Challenges with platforms in financial services

Industries that have the following attributes are more likely to see the drive towards platform revolution.

1. Information intense – industries where the product or service is linked to information are more likely to be disrupted through platforms. Examples could be media, as newspapers go more online over time as the industry changes (Choudary, 2016).
2. Non-scalable gatekeepers – industries where there are middlemen with a certain capacity. Buyers in retail for example can only see so many suppliers and it is difficult for new ones to break into shops. Amazon and eBay have allowed for millions of producers and consumers to trade. This scales very quickly as there are fewer capacity constraints.
3. Highly fragmented – industries that are highly fragmented can aggregate this demand on a platform to provide choice for buyers. Examples include restaurants combining offerings, car owners who have time to taxi and home owners who would like to rent out their homes.
4. Information asymmetric – where information knowledge is important in an industry there is more likely to be platform disruption if one side of the buyer or seller relationship is more asymmetrical than the other (Choudary, 2016).

What makes an industry less resistant to platforms revolution?

1. High regulation – banking and healthcare are two highly regulated industries where the regulators have an interest in ensuring there is a stable and functional industry. There are often tensions between increasing competition whilst ensuring the status quo is maintained.

2. High failure costs – if an error is made in health care the impact is significantly higher than making a mistake delivering goods to a customer. This may mean that much more care will need to be applied when cost of failure is high.
3. Resource intensive industries – industries like oil, mining or agriculture are all industries that rely more heavily on resources than information, and therefore are less likely to be impacted by platforms.

6.6.4.5 Implications

Platforms was one of the business model options that kept coming up within the interviews. The option for incumbent banks to work together on scalable platforms that would reduce the costs by sharing development and compliance costs plus the advantages of scale. The incumbent implemented a global platform but an option in the future is to white label this and become the platform of choice for the business segment. Other platform opportunities will arise and collaboration will be needed to get the true benefits. The benefits if this is implemented right has the opportunity to transform the industry. Maybe this will be delivered by the Bigtech platform experts.

6.6.5 Agile and DevOps

6.6.5.1 Introduction

This field has attracted more and more focus over the last few years, see the survey of DevOps concepts and challenges graph below. Figure 6.14 shows the increase in journal, magazine articles and conferences focused on DevOps. This is a new and growing focus that can help solve many challenges with software development.

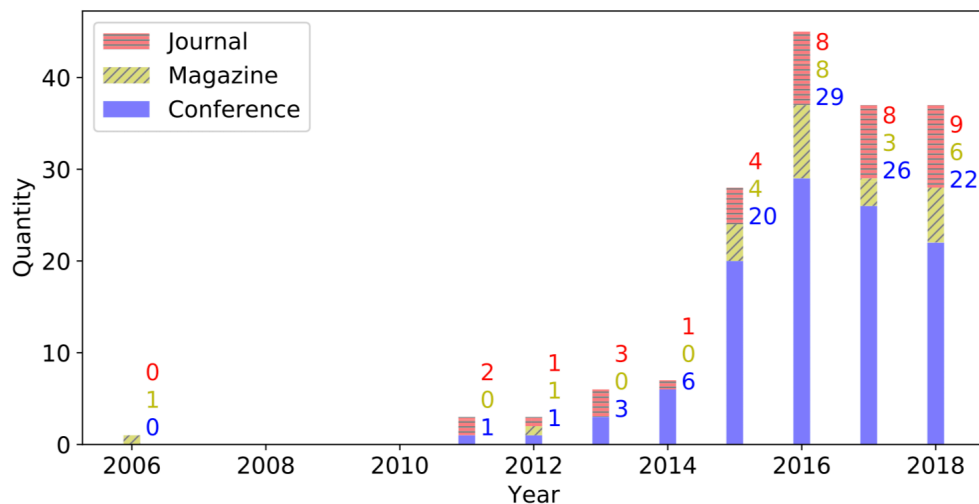


Figure 6.14 - Number of journal, magazine or conferences has increased

Source - (Leite, Rocha, Kon, Milojevic & Meirelles, 2020)

The cost of IT system failure in the 1970's-80's would result in mass layoffs or bankruptcy. In the 90's IT failures would result in revenues lost and the job of the CIO. Now with the latest development techniques the costs of failure are reduced to the point of being negligible. New more agile development processes have reduced the size of projects, the time taken to deliver and deploy them and importantly therefore the risks.

The challenges of IT development have been around for years, the development of technology solutions to unrealistic budgets and timelines is nothing new. In the quest for new funky functionality, often the organization pushes for more than can be achieved, at unrealistic costs and benefits.

Partial work completed – this results in a lack of complete documentation, or in the decommissioning of the old systems or creating suboptimal data flow

1. Long drawn out processes – getting projects approved, mobilized, documented and reviewed takes significant effort and doesn't improve the output to the business clients.
2. Gold plating - additional features that are built into a project that goes beyond the needs of the clients can over time result in complex systems that are very costly to design. This leaves the firm vulnerable to disruptive change.

3. Waiting time - the time it takes to get projects approved, resources allocated, developed or tested.
4. Handoffs from department to department – moving information backwards and forwards between the people delivering the requirements and the people asking the work to be done.
5. Heroics – the reliance not on mature processes that work, but the hard work of individuals who step in and fix things by working all night long to hit deadlines due to delays elsewhere.
6. Large batch releases – large waterfall project management are not used as the main way of delivering change projects. Instead smaller change releases are done on a continuous basis.
7. Lack of visibility – after requirements are agreed, then developers go away and complete the work before its tested and released.
8. Cost of unplanned work – the cost of new changes, scope changes and corrective work is very costly for complex organizations to deal with. It is important that rework or new work is minimized, to use an analogy adding an extra foot to a house extension is really difficult when the foundations have already been completed.
9. Firefighting – the need to stop and deal with fires puts delays into the system and can increase costs. These can be project reviews, headcount cuts, reduced funding, scope issues, changing priorities and new challenges. All can be costly and cause delays.

Agile and DevOPS does bring working practice benefits for firms who can master new development techniques. According to assessments, new Agile development practices can increase code and deployment by 30, lead times are 200 times quicker, with improved reliability metrics, production deployments have a 60 times higher change success rate and the mean time to restore is 170 times quicker. The higher performers who have been able to master these development techniques are also able to drive greater market shares, be twice as profitable and have higher staff satisfaction scores with less burn out (Kim; Gene; Humble, 2016). The final impact of a project can be significant. The overall development costs could reduce by as much as 40% and resources driving innovation increased eightfold (Humble, 2018).

6.6.5.2 *Advantages of DevOPs*

There are three waves described in the DevOps Handbook, that seem to sum up simply the need for a different approach (Leite *et al.*, 2020). The first is relooking at the flow from development to operations with the objective of speeding up the flow. The second is to look at fast and reliable feedback, and the third is creating a culture focused on learning, discipline and scientific experimentation but that also listens and takes on board feedback.

The success of implementations can be measured. The software development performance can be measured by lead time improvements, deployment frequency, mean time to restore and change failure rates.

Advantages:

1. High performers deploy on demand code into production many times a day whereas low performers deploy once a month or quarter.
2. Lead time is the time it takes for a ticket for development being created to when the work is completed.
3. The process time is from when the work is started to when the work is completed. Speeding up lead time improvements also includes the constraints in getting projects up and running.
4. Lead times to changes for high performers would be less than an hour compared to low performers that would take one month to six months.
5. Mean time to restore (MTTR) systems should be less than an hour versus a day (Forsgren & Kersten, 2018). This will however depend critically on the systems, but overall the MTTR should be as low as possible.
6. Change failure rates should be less than 15% for high performers with poor performers judged over 30% (Forsgren, 2018).

6.6.5.3 *Speeding up the flow*

Speeding up the flow can be completed with work in 3 main focus areas. Firstly reducing the size of a project releases the second area; reducing work in progress (WIP) and in turn the third, reducing constraints that lead to delays in the system (Kim; Gene; Humble, 2016).

One of the learnings from lean practices is to reduce the levels of WIP by shrinking lead times and increasing quality. In software, it is about ensuring that the project is broken down into smaller deliverables that release quicker and then feedback is gained. This is different than just one large project that delivers 5 new sets of functionalities at the same time. The new approach is that at each deliverable will be delivered when ready. The 5 sets are released separately and therefore they can constantly check that the projects are going in the right direction during the project, and not just at the end. This reduces risk dramatically and isolates potential issues quickly (Kim; Gene; Humble, 2016; Leite *et al.*, 2020).

The more there are different teams there are, then the more this can add costs and delays. The ability to stop or reduce this lies with three key areas; automate as much of the process as possible, create integrated teams that don't need to handoff but are instead focused on delivery, and reduce the constraints that are holding back the deployment times (Wiedemann, Forsgren, Wiesche, Gewalt & Krmar, 2019). Organizational design matters when it comes to software development. It matters if the organizational structures are aligned for cost reduction in functional expertise or more market-oriented teams.

Functional teams reduce costs, are hierarchical and have separate teams delivering parts towards the whole. Market oriented teams are flat teams, with cross functional disciplines and are focused on services or customer's needs. Moving to cross functional teams reduces the handoffs and empowers smaller teams to build, test and release code within their product and service expertise. Building in service operational engineering and security engineering within the team structure means that the funding for such a model would move from just looking at project funding to product/team funding (Leite *et al.*, 2020; Zaydi & Nassereddine, 2019). Building cross functional teams who managing the product/service journeys by teams means they all have a vested interest in paying down the technical debt that has been built up over time. The cleaner and lower the technical debt the easier development is and the more efficient it is. Ensuring as much of the life cycle is automated prevents the need to manually move or reduce handoffs.

Continuous delivery and integration require dedicated environments that mirror production. Build and test can happen all the time on small batch independent packages. These can be in a package that may be deployed in containers. Using

tools like Gitlab CI or Jenkins developers can automate deployment once development is completed (Leite *et al.*, 2020). One of the obstacles for effective continuous delivery is highly coupled monolithic architectures. These create complex dependencies due to technical debt that has been built up over years. One of the principles of continuous delivery is small and independently deployable units, these are sometimes called microservices that are easy to test and deploy. This is completed by using the same versions of production for testing, therefore quick feedback can be gained (Forsgren, 2018). The technical debt that has been built up over years can reduce the effectiveness if small changes require large amounts of testing in every part of a large complex system, instead of the small independent part.

Automation is not just the way that code is developed, tested and integrated, but also the ability to automate the deployment of development environments and compute, storage and database capacity as and when needed. Waiting for infrastructure was a key delay discussed and through cloud services like Azure, this deployment can take minutes versus the need to wait months for new hardware to be implemented and integrated.

6.6.5.4 *Quick feedback*

Quick feedback on the health of the wider IT estate is critical to ensure that developers can code with confidence. Monitoring using telemetry is key to this, including the monitoring of application features, application health, database, operating systems, storage, networks, security. Monitoring thousands of metrics across the whole estate should pick up on potential issues and resolve them as quickly as possible. The measurement of MTTR is a critical metric to ensure systems are up and running as quickly as possible. The monitoring should move into anticipating issues through alerts looking at the health of the application and fixing this, before the real issues arise. Some of the monitoring is also done by employees reporting by raising tickets when applications are working slowly and not working at all.

This is unnecessary if application health is anticipated by looking at 4 different levels. The first is the application layer, for example a web page loading time taking much longer. The second is the OS level, here server companies can monitor free memory running low or disk space running low. The third level is the database level and if the database transaction times are taking longer than normal. The fourth example is monitoring networks and checking the number of functioning services behind the load

balancer dropping. All of these can be completed using new modern tools and statistics to highlight the issues that need to be looked into.

Anticipating issues and fixing them before users, businesses and clients are impacted gives developers confidence to code in security that issues will quickly be picked up and fixed. This should be built into the normal developer day and not just OPS. Key metrics need to be owned by the developer environments including defect counts, severity counts, alerts and monitoring coverage. Part of the key here is the pay down the technical debt to simplify the environments and ensure they are more loosely coupled, ensuring issues with the correct parts of the application estate are easier to manage in future.

6.6.5.5 Culture

Creating a learning culture is reliant on a culture of collaboration where people work together to highlight defects, solve them and heal themselves through learning and blameless postmortems. Thereby sharing and teaching themselves to improve. Dr Ron Westrum was one of the first to understand the need for the right culture (Westrum, 2004). He produced a simple framework explaining 3 different culture styles; power oriented, rule oriented and performance oriented shown in figure 6.15. Power is around the retention of knowledge, failure blamed and messengers being shot. Whereas at the other extreme is a performance-oriented culture where co-operation is encouraged, risks are shared and failure leads to the opportunity to learn and improve.

Pathological (power-oriented)	Bureaucratic (rule-oriented)	Generative (performance-oriented)
Low cooperation	Modest cooperation	High cooperation
Messengers shot	Messengers neglected	Messengers trained
Responsibilities shirked	Narrow responsibilities	Risks are shared
Bridging discouraged	Bridging tolerated	Bridging encouraged
Failure leads to scapegoating	Failure leads to justice	Failure leads to inquiry
Novelty crushed	Novelty leads to problems	Novelty implemented

Figure 6.15 - These are very different cultures

Source: (Edmondson, 2019)

The need for psychological safety is discussed by Amy Edmondson. In her research she found that 85% of polled employees had at least one instance when they didn't speak up when they felt they should have done. The benefits of silence for an employee is clear; if they don't say anything then they can't be blamed or questioned (Edmondson, 2019; Edmondson *et al.*, 2019). This behavior reduces conflict for the individual but doesn't help the organization. This drives issues around silence, despite firms promoting diversity and inclusion and the stance that differing views and inputs lead to better and more robust decisions.

The response of a firm's culture can lead to unexpected consequences, so it's important that failure is reframed and the culture is encouraging learning from issues and that failure is part of experimentation. This is different to breaching policy. Clear breaches of policy should be dealt with using the company's policies. However, when something new is being tried but doesn't work out the company should celebrate the learnings and how this can be used in the future (Edmondson *et al.*, 2019).

6.6.5.6 Observation study findings: DevOps

During 140 weeks of the observation study, transformations in DevOps and Agile implementations were observed. DevOps relies on many disciplines all coming together including developer scrum teams, developer tools, automated tools, provisioning of infrastructure, training, monitoring, security and a change in culture that promotes the need for performance learning and enhancement.

Over the last few years there has been significant investment into development tools, Agile training, system monitoring tooling, the improved communications of issues, automation levels and collaboration across teams. There have been dramatic improvements under the latest CIO, but there is still much to do. Some simple examples of the improvements observed during the observation study duration follow.

At the beginning of the journey infrastructure was blamed for outages, monitoring tools only covered some of the estate and outages were noticed by employees or customers. Developers waited for hardware to be installed and there were more outages due to large scale projects going live. Improvements have been made with new developer tools in the cloud, the provisioning of the development environment in the cloud, automated provisioning of infrastructure and self-healing systems with over a million automated fixes already deployed.



Figure 6.16 - Agile - education to strategy to execution results

Figure 6.16 above shows discussions over several years, Agile is still very much in the implementation stage. The implementation was needed to provide faster solutions for customers with stable levels of quality, de-risking large scale implementations. The peak of discussions and decisions were made in Q3 2018, since then the full implementation of a number of initiatives have helped transform the technology function.

6.6.5.7 Implications

The areas for continued improvement are regarding the paydown of technical debt and culture. The incumbent bank has built up significant numbers of legacy systems that are large and complex, over lapping in functionality and costly to maintain. A final important point coming to note is the tenure of staff. The technology organization has developers and technology experts who have been with the organizations for 15-20 years. This is good from a deep skill and understanding the older legacy systems point of view, but can be challenging when the adoption of new ideas and new technologies is needed.

6.6.6 Blockchain

6.6.6.1 Introduction

Blockchain came alive in 2009, when Bitcoin the most famous user of blockchain technology started. It is still the first and most popular crypto-token on the market. A white paper was written by an unknown writer using the pseudonym of Satoshi Nakamoto in 2008 (Nakamoto, 2008). This paper outlined how the basics of Bitcoin; a peer to peer blockchain could work, this mysterious person helped develop the Bitcoin until they disappeared in 2011.

There are a number of possible outcomes from the Fintech revolution. The innovations coming from this new industry that rose out of the ashes of the financial crisis of 2008, seem to fall into 3 main categories. 1) New challengers who face off directly with banking services 2) Fintech new technologies that can be used by Fintech's to challenge banks 3) the same technologies can be used by banks to disrupt their own processes, products and services by using the Fintech as an open innovation arm (Gomber *et al.*, 2018). These new technologies fall into the categories of complementary and disruptive.

Complementary technologies can be implemented to help deliver the same products and services but in a more digital way. This may result in a better margin service, better decision-making information, lower risk of fraud or speedier processes. Other new technologies disrupt the existing systems, products and services and replace older ways for working with completely new ways of working. Blockchain is in the later and is disruptive to existing incumbent banks (Anderson & Tushman, 1990).

Disruption can happen when a lesser product attacks an incumbent player by being more affordable and accessible. Blockchain technology itself has the potential to disintermediate some of the banking systems traditional products and services, reducing the margins of incumbents significantly. This is not a pipe dream. The fact is that banking has been bypassed by the forerunners of the blockchain technology. Currencies like Bitcoin and Ethereum are already disintermediating the current banking systems. We have been here before with Uber disrupting taxis, Airbnb disrupting hotels, Skype disrupting telecommunication companies and Netflix disrupting video rental business. This is where technology has been used to innovate and disrupt incumbent businesses (Haycock, 2015). As this is new technology that has the potential for disrupting the banking industry, the levels of hype are very high and in reality, although the potential is there, the level of disruption predicted in the short term has been over estimated (Kolb, Abdelbaky, Katz & Culler, 2020).

The distinguishing feature of blockchain is its decentralized system. This means no one user or institution runs blockchain and therefore they cannot control it. For some followers of the technology, this is a key feature stemming back to the failing of banks in the financial crisis of 2008; the fact that this enables users to bypass what was a traditionally owned processes by incumbent banks.

The traditional way of transferring \$100 from one person to another, requires the following steps (Neyer & Geva, 2017):

Someone requests the transfer:

1. The bank takes a fee for processing
2. They validate that the money is in your account
3. They check the deposit account is open
4. They update the account that it has been transferred to
5. Days later the receiving account is then updated with the \$100

Distributed ledgers on the other hand work in the following way:

A transfer request is made:

1. The nearest computer verifies that there are enough funds in the system
2. There is a broadcast to all computers in the distributed ledger

3. In turn computers re-verify the transaction and pass it along and therefore add it to the end of every ledger in a peer to peer network

This is a really simple example but it shows how value can be passed peer to peer bypassing traditional incumbent banks. This is completely private and people don't know who has passed the amount to whom, they just know it has happened as the ledger is transparent to all. Traditional banks are still built on trust; the belief that the bank will transfer money and check correctly that a person had the money to transfer in the first place (Workie & Jain, 2017).

The distributed ledger is a key core component of how blockchain works. All have access to the ledger is it's a public blockchain, basically a log of stored data. New items are added to the ledger roughly every 10 minutes (Bitcoin example) and clustered together in blocks (Das, 2019; Flinders, 2018; Kolb *et al.*, 2020). The ledger is therefore just a series of blocks with ledger entries which track the transactions across the distributed network. A subset of members in the network not only maintain copies of the distributed ledger but also help to construct the blocks themselves and ensure consensus; this is known as 'mining' (Birch *et al.*, 2016; Neyer & Geva, 2017).

Each transaction must be signed using a unique private key that prevents forgery. This is how cryptocurrency works. This private key is critical and payments or transfers can't happen without this private key. If lost then the owner would not be able use their currencies or if the key is stolen then the currency could be taken and extremely difficult to trace if not almost impossible.

There are different types of blockchains, they can be permission less or permissioned (Gomber *et al.*, 2018; Kolb *et al.*, 2020). Permission less is a public blockchain that allows users to join and then transact without knowing each customer. This was responsible for the origins of Bitcoin attracting illegal traders who wanted to bypass legal systems. Bitcoin became linked with these practices as off-grid commerce sites in the darknet began to trade illegal items. Bitcoin was seen as a way of paying peer to peer without trace.

There are a number of Bigtech companies working with the consortiums on a technical system to be above challenges. Amazon, IBM, Google, Microsoft and Oracle are all offering blockchain as a service in their cloud solutions. In the new Ethereum network, miners can provision cloud based virtual machines to build blocks.

Microsoft are also working on Coco, a blockchain framework targeting permissioned blockchains using Trusted Execution Environments that rely in validator nodes. This can avoid the need for consensus processes (Kolb *et al.*, 2020).

The focus so far has been on how the start of blockchain technology was used especially at the beginning regarding peer to peer transfer of value. This started with Bitcoin as the first and most famous example. Ethereum was introduced by Vitalik Buterin and Gavin Wood in 2014, a simple computer program that proved to be very powerful. This was the first program to not only introduce a currency type peer to peer payment system, but also the ability to create smart contracts. Conditions can be built into the program that depend on work being completed, goods being passed that are verified, auctions taking place or legal work being in place, only then is value is transferred from one party to another. This uses a similar process as Bitcoin but uses smart programs that open up new and more complex possibilities for blockchains (Kolb *et al.* 2020).

6.6.6.2 Observation study findings: Blockchain

Blockchain discussions have been going on for many years. Proof of concepts have been created with business case studies. At the beginning the expectations and hype where too high and this was explained as a cure for all issues within the bank. More focused and practical applications are being developed and matured.

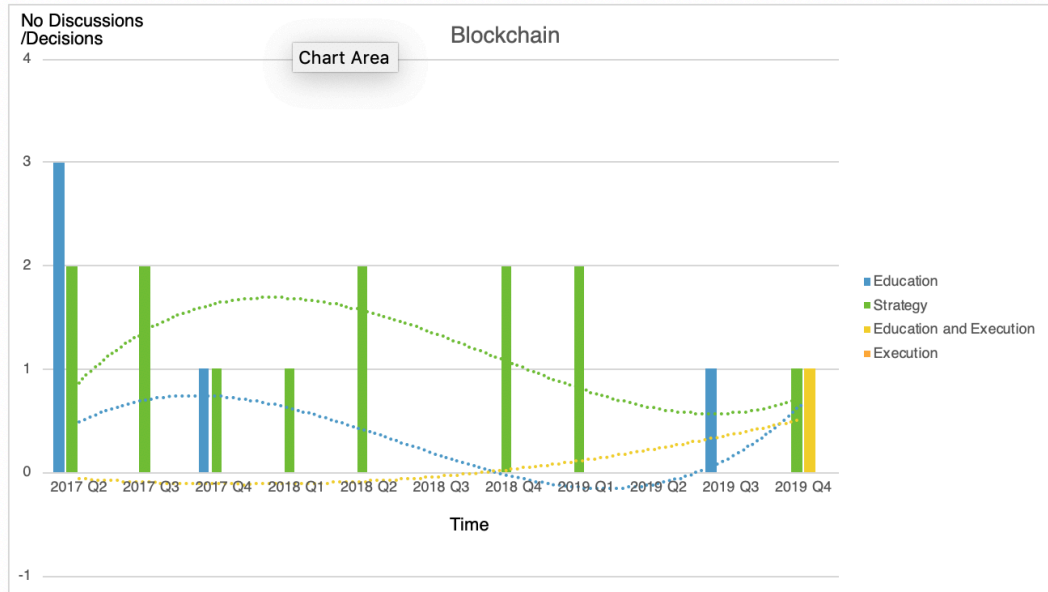


Figure 6.17 - Blockchain - education to strategy to execution results

You can see from figure 6.17 this is an interesting case. The education moved to strategy and there it still is. There are implemented proof of concepts but the expected disruptive qualities for this technology have yet to be fully realized.

6.6.6.3 Challenges with blockchain

Figure 6.18 below that of the applications that blockchain has listed will not be ready for at least 5-10 years. Most of the applications are in the innovation space with some coming through the trough of disillusionment.

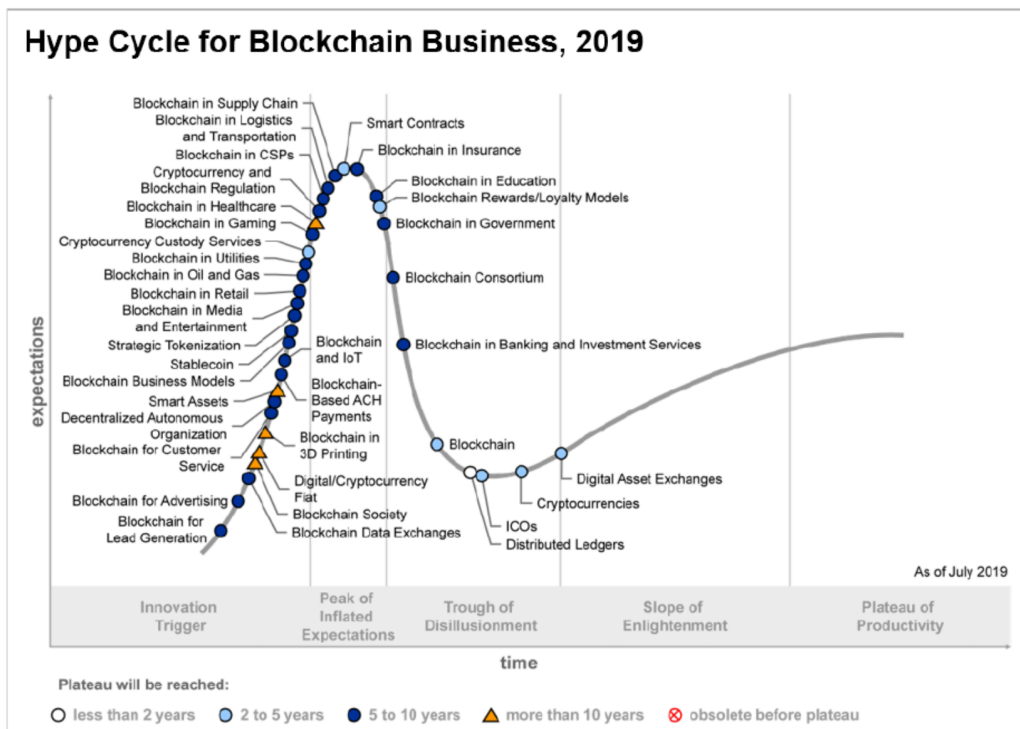


Figure 6.18 - Blockchain hype curve

Source Gartner: (Stamford, 2019)

Blockchain in banking was hugely hyped a few years ago and today it is coming through the model with more realistic expectations. Although blockchain is being used to update decades old systems and products, only 7% of CIO's surveyed by Gartner respondents suggested that blockchain is a game changer for the industry, and only 18% of the survey respondents said they would be implementing anything blockchain related in the next 12 months (Stamford, 2019). It's hard to understand if this is underestimating the potential impact of blockchain due to its initial hype, or of the existing legacy processes are just good enough to meet the client's needs and therefore the risk of disruption is less than people suggest.

Many believe that permissioned blockchain will eliminate these illegal or unwanted elements as people will be given access to the blockchain probably following rigorous checks, however this is counter to the point about bypassing controlling companies (Thombs & Tillman, 2018). If controlled by banks these would be know your customer regulated. There are now a number of consortiums of companies working together to

create these blockchains. There are 4 main issues to tackle (Lacity, 2018; Neyer & Geva, 2017).

- 1) How do companies set the same standards including right of access, allowable transactions and data structures?
- 2) How will this be regulated? In theory this could be a more transparent process as it's a distributed ledger.
- 3) How will the blockchain be governed and developed?
- 4) How can it be ensured that enough parties play to make the ecosystem work?

6.6.6.4 Implications

The implications of Blockchain and related technologies are significant. It has been over hyped and still some way from being implemented in a way that meets its true capabilities. A breakthrough in computer science or scalable quantum computing may be the missing ingredient. The potential is there and that is why this have got some much attention over the 140-week period.

6.7 Summary of Observations

Incumbent banks invest a huge amount of investments just keep the current legacy systems up to date and regulatory compliant. This study shows that they can also invest in building and implementing new capabilities as well. Some are in strategy stage but some have moved to execution. The reasons for this likely to be a combination of short-term gains, ease of implementation and the fact that some of the technologies are still maturing. The need to explore and exploit business opportunities through the use of new capabilities linked to technologies will be needed if incumbents are going to survive the waves of disruption that will come ahead. Although the task is large there is still some hope. The incumbents have demonstrated the capability to make decisions quickly and allocate resources for the longer term. These are large, complex and expensive implementations that will give the incumbent new capabilities it doesn't have at the moment. Combining the expertise of the business, the resources, brand, customer loyalty and these new capabilities to provide even better products and services will be key to combat the disruptions coming its way.

6.8 External Validation

In a recent study by the Society for Information Management published in the March 2020 the MIS Quarterly executive, important findings from industry surveys of over 1000 technology executives (Kappelman *et al.*, 2020) were shared. Executives surveyed included nearly 400 CIO's, the most senior IT role within companies. Questions were asked regarding top investments, what was troubling the CIO's, % level of investment in IT compared to revenue and where they were spending their monies. This is useful information for comparison against the later findings of this research.

The associated table below shows the largest investments companies are making into new capabilities. Companies use the increased capability to drive additional value for the firm. The top technologies are shown as analytics and data, cloud, security and application maintenance. Also making the top 10 are the re-platforming of legacy applications and maintenance of legacy applications. From the rankings it can be seen that cloud has become more important over time as technology matures and the external service providers become more sophisticated. This has changed from being just for outsourcing standard IT software to a way to quickly scale up compute resource capability using the scale and utilization of external vendors. IT capabilities are increasingly seen as ways to drive competitive advantage through the ability to drive connections and relationships or by redesigning business models (Bhatt & Grover, 2005).

The number one investment area remains business analytics and data. This has been the case for over the last 10 years. No 2 is cloud computer and coming in at 3rd place is security and cyber with the 4th place entry as software development and maintenance. By adding the legacy maintenance and re-platforming together, this would make it within the top 5 spend. This is also consistent with the top software development categories highlighting the need to spend on maintenance and enhance legacy.

Table 6.15 - Investment priorities by SEM

Information Technologies	Largest IT Investments (% Selecting) 2018 Rank	Those that Should Get More Investment (% Selecting) 2018 Rank	Those Most Personally Worrisome (% Selecting) 2018 Rank
Analytics/Business Intelligence/Data Mining/Forecasting/Big Data	1 (37.9%) 1	1 (35.8%) 1	4 (16.3%) 3
Cloud Computing (e.g., SaaS, PaaS, IaaS)	2 (36.1%) 3	4 (21.2%) 3	7 (13.9%) 7
Security/Cybersecurity	3 (33.3%) 2	2 (31.6%) 2	1 (46.9%) 1
App/Software Development/Maintenance	4 (28.3%) 4	14 (11.0%) 13	9 (11.5%) 8
CRM (Customer Relationship Management)	5 (24.1%) 6	8 (14.6%) 7	15 (8.4%) 17
ERP (Enterprise Resource Planning)	6 (22.5%) 5	18 (8.6%) 18	16 (8.1%) 12
Legacy Apps: Replacing/Re-platforming	7 (18.8%) 9	11 (13.4%) 9	6 (14.4%) 5
Data Center/Infrastructure	8 (15.4%) 7	28 (5.0%) 22	18 (7.3%) 14
Legacy Apps: (Maintain/Update/Consolidate)	9 (12.8%) 10	32 (4.5%) 34	10 (11.3%) 9
Integration/Application Integration/Data Integration	10 (11.5%) 11	16 (9.9%) 15	14 (8.7%) 10
AI/Machine Learning/Expert Systems ^a	12 (10.8%) ^a	3 (26.1%)	11 (10.2%) ^a
Innovation/Disruptive Technologies	15 (8.3%) 15	5 (19.4%) 4	5 (14.6%) 4
Disaster Recovery/IT Continuity Planning	14 (9.1%) 12	6 (14.9%) 5	2 (24.3%) 2
Staff Development/Training/Retention/H1B ^b	24 (5.7%) 30	6 (14.9%) 6	3 (18.1%) 6
Data Integration/Data Quality	17 (7.0%) 20	9 (13.8%) 14	8 (12.3%) 11
Master Data Management/Data Quality	17 (7.0%) 16	10 (13.6%) 11	12 (9.4%) 12
^a AI/Machine Learning/Expert Systems was introduced in 2019			
^b H1B is a visa that allows U.S. employers to employ foreign workers in specialty occupations			
n = most senior IT leader in 618 unique organizations			

Source: (Kappelman et al., 2020)

The table 6.15 shows the areas where the CIO's believed there should be more investment. The areas of growing need and focus are on AI/machine learning and data integration. This was highlighted as 12th in the overall prioritization level but 3rd on the CIO list. Innovation and disruption also came lower on the overall list but the CIO thought there should be more investment. As this is just a survey there are no real insights into why the areas are not getting the prioritization that CIO's feel warranted. Is this due to the prioritization process, longer term payback, more immediate needs crowding out the investments or the level of immaturity of the technologies involved? It will be interesting to compare and contrast these issues to find some answers.

The most worrisome information technology came out as security and cyber, followed by staff retention. This is understandable as these would significantly disrupt business or effect the on-going value of the firm if not executed correctly.

It is interesting to note that a none essential item needed to ensure day to day viability but seen as a more forward-looking issue is innovation and disruption. This could be deemed as low in prioritization but with the awareness that more needs to be invested. Maybe CIO's are constrained by internal or external factors? This can be examined more in the multimethod research study. This is particularly concerning for the CIO's who understand the need to resolve this or over time it will impact the viability of the business.

Table 6.16 - Breakdown of software development categories

Software Development Categories	2017	2018	2019	% change 2018-19
n (unique organizations)	337	326	223	
Integration	65.3%	67.8%	62.3%	-8.1%
Maintenance/Enhancement of Legacy	49.3%	48.2%	47.5%	-1.4%
Customization	38.0%	38.0%	31.8% ^b	-33.9%
Modification of COTS	14.2%	10.1%		
Web	33.8%	31.0%	27.4%	-11.6%
New Custom/Bespoke Development	18.1%	22.4%	32.7%	46.0%
Maintenance/Enhancement (Other Than Legacy)	23.4%	19.9%	24.7%	23.9%
Migration	14.5%	14.7%	14.8%	0.5%
Mobile		13.5%	13.0%	-3.7%
Internet of Things (IoT)		6.4%	3.6%	-44.1%
^a Percentage of respondents who ranked this category as one of their three largest. Blanks represent a category not present in the survey that year. ^b Customization and Modification of COTS were combined into one category for 2019				

Source: (Kappelman et al., 2020)

Table 6.16 shown above shows the software development priorities for spend. The survey also looked at what companies are increasing or decreasing IT budgets over time. The survey showed that IT budgets overtime have been increasing and are expected to continue to increase. Again, this is hard to understand why this is the case assuming that new investments will be about building new capabilities that will be expected to payback through increased returns. This is difficult to measure especially with emerging technologies and a longer-term impact on business

revenues as there are often macro-economic changes that are difficult to dissect. It is clear that the direction of travel is to continue to invest in technology.

6.8.1 Implications

These findings support the observational review and archival data from the incumbent. The focus is slightly different between financial services and non-financial services but the themes are similar. As is the drain of maintenance of legacy.

7 Implications

7.1 Introduction

The stated aims for this research were to understand how and why disruption impacts incumbent firms within financial services including an assessment of how these impacts can be anticipated. To help understand this further, sub themes and conjectures were used to test the theory in the literature review.

There are two sub themes of analysis:

- A. Investigation into the forces driving action and inertia to help understand the ability to respond to the changes in the industry
- B. Understanding what investment decisions are being made to combat the growing threat of disruption within the financial services industry and the reasons for this

The aim of this body of work is to reinforce, challenge and extend the existing theory through the use of these conjectures and also provide insights into why disruption in financial services is happening in the way it is. The contribution also affects practice. This links academic theory and pulls all related points together in a simple tools and conceptual framework that can be used to assess the potential disruption within firms.

For ease of review I have split the implications into 2 parts. One is the contribution towards theory and the second is contribution to practice. These are highly linked but the split helps to ensure a consistent flow of implications towards conclusions.

7.2 Contributions Towards Theory

This section of the thesis will look at the contribution to the theory and use the conjectures as a framework to link back to the findings. We will start with the first 4 conjectures that are linked to the question of how and why is disruption is impacting incumbent firms.

7.2.1 Conjectures linked to how and why disruption is impacting financial services

This first section looks at the research question, how and why disruption impacts incumbent firms and includes an assessment of how these impacts can be anticipated through the related conjectures to test theory.

Table 7.1 - Conjectures relating to research questions being reinforced, challenged or expanded

Question and theses of analysis	No.	Conjectures	Leading Authors	Reinforces	Challenge	Expand
Research question: How and why disruption impacts incumbent firms within Financial services including an assessment of how these impacts can be anticipated?	1	New Entrants into the market will do so by using inferior products/services but becoming more affordable and accessible	C Christensen	✓		✓
	2	Disruption can be predicted and assessed	S Anthony	✓	✓	
	3	Technological changes could disintermediate existing traditional banking services and put financial services type transactions in the hands of non traditional banks	J Haycock	✓	✓	
	4	Profit erosion and market share price impacts will happen to incumbent banks unless it explores new ideas to exploit opportunities from disruption	PWC assessment, CBInsights	✓		✓

7.2.2 New entrants into the market

The first conjecture is that new entrants enter the market with inferior products but make them more affordable and assessable. The new entrants then continue to develop products to the point where more and more customers use them. The theory also states that incumbents have over develop their products creating unnecessary complexity and overheads associated to this. This allows new entrants to undercut without a significant loss of product functionality. New entrants therefore offer good value and are more accessible to clients (Christensen, 1997a).

The research reinforces this position but also extends this. New entrants have entered the market with a reduced set of banking products and services. We saw from the research on Fintech, that new entrants start off first with a very limited set of

customer propositions but the products are offered at a much lower cost than incumbents. Over time they add to them and start delivering a more comprehensive set of products and the theory relates to these individual products themselves. This can be seen from how Fintechs and Bigtechs are working.

The extension of the theory relates to the use of technology to equal or better the existing products. This is purely comparing a product or experience like for like. It can be argued that they are not inferior and that they are more affordable and accessible. Fintech have new technology processes and platforms offering a digital offering that matches or betters the incumbent experience as per client satisfaction scores and new customers. Revolut offer online account opening, currency credit cards that convert exchange rates at spot rates, they offer virtual card numbers that change hence very secure and other great customer interface experiences. This digital experience is not inferior and is enabled by new technology services but does only offer limited services. This overtime will be copied by incumbents but whether incumbents match the simplicity of the system designs and cost structure is yet to be seen.

7.2.3 Predicting disruption

This conjecture suggests that disruption can be anticipated through looking at the forces of disruption and reviewing the threat. This was based on the dual transformation work that sets out key indicators of disruption and looks forward to understand what the future could be (Gilbert *et al.*, 2017a). The theory here is by looking at the factors that are happening or likely to happen and the barriers and internal change capability, you can get a feel for the threat of disruption. Through the interview process and observational study, it can be concluded that this is possible using a simple framework as shown in the contribution to practice. This therefore reinforces this view that it can be predicted.

The challenge is that there are a lot of factors that impact the performance of an incumbent bank. An example would be the current pandemic. This has reduced the market capitalization of banks significantly. The preciseness of the anticipation is less important than the anticipation of the threat itself and scenarios can be conducted. Whilst offering valuable insight, this only works when looking through the lens of a product or client experience. A company lens is wide with too many products and services. A product or customer experience can be assessed using the models in the

contribution to practice. A simple example from the interviews and reviewing how Fintechs and Bigtech are competing, is that the focus is from new entrants is on revenue pools that are big, return on equity is high, barriers to entry are low and the incumbent response ability is low. Therefore payments experience is an area being disrupted the most.

7.2.4 New technology can disintermediate incumbents

Disruption has been over hyped over the last few years. Consultants, book writers and bloggers have all declared the demise of incumbent banks on the back of new technologies like Blockchain. This has been the case since 2012 and still the case today but the projections and actual disruption are completely different (Wade, 2020). New technologies like Blockchain and Bitcoin do have the capability to bypass current banking systems, however Blockchain was explained as the cure for all banking products and systems a few years ago but we have seen from the research, that Blockchain is still 5 to 10 years away from maturing and needs significant external co-ordination to make it work. This will potentially disrupt in 10 years or more depending on technology changes or how this is adopted.

This body of research reinforces the claim that banking products are at risk of disintermediation. This was clear from the Blockchain deep dive. The new technologies of the future may drive this further than we are able to comprehend today. That said, it is unlikely to replace all that banks do in the near term of the next 10 years. Once the technology has matured and is scalable, this may increasingly have an impact but it's unclear how incumbents will also adopt these technologies to offer alternative solutions, while maintaining customer trust and loyalty. The past has been over hyped and the future adoption is uncertain but the potential is clear.

7.2.5 Profits will be impacted if the disruption is not tackled

The findings reinforce the position that profits will be impacted by increased competition. Margins are already low and could reduce further. The simulations are clear. With new entrants and the threat of future pushes from the Bigtech firms, further erosion of profits is a real risk. The profit levels of incumbents have reduced substantially since the financial crisis. The majority of banks in Europe have returns less than the cost of equity and the share price is trading below book value (Mahoney, 2019; McKinsey, 2019). As new entrants attack revenue pools with the lowest

barriers, therefore revenues and margins will be under pressure hence the focus on costs in incumbent banks will continue. However, incumbents have some time to continue to invest in better client experiences, retain the loyalty, tackle their costly legacy systems and look for business model challenges like utilities across incumbents or consolidation.

7.3 How and Why Investment Decisions are Made

The implications relating to how decisions are made will be explored next. The conjecture will be used to explore this more deeply. The focus of this is an assessment as to how incumbents are investing their limited funds to combat the threat of being disrupted.

Table 7.2 - Conjectures relating to investment decisions being reinforced, challenged or expanded

Question and theses of analysis	No.	Conjectures	Leading Authors	Reinforces	Challenge	Expand
Understanding what investment decisions are being made to combat the growing threat of disruption within the financial services industry and why	5	Incumbents focus their investments resources to service existing customers needs - Not enough is being invested in disruption innovations	C Christensen, M Tushman	✓		
	6	Incumbents have the resources and knowhow to change and take advantage but are unable to react due to the culture of the firm, its complex processes and routines designed to maintain efficiency	C Christensen	✓	✓	
	7	Resource allocation is made in a suboptimal way and driven by political issues, driven bottom up and operational in nature. This is not driven by maximising economic benefits	J Bower	✓		

7.3.1 Incumbents invest just focusing on existing customers

The literature suggests that incumbents invest on current customers at the expense of investing in disrupting their own models or exploring new opportunities. This focus on current customers is critically important, but they must not over supply the customers with functionality they don't need, pushing up prices or overheads or missing out on new longer-term opportunities. If revenues for products that are being

attacked by Fintech and Bigtech are not replaced by exploring new growth horizons, then revenues and margins will continue to be under pressure.

The findings in the observational study showed, that there was a clear correlation of sustaining innovations being in the execution stage and disruptive innovations being more in the strategy stage. There was indication that these investments paid back more in the short term than in the longer term, however there was evidence of longer-term investments in platform capabilities. The cost of regulatory investments, security investments, maintaining the current legacy estate and then investing in projects that payback could be a critical factor. It is too early to state that disruption is not being focused on as Blockchain and AI are still maturing technologies according to Gartner and therefore the maturity maybe a big factor at play here. As was the case with Cloud investments, decisions can be made very quickly once the maturity is at a sufficient level.

The data therefore reinforces the notion that incumbents focus on both sustaining innovations and the more short-term payback innovations but the reason why is less clear.

7.3.2 Incumbents have the knowhow and resources but are not able to react

The literature states that although incumbents have the knowhow, resources and lots of smart people they are still unable to react (Christensen, 1997a). This conjecture focusses more on the knowhow and resources. The ability to react will be covered in other conjectures.

It's clear that banks have banking experts, a huge history of successes and invest vast sums into change. This largely reinforces the theory. The challenge comes from the interviews where a large number of interviewees questioned the level of existing knowledge of the senior leaders across the banks. The challenge related to whether there was sufficient awareness of technology and its capabilities to make strategic decisions into the future. Therefore, this leads to a natural focus on existing customers or controls. This situation is similar to that of Kodak, where the executives had chemistry backgrounds and struggled with the new digital era. The counter argument is that it is not so simple to compare banks to Kodak as there isn't a fundamental shift in the way products are being delivered. Banks have relied on technology for many years and we are seeing an era of innovation.

A final point to note is that in the research, this thesis benchmarked the level of investments being made in the incumbent bank and the industry as a whole. The data shows that its higher than other industries when you look at technology spend as a % of revenue. The challenge relates to how much of this is tackling technical debt, regulatory compliance, cyber security, maintaining the existing estate and looking after the existing customer current needs vs investment let to tackle disruption. The % is high but so are the existing investment needs just to retain existing revenue.

7.3.3 Resources are allocated in a sub-optimal way

The literature suggests that large complex companies delegate the resource decision making, down into the organization and often to operational managers. This leads to a natural focus of work under the remit of this population. The focus is often sustaining existing customers with operational risk frameworks (Bower & Christensen, 1995).

The research reinforces this theory and concludes that the existing practice of delegated investment management leads to the enviable focus on sustainable innovation, risk management and siloed focus but unclear if this is really sub-optimal given the challenges the financial services firms have faced in the past. The current process of resource allocation works in the most stable of time. The focus on existing customers and risk makes sense coming out of the financial crisis and the need to get a grip of controls, processes, efficiency and effectiveness plus keeping existing customers. The process was born out of circumstance. However, the research also suggests this may now need to be tweaked to ensure the board and executive teams are more involved in the setting of investments in a more detailed and strategically linked way.

7.4 Forces of Inertia

The forces of disruption help to answer the research question. These conjectures are more focused on the level of inertia including high costs, complex and rigid processes and cultural issues that lead companies to struggle to change.

Table 7.3 - Conjectures relating forces of inertia being reinforced, challenged or expanded

Question and theses of analysis	No.	Conjectures	Leading Authors	Reinforces	Challenge	Expand
Investigation of the forces driving action and inertia to help understand the ability to respond to the changes in the industry	8	Focus on current customers leads to high costs and over servicing clients this will leave the incumbents at risk of exposure to disruption	C Christensen	✓		
	9	Business processes and routines are complex and can take time to navigate reducing flexibility to drive changes quickly	C Christensen, S Anthony	✓		
	10	There are significant levels of inertia within large organizations driven by risk, fear, regulatory changes, incentives, shortermism, financial rules and shareholders. These combine to hold back the organisation taking on new and more disruptive opportunities	A Edmondson, C Christensen, S Anthony, M Tushman, M Benner, C O'Reilly	✓		✓

7.4.1 Focus on current customer can lead to over servicing leaving and high costs

The literature stated that overtime a company this continue improving existing offerings to the point where they over service the client's needs. This can lead to additional costs but not to huge levels of value for the majority of customers.

This research reinforces the existing literature. During the research issues of incumbent banks being too costly, gold plate solutions and overshoot functionality was a leading point coming through as a category within coding. This results in cost income ratios being high and the inability of incumbents to reduce the costs while offering the same service levels to the existing clients.

7.4.2 Business processes and routines are complex

The literature states that large incumbent firms have very rigid processes and routines, that make it very difficult to match the focus and velocity of new entrants. The culture of incumbents and size is therefore a disadvantage to moving quickly when threats arise. This was covered both in the interviews and observational studies. As discussed previously, once a technology is mature, relatively quick

decisions to invest large sums of money to payback can be made, as seen during the 140-week study.

Making decisions and investing seems to be possible. However, the issue of internal barriers to change constantly came up as a major concern of the experts being interviewed. These barriers to internal change included a culture of risk and fears to experiment, lack of knowledge of technology and costly legacy infrastructure. The biggest concern here is that without cultural embedded innovation, decision makers will find it challenging to implement and actually make the changes necessary. This was the biggest barrier to tackling the threat of disruption.

7.4.3 There are significant factors driving inertia

There is a huge volume of literature in this space. The evidence from the literature review shows that incumbents have a number of changes to deal with; from fear, risk, rigid processes designed around control, the role of analysts, shareholders and customers.

The research reinforces this literature, the most significant issue was identified as culture within the interviews. This covers risk adversity post the financial crisis, too many people controlling things, a culture of fear resulting in the lack of innovation and failure as well as a history of success leading to complacency with incentives driving people to not risk their own futures.

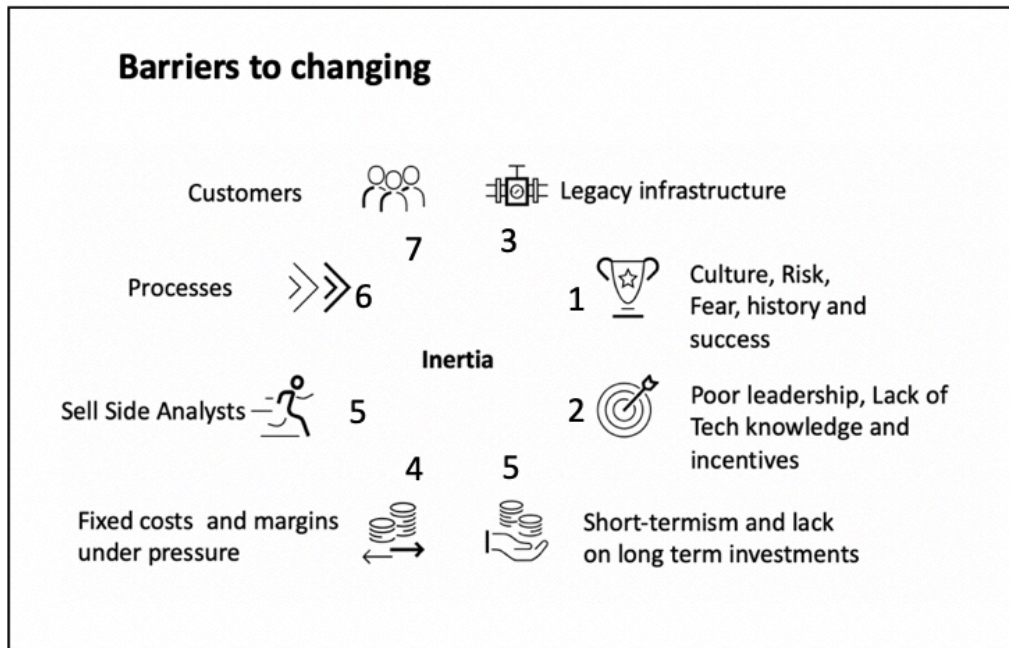


Figure 7.1 - Barriers to changing

This research reinforces the existing comprehensive literature completely. An extension of the theory is the extent to which legacy and technical debt is a problem to change. The challenge of legacy relates to the degree of investment and run costs the bank has to maintain the complex legacy environment. It also relates to how much time it takes to convert to cloud ready systems, the investment needed to move to more modular systems and away from monolithic systems, and the fact that this has been built up over decades. This is fixable but will take some time and resources to get there.

7.5 Contributions Towards Practice

To add to the contribution to theory, this section provides a framework coming out of the findings that will help practitioners to frame disruption, understand how and why this is impacting their business, understand how to measure the disruption, to understand the dynamic nature of barriers and the how the investment process needs to support the reactions needed by the incumbent. The whole point of this section is to help understand how and why disruption is happening to then understand the end condition of the eroded bank. This is the same with weather eroding a cliff face. The erosion is not random but due to forces and barriers that impact the final condition.

Disruption tool framework

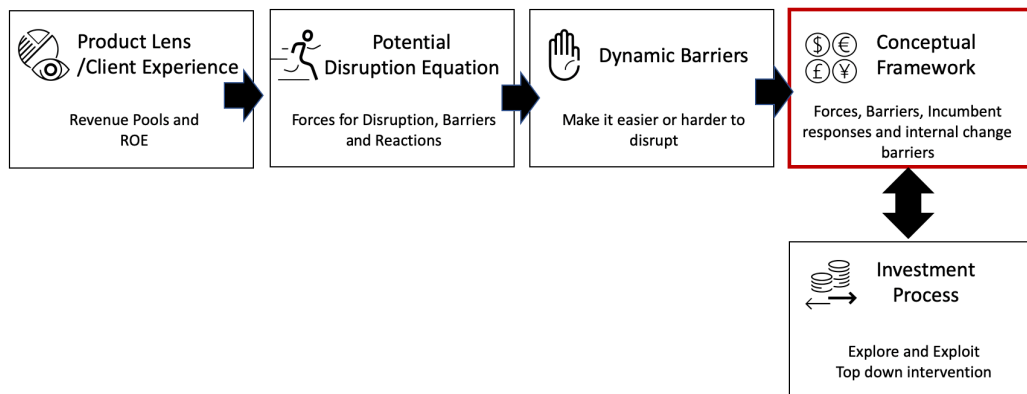


Figure 7.2 - Disruption tool framework

The start is a framework and ends up with the potential implications for an incumbent bank. As for all frameworks, this doesn't have the specific answers but provides a framework for practitioners to use to work through the dynamics at play.

7.5.1 Product lens or client experience

Looking at the lessons so far from Bigtechs in Asia, US and Europe and the assessments of Fintech challengers, there is a pattern to how they are entering these markets. As identified in the findings, the areas being attacked the most are products or client experiences that have low barriers to entry and large revenue pools providing good returns on equity. The disruption is not trying to replicate the existing universal banking model. This is too complex and regulated. They are focusing bottom up at product or client experiences. An example would be payments.

Looking at this through the lens of payments as a products or mortgages as a product; the forces for disruption and barriers of that disruption are different. Hence, we are seeing product and service disruption first, then new entrants add more and more products to potentially disrupt. At the moment disruption is still at product and service layers in banking.

How disruption is happening

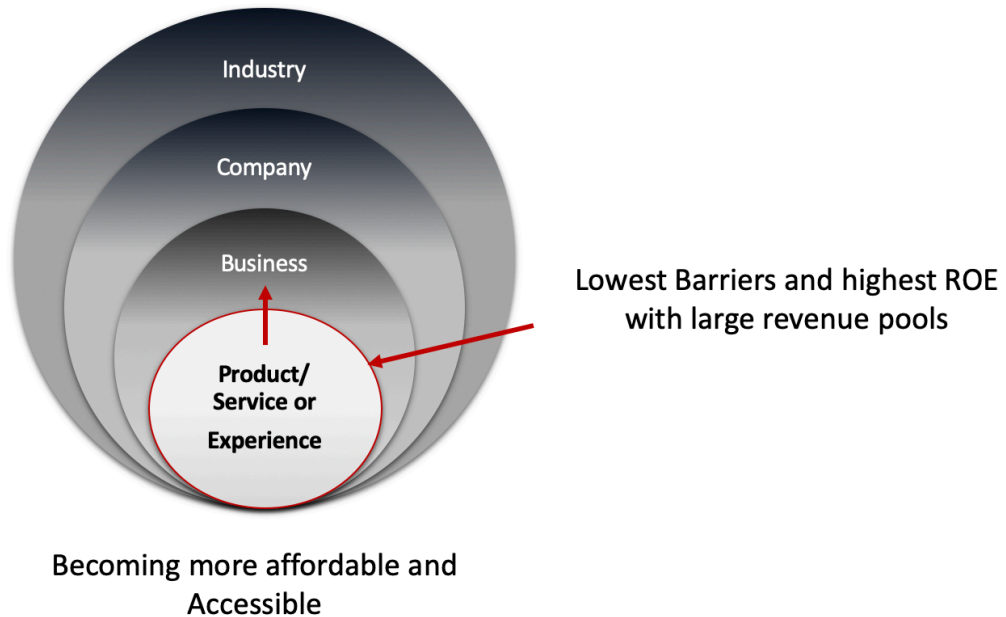


Figure 7.3 - Product or client experience lens

Product by product will be disrupted that could lead to disruptions of businesses. However, it's not that easy for the new entrants. The barriers for each product or client experience are not the same. When you move away from basic transactions, the barriers increase. This is covered off in the dynamic barriers section.

7.5.2 Potential disruption equation

The disruption potential equation is a very simple model that materialized through the research findings process. This simply pulls together the themes from the coding to understand the combined impact. It helps frame the different factors at play. Simply put there are forces for disruption which are mainly items like new entrants or technology changes. These need to combat some barriers to disruptions including the stickiness of customers, technical expertise and regulation. If the barriers have not been dealt with, then it will be more difficult to disrupt the incumbent business. All barriers can be navigated but it takes resources, effort and time depending on the product or service.

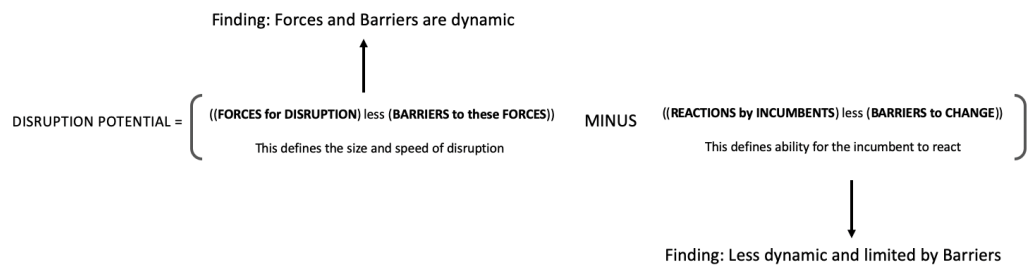


Figure 7.4 - The potential disruption equation

The next part of the equation is the reactions from the incumbents. This does act as a barrier but has been pulled into a separate part of the equation due to its significance. This includes technology investments, consolidations or new business models. As the forces grow, then incumbents' responses will also grow to try and combat these forces while investing to exploit and explore new opportunities themselves through ambidextrous strategies.

The last part of the equation is internal barriers to change. There is a significant amount of academic input here and this has been researched for many years. Although decisions and investments can get made, there are internal barriers of inertia that work against the ability of the bank to change. These internal barriers could be cultural, legacy systems or poor leadership decisions.

This equation can help practitioners understand the dynamics at play and at best anticipate the challenges. This can then be used to help set strategic reactions or reinforce strategic intent. An example could be applied to peer to peer payment products, they have high levels of revenue pools, low barriers and although incumbents can match the experiences, the price of transactions will be lowered through this disruption as per the disruption theory (Christensen, 1997b). The price of payments will continue to fall due to low barriers, new technology and the number of new players in this market. Mortgages is another product that is less disrupted. The barriers to forces of disruption are much higher including balance sheet cash surpluses that are required by the challenger, banking licenses, technical solutions and the stickiness of clients through relationships, starts to play a bigger role. The level of entrants and investments in mortgages are therefore much less. These are two products but with very different forces disrupting and barriers preventing

disruption. The equation can help firms understand the potential for disruption and the reasons for it.

7.5.3 Dynamic barriers

Based on the findings from the interviews. It's clear that each product type is not the same in terms of potential; revenue loss, the return on equity from each product and the barriers each one has. This was mentioned by a number of banking experts. Payments is one thing but the regulation increases when wealth is being managed for example. The use of the term dynamic relates to two changing processes. The barriers can change depending on the product, service or even location. They are also dynamic because they change overtime, examples being regulations which may increase or decrease or customer trust that changes over time.

Products, services and businesses have different dynamic barriers slowing this disruption down. The barriers increase and decrease depending on the product. For example, relationships don't seem to matter for a peer to peer payment. These are low risk, standard products that are not that important for clients. As long as it is secure, we have seen customers use new entrant products but they still remain with the incumbent banks for deposits, wealth management or financing. When relationships, trust, brand, capital requirements, global presence, long term experience and stability are critical, the barriers increase as does the regulation and cost of compliance. This doesn't stop disruption but it slows down the pace and makes the disruption harder or needing significantly more force to make it work.

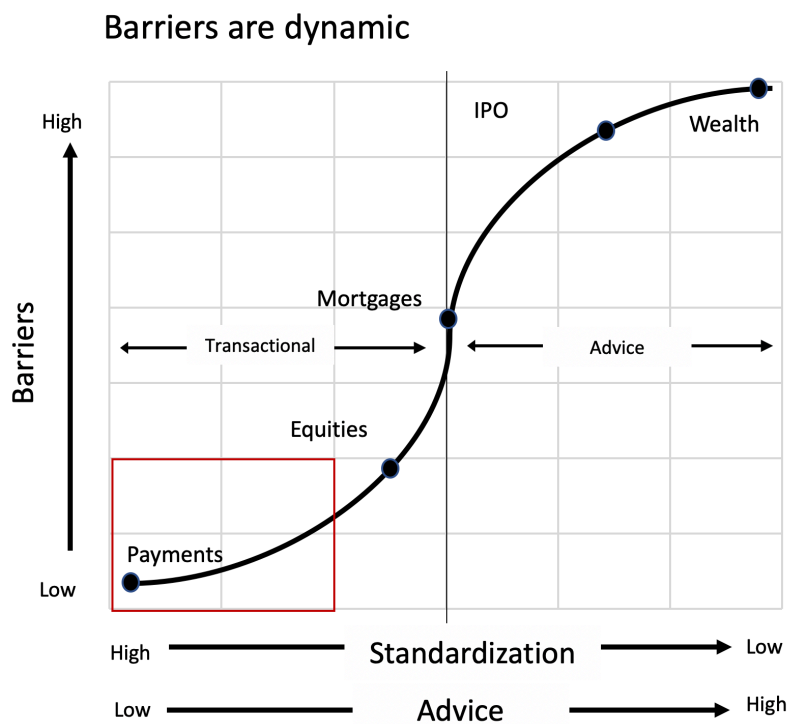


Figure 7.5 - Dynamic barriers

The barriers therefore change or increase for many reasons depending on the location, regulator, customer changes, products and services being assessed – all dynamic in nature. As you move more into advisory sectors and the products are riskier or linked to personal wealth or complexity or products that need more of a global presence, the barriers increase. It cannot be concluded that financial services as a sector is being disrupted due to a small element of disruption in payments or loans. As new entrants move away from basic transitions.

7.5.4 Investment process to address disruption

The last tool within the framework relates to ensuring that there is thought around the correct balance between disruptive innovation, sustaining, risk and efficiency. There needs to be involvement from top management to ensure that this happens. With a bottom up process the observational study showed that the operational teams who did the planning focused mainly on sustaining innovations and more short term in focus. This is aligned to the findings from the investment review and aligns to the ambidexterity literature regarding the need to explore and exploit. This needs a more

longer-term approach involving a more top down senior leadership involvement. The below simple tool helps organizations to categories their investments and involvement from senior management. This involvement and training at a senior level is a key part of the response to combat disruption as per the internal barriers section no 2 and no 5 regarding leadership and short-termism.

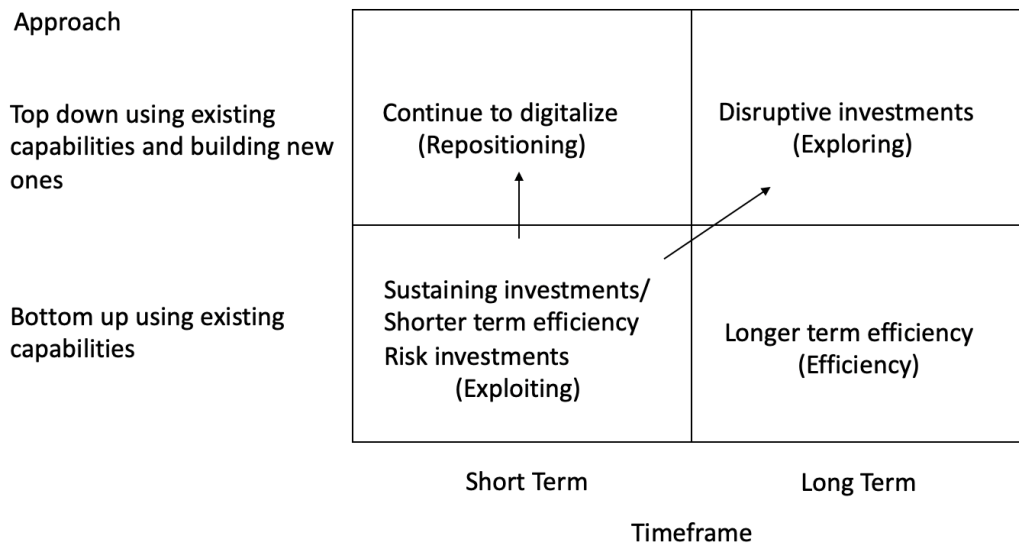


Figure 7.6 - Top down interventions to get balanced investment focus

Figure 7.6, findings showed how the current focus is more aligned to sustaining innovations, efficiency and risk. This is by design and need, with the focus on exploiting current capabilities, products and services. However, looking head and the new threats incumbents are facing, demand will likely change given the disruptions coming. It is important that a more ambidextrous approach is taken. This will require more top down involvement and support, strategic alignment and new ways of measuring the new exploring investments (O'Reilly lli *et al.*, 2009; O'Reilly lli & Tushman, 2013). Again, each business will be different but it's important to ensure that the investments link with the desired strategy or the reactions of incumbents within the potential disruption equation. These need to be aligned to ensure the valuable investment is focused in the desired areas. The tensions driven by sometimes inconsistent goals of exploring and exploiting is at the heart of the innovator's dilemma. The need to cope with paradoxical internal inconsistencies the two approaches require can be very challenging for organizations to deal with. The

ability to explore new ideas by diverting resources from exploiting investments will be challenged by existing processes. The current people and processes who are great at sustaining or exploiting will be challenged to explore. These are some examples of challenges but there will be many more.

7.5.5 Conceptual Framework - Potential Disruption

The above tools set out the need to look through a product or experience lens, and that barriers are dynamic, the potential disruption equation and the need to ensure the investments are both focused on exploit and exploring more longer-term disruptive investment. The last part of tool kit pulls together the findings from the interviews and what incumbents are doing to respond, into one single conceptual framework.

The dynamics in a final conceptual framework are from each of the sections of the findings to help understand the elements that are most important to least important for anticipating disruption. It is clearly important to keep barriers for disruption high and reduce the level of internal barriers at the same time as investing wisely to reposition the firm. However, the barriers are not always in the power of the firm, regulations may increase or decrease for example. It is therefore important that the firm focus on doing what is under its own control.

The conceptual framework below sets out the four quadrants that have an impact on disruption for practitioners to then be able to focus on the most important elements affecting them. The numbers show the most significant factors coming out of the research. The number 1 force for disruption is new entrants. The number 1 barrier is regulation while the number 1 incumbent reactions are investments but the culture was highlighted as the biggest challenge to internal change.

Every company will have different views of what is more or less relevant for their particular company. This is just a model to help practitioners think through the dynamics at play for them to assess the potential disruption for their firm.

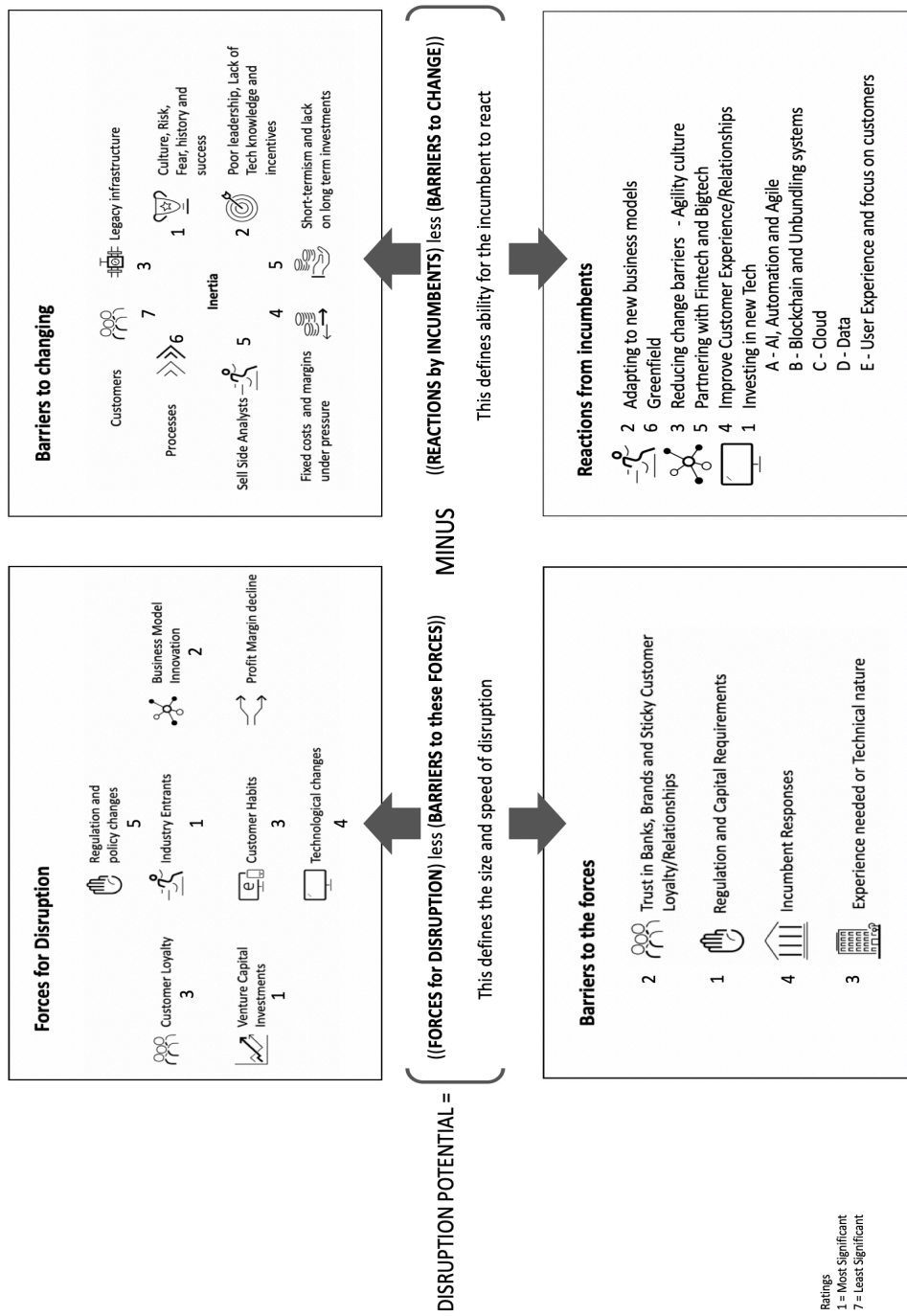


Figure 7.7 – Conceptual framework – potential disruption equation framework

7.6 Summary of Implications

The implications relating to theory mostly reinforces the theory but extended or challenged into the field of financial services. The conjectures helped to frame the complex academic landscape. Even through this mainly reinforced the theory, the exercise to get there was insightful and led to interesting and usable practitioner tools. The potential disruption equation, the product lens, dynamic barriers and investment model to build the correct capabilities are all usable tools that should help drive scenarios to work out how incumbents will be disrupted over time. This is not a one-off activity but a constant strategy assessment exercise.

7.7 Interventions

7.7.1 Introduction

The incumbent bank is a huge global organization. Measuring the impact of interventions is not possible given the timescale, complexity of the company and being unable to isolate the impact of the changes.

Disruption tool Framework

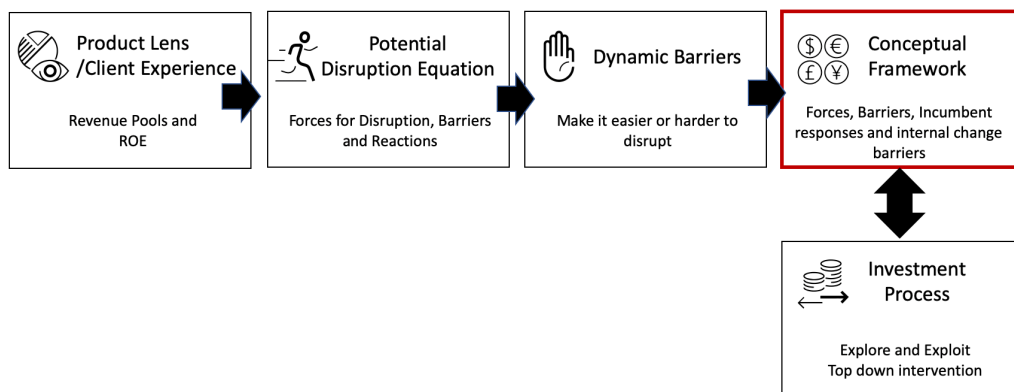


Figure 7.8 - Disruption tool framework used as a framework for interventions

However, there are a number of interventions possible using the potential disruption equation. Two interventions that could be implemented were chosen to get feedback on the framework created.

- 1) Executive training on disruption and review against strategy of bank
- 2) Changing the investment process to include a more top down approach, plus including the most senior executives in the process

7.7.2 Culture – Training on the conceptual model

No 2 on the internal barriers to change listed that needed to be addressed, was the lack of understanding of disruption and technology. The intervention was to run a pilot training system using the outcomes of this thesis to train 100 of the banks employees and gather feedback. Some training has already been completed with further training planned. This includes very senior executive members. The feedback is shown below and could help build a foundation for executive disruption within the firm. This also includes reviewing the models with the head of innovation for including into the setting of the disruption strategy.

7.7.3 Changes to the investment management process

The investment model helping drive incumbent response is a key part of the equation. The outcomes of the thesis is the need to align the investment process to the needed outcomes to combat disruption. This year the process for investment prioritization has been changed to include a top down approach, to ensure the executive board understand and review the investments, if the investments are disruption, sustaining or efficiency savings will be made clearer for sign off by the board. As stated before, the outcomes take time to assess but the process changes have been agreed and implemented for 2021 investment cycle.

7.8 Feedback on Results on Conceptual Model

Below is feedback training and sharing the results of the research.

Feedback from Bank Executive

“Amazing piece of work!. You need to understand the individual components of disruption in order to understand the overall impact of disruption as each component will be impacted differently. The simple yet dynamic formula which brings it all together – is pure genius - explaining the forces and barriers which anyone can understand.!”.

Feedback from Bank Director

“The pack shared on disruption from Fintech / Bigtech organisations to incumbents was very useful. It has framed the debate in a way in which I had not considered before – with particular regard to the future of incumbent banks being different (rather than obsolete). Particularly powerful were the references to the Facebook user count (2bn+, i.e. almost 1/3 of the world’s population!) and the implication for what this could do the financial services market place, the disruption formula pitting the various barriers to change vs barriers to entry factors into a single view and finally, the assessment of the changing face of challenge (e.g. new attacker finds it harder the longer in a market once other attackers enter or regulators seek greater oversight)”.

Feedback from Bank Director

“A mind blowing and wholistic coverage on assessing the future of banks and its potential disruption. The key takeaway is understanding the various components of disruption. It is not solely on barriers of entry but also highly dependable on the reactions of the incumbents. Incumbents will be worse off if they do not react or continue to upgrade themselves”.

Feedback from Bank Executive

“Your conclusions dissect the disruptive potential between distinct banking product groups and expose their relative vulnerabilities, transcending typical commentator generalizations”.

Feedback from Bank Director

“Vital experience! Organised professionally, with this level of energy expressed by the leader and the group, any mountain can be moved! Inspiring and motivating. Simply excellent”.

8 Conclusions

8.1 Introduction

These conclusions review final outcome discoveries, review the limitations of this thesis and also review future research. The aim of this thesis was to help bridge gap between the academic theory and what is happening in practice by helping to understand how and why disruption is occurring in a financial services context. This understanding would then lead to real interventions and help for other practitioners to understand and anticipate disruption.

8.2 Implications

Using the latest literature and doctorate research, this thesis aimed to understand how and why disruption is happening and what incumbents are doing about it using a multiple method technique.

The research conducted adds to the existing body of knowledge in this area as it references a new industry that is at the beginning of any disruption journey.

The 4 tools created from the research deliver on the aims set out in this thesis. The 4 tools are:

- the use of the Product and Service Lens
- the Potential Disruption Equation and the Potential Disruption Conceptual Model
- the Dynamic Barriers
- and investment process alignment

These findings have given a greater understanding of not just some of the issues but a comprehensive framework to use to look at a wide range of dynamics at play. Disruption is complex to map out and explain; it is multi-layered, complex and dynamic but understandable and explainable using the 4 tools created. As with all erosion, to understand the future condition of something being eroded, its important to understand how and why the erosion happens. The relative importance ratings of the conceptual framework will of course change from company to company or location

to location but the overall concept should still remain relevant and help to frame challenges facing incumbents.

8.3 Limitations

There are several limitations to this study. This is a new and contemporary phenomenon and the timing of this research is at the beginning of any disruption curve. Other research has looked backwards after disruption has occurred to understand what happened and why. This thesis is looking at the issue from the present and therefore may have picked up on misleading signals that don't turn out to be as relevant in the future. This is of course unknown at this time.

The research itself was centered around a single but critical case; the financial services industry which is a multi-trillion-dollar business spread globally. Although the incumbent is a leading globally present banking player, the extrapolation to others may not be possible. Other incumbents will have different challenges than the way assessed but the broader models should still help and guide.

During the observational study, I have significant access but there will always be discussion and decisions that I was not involved in. This could have the effect of distorting the data. However, overtime if the decisions were significant they should have come to my attention over the 140-week period.

8.4 Future Research

This is a very exciting time for research into disruption in financial services. Change will surely happen and it will be fascinating to see how this develops from this point onwards. Future research could be to look backwards to see if disruption occurred following the implementation of the 4 discoveries or tools. Future research could map out any disruption using the disruption equation to see how and why it occurred. Did the forces of new entrants combat the barriers to entry or did the barriers to entry change? How did incumbents react and could incumbents muster the internal change capability needed? What helped or hindered this? As this work is dated at the beginning of the disruption cycle a 10-year review and application of some of these tools would be very insightful.

8.5 Final Conclusions

This is a very exciting time to assess the subject of disruption within financial services. It is a huge industry and relevant to billions of people around the world and people who use their services every day. Disruption indicators have increased but have been over hyped, however it is clear that the potential for disruption is there.

The Covid 19 pandemic began during the last 6 months of this research timeline. Coronavirus has impacted financial services disruption by accelerating the use of digital offerings at a time when more traditional face to face interactions were not possible. The changing customer behavior that has moved to more digital methods was noted in the Potential Disruption Conceptual Model as a force for disruption, it will be interesting to see how this accelerates change for new entrants and incumbents.

As a financial services employee for nearly 20 years, the findings of this thesis are both surprising and enlightening. As the challenges ahead have never been so big, it is hoped that the findings of this thesis are considered insightful, relevant and useful in an unprecedented time.

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10 Appendices

10.1 Semi Structure interview script



DBA - Semi Structure Interview Script – Erosion of Banks – Derek Hubbard

Name:

Role:

Experience:

Experience:

Involvement with Technology within Banking:

Introduction:

I'm writing a thesis on the impacts disruptive technology could impact incumbent banks dominant market positions. For hundreds of years, banks have been the only place where you make or complete financial transactions but we are seeing changes due to technology, industry and competition

I just wanted to get your insights into the potential impacts

The interview is complete anonymous

Questions:

Do changes pose a threat or opportunity?

Is banking being disrupted?

1. Bill Gates famously said we need banking but not banks and there have been many books on the demise of banking but it's still a 5.7 Trillion industry? What are your thoughts?
2. My Thesis is called: The Erosion of Banks? – Will incumbents be eroded? What are your thoughts?

3. What are your thoughts regarding the threat or opportunity, new disruptive technology presents to the financial industry for incumbent banks? Where do you think this will impact first?
4. Do you think that incumbents should be more worried by existing competitors mastering new technology faster and better than them, Technology giants creating global platforms or entering FS or Fintech challengers joining the competition or refining business models?
5. How do you think technology is changing financial services and how do you think this will develop in future? – How will this transform banking? Or how should banks transform?
6. How do you think the role of banks will change over the next few decades?
7. What are the new developments in technology most excite you and how do you think this will be used within financial services? - AI, Blockchain, Platforms, Cloud
8. What timeline do you think this will impact the banks margins?
9. Banks make money through fees for services and transactional services. How will these be impacted differently?

What's the banks reactions? - Are they or sleeping?

10. Are we investing in the right areas? Why is that? – Investing on current customers or new business models and new areas? What % of investments are on true innovations and how much on disruptive technology?
11. Do you think banks are agile enough to change at the pace they need to meet the challenge coming their way? What are the things that are slowing down change? – Structure, Politics, incentives
12. Are incumbents really investing in Disruption or just evolving their current technology? There seems to be a lot going on if you listen to the press or blogs but is this real or PR?
13. Different banks are reacting differently to the challenges – Greenfield, start-ups, partnering, sharing etc – What's the best way for incumbents to tackle the challenges and why?

Are there conditions stopping banks reacting to changes?

14. Incumbents have been around for hundreds of years and built technology up over time? Is technology debt a concern and how should this be addressed?
15. Do incentives play a role in driving change, innovation and disruption?

16. Is customer ready to move to more digital players? How do you think this will change?

17. What would you do if you were the CEO? How would you change the bank?

Figure 10.1 - Semi-Structure interview script

10.2 Initial coding results in detail

First Round Coding - Initial Coding			
No.	Open Coding	Consolidated list from initial coding	Concepts explained
1	ABCDE		
2	Able to React		
3	Adapt to change	1 Adapt to change	Intenal Change
4	Adoption of new tech marketing or crisis pushes customers		
5	Advisory high touch could be disrupted	2 Advisory high touch could be disrupted	Difference in Products
6	Advisory is not Scale		
7	Aggregators	3 Aggregators	A service being offered now
8	Agile	4 Agile	New Tech approach being adopted
9	AI	5 AI	New Tech approach being adopted
10	Airbnb idea		
11	Ambidextrous	6 Ambidextrous	Need to think on explore and exploit
12	API	7 API	
13	Apps store for Banks		
14	Are Big Tech trusted		
15	Automation	8 Automation	New Tech approach being adopted
16	Banking hasnt changed	9 Banking hasnt changed	Intenal Change
17	Banking is always evolving		
18	Banking made Simple		
19	Banking Utilities	10 Banking Utilities	Business Model
20	Banks are Tech teams		
21	Banks are too costly	11 Banks are too costly	Banks need to change
22	Banks Business Model will change	12 Banks Business Model will change	Banks need to change
23	Banks needed	13 Banks needed	They are still relevant for some things
24	Banks needed Banks could fail		
25	Banks needed Banks must die		
26	Banks not making same money as before	14 Banks not making same money as before	Banks need to change
27	Banks not needed		
28	Banks now Tech Companies		
29	Banks provide a role		
30	Banks should be allowed to fail		
31	Banks will be defensive		
32	Barriers for Fintechs	15 Barriers for Fintechs	New Entrants and Barriers
33	Barriers to change	16 Barriers to change	New Entrants and Barriers
34	BAU needs to be done		
35	Beyond Transactions		
36	Big Brother		
37	Big Data	17 Big Data	New Tech approach being adopted
38	BigTech	18 BigTech	New Entrants and Barriers
39	Bigtech and Banks working together		
40	Bigtech are strategically stable		
41	BigTech clients are banks - Conflict		
42	Bigtech could disrupt		
43	bigtech dont like regulations		
44	bitcoin		
45	Blockchain	19 Blockchain	New Tech approach being adopted
46	Boards dont understand tech budget		
47	Boards must understand Tech		
48	Books Record vs Client engagement Differentiation		
49	Branches needed in US		
50	Branches Not needed	20 Branches Not needed	Banks need to change
51	Brand	21 Brand	Helps as a barrier and important
52	Bundles are Profitable		
53	Business Model Opportunities	22 Business Model Opportunities	Banks need to change
54	Business Processes		
55	Can we go quick to transform		
56	Cant compete on Price		
57	Cant rely on COO		
58	Capabilities		
59	Capital Barriers		
60	CEO and Board relationship key	23 CEO and Board relationship key	CEO and Board are key. – Tech knowledge
61	Challenger Banks		
62	Change takes time		
63	Chatbots		
64	CIO on Board		
65	Clay C		
66	Client Relationships		
67	Cloud		
68	Commodity Banking	24 Commodity Banking	Business Model
69	Competition Driving Innovation		
70	Competition will drive revenues down		
71	Complexity Systems		
72	Control own it spend		
73	Cost of Technology		
74	COVID accelerate digital change		
75	Credit Cards		
76	Crisis showed that banks can move		
77	Culture		
78	Culture of Change	25 Culture of Change	Intenal Change
79	Customer Experience	26 Customer Experience	New Tech approach being adopted
80	Customer Proposition not clear		
81	Customer Relationships		
82	Customers are not ready for radical Tech change		
83	Customers more digital	27 Customers more digital	Customers are changing
84	D&I help with longer term thinking		
85	Data and Analytics	28 Data and Analytics	New Tech approach being adopted
86	Decommissioning		
87	Devops		
88	Digital Currencies		
89	digital factories		
90	Digital in another market first		
91	Digital Strategy		
92	Disintermediate		
93	Disruption a threat but not unique to Banking		
94	Disruption not a threat	29 Disruption not a threat	Some products are not at threat some are
95	Disruption not at an organisational layer		
96	Disruption Threat		
97	Disruptive investments are crowded out	30 Disruptive investments are crowded out	Investments an issue -Banks not as profitable
98	Diversity will help Disruption		
99	Diversity will help Disruption Central Banks		
100	Do it yourself		

Figure 10.2 - Initial coding results and consolidation

10.3 Observation study – Raw data capture template – Example

Observational Log - RAW DATA	Date	Main Weekly Discussion Content	What's Subject	Level of Organisation	Value	Response to sustaining or efficiency	Comments	Maturity	Agreed	Dependencies internal	Dependencies external	Value	Internal support	Size	Date
1	01/04/2017 09:20:17	CFO Town Hall	Finance	GM, GEB	Education	Efficiency	Group initial	High	Yes	Low	Low	Low	GEB	Small	
2	08/04/2017 09:20:17	Innovation Head - Future of finance	Blockchain, AI, Robotics, Big Data	GM, GEB	Strategy	Efficiency	Agitudinal	Low	Yes	High	Low	Low	GEB	Small	
3	15/04/2017 09:20:17	Board Member Learn - Discuss Tech	AI, Blockchain, Robotics, Big Data	Board	Education	Efficiency	Education	Low	Yes	High	High	High	GEB	Small	
4	22/04/2017 09:20:17	Machine Learning Demo	Machine Learning	MD	Education	Efficiency	Demo	Low	Yes	Low	Low	Low	Operational	Small	
5	29/04/2017 09:20:17	Machine Learning Demo	Machine Learning	MD	Education	Efficiency	Demo	Low	Yes	Low	Low	Low	Operational	Small	
6	05/05/2017 09:20:17	Change Planning	ALL	GEB	Education	Disruption	Budget	Low	No	High	Low	High	GEB	High	
7	12/05/2017 09:20:17	Tech Office	Whisper, Acquisition discussed later	GM and MD	Strategy	Efficiency	Acquisition	Low	No	High	Low	High	GEB	High	
8	19/05/2017 09:20:17	Learn	Final 'How'	ED	Strategy	Efficiency	Group update	Low	Yes	Low	Medium	High	Operational	Low	
9	26/05/2017 09:20:17	Innovation Head - Future of finance	Finalised with lack of progress AI, Crypt, Blockchain	ED	Strategy	Efficiency	Group update	Low	Yes	Low	Medium	High	Operational	Low	
10	03/07/2017 09:20:17	Learn		GM and MD	Strategy	Efficiency	Education	Low	Yes	High	Medium	High	Operational	Low	
11	10/07/2017 09:20:17	GM Board member - Blockchain	Blockchain, AI, Robotics, Big Data	GM and MD	Strategy	Efficiency	Discussion about	Low	Yes	High	High	High	Operational	Low	
12	17/07/2017 09:20:17	Tech Management team - AMA	AI, Blockchain	GM and MD	Strategy	Disruption	Discussion about	Low	Yes	High	Medium	High	Operational	Low	
13	24/07/2017 09:20:17	Tech Management team - AMA	AI, Blockchain	GM and MD	Strategy	Disruption	Way forward	Low	Yes	High	Medium	High	Operational	Low	
14	31/07/2017 09:20:17	Group Planning	Disruption overall	GM and MD	Strategy	Disruption	Discussion about	High	Yes	High	Low	High	Operational	Medium	
15	07/08/2017 09:20:17	Acquisition Symposium	Symposium	MD	Education	Efficiency	Way forward	High	Yes	High	Low	High	Operational	Medium	
16	14/08/2017 09:20:17	OH, LEAVE	Disruption	MD	Education	Efficiency	Discussion about	Low	Yes	High	Low	High	Operational	Low	
17	21/08/2017 09:20:17	EDE cost digital	Disruption	MD	Education	Efficiency	Way forward	Low	Yes	High	Medium	High	Operational	Low	
18	28/08/2017 09:20:17	CX2020	Disruption	MD	Education	Efficiency	Way forward	Low	Yes	High	Medium	High	Operational	Low	
19	04/09/2017 09:20:17	Obtain Tech Acquisitions	New to acquire knowledge	MD	Strategy	Efficiency	Decisions about	Low	No	High	Low	High	GEB	High	
20	11/09/2017 09:20:17	Start Analytics	Data	MD	Education	Efficiency	Decisions only	Low	No	High	Low	High	Operational	High	
21	18/09/2017 09:20:17	Per Tech Planning	AI and Blockchain	MD	Education	Disruption	Decisions about	Low	Yes	High	High	High	Operational	High	
22	25/09/2017 09:20:17	Per Tech Planning	AI and Blockchain	MD	Education	Disruption	Decisions about	Low	No	High	High	High	Operational	High	
23	02/10/2017 09:20:17	Brain tag AI	AI and Blockchain	MD	Education	Disruption	Decisions about	Low	Yes	High	Low	High	Operational	Low	
24	09/10/2017 09:20:17	30% in workflow	AI	CEO	Strategy	Efficiency	Strategy	Low	Yes	High	Low	High	Operational	Low	
25	16/10/2017 09:20:17	Reducing the workflow by 20% by/MD	AI	CEO	Strategy	Efficiency	Strategy	Low	Yes	High	Low	High	Operational	Low	
26	23/10/2017 09:20:17	Cloud Decision in Finance	Cloud	MD, GMB	Strategy	Efficiency	Discussion about	High	Yes	High	Low	High	Operational	High	
27	30/10/2017 09:20:17	1WAP 2018 live	Finance	CEO team	Education	Sustaining	Education	High	Yes	High	Low	High	GEB	High	
28	06/11/2017 09:20:17	Q3 results - CEO mentioned tech	CX2020 Disruption	CEO and CFO	Strategy	Disruption	Investments	High	Yes	High	Low	High	GEB	High	
29	13/11/2017 09:20:17	GM, CX On Learn	Blockchain, IoT, AI and Blockchain, FCC Content - Data	GM and MD, LWM	Education	Disruption	No data in the direction of others or the suite of AI. Senior GM's taking for/ing	Medium	Yes	High	Low	Low	GEB	Low	
30	20/11/2017 09:20:17	Future of Finance	Blockchain, IoT, AI and Blockchain, FCC Content - Data	GM and MD, LWM	Education	Disruption	No data in the direction of others or the suite of AI. Senior GM's taking for/ing	Medium	Yes	High	Low	Low	GEB	Low	
31	27/11/2017 09:20:17	Data Strategy being a top discussion	Disruption - E2B - Reductions on the COO	Head of Innovation	Education	Efficiency	Innovation will meet and create a new COE	Low	Yes	High	Low	Low	GEB	High	
32	04/12/2017 09:20:17	Was an meeting in AI - Recruitment	AI will change the way we operate	Head of Innovation	Education	Efficiency	Innovation will meet and create a new COE	Low	Yes	Low	Low	High	Operational	High	
33	11/12/2017 09:20:17	ROD Approves an additional 10k of	Treatment to treat 3 years at round	Board	Education	Sustaining	Innovation will meet and create a new COE	Low	Yes	High	Low	Low	GEB	High	
34	18/12/2017 09:20:17	Obtain in New York	AI and Blockchain, Cloud, Data	GM and MD	Strategy	Efficiency	Speeding up execution	Low	Yes	High	Low	Low	GEB	High	
35	25/12/2017 09:20:17	Condemn		GM and MD	Strategy	Efficiency	Speeding up execution	Low	Yes	High	Low	Low	GEB	High	
36	01/01/2018 09:20:17	2018		GM and MD	Strategy	Efficiency	Speeding up execution	Low	Yes	High	Low	Low	GEB	High	
37	08/01/2018 09:20:17	2018		GM and MD	Strategy	Efficiency	Speeding up execution	Low	Yes	High	Low	Low	GEB	High	
38	15/01/2018 09:20:17	2018	Financial Results - Investing an additional 10k investments should be maintained in 2018	GM and MD	Education	Sustaining	Speeding up execution	High	Yes	Low	Low	Low	GEB	High	

Figure 10.3 - Extract from detailed observation study

10.4 Top global incumbent banks

Australia, Japan, United States		Alpha Bank SA	ACB.AT
ANZ Banking Group	ANZ.AX	Pinacore Bank SA	BOP.AT
Bank of Queensland Limited	BOQ.AX	Greece	
Bendigo and Adelaide Bank Limited	BEN.AX	CITP Bank Nyrt	OTPB.BU
Commonwealth Bank of Australia	CBAA.AX	Hungary	
Heartland Bank Limited	HEART.LZ	Santander Bank Polska SA	SPLI.WA
Macquarie Group Ltd	MQA.AX	Pekao	PEO.WA
National Australia Bank	NAB.AX	PKO BP	PKO.WA
Westpac Banking Corporation	WBC.AX	Poland	
Australia		Absa Group	ABGJ.J
Goldman Sachs Group Inc.	\$ GSN	Capitoc Bank Holdings Ltd	CPD.J
Morgan Stanley	\$ MSN	FirstRand Ltd	FSRJ.J
US Broker Dealer		Investec	INVL.J
Bank of America Corp.	BAC.N	Nedbank Group Ltd	NEDJ.J
Citigroup Inc	C.N	Standard Bank Group Ltd	SBJJ.J
JPMorgan Chase & Co.	JPM.N	South Africa	
US Universal Banks		Latin America	
Bank of New York Mellon Corp.	BK.N	Bradesco	BBDC4.SA
Northern Trust Corporation	NTRS.O	Itaú Unibanco	ITUB4.SA
State Street Corporation	STT.N	Santander Brasil	SANB4.SA
US Trust Banks		Banco BTOPactul S.A.	BPACTL.SA
Trust Financial Corp	TFC.N	Brazil	
M&T Bank Corp	MTB.N	Santander Chile	SANTANDER.S
PNC Financial Services Group Inc	PNC.N	Chile	
Regions Financial Corp	RF.N	Banco Desvivienda	DVI_p.CN
US Bancorp	USB.N	Bancolombia	BIC_p1.CN
US Large-Cap		Colombia	
Bank OZK	OKO.O	Banco del Bajío	BBAJOO.MX
BankUnited Inc	BRUN.N	Banorte	BNOO.MX
Citizens Financial Group	CFG.N	Regional SAB de CV	R.A.MX
Comerica Incorporated	CMA.N	Genesa	\$ GENTERA.MX
East West Bancorp	EWBC.O	Infursas	JINBURO.MX
FB Financial Corporation	FBK.N	Santander Mexico	BSMXB.MX
Fifth Third Bancorp	FTB.O	Mexico	
First Hawaiian Inc	FHB.O	Credicorp	BAP.N
First Horizon National Corporation	FHN.N	Peru	
First Republic Bank	FRBN.N	Asia	
Huntington Bancshares Incorporated	HBAN.O	Agribank of China	1288.HK
KeyCorp	KEY.N	Bank of Beijing	601169.SS
New York Community Bancorp Inc	NYCB.N	Bank of China	3988.HK
People's United Financial Inc	PBCT.O	Bank of Communications	3328.HK
Pinacore Financial Partners Inc	PINF.O	China CITIC Bank	6098.HK
Signature Bank	SBNY.O	China Construction Bank	0939.HK
SVB Financial Group	SVB.O	China Merchants Bank	3968.HK
TCF Financial Corporation	TCF.N	China Merchants Bank - A	600036.SS
Texas Capital Bancshares, Inc	TCBL.O	Chongqing Rural Commercial Bank	3618.HK
Webster Financial Corporation	WBS.N	Hua Xia Bank	600015.SS
Worthington Financial Corporation	WFTCO	Huishang Bank	3698.HK
Zions Bancorporation	ZION.O	Industrial & Commercial Bank of China	1398.HK
United States		Industrial Bank	601166.SS
Europe		Ping An Bank	000001.SZ
BAWAG Group AG	BAWG.VI	China	
Erste Group Bank AG	ERST.VI	Bank of China (Hong Kong)	2388.HK
Ballifinan Bank Inti	BBVI.VI	Bank of East Asia	0023.HK
Austria		Hong Kong Bank	0011.HK
ABN AMRO	ABN.LAS	Hong Kong	
ING	INGA.AS	Axis Bank	AXBK.BO
KBC Group NV	KBC.BR	Bank of Baroda	BOB.BO
Van Lanschot Kempen	VL.AS	Federal Bank	FED.BO
Benelux		HEC's Bank	HEBK.BO
BNP Paribas	BNPP.PA	Housing Development Finance Corporation	HDFC.BO
Credit Agricole SA	CAGR.PA	ICICI Bank	ICBK.BO
Natixis SA	CNAT.PA	Indulud Bank	INBK.BO
Société Générale	SOGN.PA	Kotak Mahindra Bank	KTM.LBO
France		Punjab National Bank	PNBK.BO
Commerzbank	CBK.DE	Shriram Transport Finance	\$ SRTF.BO
Deutsche Bank	DBK.DE	State Bank of India	SBI.BO
Germany		India	
Allied Irish Banks	AIBG.I	Bank Central Asia	BBCA.JK
Bank of Ireland	BIRG.I	Bank Mandiri	BMRL.JK
Ireland		Bank Negara Indonesia	BBNI.JK
Banco BPM	BAMI.MI	Bank Rakyat Indonesia	BBRI.JK
BPER	EMIL.MI	Bank Tabungan Negara	BBTN.JK
Credito Valtellinese	PCV.MI	Bank Tabungan Pensiunan Nasional Svariah	BTPS.JK
Intesa SanPaolo	ISP.MI	Indonesia	
UBI Banca	UBL.MI	Hana Financial Group	086790.KS
Unicredit	CRUI.MI	Industrial Bank of Korea	024110.KS
Italy		KB Financial Group	105560.KS
Danske Bank	DANSKE.CO	Woori Financial Group	316140.KS
DNB	DNB.OL	Shinhan Financial Group	055550.KS
Swedbank	SWEDA.ST	Korea	
Nordea	NDASE.ST	CIMB Group Holdings Berhad	CIMB.KL
SEB Group	SEBS.ST	Hong Leong Bank	HLB.KL
Hanabank		Malayan Banking	MBMB.KL
Nordic		Public Bank	PUBB.KL
Banco de Sabadell	SABEMC	RHB Bank	RHBK.KL
Bankia	BKIA.MC	Malaysia	
Bankinter	BKTM.MC	Bank of the Philippine Islands	BPI.PS
BBVA	BBV.AMC	Metrobank	METP.PS
Caixa Bank	CABK.MC	Security Bank	SECB.PS
Santander	SAN.MC	Philippines	
Unibanco	UNB.MC	DBS Group Holdings	DBSM.SI
Spain		OCBC	OCBC.SI
Credit Suisse Group	CSGN.S	United Overseas Bank	UOBH.SI
Switzerland Large		Singapore	
Combra Money Bank AG	CMBS.S	Cathay Financial Holding	2882.TW
Switzerland Consumer Lenders		Fubon Financial Holding	2881.TW
EPG International	EPGN.S	Mega Financial Holding	2886.TW
Julius Baer Group	BABK.S	Taiwan	
Vontobel	VONNS	Bangkok Bank	BBL.BK
VZ Holding	VZNS	Kasikornbank	KBANK.BK
Switzerland Wealth & Asset Managers		Kiaistank Bank	KSP.BK
Switzerland		Krung Thai Bank	KTB.BK
Barclays	BARC.L	Thanachart Capital	TCAP.BK
Close Brothers Group	CBROL	Siam Commercial Bank	SCB.BK
Lloyds Banking Group	LLOY.L	TMB Bank	TMB.BK
Paragon Banking Group PLC	PAPG.LL	TISCO Financial Group	TISCO.BK
NatWest Group	NWGL	Thailand	
United Kingdom Domestic		Military Commercial Joint Stock Bank	MBB.HM
HSBC plc	HSBA.L	Techcombank	TCH.HM
Standard Chartered plc	STAN.L	Vietcombank	VCB.HM
United Kingdom Asian		Vietnam Prosperity Bank	VPB.HM
United Kingdom		Vietnam	
EMEA		Aggregates	
Komercni Banka	BKOM.PR	Global Banks	4,562,276
Czech Republic		Europe	774,216
		EMEA	215,497
		Asia (ex-Japan, China)	1,815,350
		Asia (ex-Japan, China)	737,897
		Latin America	192,456
		Developed	2,339,473
		GBM	2,223,303
		GBM (ex-China)	1,145,650
		Emerging	2,069,203
		United States	1,135,430
		Europe (ex-UK)	598,062
		Eurozone	375,462
		Eurozone (developed)	371,896

Figure 10.4 - Top global Incumbent Banks

