FinTech and the Make-or-Buy Decision: A Valuation Model for Retail Banks Facing Disruptive Innovation

J.L. Ruiz del Portal Tranche

DBA

2023

FinTech and the Make-or-Buy Decision: A Valuation Model for Retail Banks Facing Disruptive Innovation

J.L. Ruiz del Portal Tranche

A thesis submitted in partial fulfilment of the requirements of the University of Northumbria at Newcastle for the degree of Professional Doctorate

Research undertaken in Newcastle Business School and in collaboration with Amsterdam University of Applied Sciences

March 2023

In Memoriam

Dedicated to my dear friend

Jan Peters

who was so generous to share his passion for education with me.

ABSTRACT

This thesis addresses a research gap in the use of financial metrics as enablers of disruption to adapt to newly emerging technologies in the financial services industry (FinTech).

By disrupting the Information Technology (IT) vendor model, the banking value chain, and the value network, FinTech firms have taken the lead in the race to reshape a new banking taxonomy. Incumbents, though willing to step forward and embrace innovation, let their decision-making on investments be subordinated to the idea of preserving their legacy above the idea of embracing innovation. To keep patching back the fallen pieces of their monolithic IT systems instead of combining those pieces into new platform-based architectures.

Internal technology development has become a challenge for incumbents. The complexity of the IT legacy, associated with the systemic role incumbents still play, the lack of people and management in numbers and skills, and the complexity of the regulatory framework do not encourage a likely choice for the 'make-it' option in the title of this research.

The findings confirm that not every technological innovation that unchains a shock in a market is disruptive. In fact, most of the technology applied is not. In addition, valuation models were developed to serve decision-making discussions about investments in technology of a different nature than FinTech innovation. Literature on decision-making shows that flexibility in the approach improves the quality of this process. Valuation models and metrics that ensure flexibility are not used, however, but are simply disregarded as too complex.

A decision tree integrating multiple real options incorporates the flexibility required to inform decision-makers about the right opportunity costs associated with investments in FinTech innovation. The latter would help incumbents make a fairer make-or-buy decision in their pursuit of new dominant designs that can ensure their survival.

Contents

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGMENTS

I would like to express my gratitude to my Principal Supervisor, Dr. Binam Ghimire, for his guidance during the long and exhausting journey that brought me here.

My gratitude and appreciation for Dr. Hannah Berkers transcend the boundaries of this page. Acting as my Second Supervisor during the last three months of my DBA, she showed me the way. I would not have been able to complete this work without her assistance and good advice. Such a talented young lecturer and researcher made possible the impossible that I set my first word of the literature review on paper. I will never forget that first Pomodoro session together, online, in the midst of the COVID-19 pandemic. *Vanuit de allerdiepste van mijn hart, bedankt.*

Special thanks to Dr. Pushkar Jha and all colleagues of the Postgraduate Research department at the Newcastle Business School. I will always be grateful to you for your support during the toughest days of the COVID-19 pandemic.

Thanks also to Professor Frank-Jan de Graaf and all colleagues of the research group of the Corporate Governance and Leadership department at the Amsterdam University of Applied Sciences for your valuable contributions as a peer panel.

I am extremely grateful to Professor Micha Keijer and all my colleagues in the Finance department at the Amsterdam School of International Business, for keeping me away from the daily workflow, so I could complete this DBA.

Special thanks to D. José María Fuster van Bendegem, D. José Manuel Valiño Blanco, and D. Fernando Ventoso López, the Spanish crew. Your knowledge of the banking business and good advice have been extremely valuable to my research. *Muchas gracias, de corazón.*

My thanks also go to all the participants in my research. I am very grateful to them for their willingness to share their time and knowledge with me.

The best things in life are made with love, and a DBA is not an exception. I would like to close this section by expressing my love and gratitude to my dear wife, Lucienne, and children, Claire, and Lucas. Thank you very much for your unconditional love, patience, and constant support during these three and a half years.

DECLARATION

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges the opinions, ideas, and contributions of others.

Any ethical clearance for the research presented in this commentary has been approved. Approval has been sought and granted through the Researcher's submission to Northumbria University's Ethics Online System on May 20th, 2020.

I declare that the Word Count of this Thesis is 61,405 (61,340) words

Name: J.L. Ruiz del Portal Tranche

Submitted: March 1st, 2023

Revised: July 24th, 2023

CHAPTER 1. INTRODUCTION

1.1 PURPOSE STATEMENT

The purpose of this qualitative, phenomenological research is to explore the experiences of decision-makers engaged in the valuation of FinTech innovation and to define the context in which these experiences can be interpreted. Phenomenology helps to illuminate a decision or set of decisions, why they were taken, how they were implemented, and with what result (Schramm, 1971). By conducting a case study from the perspectives of three different personae, namely traditional retail banks (incumbents), FinTech firms (disruptors), and equity investors, I will illuminate the decision-making experience around the valuation of investments in FinTech innovation.

As a result of the case study conducted in this research, decision-makers on the incumbent's side who are engaged in the innovation will understand better the 'opportunity cost' of the forgone alternatives to the investment currently being considered.

The context and significance of this research are provided in Section 1.2. The personal and professional motivations that resulted in this DBA dissertation are the subject of Section 1.3. The main research question and research objectives are introduced in Section 1.4. Section 1.5 is about the conceptual framework. The contributions that this research makes are presented in Section 1.6, while Section 1.7 elaborates on the delimitations and limitations. Finally, Section 1.8 outlines the overall structure of the research.

1.2 CONTEXT AND SIGNIFICANCE OF THE RESEARCH

The importance of the FinTech phenomenon nowadays cannot be properly placed into perspective without going back to the 2008 financial crisis and its devastating effects on consumers' trust in the banking sector and its major players, incumbent banks. Since then, the FinTech phenomenon has been regarded as one that *"helps to ensure financial stability by providing a source of competition for incumbent banks"* (Cliffe, 2021).

Nevertheless, the expectations of governments and regulators worldwide regarding FinTech go far beyond this controlling role in the markets of financial products and services and the role of incumbents in them. FinTech firms are not only leading

innovation; they have also managed to find a niche in unserved or underserved markets of financial services worldwide.

The 2019 FinTech Adoption Index is led by China (87% adoption rate), India (87%), Colombia (76%), Peru (75%), and Mexico (72%). In Europe, the ranking is led by the Netherlands (73%), Ireland (71%), and the UK (71%). (EY Global Fintech Adoption Index, 2019).

In the United States, before the pandemic, the Federal Reserve estimated that 22% of adults, or around 60 million people, fell into this category of unserved or unbanked customers of financial services (Terentev, 2021).

During the COVID-19 pandemic, FinTech has played a role of paramount importance worldwide, ensuring people have access to financial services online. Digital technologies are regarded by the European Commission as *"key for relaunching and modernising the European economy across sectors in the context of the recovery plan post-Covid-19"* (European Commission, 2020).

What is FinTech?

According to the FSB (2019), FinTech is *"a technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services".* In this sense, the term FinTech has evolved in the last ten to fifteen years from computer technology applied to back-office transactions in banks and other financial institutions to technology that is not only reshaping financial markets but ensuring financial stability and enhancing consumers welfare worldwide (Cliffe, 2021).

Meanwhile, the extensive use of Screen Scraping (scanning of a webpage to extract information), Application Programming Interfaces (API), the Access to Account rule (XS2A), which obliges banks to grant FinTech firms access to PSU[1] data, subject to consent by the end user, and Distributed Ledger Technologies (DLT), has unchained a digital revolution of unprecedented scale in the financial services industry.

The increase in mobility created by the Internet and smartphone revolutions has further broadened the offering of online, cloud-based financial products and

[1] Payment Service Unit

services. From online payments to alternative lending platforms, wealth management, insurance services, foreign exchange, trading, and risk management, businesses and consumers have become more aware of the advantages of online and digital banking.

Stimulated by governments and regulators, the disruption unleashed by FinTech innovation is not only fostering industry competitiveness (Romānova et al., 2018), but also transforming the nature of retail banking itself. Retail banking is, in fact, facing the obsolescence of a traditional business model still based on physical bank offices and bundled financial services.

As a disruptive innovation, FinTech is also on the move. FinTech innovation has evolved from the scenario sketched by Christensen (1997), where disruptors try to find ways to serve niches either unexplored or abandoned by incumbent organizations, to a broader ecosystem with unclear boundaries between both. The 'essence' of banking itself is under discussion.

FinTech firms, the disruptors in the FinTech ecosystem, do not simply need capital to pursue growth; they also need customers who trust their products and services. Scaling-up is becoming an issue; the so-called 'challengers' or 'neo-banks' are in the surge.

Traditional financial institutions, the incumbent organizations, invest in FinTech innovation because they either do not believe in their in-house capabilities or the investments required do not make it attractive enough. Retail banks may have branding recognition and adequate capital resources, but when it comes to the make-or-buy decision about investments in FinTech innovation, the business case is unfavourable for the 'make' option. The burden of the IT legacy systems and the use of valuation models that penalize uncertain, long-term investments with volatile discount rates partly explain this negative outcome.

In the equation 'make it-or-buy it', the 'buy' option is not favoured either. The role of venture capital (VC) and private equity firms (PE) is also putting a lot of pressure on the incumbents. Total global investments in FinTech reached USD 210.2 billion in 2021, of which 60.5% came from VC and PE activities. To compare, total global investments for the full year 2020 were USD 121.5 billion, of which 39.0% came from VC and PE firms (KPMG, 2020, 2021).

The inflow of these massive amounts of capital in the FinTech markets has increased the aversion of banks to paying a lot for the option value of future growth based on transactions executed by these VC and PE investors. If the alternative to a plain valuation using net present value is the use of these somewhat overstated multiples, banks are not being helped when changing their initial aversion into an appetite for investments in FinTech innovation.

Christensen et al. (2017) recommended further research on the evolution of the disruptive innovation theory from a technological framework to a causal theory of innovation and competitive response. The authors identified the following five avenues for further research: performance trajectories, hybrid response strategies, platform businesses, modular architectures, and financial metrics as enablers of disruption. The claim for future research into metrics that do not bias incumbents' decision-making against the adoption of disruptive innovations that pay off in the long run stands at the base of this phenomenological research.

1.3 Researcher's Position

This research builds upon my motivation to incorporate contemporary topics into the curriculum of finance and accounting courses.

The labour market that students of business and economics disciplines are facing today has dramatically changed in the last ten to fifteen years. The sharing economy, digital economy, and platform capitalism are all actual concepts that, in the end, express a massive transformation of our economies.

Technology is no newcomer to this transformation. Technological developments that triggered the so-called first (water-steam), second (electricity), and third (automation) industry revolutions are well-known and not the subject of this research. The Internet revolution and the changes in digital technologies, coined as "the fourth industrial revolution" by Klaus Schwab, founder and Chairman of the World Economic Forum, have transformed the dynamics of businesses worldwide. Data, or 'big data' more specifically, has become a tradeable good.

> "*In the twenty-first century, on the basis of changes in digital technologies, data have become increasingly central to firms and their relations with workers, customers, and other capitalists. The platform has emerged as a new business model, capable of extracting and controlling immense amounts of data, and with this shift we have seen the rise of large monopolistic firms"* (Srnicek, 2017, p. 6).

In this new context, my goal is to help students of programmes in business and economics acquire a body of knowledge that can give them a fair chance when approaching the labour market, either in the private or public sectors. Platform business is about the interaction between groups, not the ownership of the assets. Decisions on investments based on traditional return on assets are, therefore, deemed to be revised because: does it make any sense to elaborate on performance or valuation based on the use of assets when most successful companies barely own any?

Incorporating the results of my research activities into finance courses at both the Amsterdam University of Applied Sciences and Northumbria University is already helping me transfer the technical knowledge of performance and valuation in a more comprehensive way. Teaching finance by putting theoretical concepts into the perspective of actual topics, like in my case, the valuation of investments in FinTech innovation, makes learning not only easier but more attractive. Challenger banks like Revolut, Monzo, Bunq, and N26 and technological firms like Google, Facebook, Instagram, Amazon, Microsoft, Uber, Airbnb, Apple, and Tesla are the companies in the spotlight nowadays. Business and economics students know these companies very well. These are the companies I have been incorporating into my finance courses since I started with this research.

As a researcher, I entered a process of self-reflection from the moment I made the decision to engage in research over valuation techniques other than the traditional Discounted Cash Flow analysis (DCF). My experience with DCF analysis for decision-making purposes has been gained from a corporate perspective and might be regarded as similar to the experiences of the participants in the case study ‘Incumbents’. Therefore, eventual biases or pre-assumptions are not set aside but rather embedded in the research process, consistent with the interpretive angle taken in this research (Laverty, 2003).

I intend to benchmark the findings of the research with my own pre-existing understandings of this subject. Journaling my reflections while reviewing literature and conducting semi-structured interviews are the techniques that have assisted me in the abovementioned process of self-reflection and interpretation.

1.4 Main Research Question and Research Objectives

The gap identified in the literature and the context sketched in Section 1.2, as well as the motivations named here above, have all resulted in the formulation of the following main research question:

> "How can retail banks confronted with investments in FinTech innovation use valuation models for a better make-or-buy decision?"

The conceptual framework required to shape the research design, outline the literature review, and answer the main research question is based on the four research objectives listed below. Information about the collection of data and the analysis of empirical evidence to achieve these four objectives can be found in the research strategy section of Chapter 3, methodology.

- Objective 1: To understand the essence of FinTech innovation by illuminating the boundaries between sustaining and disruptive innovation.
- Objective 2: To define the FinTech business model and identify the value drivers essential for the make-or-buy decision.
- Objective 3: To explore alternative organizational structures that can help embrace FinTech innovation within the current organizational architecture of traditional retail banks.
- Objective 4: To design a valuation model based on decision tree analysis and real options theory to assess investments in FinTech innovation.

1.5 Conceptual Framework

1.5.1 Managerial Decision-Making

Managerial decision-making came forward halfway through the 1950s as the opposite of actionless policymaking, a term imported from the public administration sector (Buchanan & O'Connell, 2006). A fundamental research interest of Herbert A. Simon, the term decision-making has followed different avenues since then. From the Decision Tree Analysis Theory (DTA) developed by Magee (1964) to empirical models for the analysis of constraints by Balakrishnan and Cheng (2005), or the more recent challenging assumption of human rationality in the decision-making process by Heukelom (2011) and Kahneman and Tversky (2018).

The Decision Tree Analysis Theory (DTA), as a method to solve the inadequacy of discounted cash flow analysis when facing changes in expected scenarios, is a fundamental part of this research. Alternative options around investments in a specific fintech project or firm are visualized as paths following the tree structure introduced with the DTA. Crossroads in these paths, the quadratic nodes in the decision tree, indicate the moments when the decisions are due and the options must be exercised. Put into the context of a valuation exercise, these quadratic nodes represent the discount rates derived from the specific risk level associated with each option in the decision tree. Each node stands for the matching of choices to face possible events that, eventually, could be influenced by uncontrollable circumstances. Consequently, decisions at these nodes can be postponed until the information needed to ascertain the associated degrees of uncertainty and controversy is known or available.

The importance of these nodes, however, does not only lie in the fact that they show the alternatives that could be initiated or undertaken for the making of a to-do decision. They also represent situations where a path not taken stands for the forgone opportunity related to that specific situation (Buchanan & O'Connell, 2006). The identification of the opportunity costs associated with the investment in FinTech innovation has been considered in the initial construct of this research and is, consequently, the cornerstone of the conceptual framework, as shown later in Section 1.5.3 of this chapter.

Due to the nature of the proposal for this research, a heuristic approach to the problem of valuation is justified. As a matter of fact, the complexity of models based on real options impedes a more extensive implementation of this methodology for decision-making in investment analysis. The research, therefore, pays special attention to cognitive biases associated with this heuristic approach.

Because the specific nature of the incumbent's business is banking, the cost of capital may be regarded as the best 'price' for the investment project's risk. In addition, the potential gains of the real options considered are split across the value network of the incumbent.

Finally, the hazard equation, outlined and enriched with information obtained from the interviews, is the tool used to model managerial behaviour during the decision-making process and eliminate both cognitive biases and intentional actions arising from misaligned incentives.

1.5.2 The Make-or-Buy Decision

The decision about either manufacturing in-house (make-it) or outsourcing to a third-party (buy-it) was first addressed in the context of the Transaction-Costs Economics theory as a fundamental element towards the creation of value while avoiding waste (Ketokivi & Mahoney, 2017). The make-or-buy decision is most often associated with strategic decisions over outsourcing leading to cost reductions in the supply chain, namely triggered by the purchasing function (Mcivor et al., 1997).

Relationships based on collaborative partnerships are not rare in the FinTech ecosystem. As a matter of fact, they are more the norm than the exception. It is in this context that the make-or-buy decision becomes relevant for the purpose of this research. The decision to invest or not in FinTech innovation is not simply based on considerations about how to lower costs or achieve higher levels of efficiency in the value chain by means of shortlisting strategic suppliers. Discussions about this type of relationship are more about the trade-offs associated with the acceptance of investments in FinTech innovation, as a FinTech firm can become either a potential supplier liaised by a partnership or a strategic competitor with real chances to gain a dominant position in the incumbent's own value network.

Using the make-or-buy question for decision-making, however, is not without flaws, as it does not provide a solid basis for the evaluation. There is not a decision model as such with specific variables cast in stone. For this research, I adhere to the conceptual framework defined by Mcivor et al. (1997), based on three criteria: core competencies, capabilities (internal vs. external), and costs (internal vs. external).

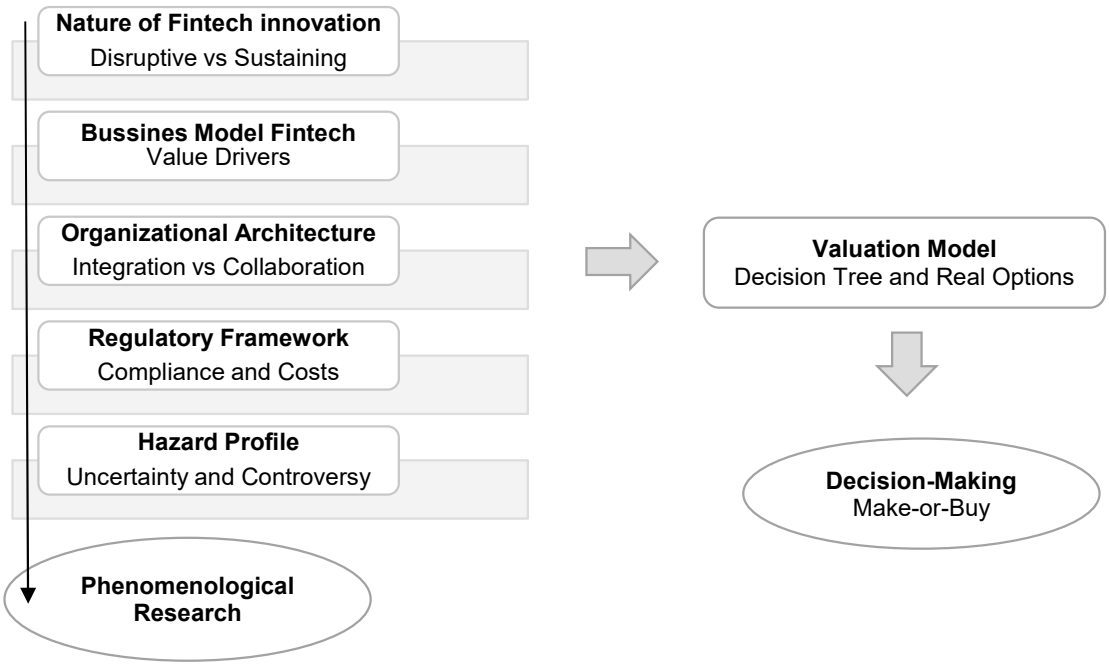
In the context of FinTech innovation and from an incumbent's perspective, the identification of the core competencies refers to the nature of the investment in the innovation. Sustaining, meaning being purely technology-driven, is not core. Disruptive, meaning the banking function 'as-a-service', is core. The discussion around internal and external capabilities is addressed from a double perspective. First, from the will and ability to adapt, or eventually replace, current business models by others based on the innovation considered; second, from the will and ability to adapt the organization to host new forms of collaboration between commercial banks and FinTech firms. Finally, the costs associated with the decision-making process are the main subject of this research. As a matter of clarification, it is not about the numerical outcome of the cost exercise but about a

result in the calculation of the valuation model that can be regarded as ‘unbiased’ by the decision-makers engaged in the aforementioned process.

1.5.3 Independent and Dependent Variables

The conceptual framework used to arrive at the initial construct of this research is based on the interconnection between two sets of variables: five independent and one dependent. Ascertaining the degree of controversy and uncertainty associated with a specific FinTech project ensures that the decision to either enable or impede the investment in that project is based on an unbiased outcome of metrics in the valuation model. Uncertainty is about the alternative options available, and it can easily be incorporated into a financial model. Controversy, which is more difficult to comprehend, is about resolving differences that eventually might occur when accepting the specific alternative being evaluated. The independent variables will conform to the set of explanatory and control variables in the model introduced in Section 2.3.4.1, Proportional Hazard Models. A representation of the conceptual model is shown below.

FIGURE 1: CONCEPTUAL MODEL



The purpose of this phenomenological research is to explore the five independent variables and illuminate their influence when designing the valuation model for decision-making.

Determining the nature of the innovation comes at the top because it does help to place the decision on the investment in the right perspective: while sustaining innovation means a continuing factor in the lifecycle of the company, disruptive innovation is about the ‘survival’ of the firm. By taking this survival perspective as a starting point for decision-making, commercial banks can better understand how to take back control of this new reality represented by FinTech.

Understanding the business model and value drivers of FinTech is relevant to evaluate the willingness and capacity of incumbents’ organizations to, eventually, switch business models, e.g., from bundled or centralized to unbundled or decentralized. If bundling is intrinsic to the essence of banking, banks should then take the lead in bundling the current constellation of unbundled FinTech solutions.

Exploring the organizational architecture is crucial for decision-making because incumbents’ organizations must be prepared to assimilate FinTech innovation. E.g., the acquisition by an incumbent of a FinTech firm that delivers radically different products and services is just the very first step. Next to the required strategic alignment beforehand, completing the integration successfully means that the right people and systems must be in place. Strategic manoeuvring, for example, is that component of the organizational architecture that stands for the capacity of the firm to face the challenges of a successful post-integration process, the real challenge of the decision-making process.

Comprehending the magnitude of changes undergone by ‘traditional’ regulatory frameworks is necessary to understand the inequality in the competition between newcomers and incumbents for a dominant position in the financial services industry. It also helps to understand the difficulties of the latter in absorbing the extra compliance costs imposed by the regulators.

In the context of valuation, the hazard profile stands for risk. Illuminating those factors of influence that define the risk profile of an investment is, therefore, key to estimate the associated discount rate.

The justification for a phenomenological approach arises from the fact that the decision over the innovation transcends the boundaries of a plain technological innovation. In the end, the decision is more about understanding that the essence of banking remains the same, despite the radical technological change represented by the FinTech phenomenon. FinTech innovation is just one more step, though one of a momentous dimension, in the technological evolution process inherent to any

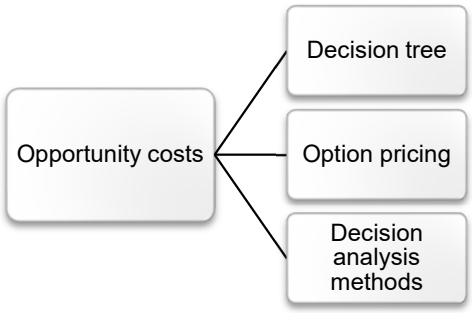
industry (Suárez & Utterback, 1995; Utterback, 1971, 1974). In this respect, the financial services industry today is not an exception.

1.5.4 Initial Construct

The identification of opportunity costs associated with the investment in FinTech innovation has been considered in the initial construct of this research because it is the cornerstone of the conceptual framework introduced here above. The construct further assumes that a decision on disruptive innovation favours the use of a divergent approach to valuation.

The formulation of this initial construct as the starting point of the research states that a decision tree analysis integrating option pricing and decision analysis methods puts the degree of uncertainty and controversy associated with investments in disruptive innovation into perspective. The outcome of this exercise helps traditional retail banks make better decisions when assessing the opportunity cost of investing in FinTech innovation.

FIGURE 2: INITIAL CONSTRUCT AND MEASURES



1.6 Contributions

The make-or-buy question regarding investments in FinTech innovation is often answered with a ‘buy’, as retail banks embrace collaboration above internal organizational alternatives. From a theoretical perspective, actual valuation theories for the assessment of investments in sustaining and disruptive innovations by retail banks will be tested. The real options theory will be introduced to bring the valuation techniques used in these two types of investments into a model for valuation. The rationale behind this decision is that such a valuation model can deliver a positive outcome for FinTech investments undertaken by retail banks. Hence, the role of financial metrics as enablers of disruption is the most relevant potential contribution to the knowledge of this research.

A second contribution of the research will be the further clarification of the role of regulation in the FinTech ecosystem. More specifically, the reduction of the regulatory burden for FinTech firms, which in the end creates a disadvantage for the incumbents, either when adopting the innovation themselves or teaming up with the disruptors.

A third and last contribution will be the exploration and analysis of alternatives for collaboration between incumbents and FinTech firms.

1.7 Delimitations and Limitations

In a recent work about FinTech, Lee and Shin (2018) identify five constituent elements of the FinTech ecosystem: FinTech startups, governments, traditional financial institutions, financial customers, and technology developers. This research focuses on European (and UK) traditional financial institutions and FinTech firms. In some cases, references to other geographical regions are included, though with the aim of comparing them with countries within the scope of this research.

I address the role of technology developers when exploring the present and future of distributed ledger technologies, namely 'blockchain,' in the context of centralized versus decentralized finance. I investigate the role of governments and other overarching institutions, like the European Commission and the European Central Bank (ECB), through the analysis of laws and regulations issued by public regulators and other central authorities that go over the regulation of the financial markets. Though I cover the role of financial customers very tangentially in this research, I do not underestimate their relevance in the creation of the unbundled offering of financial products by FinTech firms.

Next to the works of scholars like Damodaran (2018) and Puca (2020), I have based my analysis of real options on the works of Trigeorgis (1993), Smith and Nau (1995), Borison (2005), and Triantis (2005). Though the references in the literature review to these authors might seem outdated, their works have played a critical role in the definition of the valuation model and the corresponding options in the decision tree.

The case study incorporates the experiences of representatives from companies external to the FinTech ecosystem, though actively engaged in its current development: equity investors, namely venture capitalists and private equity firms. I

also investigate valuation models used by professional consulting firms engaged in the valuation of public and private offerings in the FinTech sector.

Regarding the outcomes of the case study, major concerns are the size of the samples and the scope of the market research, which was mostly limited to two countries: the Netherlands and Spain.

Finally, the narrative nature of the literature review as well as the complexity of the journaling process inherent to the phenomenological approach, can both increase the likelihood of bias in the research results.

1.8 Outline of the Research

Next to this introduction chapter, the search strategy and the review of the literature are the subjects of Chapter 2. The philosophical perspective, the research design, the boundaries of the case study, the strategy for data collection and data analysis, reflections over validity and reliability to ensure trustworthiness, and ethics are all described in Chapter 3. The presentation and analysis of the findings are the subject of Chapter 4. The discussion about the findings in its relation to the theoretical framework is the subject of Chapter 5. The valuation model for the make-or-buy decision on investments in FinTech innovation is presented in Chapter 6. Finally, Chapter 7 closes this dissertation with the conclusions and implications of the findings, the contribution to knowledge and professional practice, my personal reflection, and recommendations for future research.

CHAPTER 2. LITERATURE REVIEW

2.1 INTRODUCTION

Literature in phenomenological research is used to frame the problem, to determine whether the specific topic of the research is worthy of study and, eventually, to refocus the scope of the research to an area that deems inquiry (Peoples, 2021).

The review of the literature in this research is of a narrative or traditional nature and is subdivided into three research categories: first, generic, over the theoretical concepts associated with the research objectives; second, specific, over FinTech in the context of the conceptual framework and the research objectives; third, and last, over the role of the legal and regulatory framework when stimulating or discouraging FinTech innovation.

The purpose of the review in the first research category is to gather and synthesise critical and objective knowledge over the four theoretical concepts deemed necessary to construct a valuation model to support the make-or-buy decision. The purpose of the review of the second research category is to identify potential gaps and, eventually, to redefine the research objectives and the research question. The purpose of the review in the third research category is to illuminate the way FinTech is contributing to the reshaping of the financial services industry.

The organization of the review in these three categories is thematic. The manner of reviewing literature in this research is congruent with the choice for hermeneutic phenomenology as theoretical framework. Subsequently, the approach to the literature is one that aims to the creation of interpretive understanding (Boell & Cecez-Kecmanovic, 2014).

2.2 OUTLINE OF THE LITERATURE REVIEW

2.2.1 SEARCH STRATEGY

The selection criteria for the search of academic papers are based on their relevance to the three research categories mentioned above. The selection of sources is not exhaustive. Occasionally, and to gain a better understanding of the FinTech phenomenon, I have reviewed literature that falls outside the scope of this research, namely European and UK FinTech firms and markets.

The search has been conducted based on the 'supporting arguments sought' as shown in the table below.

TABLE 1: OUTLINE OF THEORETICAL CONCEPTS

Key theoretical concepts	Supporting Arguments Sought
	Part 1: GENERIC
Disruptive Innovation	- Disruptive and sustaining innovation. - Value network, value chain. - Changes in business models driven by new technologies. - The importance of the environment, ecosystem.
Business Model Innovation	- Strategic models for innovation. - Radical product innovation. - Complementarity of business models. - Business model adaptation.
Organizational Architecture	- Ambidexterity. - Collaboration (partnerships). - Integration.
Valuation	- Categorisation of risky investments. - Decision-making trees. - Use of real options for reasoning and valuation on investments.
	Part 2: FINTECH SPECIFIC
Disruptive Innovation	- Boundaries between sustaining and disruptive innovation. - Main actors within the FinTech ecosystem. - Essence of banking.
Business Model Innovation	- FinTech taxonomy. - Essential value drivers for the make-or-buy decision on FinTech.
Organizational Architecture	- Alternative organizational structures to accommodate investments in FinTech innovation. - Venture capital partnerships incumbents-FinTech firms.
Valuation	- Valuation techniques used by investments in FinTech. - Specific use of real options for investment analysis.
	Part 3: REGULATORY FRAMEWORK
Business Model Innovation	- Influence of the regulatory framework on the FinTech taxonomy. - Banking regulation (e.g., Payments Directive). - Anti-money laundering.
Organizational Architecture	- Influence of the regulatory framework in the forming of partnerships. between incumbents and FinTech firms.
Valuation	- Impact of regulatory costs in the calculation model for investments in FinTech innovation.

2.2.2 Sources of Literature According to the Theoretical Concepts

Key academic sources of the literature review specified according to the theoretical concepts are the following:

TABLE 2: MAIN SOURCES LITERATURE' BY THEORETICAL CONCEPTS

Key Theoretical Concepts	**Main sources**
	Parts 1 and 2: Generic and FinTech specific
Disruptive Innovation	Christensen (1997), Christensen et al. (2016)
Business Model Innovation	Markides (2006), Christensen & Rosenbloom (2013), Ansari & Krop (2012), Chesbrough (2010), Lee & Shin (2018), Palmié (2018), Thakor (2020)
Organizational Architecture	Markides & Charitou (2004), O'Reilly & Tushman (2004)
Divergent Valuation Models	Suarez & Utterback (1995), Smith & Nau (1995), Trigeorgis (1993), Lee & Lee (2005), Borison (2005), Triantis (2005)
	Part 3: REGULATORY FRAMEWORK
Incumbent's Status Quo	Cliffe (2021), Buckley et al. (2020)
Anti-Money Laundering	Parra Moyano & Ross (2017)
Payments Service Directive	European Commission (2020)
Regulatory Technology	Anagnostopoulos (2018)

2.3 Part 1: Review of Generic Theoretical Concepts

2.3.1 Disruptive Innovation

Christensen's (1997) first work on disruptive innovation was not only a thorough analysis of the disc-drive industry in the nineties, but it also became the origin of a new management theory to explain the response of consolidated firms to the threats of technological change. Born in the very specific context of the first steps of the Internet, the application of the term disruption has become, over time, a descriptive framework to explain innovations other than technological, namely business models and products.

It is probably because of the widespread use of the concept of disruptive innovation in the last twenty years that the core of the initial theory, technological change, has not only been misunderstood but has faded into a more general theory of innovation and competitive response (Christensen et al., 2017). For this research, it is important to stay true to the disruptive innovation theory as introduced by its founder, a technological change at the centre of the disruption created in the financial services industry by FinTech innovation.

Christensen et al. (2016) warn about the risks of labelling any technological innovation that might shake a market as disruptive. This clarification falls back on the original differentiation between the two types of technological innovation, namely sustaining and disruptive. While the first one aims to make an existing product better, the latter is about the creation of new business models or products.

The importance of addressing this point is that different types of innovation will require different types of answers from the incumbents in that specific market. Therefore, taking either the sustaining or disruptive path is not only a strategic choice for the incumbents but also the first step in the decision-making process on the investment itself, as the type of response of the incumbents against the disruptors will be substantially different.

The aim of the disruptors is to create a new offering of products and services, a process that requires time before crystallizing into real competition for the incumbents. In the end, it is this 'time element' that makes incumbents overlook the risk of innovation, as disruptors do not immediately threaten their current product offering. Consequently, incumbents believe that the disruption is not about them. The delaying factor is already a fact before they start responding to the threat.

Is the incumbent's myopia the issue when explaining their sluggish reaction to the threat posed by the disruptors? Can incumbents still rely on their existing knowledge and capabilities? Does the type of incumbent matter? What types of organizational structures increase the risk of being disrupted, or what others can they use to better protect themselves against disruption? Do the institutional and legal environments play any moderating roles? These are all critical questions that need to be addressed by incumbents prior to re-designing their strategies to respond to the disruption (Hopp et al., 2018). These are also the steps followed in this research when identifying relevant variables for decision-making and valuation models.

2.3.1.1 Business Model Innovation and Radical Product Innovation

The source of the disruption may be of a technological nature, and the way it further develops can substantially differ in such a way that it may even trigger the appearance of different phenomena. The disruptive innovation theory, however, does not make any further discrimination about the consequences for the incumbents of the appearance of one or another type of innovation. This is the main point addressed by Markides (2006) in his analysis of two specific variations of this theory: business model innovation and radical product innovation.

Business model innovation implies the discovery of a completely new business model in an existing market. It is not about the creation of truly new products and value propositions but rather about the 'redefinition' of the existing ones (Markides, 2006, p. 20). From an incumbent's perspective, tweaking the value proposition of the business model may, therefore, be an alternative to cope with disruptive innovation.

Radical product innovation refers to the introduction of new products and value propositions as the result of supply-push processes unchained by technological innovators (Markides, 2006, p. 22). One of the characteristics of markets emerging through these supply-push processes is the initial overflow of technological newcomers, pioneers of the first 'hour', trying to find their way up to the 'surface' of the market they are entering. Though these pioneers are rarely the ones that, in the end, will manage to survive, they are responsible for the 'explosive' growth of new designs at the beginning phase of innovation. From an incumbent's perspective, a likely response to radical product innovation is not to enter the battlefield of innovation at the beginning because it is too crowded and unequal but rather to focus on the consolidation of this new emerging market into a bigger mass market

where they can operate better because it is familiar and maintain their current position. Incumbents should aim *"to create and maintain a network of pioneering firms entering the new niches created by disruptive innovation, reserving for themselves the role of venture capitalist"* (Markides, 2006, p. 24).

2.3.1.2 The Value Network and the Environment

A value network, as the graphic representation of all interactions within a specific value chain, e.g., the banking value chain, is a critical factor in analyzing the chances of both incumbents and entrants to successfully innovate and survive disruptive innovations. The concept was introduced by Christensen (1997) as part of his disruptive innovation theory. If technological innovation transcends the boundaries of the existing value network, e.g., new markets or products and services, then the establishment of a new value network is required. While innovative disruptors succeed when they manage to introduce technological innovation into a new value network, incumbents continue operating within their same value network. Though the position taken in this research is that of the incumbent, understanding the way other participants in innovation operate is relevant as a first step to helping identify the options of the incumbents when trying to anticipate the moves of the disruptors.

Christensen and Rosenbloom (2013) propose that, in addition to the technological character and magnitude of the innovation, innovations be categorised by the degree of mobility they enable or require across value networks. It is not only about the technological innovation itself but also about the way the innovation presents itself throughout the value chain in which the incumbents operate.

The willingness on the part of the incumbents to make the strategic decision of embracing innovation, even though this might go beyond the boundaries of their own value network, will be incorporated as one of the variables in the decision-making and valuation models.

For incumbents facing disruptive innovation, the importance of the environment is the subject of the study by Ansari and Krop (2012). The authors acknowledge that incumbent organizations suffer in the face of radical innovations and elaborate further on the factors that influence this situation.

> *The chances for incumbents to survive the challenge of new entrants are directly influenced by the interrelations among all actors engaged in this augmented*

marketplace: the degree of evolvement and protectionism of the institutional environment and its constituents; how sensitive are existing consumers to making frequent low-cost decisions and willing to change providers; the role of other 'suppliers' of similar products and services; the degree of embeddedness in the value network of the incumbents, leading or following the disruption; the degree of rivalry among major actors in the industry" (Ansari & Krop, 2012, pp. 1363-1364).

This view of the industry connects well with the concept of value networks as introduced by Christensen (1997) and Christensen and Rosenbloom (2013) and somewhat precedes the introduction of the term 'ecosystem' as a concept recurrently associated with FinTech innovation. The role and importance of the FinTech ecosystem will be reviewed in the FinTech section of this chapter.

2.3.2 Business Model

Magretta (2002) makes a clear distinction between business models, as a system which fits together all pieces of a business, and strategy, that deals with the reality of facing competition. A good business model alone is, therefore, not enough to ensure an organization's success. In essence, only when a new business model changes the economics of an industry and makes itself difficult to replicate can help to create a strong competitive advantage.

Teece (2010) explores further the connection between business models, business strategy, and innovation, concluding that the existence of a well-developed business model is essential to succeeding in innovation. The importance of business models transcends the boundaries of their constituent elements. The business models of successful companies are literally embedded in their organizational architectures. The importance of matching business models to the right organizational architectures will be the subject of the next section of this literature review.

Nevertheless, despite its importance, a good business model does not guarantee a competitive advantage by itself, as it is easy to replicate. The risk that a business model, disruptive or not, gets shared by a wider range of competing companies operating in the same market makes the role of strategy even more important. From the disruptor's perspective, the initial reluctance shown by incumbents to change their own models due to their fear of a likely cannibalization of their existing customers and product portfolios gives them a time frame to tinker with these new disruptive business models, increasing in this way their chances of making them succeed. The incumbents, on the other hand, waste precious time finding

arguments to switch from a good, in their opinion, still successfully functioning business model to a new model that can easily be copied.

As previously explained in Section 2.3.1.2, the role of the environment becomes critical to properly evaluating the chances of new business models succeeding (Ansari & Krop, 2012). The environment, meaning all participants in the same value network, helps shed extra light on future developments that might be relevant when assessing the make-or-buy decision. In this sense, Teece (2010) does not regard the business environment as a static component but rather as a variable factor. Firms can not only choose to be part of the new ecosystem in a passive way, but they can also choose to actively shape or reshape it. From the incumbents' perspective, the latter is very relevant when considering the adoption of a new business model to embrace the innovation.

The introduction of a business model innovation does not necessarily imply the need to abandon existing business models, as it is possible to manage conflicting strategies in a profitable manner, and separating the two is neither necessary nor sufficient to be successful with the innovation (Markides, 2006). Adopting conflicting strategies to serve the same market is often not without risk for incumbents, however. The advantage gained over disruptors by adopting the new business model can be shadowed by the risk of potential conflicts with current models (Markides & Charitou, 2004). In addition, markets created around these new competitors tend to account for different key success factors than the established ones. It is this struggle to preserve the established and innovate with the new that, in the end, awards business model innovation the disruptive "label" (Markides, 2006).

From the decision-making and valuation perspectives and, independently of whether the incumbent adopts the new business model or not, it is also worthwhile to look at barriers that could impede the adoption of the innovation, the stimuli that could favour its implementation, and the interactions that could arise between incumbents and innovative new entrants.

Chesbrough (2010) reviews the extant academic literature on barriers encountered by incumbents when embracing business model innovations to conclude that these can lead to two kinds of conflicts. Incumbents may face conflicts with their existing assets and established business models. Nonetheless, Chesbrough (2010) concludes that eventual conflicts that may arise from these barriers point out

confusion rather than obstruction as, in his belief, incumbents are not sure what the right business model ought to be. No matter how difficult this endeavour might be, it must be clear that the benefits of business model innovation more than exceed the risks of stranding at one of the barriers identified here above. Technology has no objective value by itself, but its subsequent commercialization via a new business model does. Incumbents must force themselves to overcome these barriers.

The focus of Cozzolino et al. (2018) is on stimuli that trigger incumbents' reactions following a business or technological disruption. Despite the limited scope of the study, which focused on the European publishing house industry, their findings are relevant to understanding how the adaptation process to the new environment can be set in motion. The identification and separation of the disruption into two phases, which we also found in Markides (2006), is an interesting first factor. The success of incumbents' adaptation is, to a very large extent, a factor of the 'timing' of the disruption. For an incumbent, trying to adapt his strategy at the beginning of the disruption, when the innovation may still be under discussion, can be substantially different from engaging halfway in the process, with the technological innovation fully underway. While stand-alone experimentation is rather common in the first situation, alliances and acquisitions are more frequent in the latter. Opening business models to external sources is a feasible second alternative for incumbents to reconfigure their business models following the disruption. The transformation of 'closed' vertically integrated product-company models into 'open' multi-platform businesses is an interesting third and last alternative.

The increasing number of opportunities for business model configurations enabled by technological innovation is the starting point of the study by Casadesus-Masanell and Zhu (2013). Regarded by the authors as the first formal example of business model innovation in a game-theoretic framework, the study revolves around the strategic interactions that arise between innovative entrants and incumbents.

Though not specifically related to disrupted innovation and limited to sponsor-based business model innovations, this work provides an interesting approach to the construction of a decision tree model when the first decision node refers to either adopting the innovation or remaining faithful to the current business model. The model sets entrants at the gate of the decision tree and illustrates how incumbents can make their choices when imitation of the entrant's business models is an option. The imitation of disruptors' business models by incumbents is a common

phenomenon in the second phase of the disruption process identified by Cozzolino et al. (2018).

2.3.3 Organizational Architecture

With organizational architecture, I refer to people, management, and employees, as well as systems, the so-called IT legacy systems. The way incumbent organizations approach disruptive innovation does not only affect the way they conduct business; it may also have consequences for their organizations. The claim of Christensen (1997) to establish separate organizations, or business units, to exploit the disruption was a first suggestion to facilitate the adoption of the innovation without creating extra tension for the existing organization. Other scholars, including Christensen himself, have later discussed the need to separate units and even proposed the implementation of hybrid models (Christensen et al., 2013).

This part of the literature chapter reviews further the deployment of ambidextrous organizations, the role of organizational evolution, corporate culture, and scenarios when cooperation arises as a better alternative to integration.

2.3.3.1 Ambidextrous Organizations

Markides and Charitou (2004) provide empirical evidence to show that it is possible to manage two conflicting business models together under the same organization and that separating the two into different organizational units is neither necessary nor sufficient to make them both succeed. The key to success is to accept the challenge of managing the conflicts inherent to the new strategy, rather than start contemplating de facto an organizational separation. Field research showed that, whatever the decision made, framing the decision as an opportunity encourages the decision-makers to take a long-term view of the investment that, in the end, ensures the resources required for a successful strategy. In other words, an adequate balance between old and new business models delivers an optimum level of synergies between old and new organizational architectures.

Cannibalization of existing products and services is one of the risks inherent to ambidextrous organizations and the reason why companies often emphasize the exploitation of their own solutions above the exploration and acceptance of new ones. Again, to make ambidexterity succeed, the willingness within the organization to eventually cannibalize and combine its own knowledge with the innovation is a requirement (Harmancioglu et al., 2020).

Despite what may be gleaned from the above, ambidexterity is not as simple as creating separate units within an organization and letting them work together. Markides and Chu (2009) place this term in the context of diversified firms and conclude that success when implementing an ambidextrous organization is about the ability of a firm to simultaneously combine decentralized and centralized control. Empirical research found that higher levels of autonomy can be explained in situations of volatile environments, differentiation strategies, and not-shared resources.

Common to these three situations is the level of uncertainty, which is higher than the one captured by the firm's cost of capital. Though combining two different strategies is complex and not without risk, the chance of missing the benefits of the innovation more than justifies any potential organizational risks. Hybrid models that combine a mix of decentralized and centralized control are also common when facing innovation.

O'Reilly and Tushman (2004) had already explored this angle of linking organizational structures to success when pursuing incremental innovation. Of the four responses identified by the authors in their study on organizational change, functional designs, cross-functional teams, unsupported teams, and ambidextrous organizations, the latter is the one that ensures the achievement of the goals expected from the innovation in as much as 90% of the cases analyzed. Another important conclusion of this study, well aligned with the findings of Markides and Charitou (2004), is that a company's key senior management must be committed to operate ambidextrously even if its members are not ambidextrous themselves (O'Reilly & Tushman, 2004).

The superiority of ambidextrous organizational structures was the subject of a later study by the same authors, where they linked organizational ambidexterity to enterprise performance. The study confirmed that "there is a preponderance of evidence that shows a clear pattern of positive influence measured with the help of relevant performance metrics" (O'Reilly & Tushman, 2013, p. 5). This study also identified three different ways in which ambidexterity can be achieved: sequential, simultaneous, and contextual. In the case of sequential ambidexterity, internal processes, and structures are deemed to be realigned to cope with either internal changes, e.g., in the strategic direction, or external changes from the environment. When the firm pursues both strategies by using separate subunits, then we are in

the presence of structural or simultaneous ambidexterity. Finally, the case of contextual ambidexterity refers to the "*behavioural capacity to simultaneously demonstrate alignment and adaptability across an entire business unit*" (Birkinshaw & Gibson, 2004, p. 209). The key to success when finding an optimal balance between two conflicting business models relies on *"an organizational context characterized by an interaction of stretch, discipline, and trust, and requires supportive organizational context"* (Birkinshaw & Gibson, 2004, p. 214).

2.3.3.2 Organizational Evolution

The use of the term ambidexterity in the context of organizational evolution is not new. At the time when disruptive innovation was observed by Christensen (1997), discussions over organizational patterns for success or failure when adopting innovation were in full swing.

O'Reilly and Tushman (1996) argued that to remain successful, organizations must be able to cope with both incremental and revolutionary changes. In other words, organizations must be ambidextrous. In this context, organizational evolution may be regarded as a natural process that starts at the moment of adaptation to innovation. This situation reflects the need for companies to change over time their structure, skills, culture, and technology to realign their organizations to new strategic challenges. There are two phases to this process: first, organizations try to differentiate themselves from competitors by adapting the new models. Second, organizations work on their cost structures to ensure higher retention rates.

In the case of technology cycles, organizational evolution may substantially differ due to the emergence of 'dominant designs' that transform competition by shifting to prices and extra features, and not by altering the basic product or design (Utterback & Abernathy, 1975). This situation reflects the dynamic of product, service, and process innovation moving from one dominant design to another.

2.3.3.3 Corporate Culture

In the context of corporate culture, Nguyen et al. (2019) analyse the influence of bank culture on the risk-taking process associated with bank lending decisions. Though limited to a very specific subject of banking decision-making, the study goes deeper into the concept of corporate culture derived from the Competing Value Framework (CVF) developed by Quinn and Rohrbaugh (1983). This framework identifies four dimensions that outline corporate culture: "Compete" (risk-taking with

a focus on competitiveness), “Create” (risk-taking with a focus on innovation), “Control” (predictability with a focus on process capability), and “Collaborate” (predictive ability with a focus on harmony). This study provides evidence that corporate culture matters when assessing the risk associated with lending decisions, and that banks associated with the dimension of compete-dominant can be linked to riskier lending practices. Conclusions of this study are relevant for the research when exploring the possibilities of integration of FinTech firms within incumbent organizations.

2.3.3.4 COMPETITION VS. COOPERATION

In all previous sections of this literature review, we have explored the behaviour of both disruptors and incumbents when facing innovation. Approaching from different perspectives, we have seen how incumbents try to defend their status quo from the sudden entrance of these new competitors, the disruptors. However, despite what the words “disruptor” and “status quo” may suggest, incumbents and disruptors often find a way to collaborate. It is not always about the survival of the fittest, as we will review in the next two sections.

A first form of collaboration is when an incumbent firm engages with a start-up to enhance innovation. Weiblen and Chesbrough (2015) contemplate the increasing collaboration between start-ups and incumbents as an important trigger for corporate innovation. The authors analyse four different models that corporations can use to engage in successful collaborations with start-ups:

TABLE 3: ENGAGING WITH START-UPS TO ENHANCE CORPORATE INNOVATION

1	Corporate Venture Capital	Corporate funding start-up itself
2	Corporate Incubation (inside-out)	Corporate funding start-up through external business unit (e.g., ING Ventures or Santander’s Mouro Capital)
3	Outside-In Start-Up programmes	Multiple start-ups to elaborate and deliver
4	Inside-Out Platform Start-Up programmes	Corporates funding start-ups to stimulate the expansion of the market.

Source: Author, based on Weiblen and Chesbrough (2015)

The first two models are well known in the context of corporate innovation and can be extensively found in the FinTech ecosystem. More interesting for the purpose of this research are two new models of collaboration based on start-up programmes

that do not involve corporate ownership: Outside-In Start-up Programmes, and Inside-Out Platform Start-up Programmes. While, in the first, start-ups are placed in the role of “external” suppliers, in the second, start-ups build products for corporations using technology supplied by the corporations themselves.

The second form of collaboration is entering into strategic alliances. Other than the use of transaction cost economics frameworks might suggest, technologically intensive industries do not per se avoid alliances to protect their technologies. This is the main conclusion of the paper by Mauri and McMillan (1999) on the influence of technology in strategic alliances. The paper is a direct application of the product and process innovation model developed by Utterback and Abernathy (1975), namely, that technology evolves through a three-stage pattern: a first stage when the new technology competes with the old one and many alternative models share the same space in the value network; a second stage when a dominant model takes it over; and a third and last stage, where the disruptive innovation changes into incremental innovation and cost minimization become the main goal.

Despite the limitations of this paper for my own research, as it is slightly outdated, only focuses on American firms, and excludes the banking and insurance industries, the study is still a very interesting approach to the ‘when’ and ‘how’ of entering a strategic alliance. In the early stages, companies strive towards product innovation; at later stages, once the dominant design has emerged and consolidated, it is more about process innovation. An interesting collateral conclusion of this model is that cooperation at early stages fosters the spreading of technological innovation in a sort of attempt to stabilize the technology, favouring in this way the consolidation of a product standard, the forerunner of the dominant design. The innovation could, therefore, be regarded as an instrument to ensure the ownership of the dominant model.

Though in a different context and industry, this was one of the reasons behind Tesla’s to open its patents. An attempt, say successful (?), to consolidate the electric-driven motor as the dominant design against the hydrogen fuel-cell alternative of one of its competitors.

2.3.4 Divergent Valuation Models

The initial construct of this research is that decisions over investments in disruptive innovation favour the use of a divergent approach to the Net Present Value model

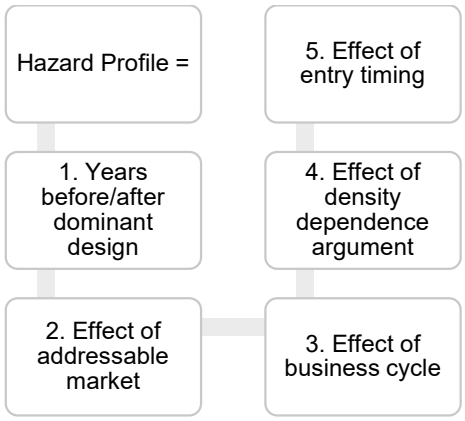
(NPV) as the basis for the calculations. In this section, I review alternatives for valuation when the identification of cash flows and discount rates in the NPV model cannot easily be estimated due to either the complexity of the business, the lifecycle of the firm, or developments in the environment where the firm operates.

2.3.4.1 Proportional Hazard Models

Suárez and Utterback (1995) incorporate technological evolution as a key strategic variable explaining the phenomenon of the survival of firms following the emergence of dominant designs, a specific path along an industry's design hierarchy that establishes dominance among competing design paths (Utterback & Abernathy, 1975). Technological evolution, however, is not the only factor explaining the appearance of these dominant designs. Other factors, such as the possession of collateral assets, industry regulation, the capacity for strategic manoeuvring at a firm level, and network externalities in the industry, may all play a substantial role in successfully adopting a new dominant design.

Suárez and Utterback (1995) establish a relationship between the survival of a firm and the moment of adoption of innovation, before or after the dominant design acknowledges its existence. A firm's survival is regarded as a factor of a so-called hazard profile, which in turn is a function of a set of explanatory and control variables, namely the addressable market at the firm's entry, the effect of the business cycle of the product or service, the effect of density dependence, and the effect of entry timing on the performance of the firm. A similar hazard function that captures all the above variables will be used for the estimation of the discount rates associated with each node in the decision tree for FinTech innovation.

FIGURE 3: CONTROL VARIABLES IN THE HAZARD FUNCTION



Source: Author, based on Suarez and Utterback (1995)

2.3.4.2 Uncertainty and Controversy

In the same line of thinking, Kang et al. (2018) link choices in the valuation of mergers and acquisitions (M&A) to uncertainty and controversy. Though the empirical context of this study is limited to Korean conglomerates, the methodology applied sheds light on the use of qualitative methods to assess levels of uncertainty and controversy, e.g., the composition of lists that identify potential conflicting goals.

The consequences for decision-making are plotted in a matrix that relates uncertainty and controversy based on their level of occurrence, namely high or low. Created in this way, patterns for each of the four propositions suggest that firms increasingly evaluate potential M&A deals via qualitative methods as uncertainty and controversy increase. In other words, *"M&A values are sometimes endogenously created as a result of the method that firms use to evaluate a deal"* (Kang et al., 2018, p. 1).

2.3.4.3 Real Options Theory for Decision-Making, Valuation and Strategy

The idea of using the real options theory for decision-making purposes on investments goes back to Myers (1977) and his idea of considering discretionary investment opportunities as growth options. The transition from Capital Markets Theory to Corporate Finance Theory was subsequently made, as the values of real options for projects can be calculated using the Black-Scholes model and the binomial option pricing model of Cox et al. (1979) if estimates of the underlying asset value and variance are obtained.

> *"Present value calculations are needed as a check on strategic analysis, and vice versa. However, standard discounted cash flow techniques will tend to understate the option value attached to growing profitable lines of business. Corporate Finance theory requires extension to deal with real options"* (Schulmerich, 2010, p. 22).

Contrary to the use of Net Present Value (NPV) for the valuation of risky investments, real options models capture both the downside and upside risks of the associated management decisions. For example, the decision to eventually abandon a project could be regarded as an example of downside risk. A management decision to either expand or delay the project, could be an example of an upside risk. As a matter of fact, *"the real options approach is the only one that gives prominence to the upside potential for risk"* (Damodaran, 2018, p. 133).

Indeed, when uncertainty is regarded as a source of additional value, options-based techniques are more useful to assess the upside potential implicit in the decision-making about investment opportunities. In its way of working, the use of real options for the valuation of risky projects is an instrument that helps to capture managerial alternatives (Trigeorgis, 1993). Examples of these alternatives are, e.g., the option to defer the investment project, the option to abandon it, the option to either contract or expand the scale of the project, and the option to switch to an alternative project.

Once the project is undertaken and prior to the calculation of the value of each option, the present value of the expected cash flows serves as the underlying value of the assets. The valuation of the options, however, is not without problems. As a matter of fact, the relevance of adding these options is more about the flexibility that they incorporate into the decision-making than the true estimation of their value itself. Due to the interactions between the options, the total value of all options is not adding up. Nevertheless, the risk of valuing the options separately cannot be ignored either, as it can lead to an overstatement of the project.

The work of Smith and Nau (1995) is crucial to understand how to integrate the use of option pricing and decision analysis methods into a decision tree model for the valuation of risky investments. This study is an extensive analysis of the adequacy of combining these two approaches in three different scenarios: complete markets, incomplete markets, and partially complete markets with restricted preferences. Only in the third case, when assuming that markets are partially incomplete, is it possible to successfully integrate both valuation approaches.

The key to resolving this conundrum is to distinguish between market and private uncertainties related to a specific project. Market uncertainties can be hedged by trading securities; private uncertainties cannot. Consequently, the cash flows of a project should be separated in the same way, with a market component and a private component specifically related to the project. While market information can be used for the first part, for the second part, we are deemed to use subjective preferences regarding uncertainty and risk tolerance that, eventually, can be captured by using exponential utility functions. For decision-making about investments in FinTech innovation, all five independent variables in the conceptual model aim to outline these subjective preferences.

The real options proposal is developed by Amram and Kulatilaka (1999) into a comprehensive model for decision-making when investments are of a kind that

discourage the application of traditional valuation techniques. Investments, regarded either as activities to increase flexibility or reduce uncertainty, are further classified into four categories: modular, irreversible, platform, and learning. This approach could be applied to investments in FinTech due to the unbundled nature of FinTech innovation and the monolithic character of IT legacy systems.

The use of real options theory for the valuation of technology projects has been analyzed by Lee and Lee (2015) in the context of the so-called Internet-of-Things (IoT), e.g., cloud computing and application programming interfaces. Investments in technology require substantial initial outlays that are often irreversible. In addition, decision-making on these investments requires the assessment of different alternatives for the same project. The degree of flexibility required, well embedded in real options models, cannot be captured with a standard net present value calculation as *"it ignores flexibility in investments such as reversibility and scalability in the valuation horizon"* (Lee & Lee, 2015, p. 436). Therefore, the recommendation for the use of this technique in combination with decision trees.

In a recent study, Trigeorgis and Reuer (2017) examined the application of the Real Options Theory to strategic management issues in three different ways: Real Options Reasoning, Real Options Valuation, and Behavioural Perspectives. The main characteristics of this approach, which puts investment in the context of strategy and strategic alignment, are shown in the table below.

TABLE 4: APPLICATION OF REAL OPTIONS THEORY TO STRATEGIC MANAGEMENT ISSUES

Real Options **Reasoning:** Key values of the option can be identified. It helps with the formulation of hypotheses and propositions.
Real Options **Valuation:** It can be used to stage possible values a project can take. It can explain better market valuations than DCF/ NPV calculations, as the latter excludes the making of decisions during the 'life' of the project. It is more transparent over the key assumptions and, therefore, it enables the simulation of more complex situations.
Behavioural Perspectives: It captures the experiences of decision-makers, as well as the constraints of organizations to face and adapt changes. It helps to capture requires for the implementation phase of the investment and, more importantly, the post-implementation tracks.

Source: Author, based on Trigeorgis and Reuer (2017)

I would like to close this section on the use of real options with a review of two papers published in Morgan Stanley (2005). In the first paper of this issue, Borison (2005) elaborates on three fundamental elements that need to be addressed in the approach to real options: the applicability of the calculated value of the option, the assumptions supporting the analysis, and the mechanics of the approach. The analysis of these three elements is carried out for five different approaches: classic, subjective, market asset disclaimer, revised classic, and integrated. An overview of these five approaches is presented in the table below.

Table 5: Main Issues when Approaching Real Options Valuation

Applicability	Assumptions	Mechanics
Classic Approach (No arbitrage, Market Data)	A portfolio of traded investments can be constructed to replicate the returns of the real option.	Identify the replicating portfolio and calculate its price and volatility.
Subjective Approach (No arbitrage, Subjective Data)	There is a replicating portfolio that justifies the applicability of no-arbitrage arguments. Idem as by classical approach.	Mechanics differ with the classical, however, in the data collection. Estimation of value and volatility of underlying investment is subjective.
Market Asset Disclaimer (MAD) (Equilibrium Based, Subjective Data)	There is no need for a traded replicating portfolio. The calculated NPV is an estimate of the value that the asset would have if traded. Discount rate is based on WACC.	Cash flow model put into a NPV calculation, discount rate based on CAPM[2], complemented with Monte Carlo simulation. Estimate value of the option using a risk-neutral binomial lattice.
Revised Classic Approach (Two Investment Types)	There are two different types of corporate investments, public and private, and each requires its own approach.	Public, market-priced, justifies the use of real options. Decision analysis is applied when investments cannot be tracked by market but private risks.
Integrated Approach (Two Risk Types) Described by James Smith and Robert Nau in 1995. It integrates option pricing and decision analysis. The approach is based on management science, not strictly finance	When markets are complete, market information complies with implicit requirements to carry out the valuation. Financial markets are partially complete; use option pricing models to value risks that can be hedged, and decision analysis procedures to value risks that cannot be hedged.	Build a decision tree to capture the alternatives of the investment and, then: Identify the replicating portfolio for public risks; assign subjective probabilities for private risks; go back in the tree to find out the optimal strategy and its value.

Source: Author, based on Borison (2005, p.p. 18-31)

[2] CAPM stands for Capital Asset Pricing Model

Of these five approaches, *"the integrated approach is the most accurate and consistent theoretical foundation, but it requires more effort as a result"* (Borison, 2005, p.31). This approach will be used for the estimation of the discount rates in the decision tree model for valuation.

In the second paper, Triantis (2005) stresses the importance of real options and the value of flexibility. Uncertainties are resolved over time. Putting an investment project within a real options framework incorporates this 'time dimension' into the valuation exercise. By doing so, decision-makers are stimulated in a more proactive way when approaching uncertainties associated with the project. More flexibility in the handling of uncertainty results, in the end, in better decision-making. The author elaborates further on the five challenges that need to be addressed for a successful contribution of real options to the decision-making process (see in the table below) and claims for a closer link between academia and practice.

> *"Academics must listen carefully to the critiques of practitioners and allow them to influence the kinds of problems that are addressed in academic research."* (Triantis, 2005, p. 16)

TABLE 6: CHALLENGES FOR A SUCCESFUL REAL OPTIONS-BASED MODEL

Challenges	**Approach**
Refining the Models of Perfection	By providing consistent guidance on how to get clear estimates of discount rates for the underlying projects.
Splitting Options	When competition between two or more companies or across different links of a value chain.
Modelling Managerial Behaviour	Addressing unintended mistakes stemming from cognitive biases and intentional actions arising from misaligned incentives.
Developing Heuristics	Evaluate new and more accurate heuristics, by challenging three of the most commonly used heuristics in traditional valuation, namely NPV using a firm's WACC, and NPV using a discount rate above the WACC, NPV including sensitivity, scenario, and simulation analyses.
Valuing and Managing the Firm	As management of the company, by being less responsive to evaluations of investors based on traditional metrics, like earnings per share (EPS).

Source: Author, based on (Triantis, 2005, p. 11-16)

This research may be regarded as a response to Triantis' claim above, in the context of disruptive innovation, FinTech innovation more specifically.

2.3.4.4 Influence of Financial Markets on the Response of Incumbents

On several occasions, I have come across references to the somewhat passive attitude of incumbents when confronted with the challenge of technological change, mainly in the initial phases of the disruption. Internal factors such as the fear of cannibalization of existing product portfolios or the distrust of organizations capacity to manage the disruption are often used to explain the initial reluctance of incumbents to intervene. External factors, however, are also relevant. Competition, the existence of adequate candidates to establish partnerships with, the role of governments, and regulation are all factors that may influence the incumbent's decision to step into innovation. Benner (2008) studies a specific external factor relevant in the case of listed companies, namely the role of financial markets and security analysts as deterrents to intervention. In his view, investors penalize the relevance of innovation by rewarding short-term cash flows generated by legacy technologies. In clear opposition to the efficient market theory, investors do not send a warning signal to incumbents informing them about the risks to the future value of their shares if they do not intervene.

2.3.5 Summary of the Literature Review on Generic Theoretical Concepts

2.3.5.1 Disruptive Innovation

To define the contextual relations of the make-or-buy decision, the first step that needs to be taken is to ascertain whether the innovation is purely incremental or disruptive. Are we confronting the appearance of better products and services, which would indicate that we are in the presence of sustaining innovation, or are we contemplating the antecedents of radical product innovation? At this stage, relevant issues that need to be addressed are the environment, or ecosystem, and the willingness to embrace innovation.

The environment must be explored to discover the boundaries of the FinTech ecosystem. Aspects like the overall degree of evolution, the level of protectionism driven by either competitors or regulators, the sensitivity of consumers to making frequent low-cost decisions, the role of other suppliers of similar products and services, the degree of embeddedness in the value network of the incumbents, and the degree of rivalry among competitors need to be thoroughly reviewed.

Although there is no need for incumbents to abandon their current business models, the willingness to embrace innovation is relevant in the make-or-buy decision. By embracing, I do not just mean changing the current business model but being open to going beyond the boundaries of your own value network. This willingness may be associated with the strategic manoeuvring incorporated in the conceptual model.

2.3.5.2 Business Model Innovation

The second step refers to the resilience of incumbents' business models, which provides an indication of the chances of succeeding in the race towards the new 'dominant model'. Relevant issues that need to be addressed at this stage are the 'timing' of the disruption, e.g., whether we are at the very early beginning of the innovation or later when the innovation is fully underway; the willingness to reshape the environment, e.g., mapping potential conflicts either with existing assets or business models; the matching of the business model(s) to the right organizational architecture as well as the ability to open the own business model to external sources, more specifically to multi-platform business; incumbents' willingness to imitate disruptors' models; and, in cases of radical product innovation, their willingness to play the role of a venture capitalist.

2.3.5.3 Organizational Architecture

The third step is about testing the willingness of incumbents to either deploy new types of organizations or enter forms of collaboration that do not involve traditional corporate ownership. Some examples of these considerations are the stage of organizational evolution between different 'dominant' designs; the ability to elaborate differentiation strategies to deal with the volatility of the environment; signs of complementarity or synergies between the old and the new organizational architectures; the willingness to cannibalize, eventually, existing product portfolios; the flexibility to switch to hybrid models; the entrepreneurship skills of senior management available to ascertain risky trade-offs; and the willingness to choose forms of collaboration or start-up programmes that may involve forms of ownership other than corporate.

2.3.5.4 Divergent Approaches to Valuation

The fourth and last step is about the identification of divergent valuation models that can help to better assess the combination of uncertainty and controversy associated with each option or node in the decision tree.

In the first place, the use of option pricing implies assuming that the FinTech market is neither complete nor incomplete but a partially complete one (Smith & Nau, 1995). Uncertainties in these projects can, therefore, be differentiated between ‘market uncertainties' (e.g., level of demand) and ‘private uncertainties’ (e.g., management capacity). Consequently, the cash flows can and should be separated in the same way. Market uncertainties can be hedged by trading securities; private uncertainties cannot.

In the second place, by assuming that the firm is at risk of survival, a relationship can be established between the corresponding hazard profile and the explanatory and control variables (Suárez & Utterback, 1995). This hazard profile can then be associated with the ‘private uncertainties’ of the project. Control variables in the formula are the entry timing, meaning the time taken to the adoption of the dominant design, either before or after its appearance; the ‘density’ at the time of the entrance, meaning the number of firms present in the market, as the higher the number of firms active, the larger the risk; and the size of the market, meaning the estimated addressable market at the time of an eventual ‘exit’. In this scenario, the risk profiles per option considered represent the discount rates for the value calculation at each of the nodes in the decision tree.

Contrary to the use of net present value for the valuation of risky investments, models based on the Real Options Theory identify both the downside and upside risks of the associated management decisions. A Multiple Real Options (MRO) approach incorporating a combination of four to five options captures the most relevant considerations a decision-maker can be confronted with when assessing uncertainties associated with a specific FinTech project.

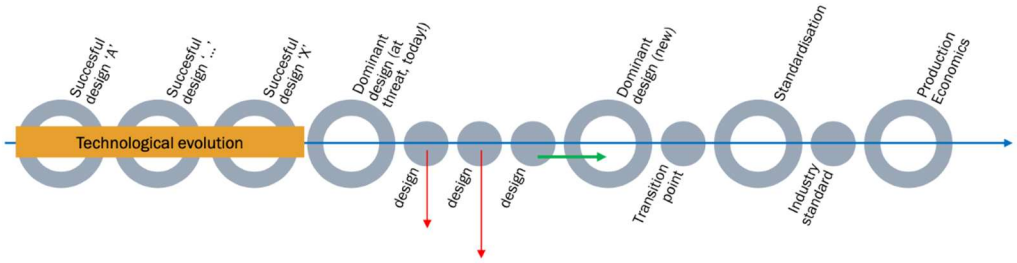
Finally, factors other than technology-related must also be considered in the valuation model, e.g., the possession of collateral assets and the existence of externalities and bandwagon effects (Smith & Nau, 1995).

2.3.5.5 Conclusion

From their privileged position as rulers of the established order, incumbents often wait until dominant designs show up before deploying a proper intervention strategy to further consolidate their position in the environment where they operate. In the case of a disruptive technological evolution, waiting until the ‘new’ dominant design consolidates might be too late for the incumbent, since its survival as a firm could be at risk.

The figure below represents how technology transitions from an established dominant design to a new one.

FIGURE 4: TECHNOLOGICAL EVOLUTION AND DOMINANT DESIGNS



Source: Author, based on Suarez and Utterback (1995)

Incumbents should dare to go beyond the boundaries of their own value network[1]. They also should dare to be on time when embracing innovation, even though it could mean the need to imitate[2] the business models of the disruptors. At the crossroads of an eventual collaboration, incumbents should dare to choose new, non-equity-related[3] forms of corporate venture capital.

Finally, when in the presence of new dominant designs, the decision-making is not simply about embracing the innovation but about the firm's survival. The use of divergent valuation models in these situations is, therefore, justified[4].

FIGURE 5: LESSONS LEARNED FROM LITERATURE REVIEW ON THE THEORETICAL CONCEPTS

1. Disruptive Innovation	2. Business Model Innovation	3. Organisational Arquitecture	4. Valuation
Dare to go beyond the boundaries	Dare to be on time	At crossroad of collaboration, dare to choose 'new'	Dare to diverge
Decision-making: Willingness to embrace the innovation going beyond the boundaries of the own value network).	Decision-making: Willingness to, eventually, imitate disruptors' business models. Regulation matters.	Decision-making, 3 options: - Equity-related - Corporate Venture Capital - **New** models based on start-up programs without corporate ownership.	Decision-making: It's not about embracing the innovation but about the firm's survival.

Source: Author.

2.4 Part 2: FinTech in the Context of the Conceptual Framework

2.4.1 The Nature of FinTech Innovation

To ascertain the nature of the innovation and remain consistent in our research approach, we will base our argumentation on the following definition of disruptive innovation:

> *"Disruptive innovations originate in low-end or new-market footholds, two types of markets that incumbents overlook. Entrants then move upmarket, delivering the performance that incumbents' mainstream customers require. When mainstream customers start adopting the entrants' offerings, disruption has occurred"* (Christensen et al., 2016, p. 6).

Indeed, not every technological breakthrough in a market is disruptive by definition (Christensen et al., 2017; Christensen et al., 2016). The importance of getting this definition straight is because different types of innovation influence the capacity to survive the innovation and, therefore, the response of the firms affected. When the survival of incumbent organizations is at risk, clarifying the source of innovation is therefore the first step that needs to be taken when a new dominant design is in sight. Is FinTech innovation, meaning the overarching process that has been dominating the financial services industry for the last ten to fifteen years, disruptive? Can we comprehend FinTech within the sharp, though clear, outline of the disruptive innovation theory as originally sketched by Clayton Christensen?

Recapitulating the first key distinctive characteristic of the theory, which is the origin of the disruption in the low-end of the markets, FinTech is growing fast in markets clearly underserved, or not served at all, by traditional banking institutions. An unserved market means that the only transactions in that market are cash transactions for commerce (payments), lending, savings, or money transfers. A person operating in an unserved banking niche may be regarded as a potential consumer who still has no access to the regular economy of the country.

With a simple product offering consisting of an ordinary bank account and a debit card, FinTech firms have put new customer segments on the map. The importance of mining these unserved markets can be seen in the boost experienced worldwide by investments in FinTech firms, and more specifically, the stake of that growth in

regions like Latin America and Asia Pacific (APAC), as shown in the table below (KPMG, 2019, 2020, 2021).

TABLE 7: GLOBAL INVESTMENTS IN FINTECH

(USD bln)	FY 2019	FY 2020	FY 2021	FY 2022
Americas	118,3	81,5	108,9	68,6
EMEA	68,1	28,2	79,0	44,9
ASPAC	30,4	15,2	50,2	50,5
Total investments	**216,8**	**124,9**	**238,1**	**164,0**
**Including WorldPay deal of $42.5 billion in 2019*				

To put FinTech into the context of the second key defining characteristic, which is the subsequent upmarket move of new entrants, the growing importance of 'challenger' FinTech banks can shed some light. Challenger banks, sometimes referred to as neo-banks, are FinTech firms that offer apps, software, and other technologies to streamline mobile and online banking. These FinTech firms, in possession of a banking licence, generally specialize in financial products, like checking and savings accounts (Forbes Advisor, 2021).

In 2021, there were 247 banks of this kind in the world. Of this number, roughly 44% are situated in Central and South America, Asia Pacific, and the Middle East and Africa, which proves the importance of these unserved markets in the forming of these neo-banks.

TABLE 8: GEOGRAPHICAL BREAKDOWN OF CHALLENGER BANKS

2021	#	%	
North America	63	25,5%	
Central and South America	54	21,9%	47,4%
Europe	75	30,4%	
Asia Pacific	42	17,0%	
Middle East and Africa	13	5,3%	
Total	**247**	**100,0%**	

Source: (NeoBanks.app, 2021)

The fact that FinTech has entered the mainstream in all markets worldwide can also be seen in the Global Fintech Adoption Index. The global consumer FinTech adoption rate stands at 64% in 2019, or 12 percent-points higher than in 2017, date of the previous report. The ranking is clearly led by emerging markets, with China and India at the top, both with 87% consumer FinTech adoption. In Central and

South America, Colombia (76%) is first, followed by Peru (75%) and Mexico (72%). In Europe, the Netherlands leads with 73% consumer FinTech adoption, followed by Ireland and the UK, both with 71% (EY Global Fintech Adoption Index, 2019).

Looking from a different angle, the development in the number of retail customers by top challenger banks also proves that these new firms, at least the six in the table below, have been successful in moving upmarket to reach the mainstream segment.

TABLE 9: RETAIL CUSTOMERS OF TOP-6 EUROPEAN CHALLENGER BANKS

Retail customers (millions)				
		2020	**2019**	Founded
Revolut	UK	14,5	10,0	2014
N26	GER	7,0	5,0	2013
Monzo	UK	3,9	1,6	2015
Hello Bank	FRA	2,9	2,7	2013
Bunq	NL	2,3	1,8	2012
Monese	UK	2,0	0,8	2013
		32,6	**21,9**	
		growth =	48,9%	

Source: Company sites

The magnitude of these developments should be put into a broader perspective, however, as a very substantial stake in this growth is incumbents' responsibility. Either standing alone in their FinTech offering or partnering with FinTech firms, the fact that incumbents are still regarded as bearers of consumer trust is the driving factor behind the recent developments around FinTech (EY Global Fintech Adoption Index, 2019).

We may therefore conclude that FinTech, as a technological evolution, is disruptive in nature. To claim that all developments around FinTech innovation in the context of banking-as-a-service are disruptive should be premature, though.

2.4.2 THE BUSINESS MODEL OF FINTECH

In June 2015, the World Economic Forum (WEF) presented ‘The Future of Financial Services’, a report prepared in collaboration with Deloitte about the transformation potential of new entrants and innovations in business models in financial services (World Economic Forum, WEF, 2015). FinTech, the short name for Financial Technology, was not used as such in a report that had been credited by its authors as the first taxonomy of financial services: payments, deposits and lending; insurance; market provisioning; capital raising; and investment management.

One year later, in August 2016, the World Economic Forum presented two new reports, once again in collaboration with Deloitte. The first of these reports was about the potential of Distributed Ledger Technology to reshape the financial infrastructure, namely Blockchain (World Economic Forum, WEF, 2016). The second report was about the role of financial institutions in constructing digital identities (World Economic Forum, WEF, 2016). This time, the FinTech acronym appeared in both reports.

Just a few years before, at the turn of the 21st century, there were already signs that the use of Application Programming Interfaces (APIs) in combination with the Internet (Web) had the potential to radically transform the landscape of online commerce. It was around this time that the term Web APIs was coined. The launching of the first iPhone in June 2007 added mobility as a breakthrough factor to the Web APIs. The outburst of the financial crisis in 2008, freeing consumers from the servitude of traditional financial institutions, put FinTech disruption on the map as we know it today.

2.4.2.1 The FinTech Ecosystem

Ecosystem, environment, and value network—all three concepts from the literature review that stress the importance of approaching the consequences of the innovation for incumbents not only from their own perspective but from that of all participants engaged in innovation processes.

Lee and Shin (2018) presented a five-participant FinTech ecosystem by type of activity. In this ecosystem, incumbents deliver traditional, bundled banking services. FinTech start-ups are newcomers that have found a way to deliver unbundled financial services. Technology developers facilitate the infrastructure where all participants compete for the financial consumers, either served or unserved. Governments work on the design of playing rules for all participants in the game of innovation. Investors, not taken in the ecosystem as such, explore this broad environment in their search for potential investments in FinTech, more often at the side of newcomers, start-ups, and scale-ups.

The study of Palmié et al. (2020) on the evolution of the FinTech ecosystem aligns well with previous conclusions about the relevance of the environment (Ansari & Krop, 2012; Christensen & Rosenbloom, 2013). As a matter of fact, it is the ecosystem that makes the disruption possible, not an individual firm or a bunch of firms. Innovatory aspects of their research are the perspective taken, which is of a

longitudinal nature; the participants, who have been reduced to barely two, disruptors and incumbents; and the role of venture capital in the innovation process, which is somewhat brought to the foreground.

In the first stage of innovation, incumbents can still manage to survive the plethora of entrants and innovations entering their value networks. It is about catching up with technological evolution. From their prominent position of industry maturity, incumbents find ways to incorporate these new API-based technological features into their portfolio of existing products and services, often cooperating with software-as-a-service providers. From the incumbents' perspective, this innovation is still regarded as of a sustaining nature. The role of venture capital is not yet significant.

In the second stage, the symbiosis stage, some of the new technologies, of a disruptive nature, shake the foundations of the banking industry. Incumbents cannot deal with the disruption by simply teaming up with Software-as-a-Service providers. Some of the newcomers manage to gain a position in the market. At this stage, the inflow of fresh capital rockets. The role of venture capital is decisive in fostering disruption. For some of the incumbents, it is already too late to step into the upcoming dominant designs.

In the third stage, that of industry resilience, incumbents struggle to survive, newcomers require larger inflows of venture capital, and customers change their needs and preferences. At this stage, the role of venture capital switches towards the consolidation of business models around these new customers' needs. Banking-as-a-Service (BaaS), Insurance-as-a-Service (InsurTech), Regulatory Compliance-as-a-Service (RegTech), Property-as-a-Service (PropTech), and Education-as-a-Service (EdTech). Though different, the role of venture capital is still crucial for either the adaptation of existing business models or the creation of new ones.

2.4.2.2 The FinTech Taxonomy

Not all developments identified in the report of the World Economic Forum WEF (2015) have yet fully come through. In addition, new entrants and innovations keep reshaping the offering of financial products and services. Nevertheless, the taxonomy of business models put forward by the WEF is still valid.

Lee and Shin (2018) described a FinTech taxonomy also consisting of six business models: payments, wealth management, crowdfunding, lending, capital market, and insurance business. Compared to the WEF's taxonomy, the market provisioning

model, meaning platforms and infrastructure, is now missing because it is considered part of a different development path.

With Palmié et al. (2020) and Thakor (2020), the FinTech taxonomy gains transparency as the boundaries between different FinTech products and services are clearly delineated. The categorization of Palmié et al. (2020), clusters the innovations around six business models as well:

- Payments are a very attractive business model for FinTech firms to enter the financial services market. Simple and easy to secure, FinTech firms can elude the concerns of the incumbents about the loss of their retail customers by directly dealing with the merchants.
- Banking products and services comprised under this banking label include mobile banking, digital and peer-to-peer lending (P2P), investment management, and personal finance. From the incumbents' perspective, these are the products where customer loyalty is priceless to safeguard. These are the products and services where disruption lurks.
- Crowdfunding, meaning the constellation of platforms for capital raising over the Internet.
- Wealth management, namely the use of automated investment platforms, is often supported by robot advisors.
- InsurTech, stands for insurance services and technological innovation.
- RegTech, or Regulatory Technology, refers to the use of innovative technology to deal with the compliance process.

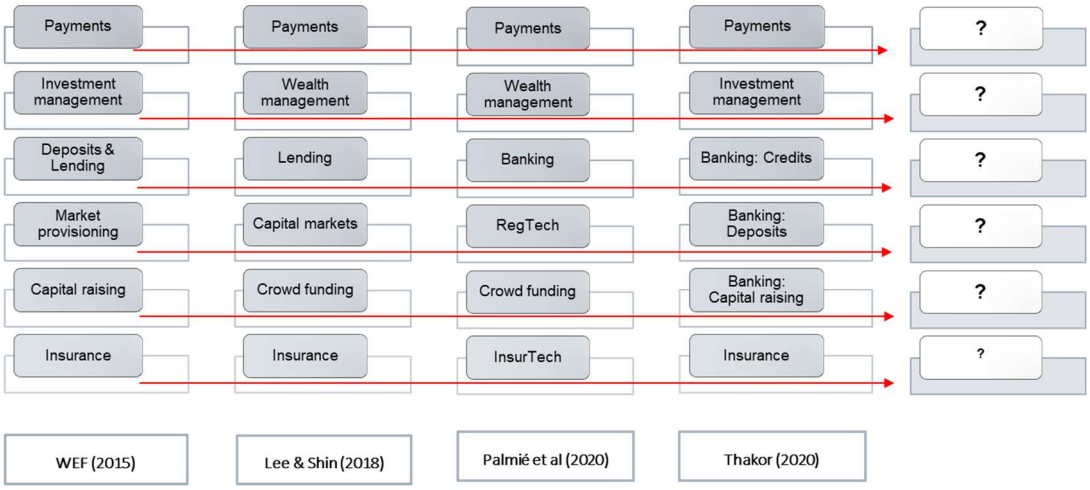
An example of how fast the suffix 'tech' gets linked to 'traditional' financial services of any purpose is the signalling of PropTech, a term used to define technological innovations in the real estate sector (Imerman & Fabozzi, 2020). The latter also includes a category "Digital Banking" in their own FinTech taxonomy, which refers to traditional online and mobile banking operations and, therefore, does not belong in a FinTech context, strictly speaking.

Thakor (2020) sets the focus on the interaction between FinTech and banking. His taxonomy is based on the categorization of FinTech innovations provided by the Basel Committee on Banking Supervision (BCBS) and the Bank for International Settlements (BIS). In this taxonomy, FinTech innovations are grouped around four categories: credit, deposit, and capital-raising; payments, clearing, and settlement services; investment management services; and insurance. It is unnecessary to say

that this taxonomy bundles the variety of FinTech innovations around three very recognizable banking categories. It also emphasizes the role that 'trust' will play as a key differentiation factor for incumbents when contending with FinTech disruptors and, more importantly, with non-financial service providers of financial technology.

After reviewing the developments of the FinTech taxonomy in the last five years, two conclusions of significant relevance for this research may be drawn. First, the fact that FinTech might be regarded as disruptive does not imply that all innovations signalled must be, per definition, labelled as disruptive. Second, there are some signs of the clustering of FinTech innovations around recognizable banking segments. This move could indicate that the banking sector, after a more defensive, wait-and-see strategy, is already making advances towards the adoption of dominant designs per banking segment. Though there is not yet an overarching dominant design 'banking', each clustering of FinTech innovations around a specific banking segment could be regarded as a step towards such dominant design.

FIGURE 6: FINTECH TAXONOMIES



Source: Author

A last, and divergent, vision of FinTech firms and incumbents in the banking sector is that of Navaretti et al. (2017). The authors consider that bundling services is more than a simple commercial strategy to attract customers and build loyalty. It is an intrinsic characteristic of the banking business. In addition, they also believe that the influence of FinTech has been overemphasized and put the innovation in a completely different perspective: despite differences in the services offered,

unbundled by FinTech firms versus bundled by incumbents, they both offer ‘banking’ services.

The chance that FinTech firms follow the bundling path has a much greater likelihood than the opposite. The convergence of the two business models, therefore, could be a fact in the foreseeable future.

2.4.3 Integration vs Cooperation in the FinTech Ecosystem

In situations of shrinking growth rates within highly competitive industries, innovation can not only be regarded as a technological upgrade but also as a stimulating factor for the modernization of outdated business models and organizations. In such situations, the financial architectures of individual firms and ecosystems are open and receptive to the innovation (Anagnostopoulos, 2018).

Traditionally, banks and other financial institutions dedicate large portions of their investment budgets to technology and innovation. As of 2019, IT spending as a percentage of company revenue was led by the Financial Services industry with 11.4 percent[3], followed by Health Care (5.9%), High Tech (4.7%), Discrete Manufacturing (3.2%), and Retail (3.0%) (Statista 2019, 2022). In the financial services industry, however, the goal of these investments is often neither the transformation nor the reinvention of their existing businesses (Infosys, 2018).

The ‘unbundling’ of financial products is not only one of the main characteristics of FinTech innovation, but also one that is directly opposed to the very nature of banking (Navaretti et al., 2017). In addition, all core competencies that can be associated with FinTech innovation are so different and their scope so diverse that a likely integration into the business model of an incumbent bank is not without difficulties: the diversity of products and services offered, the discovery of unserved niches, the small size of the FinTech firms together with their agility to build on hybrid and cross-industry business models — all these are competencies that are not only disrupting the market where incumbents operate but also exposing their weaknesses (Mention, 2019).

From an organizational perspective, however, the challenges posed by FinTech firms go beyond discussions over ambidextrous constructions to accommodate different business models under one roof or the identification of relevant dimensions

[3] Percentages named are at the 75% percentile.

that define company culture. For incumbents, the options to cope with this unprecedented competitive pressure are basically three. One is that traditional banks can innovate their existing technological infrastructure to meet the new FinTech standards. Two, they can acquire FinTech firms to gain quick access to new technologies. Three, some large banks can develop FinTech innovations on their own. More interestingly, the convergence of the FinTech business model towards that of banks is regarded by the authors as highly likely (Navaretti et al., 2017).

The above-mentioned options are well aligned with some of the conclusions anticipated in both reports of the World Economic Forum WEF (2015), World Economic Forum WEF (2016). One of the key developments identified in these reports was the deployment by incumbents of parallel strategies to confront FinTech innovation: aggressive competition against the disruptors on the one hand, and collaboration with the same disruptors on the other. In the case of collaboration, the recommendation was extended to collaboration with the regulators as well.

The developments of the last five years in the FinTech ecosystem seem to confirm this prediction. After an initial phase of exploring FinTech innovation in their own strength, an increasing number of incumbents are entering partnerships with FinTech firms in a typical win-win situation for both parties. In addition to their loyal base of customers, incumbents bring into these partnerships their proven compliance and regulatory competencies. In exchange for opportunities to grow their businesses further, FinTech firms contribute with their speed and flexibility to deal with market changes and increase customers' demand for new digital services (McKinsey et al., 2018).

Finally, the appearance of non-financial providers of financial services, such as online retailers and Big Techs, stimulates mutual partnering between incumbents and FinTech firms (Enriques & Ringe, 2020).

2.4.4 The Challenges of Valuing the FinTech Innovation

Regarding risk and uncertainty, the challenges of valuing FinTech innovation do not substantially differ from other investments in technology projects. The use of Net Present Value (NPV) models for the valuation of FinTech projects is also regarded as inadequate due to their lack of flexibility when addressing alternative options other than those taken in the base-case scenario. This lack of flexibility can be

compensated by adding a sensitivity analysis based on extra scenarios on top of the base-case scenario. The use of the real options theory to cope with this same problem, either alone or in combination with decision trees, is not new either.

The initial proposal of Smith and Nau (1995) to apply real options theory to the valuation of risky projects was further adopted by Lee and Lee (2015) for the valuation of two predecessors of FinTech innovation, namely cloud computing and consumer IoT applications. These technology investments in Internet-related projects are also known as Internet-of-Things (IoT).

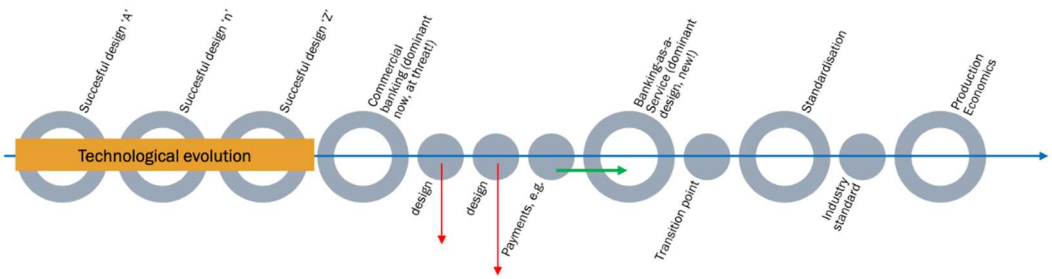
Lee and Shin (2018) also acknowledge the relevance of real options models using decision trees as a valuable instrument to incorporate alternatives associated with specific decision-making in FinTech innovation. In these models, each alternative may be regarded as an option, e.g., the option to wait, to expand, to delay the project, or to scale it back.

To cope with the diversity in the deployment of parallel strategies by incumbents, 'make-it', 'buy-it', and partnerships, a proper portfolio management strategy should be an additional requirement to any valuation model.

2.4.5 Summary of the Literature Review on FinTech

In this part of the literature review, we have learned that FinTech innovation may be regarded as a natural step in the process of technological evolution inherent to all industries. We associate FinTech innovation with the appearance of new business models or dominant designs per banking segment. Payments FinTech, for example, is one of these dominant designs, as most commercial banks have caught up with the innovation and adopted this model already.

FIGURE 7: TECHNOLOGICAL EVOLUTION AND DOMINANT DESIGNS



Source: Author, based on Suarez and Utterback (1995)

The FinTech ecosystem and financial services industry are at the second stage of innovation as identified by Palmié et al. (2020). Newcomers, e.g., challenger banks and FinTech firms specialising in the delivery of technological infrastructure, are gaining positions in the market. Venture capital and property equity firms increase the inflow of capital to foster these innovations.

We have also learned that the essence of FinTech innovation is disruptive, though not all projects popping up in the FinTech ecosystem are, per definition, disruptive[1]. The importance of regulation is not insignificant, either. In this context, and though the role of governments, institutional, and private regulators may be ambiguous at times, FinTech firms are clearly helping to reshape the financial services industry. Regarding the FinTech business model, all taxonomies reviewed so far have one characteristic in common: FinTech as an array of unbundled products and services per banking segment. The intrinsic nature of the banking business, though, is bundled[2].

More incumbents are entering partnerships with FinTech firms. The scope, type, and form of these partnerships are very different, however, from traditional equity-related to start-up programmes without corporate ownership[3].

When the survival of the firm is at risk, divergent valuation models to evaluate new strategic investments should be regarded as a valid alternative[4]. A likely higher degree of uncertainty and controversy associated with these investments can be captured by the appropriate combination of explanatory variables in the hazard profile.

FIGURE 8: LESSONS LEARNED FROM LITERATURE REVIEW ON FINTECH INNOVATION

1. Disruptive Innovation	2. Business Model Innovation	3. Organisational Arquitecture	4. Valuation
The 'essence' of FinTech innovation is disruptive	'Bundling' is intrinsic to the nature of commercial banking	Dare to choose at the crossroad of collaboration	Dare to diverge
Decision-making: However, not everything that happens in the ecosystem is, per definition, disruptive. Be selective in the approach.	Decision-making: Willingness to, eventually, imitate disruptors' business models, though still bundling! Regulation matters.	Decision-making, 3 options: - Equity-related - Corporate Venture Capital - Go for -> New models based on start-up programs without corporate ownership.	Decision-making: When it comes to firms' survival, between NPV/multiples, Go for flexibility and CHOOSE for real options and decision trees.

Source: Author.

2.5 Part 3: FinTech and the Regulatory Framework

2.5.1 Introduction

The devastating damage that the financial crisis of 2008 caused to consumers' trust in incumbent banks and other financial institutions put the role of FinTech firms forward not only because these firms ensure financial stability, but also because they enhance consumer welfare, facilitate financial inclusion, and simplify financial transactions for consumers (Cliffe, 2021).

FinTech should not only be regarded as a simple technological phenomenon but rather as a combination of economic, technological, and regulatory factors (Zavolokina et al., 2016). The growing interest in changes in the legal and regulatory framework around FinTech innovation in the popular press further confirms the complexity of this phenomenon. This increasing interest not only shows the influence regulators have on future developments of the FinTech phenomenon but also the disruptive effect of the latter on the existing regulatory framework itself.

Anagnostopoulos (2018) elaborates further on the trending enablers identified in the research of Zavolokina et al. (2016) before putting the focus on the regulatory implications FinTech firms are creating, as opposed to banks, in the re-shaping of the current regulatory framework. Banks, which had so far managed to keep and protect their current business models against the disruptive effect of new regulation triggered by FinTech firms, are now being carried along in this reshaping of the financial services industry.

Consequent to their affirmation of the similarities in the product offering between FinTech and traditional banks and the likely convergence of their business models, Navaretti et al. (2017) call for a regulatory framework with a focus on the service provided and not on who is providing it. The authors discouraged the creation of a regulatory framework specific to FinTech, somewhat lighter than the one for incumbents, as it could lead to situations of regulatory arbitrage that no one is served by.

Finally, and though exclusively based on the implications of regulations for the cryptocurrency market, Shanaev et al. (2020) confirm the suspicion that while overregulation might be counterproductive for the industry as it can lead to higher market volatility, incorporating the regulatory factor into the analysis of returns and risk exposures is still a necessity.

2.5.2 Challenging Incumbents' Status Quo

The disruptive power of FinTech innovation goes beyond anecdotal changes in financial ecosystems or radical transformations in the offering of financial products and services. FinTech innovation is also about increased disintermediation, the convergence of industries, and the use of borderless platforms (Knight, 2016). This borderless character, together with the ability to create new business models cutting across different regulatory jurisdictions, is what is currently putting a lot of pressure on government regulators, private regulators, financial markets, and incumbents.

Consequently, government regulators worldwide are stimulating FinTech innovation by lowering the level of requirements for start-ups by, e.g., establishing innovation hubs and 'testing' environments known as 'financial regulatory sandboxes' (Buckley et al., 2020). Sometimes, government regulators must throttle with one hand to stimulate their national economies by allowing, for instance, the exploitation of unserved market segments. Other times, they must slow down to protect the systemic role of traditional financial institutions. Even though the role of government regulators may remain ambiguous at times, when the nature of money or the hierarchy among currencies are under discussion, like in the case of cryptocurrencies, central banks step immediately forward. The other side of all these incentives is the competitive disadvantage created for incumbents competing in the same market.

Two new developments are creating regulatory challenges of a different calibre. The ongoing scale-up process that has resulted in the appearance and consolidation of challenger banks has unchained discussions not only over the incumbents' status quo or the need for new laws and regulations to cope with this phenomenon but also about some of the constituent elements of the banking business itself, e.g., the systemic role of banks and their importance for the economies of the countries they are present in.

The increasing number of partnerships between FinTech firms and incumbents, though very favourable to both parties, is creating regulatory problems of a different kind. The establishment of these partnerships, which in many cases lead to the outsourcing of key banking functions by incumbents, makes effective supervision of FinTech firms difficult because they often fall outside the control of the regulatory authorities (Enriques & Ringe, 2020).

2.5.3 Anti-Money Laundering Compliance (AML)

The development of e-commerce and mobile commerce, followed by the technological innovation led by FinTech firms, data, and technological companies[4], has increased the complexity in the handling of customer identification, a cornerstone of the Anti-Money Laundering compliance that came into force after the passing of the Money Laundering Control Act of 1986 (Parra Moyano & Ross, 2017).

The Know-Your-Customer (KYC) and Customer Due Diligence (CDD) processes are crucial elements of this AML compliance. Addressing anti-money laundering regulations has turned out to be a challenge for financial institutions, not only due to the complexity of the regulation itself but also to the velocity at which the technologies involved are changing.

The implementation of KYC and CDD processes is not without problems, either. While KYC is about the onboarding of new customers, the CDD process is about the continuing monitoring of risks once the customer has already been onboarded. In both cases, overall procedures, specific identification requirements, and authentication methods are different across industries (Arner et al., 2019). For this reason, the AML, KYC, and CDD verification processes have become one of the major cost items for financial institutions and are regarded not only as expensive but also as time-consuming and redundant (Shashank et al., 2020).

Strategy& (2021) estimates the yearly operating costs of European banks in KYC compliance processes at EUR 12 billion, plus an extra EUR 7 billion in ICT-related expenses. In addition to this yearly expenditure, the study estimates that banks globally paid an estimated EUR 23.2 billion for AML/KYC sanctions and related fees in the period 2015–2019. The magnitude of these costs is of such calibre that banks consider them a real source of disruption (Arner et al., 2017).

Financial institutions are already on the move, searching for technology solutions to address the extra workload created by AML processes, which confirms this phenomenon. In a survey recently published by Thomson Reuters (2022), the number of respondents performing mobile authentication increased from 23% in

[4] The Big Four, or GAFA companies are Google, Amazon, Facebook, and Apple; the Big Five, including Microsoft; And not forgetting large Chinese players such as Alibaba.

2019 to 39% in 2021, and the number of companies outsourcing the handling of their AML procedures to third-party technological providers showed an increase from 24% in 2018 to 36% in 2021. This increasing search for technology solutions is regarded by the authors as the most significant takeaway from this survey.

2.5.4 The Payments Service Directive II (PSD2)

Regarded by the European Commission as the lifeblood of the European Economy, innovations in payment services developed by FinTech firms started leading the way towards the harmonization of retail payments legislation and, in the end, the construction of a Digital Single Market (European Commission, 2020).

The need for regulation in this specific segment of financial services is nonetheless rather recent. The variety of front-end applications that in the last ten years have flooded the FinTech ecosystem, e.g., interfaces and applications for mobile phones, did not mean the creation of a fundamental new product or service but rather the improvement of an existing one.

Put into the context of the disruptive innovation theory, all these new technological features should be regarded as innovations of a sustaining nature rather than as disruptive. In the meantime, the irruption of large technology companies with no background in banking services, and the appearance of crypto-assets and distributed ledger technologies, namely blockchain, are changing the landscape further (European Commission, 2020). The disruption this time is lurking and, surprisingly, not led by the Fintech firms.

The Payments Service Directive II (PSD2) is an example of the active role that regulators are currently playing within the FinTech ecosystem and, by extension, in the financial services industry. In a European context, the adoption of PSD2 was quite an innovation at the time of its introduction, as it enabled the provision of financial services in competition with the banks.

Meanwhile, the directive has been replicated worldwide, and the European Commission is currently reviewing the current second version to decide whether this open finance experience can be broadened. It is, therefore, difficult to say whether it will come to a PSD3 or not (Ducoulombier, 2022).

2.5.5 PSD2: The Need for Harmonization

The European Community regards open finance as a strategic priority (Ceyssens, 2022). However, the objectives of the regulator and FinTech firms differ. While the regulator is concerned about trust and safety, FinTech firms claim a wider harmonization in the handling of financial data.

The European regulator feels the need to guarantee equal opportunities for everybody in this niche, primarily the FinTech firms (Cliffe, 2021). Since the implementation of the Payment Services Directive in Europe, the number of licences issued to FinTech firms in this market niche has increased significantly (Polasik et al., 2020). Financial data is now disclosed and available to all participants in the financial services industry, including new entrants, which might indicate that the objectives of the European Commission for the further integration of payment services have been met (European Commission, 2020). Nothing, however, could be further from the truth, as accessing data is not easy, as FinTech firms claim. Further harmonization of the distribution of payment services in the EU is apparently required.

The scope of this harmonization process contemplates the following factors: cross-border transactions, desktop-based commerce versus mobile commerce, the quality and type of data transacted, and differences in the implementation of the directive throughout countries.

In the case of cross-border transactions, PSD2 contemplates only a situation where the agent used by the PSP[5] is either in the country of the PSP or, eventually, the country of the consumer. This so-called triangular passport checking should be regulated, though. The preferred solution could be to treat agents as branches of the PSPs and clarify that agents are covered by the passport of the PSP, on behalf of which they act when providing services on a cross-border basis. A second-best option could be to introduce an ad hoc passport checking procedure for PSP agents in the same way as for insurance distributors (Portolano, 2022).

The final beneficiaries of the directive have also changed since its implementation. The Payments Instructions File (PSF) and PSD2 were initially tailored for e-commerce activities. Once the directive had been successfully implemented, the

[5] PSP = Payments Service Provider

landscape changed dramatically with new developments that ended up displacing e-commerce from its desktop-based reality. Examples of these changes are mobile commerce (m-commerce), the metaverse, voice recognition, and the Internet-of-Things (Olsson, 2022).

The quality and type of data are under discussion as well, as the implementation of the directive has led to a mismatch between countries and banks, which in the end creates a lot of confusion that results in friction between businesses and consumers. For example, information about credit cards is not available, or is not available in the same form in every country. Linking an account to a person is not without difficulties either, which in the end adds extra complexity, mainly in the context of Know-Your-Customer (Laínez, 2022).

Finally, the payments directive, though clear in its application, is often neglected by the banking sector in different countries. This reluctance of incumbents to implement the directive in a harmonized way does not help newcomers when pursuing innovation. Some examples of this lack of harmonization and the way it affects FinTech firms follow below:

- The onboarding of Payment Services Users (PSU), which often requires extra paperwork, the need to physically go to a branch office to sign a bunch of papers, bank mandates, and a set of offline activities that need to be taken, e.g., the sharing of data by a third-party provider.
- In the case of renewals, the Strong Customer Authentication (SCA) rule leads to a drop in the number of customers at FinTech firms. The SCA is a somewhat cumbersome process that requires customers to go back to the bank again, which does not make sense as the authentication process already took place.
- Initially meant to foster innovation, discrepancies between the sandboxes of the banks and what is really happening in the production environment do not help FinTech firms know whether their connection with the bank works well.
- The onboarding of Electronic Payment providers (EPP), which is very different from bank to bank, adds more pressure to the cost structure of these EPP.
- Service Level Agreements (SLA) could be introduced for APIs on both sides, incumbent banks and FinTech firms.

2.5.6 Regulatory Technology (RegTech)

The combination of all the factors addressed here above, namely the increase in regulatory requirements and corresponding costs, the scope of technological developments, and the damage to consumers' trust, is at the root of RegTech (Parra Moyano & Ross, 2017). An acronym for 'regulation technology', RegTech has arisen as a new subcategory within the FinTech taxonomy, one that focuses on technologies that aim to improve the delivery and implementation of this new and more complex set of rules and regulations (Anagnostopoulos, 2018).

Even though they both might refer to technological developments, the approach of RegTech is different from FinTech. While FinTech is a phenomenon initiated by start-ups climbing up from the bottom of unserved market niches, RegTech is a phenomenon initiated top-down by large incumbent banks (Arner et al., 2017).

Meanwhile, the initial problems for incumbents and regulators have turned into serious opportunities to optimise compliance-related processes by using Distributed Ledger Technologies (Parra Moyano & Ross, 2017). As an example, Strategy& (2021) concludes in its survey that banks could realize savings of up to 65% on their current expenditures when implementing more efficient and platform-oriented approaches supported by Distributed Ledger Technologies.

The potential of regulatory technology goes, nevertheless, beyond the avoidance of excessive administrative burden for financial institutions exclusively, as regulators, who are traditionally under-resourced, could in this way increase their supervisory capacity by implementing this new technology (Arner et al., 2017).

2.5.7 Summary of the Literature Review on Regulation

In this part of the literature review, we have learned that the role of regulation is crucial and that the positions of both regulators and incumbents are being challenged by FinTech firms on all fronts. For the latter, dealing with regulation is not easy either, as clear rules for new entrants are sometimes lacking, while on other occasions, the FinTech companies complain about overregulation.

In the field of payments, financial institutions have implemented the regulation issued by the European Commission. However, the use of borderless platforms made possible by the FinTech innovation has created a new problem. Cross-border transactions, made possible by these new technological platforms, are somewhat

hindered by differences between governments when interpreting regulation issued by the European Commission. Harmonization is an outstanding issue that requires more attention from both the regulator and financial institutions.

From the regulators' perspective, it is time for them to step forward and accept the benefits of technological innovation for the enforcement of the existing regulatory frameworks. The possibilities offered by these new technologies, e.g., artificial intelligence applied to customer authentication, could help towards a higher level of compliance by all participants in the financial services industry, which still struggling with internal processes that are highly labour-intensive and, consequently, very expensive.

Nonetheless, the situation pointed out here before is turning out to be an opportunity for those that manage to find a way to alleviate this burden for all participants in the FinTech ecosystem. Technological innovation applied to the regulatory field is a fact, and RegTech has earned a position within the FinTech taxonomy.

CHAPTER 3. METHODOLOGY

3.1 INTRODUCTION

In this chapter, I present my philosophical perspective and justify my choice of hermeneutic phenomenology to design the theoretical framework of this qualitative research. I introduce my research strategy, explain my choice for multi-methods, and describe the procedures for data collection and the techniques for the corresponding data analysis. Specific information is provided regarding the interview protocol, the chronology for data collection, the flexible pattern matching and template data analysis processes, including an indication of the initial themes derived from the literature review that have been incorporated into the questionnaires, and the final template that resulted after completing the coding process. A description of rival plausible explanations, that aim to strengthen the internal validity of the findings, has been added at the end of the data analysis in Section 3.8. I also explain in this same section how Computer Aided Qualitative Data Analysis Software (CAQDAS) has been used in the coding process and subsequent data analysis.

I aim to be credible in the testing of my initial constructs and propositions. Therefore, I elaborate upon my pursuit of methodological rigour and trustworthiness in my research, i.e., validity, and reliability, by rethinking the justifications for my choice of qualitative research. The work of Silverman (2017, 2022) has been very valuable in this respect. Finally, I provide an indication of how I ensure compliance with university procedures regarding ethical considerations.

The drafting of the research structure in this chapter resorts to the six-stage approach in Saunders et al. (2009).

TABLE 10: CONCISE SUMMARY OF THE METHODOLOGY

Philosophy	Hermeneutic phenomenology (Interpretive)
Choices	Inductive, qualitative, multi-methods research
Strategy, time horizon	Exploratory case study (three personae)
Time horizon	Cross-sectional
Data collection	Semi-structured interviews based on non-probability criterion sampling
Data analysis	Flexible pattern matching, template analysis

3.2 Research Philosophy

3.2.1 Philosophical Perspective

The phenomenon investigated in this research is FinTech innovation and its subsequent effects on the financial services industry, from the perspective of traditional commercial banks, the incumbents. The philosophical perspective adopted is that of phenomenology.

Based on this choice, two theoretical perspectives could have been used to frame this phenomenological research, namely the philosophies of Edmund Husserl, transcendental or descriptive, and Martin Heidegger, hermeneutic or interpretive (Peoples, 2021). This research builds further on Heidegger's hermeneutics as the art of interpretation in context (Smith, 2013). This choice is appropriate since the main objective of this research is to interpret how decision-makers engaged with technological innovations of a disruptive nature understand the specific practice of the make-or-buy decision.

When reviewing the extant literature on real options, it became clear that uncertainties are resolved over time and that incorporating the time dimension into the valuation exercise adds more flexibility to the decision-making process. Therefore, to understand and interpret the phenomenon of FinTech innovation:

> *"Time must be brought to light and genuinely grasped as the horizon of every understanding and interpretation of being. … This task, as a whole, requires that the concept of time thus gained be distinguished from the common understanding of it"* (Heidegger, 1953, p. 17)

The characteristics of this process justify, in my view, the use of an interpretive approach rather than an empirical one based on theoretical knowledge about decision-making and valuation techniques for the assessment of risky investments. In this respect, I adhere to Heidegger's definition of the phenomenological question.

> *"Our phenomenological question is initially concerned with the being of those beings encountered when taking care of something. A methodological remark is necessary to secure the kind of seeing here. This being is not the object of a 'theoretical world-cognition'; it is what is used, produced, and so on."* (Heidegger, 1953, p. 67)

I also believe that hermeneutic phenomenology is not only a useful approximation to an interpretive-based philosophy (Paterson & Higgs, 2015), but one that fits well

with the objective of my research as presented in the initial construct. My choice for flexible pattern matching as the technique for data analysis is grounded in this philosophical choice.

3.2.2 Hermeneutic Phenomenology

Paterson and Higgs (2015) argue that hermeneutic phenomenology revolves around three basic elements: the idea that hermeneutics is about understanding, while phenomenology is about knowing (Fleming et al., 2003); that knowledge is constructed through a dialogue between the text (the transcripts of the interview, in this research) and the researcher (Packer, 1985); that on the way to understanding the phenomenon, the researcher moves repeatedly between interpretations of parts of the text (the quotations in CAQDAS in this case), and interpretations of the whole text (the transcripts, also in CAQDAS). What Paterson and Higgs (2015) call, in continuation of Heidegger, is the hermeneutic circle metaphor.

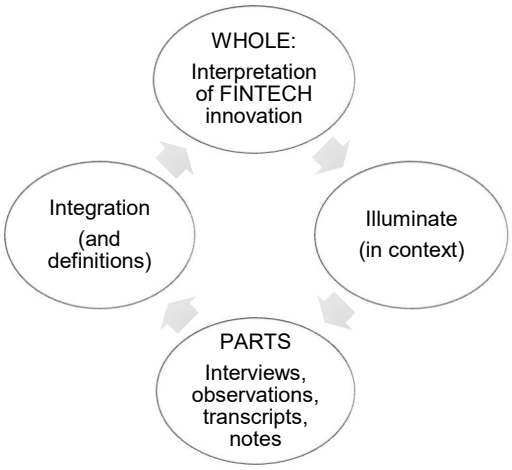
3.2.2.1 The Hermeneutic Circle in the Research Design

Other than building on knowledge from foundational beliefs, hermeneutics builds on understanding as the result of this circular process of going back and forth through possible meanings and presuppositions (George, 2020).

> *"A further unique characteristic of hermeneutics is its openly dialogical nature: the returning to the object of inquiry again and again, each time with an increased understanding and a more complete interpretive account"* (Packer, 1985, p. 1091).

The use of the hermeneutic circle in practice is shown in the figure below.

FIGURE 9: USE OF HERMENEUTIC CIRCLE IN THE RESEARCH



Source: Author, based on Paterson and Higgs (2015, p. 345).

3.2.2.2 The Hermeneutic Circle in the Literature Review

The concept of the hermeneutic circle can also be used to describe literature searches and reviews (Boell & Cecez-Kecmanovic, 2014). In this research, the hermeneutic circle has been used for the review of the literature in the search for the constituent parts of the FinTech phenomenon. The hermeneutic circle applied to the literature review started with the initial construct and revolved further around three basic pillars: key theoretical concepts, research objectives and supporting arguments sought. The review of relevant texts to achieve this goal turned into an iterative process of understanding the whole, i.e., the interpretation of the FinTech phenomenon, and the parts, i.e., the four research objectives, moving back and forth throughout the selection of texts. The circularity of this process contributed to identify the conditions under which the act of the decision-making is constructed, illuminating, in the end, the phenomenon subject of the research.

3.2.2.3 Implementing Hermeneutic Phenomenology

Implementing hermeneutic phenomenology as base for conducting research is not easy, however, and not only due to the difficulties for a novice researcher like me when understanding the underlying philosophy, but because a research methodology as such is lacking (Alsaigh & Coyne, 2021). To resolve this shortcoming, I decided to implement the following five-steps process as described by Fleming et al. (2003):

- Step one, on deciding upon a research question, I started from the gap identified in the literature, namely the reflection of Christensen et al. (2016) over bias in the use of valuation techniques for investments in technological innovation.
- Step two, on the identification of preunderstandings (before data collection). In this case, preunderstandings were those related to the use of valuation techniques during the exercise of my professional activities as a financial analyst.
- Step three, on gaining understanding through dialogue with participants, justifies my choice of semi-structured interviews and a sampling strategy aimed to recruit decision-makers at a senior level of responsibility within their companies. I believe that my objective to gain understanding could not have been achieved by collecting opinions using a survey, for example. I did need participants with a story that allowed me to enter a dialogue with them.

- Step four, on gaining understanding through dialogue with texts, namely the transcriptions of the interviews. This fourth step, intrinsically linked to the coding process in CAQDAS, resulted in a considerable work overload, more than I initially could have expected. Nevertheless, the understanding I gained during this process was one of an enormous relevance. Without any doubt, it stood at the crossroad of my entire research, not only of the data analysis section.
- Step five, on establishing trustworthiness, hermeneutic phenomenology aims to highlight the experience under exploration. Though warned beforehand, no need to say that this last step became the most challenging part of the data analysis. Criteria followed to ensure trustworthiness are further explained in Section 3.9.

In the table below, I describe the different stages in the hermeneutic circle applied to this research.

TABLE 11: STAGES IN THE HERMENEUTIC PROCESS

Initial construct	Seek interpretation in literature (generic)	Research objectives
Main research question	Seek interpretation in literature (FinTech)	Construct framework interviews
Research propositions	Outline questionnaire	Develop INITIAL themes
Answer research questions	Return to 'whole'	Develop valuation model
Develop FINAL themes	Critique valuation model	Evaluation model (ongoing)

Source: Author, based on Paterson and Higgs (2015, p. 344)

The focus of the first step was to achieve a clearer understanding of the research question and to design an initial framework that served as a solid base for data collection. This first step was split into a review of the literature on generic subjects and a review of FinTech-specific topics. The main objectives were the definition of the research objectives and the initial framework for the interviews. From the latter, I defined four research propositions, which were the base for the set of themes in the initial template and formed the outline of the questionnaires for the three personae in the case study. After a couple of pilot interviews for fine-tuning, it was time to conduct the interviews. Answers to the questions initiated a process of returning to the 'whole', meaning the initial construct. This debate with the texts from the transcripts linking to the initial construct and propositions resulted in the final set of themes for the analysis of the data.

3.2.3 The Research Inquiry in Context

The main aspiration of this research inquiry is to understand how decision-makers in the FinTech ecosystem construct meaning and reality about innovation. This aspiration implicitly connects with the phenomenological claim to engage with phenomena in our world—FinTech innovation in this case—and make sense of them directly and immediately, laying aside the prevailing understandings regarding traditional valuation techniques used by decision-makers who go over the innovation.

Integrating valuation theories for the assessment of investments into a decision-making model for FinTech innovation is a rather unexplored territory that requires a fresh look at the phenomenon of FinTech innovation itself. This critical approach to research brings along the degree of objectivity required to counterbalance the inherent subjectivity of the researcher and the subsequent risk of bias (Crotty, 1998). Therefore, the researcher's subjectivity has explicitly been placed in the foreground of the research, namely in the section on 'Validity and Reliability' later in this chapter.

The consideration of the phenomenon is based on the interpretation of relevant literature, the perspectives of the participants in the case study, and self-reflection.

A key term in the construction of the conceptual framework is the essence of banking. In this regard, the constellation of FinTech firms and their offerings of financial products and services may be seen as 'appearances as opposed to the 'banking reality' represented by the offerings of traditional commercial banks. These appearances form the context that needs to be interpreted prior to understanding the essence of banking.

The FinTech ecosystem, however, encompasses multiple perspectives. The purpose of this research is not only the construction of a hybrid valuation model based on real options to bridge the gap between these different perspectives when capturing the different levels of uncertainty per perspective. My intention is to understand the context or setting of the participants involved in FinTech innovation and to interpret their meanings before, during, and after the make-or-buy decision concerning a potential investment in the innovation. FinTech is a new and complex phenomenon where the construction of reality is still in its infancy. The FinTech ecosystem may be clear, but the roles and interactions among the participants

involved are not. This research is about the contribution of decision-making to the creation of the new 'FinTech social reality'. Hence, the choice of an interpretive-based philosophy as a framework to shape the methodology of the research in its attempt to understand the FinTech ecosystem in all its complexity and from the standpoint of all those involved in it.

In this search for essences, namely the essence of retail banking, hermeneutics helps me to explore the FinTech ecosystem and to identify the value drivers and risk profiles of these two conflicting business models: the new, represented by FinTech, versus the old, represented by 'traditional' retail banking. Are there any differences between challenger banks (disruptors in the transitional phase of the innovation[6]) and these traditional retail banks when it comes to the practice of retail banking? Are they so different in the eyes of customers, or are they just banks? Has the disruption created by technological innovation changed the essence of banking?

Following the recommendations of Crotty (1998), the construction of a valuation model combining decision tree analysis, real options theory, the venture capitalist approach to decision-making on investments, and traditional discount-rate analysis will act as a pure case when addressing the 'real-life' case study of the research, as introduced, and explained later under the section on the case study.

3.3 Research Approach to Theory

After formulating the research problem, the initial construct, and the four propositions, my approach to theory aimed to compare the latter with the extant literature in an attempt to not only find similarities but also contradictions. At this point, the qualitative data are particularly useful for understanding why emergent relationships hold. The underlying theoretical reasons to explain why the relationship exists are critical to raising the theoretical level of the research. While comparisons with similar literature sharpen generalizability, comparisons with conflicting literature help build internal validity (Eisenhardt, 1989).

The research inquiry explores the meanings held by representatives of traditional retail banks and FinTech firms, two prominent participants in the FinTech ecosystem. Equity investors, like venture capitalists and private equity firms, are also active participants in the FinTech ecosystem, participants of a kind that can

[6] In Utterback's model for innovation

accelerate or delay the acceptance by incumbents of new dominant designs. Therefore, they are included in the research as well.

Accordingly, I identified and framed these three perspectives separately before searching for theoretical concepts to provide arguments for the decision-making process. Examples of these concepts are business model adaptation in the context of innovation; the use of organisational ambidexterity to incorporate innovation within incumbents' organisations; the establishment of forms of cooperation between incumbents and disruptors; the role played by regulation; or the use of multiple real options for valuation purposes.

The main justification for my choice of social constructionism to frame investments in FinTech innovation in the context of the digital transformation currently taking place in our society resides in its stance that meaning and knowledge are socially constructed. Likewise, I justify my choice of hermeneutic phenomenology as the theoretical framework for this research based on the critical spirit of the phenomenological movement as initially grounded by Edmund Husserl (Crotty, 1998).

3.4 Methodological Choice

In this research, I combine qualitative data collection techniques and analysis procedures by using semi-structured interviews and observations, with secondary quantitative data from financial databases. My methodological choice is, therefore, multi-method qualitative research.

3.5 Research Strategy

3.5.1 Case Study

The choice of a case study strategy matches well the approach of this research, which is to investigate a contemporary phenomenon in depth and within its real-world context. This choice is further supported by a research inquiry that aims to generate answers to a 'how' research question without the need to control events of any kind (Yin, 2018).

The case study is of an exploratory nature, congruent with my choice of hermeneutic phenomenology as a philosophical perspective for the creation of interpretive understanding to illuminate the phenomenon subject of the research (Saunders et al., 2009; Yin, 2018).

A case study is not only appropriate to reveal an explanation of a new phenomenon but is also useful to create theoretical concepts that can be used to describe and explain the phenomenon or even modify or supplement existing theories. In that respect, I have reviewed the work of Eisenhardt (1989) on building theories from case study research and have followed most of the reflections identified in a work that can be seen as a protocol or roadmap for the design of case studies. Examples of elements that have played an important role in shaping the structure of my research are the a priori specification of constructs from the literature review; the selection of an appropriate population to define the limits for generalizing the findings; the advice for the use of theoretical, non-probability sampling, selecting extreme cases or polar types, when possible; the recommendation to combine multiple data collection methods to enforce triangulation; and the special note over the use of quantitative data to reinforce the main line of findings of the case study, a recommendation that can also be found in Yin (2018). Finally, the part on data analysis, specifically the recommendations for the use of within-case analysis and cross-pattern techniques, has been very valuable in my design.

In addition, I have reviewed the different perspectives of two methodologists who have published seminal works on case study research, Robert K. Yin, and Robert E. Stake. While Yin's approach to the case study is from the perspective of a methodology to conduct an inquiry into a theoretical proposition (Yin, 2018), Stake's approach emphasizes a holistic treatment of phenomena by looking at a variety of contexts (Daughtery, 2016). From an epistemological perspective, differences between both manifest in a clearer way. Yin's approach to the case study comes closer to positivism as a philosophical position. In contrast, Stake claims that constructivism and existentialism should be the epistemologies to orient and inform qualitative case study research (Yazan, 2015).

Despite the fact that my research approach to philosophy touches upon some points of Stake's epistemological claim, I adhere to Yin's methodology for the design of my case study. The main reasons for this choice are the adequacy of case studies for the construction of theories (Eisenhardt, 1989; Yin, 2018); to answer the type of 'how' questions (Saunders et al., 2009; Yin, 2018); to focus on a contemporary phenomenon, namely FinTech innovation (Yin, 2018); the possibility it offers for the use of quantitative data in the context of a multi-method qualitative or mixed methods approach (Eisenhardt, 1989; Yin, 2018); the attempt to control for bias when doing interviews (Boblin et al., 2013); and solid recommendations to construct

validity and reliability as a way to guarantee rigour, and trustworthiness of the research (Yazan, 2015; Yin, 2018).

3.5.2 Components of the Case Study

For the structure of this section, I follow the recommendations of Yin (2018) regarding the five components required at the design phase of case study research: The first three, the definitions of 'the case' itself, the case study question, and the propositions, are explained in this section. The last two, about how to link data collected to propositions and the criteria for interpreting the strength of the findings, are further explained in the section on data analysis.

3.5.2.1 The Case

The 'case' this research refers to is the decision-making concerning FinTech innovation as a contemporary phenomenon within the retail banking industry in a real-world context. To overcome the inherent difficulties of case studies in generalizing findings (Yin, 2018), the research design is based on a case study strategy consisting of three personae. The selection criteria for the cases are the impact of the development of the FinTech taxonomy on the banking business model of the incumbents and the influence of the entry of equity capital in the FinTech ecosystem on the risk appetite of the incumbents when it comes to evaluating investments in innovation. The underlying assumption is that, for an incumbent to survive the FinTech disruption, it is crucial to embrace the technological evolution on time to adopt the new dominant design, leading in this way to the transition to new industry standards.

The three personas defined in the case study are:

1. Incumbents, which aims to explore the approach of traditional retail banks to investments in FinTech innovation. All reflections, discussions, conclusions, and recommendations are consequently done from this perspective.
2. FinTech firms refer to the disruptors of the retail banking industry, either start-ups (firms in the fluid stage)[7] or scale-ups (firms in the transitional stage, e.g., challenger banks)[8] operating within the FinTech ecosystem. Reflections from this perspective, e.g., business models and the role of regulation, benchmark the findings and conclusions on the first persona, incumbents.

[7] First stage in Utterback's model for innovation
[8] Second stage in Utterback's model for innovation

3. Equity Investors refer to equity investors and stakeholders, other than incumbents, active in the FinTech ecosystem. A few investment analysts are also included in this sample. Reflections from this perspective, namely on valuation techniques, complement the conclusions on the incumbents.

3.5.2.2 The Case Study Question

The outcomes of the case study aim to answer the main research question:

> "How can retail banks confronted with investments in FinTech innovation use valuation models for a better make-or-buy decision?"

3.5.2.3 Propositions

Though *"exploratory studies may have a legitimate reason for not having any propositions"* (Yin, 2018, p. 28), I have designed my study by defining four, which are derived from the research objectives and reflect on the generic theoretical issues reviewed in Section 2.3 of the literature review. These four propositions, which aim to supply a tentative explanation for expected observations (Sinkovics, 2018), are formulated here below:

1. A FinTech innovation of a disruptive nature has a positive influence on incumbents' decisions to pursue innovation.
2. The capacity of incumbents to ascertain the strategic importance of investments in FinTech innovation has a positive influence on incumbents' decision to take the lead in the creation of a new dominant design.
3. The capacity of incumbents to accommodate current business models to new dominant designs has a positive influence on the growth expectations of the investment.
4. The capacity of incumbents to adapt the organization to the new dominant design has a positive influence on incumbents' decision to adopt the innovation before the appearance of the dominant design.

The four propositions add up to the initial construct of this research: A decision tree analysis integrating option pricing and decision analysis methods puts the degree of uncertainty and controversy associated with investments in disruptive innovation into perspective. The outcomes of this exercise will help traditional retail banks make better decisions when assessing the opportunity cost of investing in FinTech innovation.

3.6 Data Collection

This section covers the chronology of data collection, the selection of sources, its justification, and the outline of the sampling strategy.

3.6.1 Chronology for Data Collection

The research was conducted in three phases. First, the generic literature review and the online observation of 27 companies' presentations were conducted in the period 2020–21. Second, the literature review of FinTech-specific topics, including the part on the regulatory framework, was completed in 2021. Third, the interviews with the decision-makers, the transcripts of these interviews, the coding in CAQDAS, and subsequent data analysis were all completed during the year 2022. Finally, an additional eleven company presentations were observed in November and December 2022, and January 2023. In February 2022, I started conducting semi-structured interviews for the three case studies. I closed data collection in December 2022, with a total of twenty interviews.

3.6.2 Sources for Data Collection

Interviews and direct observations are the sources of the case study evidence, which are two out of the six identified by Yin (2018). In this way, I ensure proper alignment with the philosophical stance I have adopted in my research.

3.6.3 Semi-Structured Interviews

3.6.3.1 Interview Strategy

In-depth, short case study interviews (no longer than one hour) are the main source of evidence for data collection. To ensure maximum efficiency in the collection of data, I prepared the interviews in advance, followed strictly the interview protocol as presented here below, and sent the questionnaire[9] prior to the interview together with a two-page summary of my research[10]. On a couple of occasions, I used follow-up interviews to clarify the information obtained and, eventually, to gather new information that helped me reinforce the objectives of that specific interview.

Prior to the design of the case study strategy, I conducted two ‘pilot’ interviews to test the boundaries of a one-hour interview for the purposes of data collection. The

[9] See appendices 2 to 4 for an example of a standard questionnaire per case study.
[10] See appendix 1.

first ‘pilot’ interview, on March 20th, 2020, is labelled as ‘inV0101’. The interviewee is a former Head of Corporate Innovation and CEO of the Open Bank activities at a Top 10 Western European Bank (Financial Times Ltd., 2021). The interviewee is currently Chairman of the Supervisory Board at a Venture Capital firm active in the FinTech market. His experiences on both sides of the spectrum, as an incumbent and as a venture capitalist, were very valuable for my research. Though the main purpose of this interview was to learn how to conduct an interview efficiently within the time constraints inherent to shorter case study interviews, I managed to gather a considerable amount of information about trends and recent developments in FinTech innovation.

The second ‘pilot’ interview, on October 2nd, 2020, is labelled ‘FTf0101’. The interview was held with the Chief Financial Officer of a FinTech Firm, a provider of traditional and cloud-native core banking platforms. Likewise, I did not only learn how to conduct interviews in a more efficient way, but I also managed to get very valuable information about the sort of clients of these FinTech firms and the use of ‘multiples’ as a preferable technique for the valuation of the FinTech innovation.

Regarding the efficiency of the data collection process, the two main learning points from these pilots were, first, that the number of questions in my initial questionnaire was too many and, second, the need to ensure better control over the time of the interview. Regarding the questions, I decided to bring their number back to a maximum of ten and try to get additional information during the unstructured part of the interview, in case the time allowed me to do so. To ensure more efficient use of the time, I developed the interview protocol below.

3.6.3.2 Interview Protocol

The semi-structured interviews shared a common protocol regarding their execution. The interview protocol refers to three different moments. First, before the interview took place, the participant was informed about the purpose of the research and the procedures regarding consent and debriefing. Second, the interview itself followed a questionnaire with a maximum of ten questions grouped around the themes and subthemes in the initial template. Third, once the interview had ended, I marked my notes using the coding in the initial template, asked for confirmation in case of unclear or incomplete answers, and filed the transcripts.

TABLE 12: INTERVIEW PROTOCOL

WHEN	WHAT
1. BEFORE THE INTERVIEW	Short introduction of the researcher. Explain purpose of the interview. Add information sheet and interview consent form. Send questionnaire, personalised, once interview had been confirmed.
2. DURING THE INTERVIEW	Short exploratory conversation over the interviewee: specific role in the company, activities of the department, etc. Confirm the objectives of the research and the purpose of the interview. INTERVIEW (semi-structured). Closing and next steps: preparation of draft based on notes taken during the interview, inform over follow-up interview to agree on final draft.
3. AFTER THE INTERVIEW	Follow-up interview. Debrief form.

3.6.3.3 SAMPLING

I have adopted a non-probability sampling strategy, as it is congruent with my choice for qualitative case study research. The sampling is of a purposive nature and uses an in-depth approach. The focus is on the three constituent groups of the FinTech ecosystem as defined in Section 2.4.2.1 of the literature review. The composition of the sampling is homogeneous within each group, as the companies where the participants are employed are all similar and the activities the participants carried out were close to similar as well (Saunders et al., 2009).

The process of moving back and forth between the theoretical and the observed patterns, as will be explained later in the section on data analysis in this chapter, was critical to assessing when I had reached the point of data saturation. Spreading the collection of data throughout a rather extensive period, namely ten months, allowed me to start analysing the data from the very early beginning of my data collection. I adhered in this way to the recommendation of Silverman (2017) to alternate the analysis with the data collection.

The difficulties in allocating patterns identified in the transcripts of the interviews to subthemes on the initial template led to the creation of new ones. At a certain point, the creation of these new subthemes did not add any further value to the better comprehension of the themes analysed. The transition from the initial 19 subthemes to the final 34 marks the point when I decided that I had a sufficient number of interviews and that adding a new one would add marginal value to my data analysis.

With the observations, on the contrary, I decided to increase the initial number by an additional 11 at a later stage of the data collection process.

The search for theoretical arguments to estimate and justify the sample size was not without difficulties. Morse (1995) argues that the key to excellent qualitative work is saturation. Unfortunately, I could not find any specific guidelines or standards for estimating the sample size required to reach data saturation. Creswell (2007) recommends no more than four or five case studies and between three and five interviews per case study. Marshall et al. (2013) describes three methods that can be used to justify the sample size of interviews in qualitative research: citing recommendations by qualitative researchers, citing sample sizes used in similar research designs, and internal justification. In this research, I adhere to the recommendations of the qualitative methodologists in the table below.

TABLE 13: NUMBER OF INTERVIEWS RECOMMENDED

Methodologist	Type of study	Number of interviews
Denzin et al. (1994)	Phenomenological studies	6
Kuzzel et al. (1999)	Phenomenological studies	6 - 8
Morse (2000)	Phenomenological studies	6 - 10
Guest et al. (2006)	Studies to understand commonalities within a fairly homogeneous group	12

For the selection of candidates to participate in the semi-structured interviews, I have made use of social media, namely LinkedIn, professional contacts, alumni, and colleagues. I searched for candidates with either a clear responsibility for decision-making at an executive level or candidates with relevant knowledge on subjects required for the specific decision-making on investments in FinTech, e.g., retail banking business and valuation techniques.

TABLE 14: SELECTION CRITERIA PARTICIPANTS IN INTERVIEWS

Incumbents	Chief Executive Officer, Chief Information Officer, Chief Operations Officer, Corporate Finance, Treasury, Legal, Mergers & Acquisitions, Corporate Venture Capital.
FinTech Firms	Product development, Finance, Relationship management.
Equity Investors	Executive level, member of the board, specialists in valuation techniques and modelling active in FinTech.

In total, I approached sixty potential candidates, of whom eighteen agreed to participate in my research. Only one candidate explicitly refused to participate. During the search process, I kept a track record of all my activities, sending at least one reminder in all cases.

The job description of the interviewees, the date of the interview, and the persona they belong to are shown in the table below. The code shown in the column 'participant' is used to reference all quotes inserted in the narrative constructed around the presentation of the findings and the data analysis in Chapter 4.

TABLE 15: PARTICIPANTS IN THE SEMI-STRUCTURED INTERVIEWS

#	Participant	Date	Personae	Job description interviewee
1	INC01 01	15 02 22	Incumbents	Head of Finance Business Banking
2	INC01 02	16 02 22	Incumbents	Treasury Analysist Economic Capital
3	INC01 03	06 07 22	Incumbents	RegTech & FinTech Partnerships
4	INC02 01	22 02 02	Incumbents	Change manager
5	INC03 01	20 05 22	Incumbents	Head of Fintech, Mobility and Structured Finance
6	INC04 01	19 05 22	Incumbents	Former Managing Director bank
7	INC05 01	24 06 22	Incumbents	CIO (Chief Information Officer)
8	inV01 01	20 03 20	Investors	Chairman Supervisory Board; Head Corporate Innovation
9	FTf01 01	02 10 20	FinTech firms	Chief Financial Officer (CFO)
10	FTf02 01	13 04 22	FinTech firms	Supervisory Board Member (former CEO at FinTech firm)
11	FTf03 01	19 05 22	FinTech firms	Former Head of Risk Management
12	inV01 02	17 06 20	Investors	Chairman Supervisory Board; Head Corporate Innovation
13	inV01 03	12 11 21	Investors	Chairman Supervisory Board; Head Corporate Innovation
14	inV02 01	23 09 20	Investors	Strategy & Transactions Partner Big4
15	inV03 01	03 06 22	Investors	Chairman Supervisory Board
16	inV04 01	22 06 22	Investors	Professor of Finance and Banking
17	inV05 01	06 09 22	Investors	Partners' assistant consultancy firm
18	inV06 01	20 09 22	Investors	Partner and senior manager Big4
19	inV07 01	12 09 22	Investors	Exec. Director, Portfolio Manager Global Financials/ Fintech
20	inV08 01	06 12 22	Investors	Co-Founder and CEO

3.6.3.4 TRANSCRIPTS OF THE INTERVIEWS

Five interviews were conducted in person and fifteen online. The transcripts of the in-person interviews were based on personal notes taken during the interviews. The online interviews were all recorded using the transcript and video features of MS Teams. Some of the interviewees sent the invitation for the interview themselves, which did not allow me to use MS Teams for the recording. On these occasions, I recorded the interviews using the dictaphone feature of my telephone. In all twenty interviews, I wrote down personal notes to help me later when using themes and subthemes for the writing of the transcripts and the coding of all recorded materials.

I worked further the raw information obtained from the interviews into twenty transcripts in Microsoft Word, one per interview. Subsequently, I uploaded these documents to the CAQDAS software. These documents formed the basis for the coding process that resulted in the final template.

3.6.3.5 QUESTIONNAIRES

The questionnaires are the structured part of the interviews and aim to facilitate the processing of the transcripts in CAQDAS as well as within-case and cross-case pattern matching when necessary. The set of questions is slightly different per case study, as the nature of the decision-making is influenced by the specific profile of each 'persona'. Ultimately, the focus of the semi-structured interviews is the identification of common patterns between traditional financial institutions, FinTech firms, and equity investors.

The interaction during the interview is central to what is ultimately deemed to have been created (Laverty, 2003). As the nature of the sample made it impossible to conduct 'natural observations, as recommended by Silverman (2017), questions posed aimed to trigger this interaction and get at what participants really experienced during the decision-making they were engaged in. In this respect, I am aware that asking people questions to understand their experiences may influence the respondent's original meaning about the topic researched, as answers are somewhat shaped in terms of the questions asked by the interviewer (Silverman, 2022). For this reason, I have sequenced the questions in a way that, hopefully, helps to ensure final trustworthiness and reliability. In the words of the head of finance and business banking at one of the incumbent banks when running the bullet list of questions:

> *"Regulation? This is a particularly important point. In fact, your bullet points also follow the way we look at different opportunities."* 24:11 ¶ 16 in INC0101

For the persona 'Incumbents'[11], the focus is on ascertaining the boundaries between sustainable and disruptive innovations; defining the FinTech taxonomy; assessing ways of integrating the FinTech innovation within the organization; identifying the value drivers essential for the valuation of the innovation. For the persona 'FinTech firms'[12], the focus is also fourfold. The first three aims are the same as in the

[11]Appendix 2
[12] Appendix 3

questionnaire for incumbents. The fourth is about the role of regulation when entering into eventual cooperation with incumbents. For the persona 'Equity Investors'[13], the focus is on identifying the value drivers of the FinTech business model and assessing alternative valuation techniques to post-money valuation. In this respect, special attention is paid to the use of multiples based on recent deals, like enterprise value-to-revenues or enterprise value-to-EBITDA. The decision-making process from the perspective of the equity investor is also an important subject of the interview.

3.6.4 DIRECT OBSERVATIONS

Amsterdam is one of the most prominent FinTech hubs in Europe, hosting the headquarters of leading companies like ADYEN (a provider of digital infrastructure for online businesses), Mollie (digital payments), and Bunq (a challenger bank). In the period November 2020–July 2021, I followed the company presentations of 27 FinTech firms pitching for investors, sponsored by an Amsterdam-based Dutch interest group. In November, December, and January 2023, I complemented these initial observations with another 11 presentations. The purpose of this exercise was to learn first-hand about the recent developments in FinTech and to discover the boundaries between sustaining and disruptive innovation.

TABLE 16: BREAK DOWN PER ACTIVITY OF COMPANIES OBSERVED.

Activity	#	*Activity*	#	*Activity*	#
Consulting	8	Blockchain	3	Equity investors	1
Payments	8	AI Robotics	1	Capital markets	1
AML (identity, fraud)	8	*Challenger bank*	1	*Pensions (online)*	1
Cloud services	5	*Mortgages*	1	**Total**	**38**

The top-3 activities deployed by the presenting companies refer to consulting, payments, and anti-money laundering (customer authentication and fraud prevention). With the only exception of the challenger bank, none of the other thirty-seven companies are engaged in disruptive innovation activities of any kind. The analysis of the data collected during these observations has been incorporated in the findings in Chapter 4[14].

[13] Appendix 4
[14] Appendix 5

3.6.5 Secondary Quantitative Data

With the purpose of understanding the effect on prices paid by equity investors and the costs of regulation for incumbents, I have conducted an analysis based on secondary data from annual reports of incumbents and FinTech firms and a variety of white papers from the professional fields of banking, investments, and innovation.

3.7 Data Analysis

3.7.1 Flexible Pattern Matching

The technique of my choice for data analysis is flexible pattern matching, as it is regarded as the most suitable for exploratory research designs (Sinkovics, 2018). I have used this technique for the process of categorising data obtained from interview transcripts, observation notes, or other non-textual materials (recordings in video and audio).

My aim when making this choice was threefold: first, to strengthen the trustworthiness of the findings of the case study (Bouncken et al., 2021; Eisenhardt, 1989; Yin, 2018); second, to create a structure for theorising about the findings (Bouncken et al., 2021); and third, to review the extant literature to identify initial themes and patterns.

> *"Flexible pattern matching involves the iterative matching between theoretical patterns derived from the literature and observed patterns emerging from empirical data"* (Bouncken et al., 2021, p. 255).

3.7.1.1 Linking Data to Propositions

For the linking of the data collected to the propositions, I have used cross-case pattern matching techniques. Predicted theoretical patterns are based on the four propositions and the initial construct identified from the literature review. The observed empirical patterns derive from data collected through the semi-structured interviews (Eisenhardt, 1989; Sinkovics, 2018; Yin, 2018).

3.7.1.2 Matching Patterns

The process of moving back and forth between both the theoretical and the observed patterns is well aligned with my choice for hermeneutics as a philosophical perspective and justifies my choice for flexible pattern matching. The intrinsic flexibility of this process makes it possible to discover inconsistencies that can lead

to changes in propositions and patterns initially identified, to the search for new insights from the literature review, or even to changes in the research design.

For example. During the data collection process, it became clear that the term ‘regulation’ in the literature review had been approached in a very ‘general’, almost superficial, way. The interviewee coded NLB0102 made several references to the Payments Service Directive 2, or PSD2. His comments were not ‘simply’ about regulation in general but about this specific European directive. I then realized that a ‘general’ search in the literature for ‘regulation’ does not necessarily return academic papers on specific subjects like the PSD2 directive but just on regulation in those ‘general’ terms. Therefore, I decided to include an extra section on this subject in the literature review chapter. By doing this, the focus of regulation was placed upon compliance with anti-money laundering policies, namely the Know-Your-Customer (KYC) and Customer-Due-Diligence processes and the PSD2 directive. In this way, the decisive role played by additional expenditures required when entering partnerships between incumbents and FinTech firms became clearer.

3.7.1.3 Analysing Data

Bouncken et al. (2021) propose the use of different techniques for interpreting the collected data and building theory from the mismatch between the theoretical and observed patterns. I used template analysis for the interpretation of the collected data, and tables, matrixes, and figures for the further presentation and visualisation of relationships and interactions between them.

3.7.1.4 Use of CAQDAS

I have supported my analysis and interpretation of the collected data using CAQDAS. After reviewing the software packages from NVivo (used at Northumbria University) and Atlas.ti 22 (used at AUAS), I decided to go further with the latter, as it is the one used at my university, AUAS. Before starting with coding, I followed a course and trained myself by consulting webinars from the software company.

3.7.2 Template Analysis

3.7.2.1 Procedural Steps: The Templates

I have used the work of King and Brooks (2018) for the identification of the procedural steps required for the construction of the initial template. I created an initial template that linked the research propositions to themes and subthemes and

used the preliminary coding in this template to elaborate the questions for the three case studies and as a framework during the interviews for data collection. First, to assess the adequacy of the questions to answering the research question; second, to prioritise the current selection of themes and subthemes based on their relevance; and third, to identify a set of patterns that allowed the matching of the latter with the theoretical patterns derived from the literature review.

This initial template turned into a final version as soon as I had completed the data collection phase and introduced all the results into the CAQDAS[15] software. Once the initial coding scheme had been established, all transcripts were analysed separately using the same process. Each transcript was taken in turn and examined for the text that was thought to be related to the codes in the initial table.

This process resulted in a final count of 453 blocks of text, or quotations in the CAQDAS' terminology, classified into six themes (code groups) and 34 subthemes (codes). All these quotations were revised, re-coded when necessary, and transformed into a narrative using the quotations to stress the importance of the subjects addressed. Further relationships were established between themes and the questions asked during the interviews.

3.7.2.2 Initial vs Final Template

The process of coding using CAQDAS resulted in additions, eliminations, and changes in the themes (group codes) and subthemes (codes) defined in the initial template. Some of the group codes were unclear, missing depth, or were just missing at all. Consequently, the entire group structure has been revised and improved when needed.

In the specific case of 'regulation', the relevance of this subject, as proven during the interviews, justified the creation of a separate group (theme) in full alignment with the structure of the literature review. The hazard profile, as introduced in the conceptual model, was not given proper relevance in the initial template. During the data collection phase, the number of codes was increased from three to five, and the subject upgraded to a 'theme' category.

After these changes and additions, the number of themes increased from five in the initial template to six in the final template, and the number of subthemes from nineteen, as defined in the initial template, to thirty-four in the final template. The

[15] Computer Assisted Qualitative Data Analysis Software

network relationships per theme are provided at the beginning of each section in Chapter 4, Data Analysis and Findings.

The list of themes and subthemes for both the initial and final templates is shown in the table below. Boxes coloured in light grey correspond to the two 'new' code groups (themes) added.

TABLE 17: FINAL VS. INITIAL TEMPLATE

Sub Themes	Themes	Sub Themes
1. Disruptive vs Sustaining 2. Phase of innovation	**Nature of the innovation**	1. Disruptive innovation 2. Sustaining innovation 3. Essence of banking
3. Business Model 4. Bundled vs Unbundled 5 FinTech Taxonomy 6. FinTech Ecosystem 7. Banking Regulation 8. Systemic Role Banks	**Business Model Adaptation**	4. Customer proposition 5. IT legacy 6. Platforms 7. Banking value chain banking 8. Challenger banks 9. The FinTech taxonomy
9. Integration 10. Collaboration	**Organizational Architecture**	10. Ambidexterity 11. Integration 12. Collaboration 13. People & management 14. Scalability
	Regulatory Framework	15. Banking regulation 16. Compliance 17. Regulators 18. Innovation 19. Systemic role 20. Costs of regulation
11. Strategic alignment 12. Market size 13. Competition	**Hazard profile**	21. Strategic alignment 22. Addressable market 23. Density of the market 24. Stage in innovation lifecycle 25. Uncertainty and controversy
14. Options 15. Uncertainty 16. Controversy 17. Multiples 18. Net present values 19. Sunk Costs	**Valuation model**	26. Business case for valuation 27. Banking valuation model 28. Customer value 29. Valuation techniques 30. DCF/ NPV 31. Market multiples 32. Equity investors models 33. Real options 34. Customer value

3.7.3 PLAUSIBLE RIVAL EXPLANATIONS

To evaluate the strength of the findings and, consequently, to increase the credibility of the research, I have defined an initial set of 'plausible rival explanations' for each proposition before the completion of the data collection. The definition and test of

plausible rival explanations work well in combination with my choice to rely on theoretical propositions for the analysis of the data evidence collected in case study research (Yin, 2018).

These rival explanations are of two kinds: 'direct rival' and 'rival theory', both within the category of real-World Rivals as identified by Yin (2018). They are not all, but most plausible, to my best knowledge. I considered them when designing the questionnaires for the semi-structured interviews. The analysis of the role played by these explanations in the analysis of the data collected is shown in Section 5.2 of the 'Discussion' chapter. A table with plausible rival explanations, specified for each of the four propositions and the initial construct, is presented here below.

TABLE 18: PLAUSIBLE RIVAL EXPLANATIONS

Propositions	**Type**[16]	**Plausible Rival Explanations**
1.A FinTech innovation of a disruptive nature has a positive influence on incumbents' decision to pursue the innovation.	Direct Rival	Incumbents regard FinTech exclusively as technological evolution, thus sustaining, not disruptive.
2.The capacity of incumbents to ascertain the strategic importance of an investment in FinTech innovation has a positive influence on incumbents' decision to take the lead in the creation of a new dominant design.	Direct Rival	Incumbents respond to the innovation based on the sense of 'urgency', when it gets closer to their core business, and not because of an a priori strategic choice.
3.The capacity of incumbents to accommodate current business models to new dominant designs has a positive influence on the growth expectations of the investment.	Rival Theory	Incumbents prefer to collaborate with FinTech firms instead of incorporating the innovation and adapting their own business model. In this way the aim to obtain profit from the best of both worlds.
4.The capacity of incumbents to adapt the organization to the new dominant design has a positive influence on incumbents' decision to adopt the innovation before the appearance of the dominant design.	Rival Theory	Changes in the organization are too expensive. In addition, the need for specific talent to lead the change is not easy and can lead to operational bottlenecks.
Initial Construct: Opportunity cost A decision tree analysis integrating option pricing and decision analysis methods puts the degree of uncertainty and controversy associated with investments in disruptive innovation into perspective. The outcome of this exercise helps traditional retail banks towards a better decision when assessing the opportunity cost of the investment in FinTech innovation"	Rival Theory	The use of multiples based on enterprise value to EBITDA, in combination with traditional net present value calculations, are comprehensive enough and easier to apply than a model based on multiple real options.

[16] 'Type' is based on:
Direct Rival: An intervention other than the target intervention accounts for the results.
Rival Theory: A theory different from the original theory explains the results better.

3.8 Validity and Reliability

I am aware that validity and reliability are commonly regarded as weak elements in a case study strategy. To ensure the quality of the data collected, its rigour, and its trustworthiness, the following techniques have been considered in the research (Riege, 2003; Yin, 2018).

3.8.1 Construct validity: Confirmability

A case study protocol has been constructed in the design phase of the research. A chain of evidence for cross-checking and citations has been established once data collection has been completed. A draft version of the case study has been reviewed by a peer panel[17]. All raw data collected has been stored for eventual audit if required (see section on reporting, sharing, and storing).

3.8.2 Internal Validity: Credibility

Within-case analysis and cross-checking have been performed in the data analysis phase. Triangulation techniques have been used during data collection and analysis. Pattern matching has been used. Plausible rival explanations have been addressed. Peer debriefing has been accomplished on a periodic basis with academic experts and colleagues of the peer panel. Findings were revised with participants in a few cases upon request. Eventual feedback obtained was incorporated during the writing of the data analysis section.

3.8.3 External Validity: Transferability

Replication logic has been sought to guarantee the alignment of the case studies. The scope and boundaries of the research have been defined in the design phase. Comparisons with extant literature acted as a control mechanism to ensure the clarity of participants' contributions and link them with the scope and boundaries of the research. A database for the literature review has been created in Mendeley. Specific procedures for coding analysis have been developed.

3.8.4 Reliability: Dependability

I have used techniques for case study research as advised by Riege (2003). An interview protocol was designed and used for the semi-structured interviews.

[17] Members of the Lectorate on Corporate Governance and Ethics (AUAS)

Observations have been stored as concretely as possible in the form of written notes and transcripts in Microsoft Access and Excel databases. Peer review discussion has been carried out with colleague professors and members of the peer panels, namely the research groups at Northumbria University and the Amsterdam University of Applied Sciences (AUAS). I have presented the progression of my research three times to fellow researchers and professors during the conferences organised by the Postgraduate Research Group at Northumbria University. In addition, my theoretical position as formulated during the design phase of the research has been incorporated in the introduction chapter of this research. The dependability audit, though not in the same terms as expressed by Riege (2003), is monitored during the bi-monthly meetings with the Principal Supervisor.

3.9 Ethical Considerations

The structure of this section follows the model proposed by Creswell (2014).

3.9.1 Ethics Application

After obtaining approval for the research proposal, I focused on the ethics application and other additional documents required to ensure that the research is well aligned with Northumbria University's requirements.

The ethics application with reference number 23763 was submitted on April 30, 2020. The application was approved on May 20, 2020. The risk level of the research was assessed as 'medium', based on the ethical risk categories included in Northumbria University's Research Ethics and Governance Book (Northumbria University, Northumbria University's Research Ethics Guidance and Governance Book, 2016/17).

Next to the application, I developed and submitted a set of three documents, namely the "Participant Information Sheet", the "Interview Consent Form", and the "Participant Debrief Form". Before the interviews, the first two documents were sent to all participants in the case study. The Participant Information Sheet has been updated due to the almost two-year gap between the date of submission and the date of the semi-structured interviews. The changes in this sheet are exclusively an update on the developments in FinTech innovation.

3.9.2 Code of Conduct

I adhere to the principles of good research practice as stated in Northumbria University's Research Ethics and Governance (Northumbria University, 2016) and the European Code of Conduct for Research Integrity (Mayer & Steneck, 2011). These principles are reliability in ensuring the quality of the research; honesty in all aspects related to the research to ensure transparency, fairness, completeness, and unbiased results; respect for any person involved in the research; and accountability from idea to publication. In addition, the following activities and practices have been undertaken to ensure the integrity of the research:

- Research Environment: I joined Northumbria's Postgraduate Research Group (March 2020) and the Lectorate Corporate Governance and Ethics of the Amsterdam University of Applied Sciences (September 2020).
- Training, Supervision and Mentoring: I have held bi-monthly meetings with my Principal Supervisor, and bi-weekly meetings with my peer researchers. I have followed Northumbria's ethics online course and participated in forums with research ethics as a discussion topic.
- Research procedures: I follow the University's policy regarding research design and documentation of the research. I have acted transparently with regard to the confidentiality of data or findings.

3.9.3 Ethics Approach

I designed an outline for the literature review that revolves around the research objectives and follows a funnel structure.

First, I used the experiences of the two 'pilot' interviews to test ways of obtaining information more efficiently under time constraints, as is the case with shorter case study interviews. Based on these experiences, I developed and fine-tuned the interview questionnaires. Second, I have worked with standard questionnaires and checklists to avoid inequalities in the treatment of participants. Third, I report not only positive but also multiple and contrary findings, and guarantee anonymity in all cases. Finally, I will provide copies of all draft versions and final reports to participants and stakeholders. I acknowledge ownership of all participants. All digital information will be stored on devices protected with an encrypted password, namely the University's 'cloud'.

CHAPTER 4. DATA ANALYSIS AND FINDINGS

4.1 INTRODUCTION

In this chapter, I present the findings of the data collected. In Section 4.2, I first explain how all parts of my analysis of the collected data relate to each other. Section 4.3 is about the business case required for decision-making. Section 4.4 sketches the outline of FinTech innovation. In Section 4.5, I reflect on those internal and external factors of relevance when ascertaining the degrees of uncertainty and controversy associated with the decision-making process. In Section 4.6, I present the valuation techniques most preferably used by the interviewees. All sections in this chapter are presented according to the structure in the final template.

4.2 NETWORK TREE IN CAQDAS

The underlying relationships between all themes and subthemes have resulted in the following network tree in CAQDAS, a network articulated around the six themes and thirty-four subthemes presented in the final template.

FIGURE 10: NETWORK RELATIONSHIPS WHEN VALUING THE INNOVATION

Source: Database transcripts interviews in CAQDAS

4.3 THE BUSINESS CASE FOR DECISION-MAKING

There is no fixed rule for the selection of key relevant factors for the grounding of a decision on investments in innovation. Reflecting on global trends and key macroeconomics, like inflation nowadays, is a common first step that can help put the decision-making into a broader perspective. In the event the decision-makers belong to listed companies, their likely interactions with the stock market can also play a substantial role in their final decision. Shareholders are often not very keen on high disbursements in the short term as these may eventually have a negative influence on the share price of companies in which they hold a stake. For commercial banks considering investments in FinTech innovation, there is an implicit risk that strategic shareholders might not be willing to back up their capital needs in the end. Regarding the valuation itself, the role of equity investors can influence the price paid for a target firm. In the case of FinTech, for example, there is a widely held assumption that the role played by these equity investors and the surplus of capital available at the time, more specifically in the year 2021, have both driven prices paid for Fintech firms beyond what investors could regard as reasonable.

Nevertheless, the collected data and the subsequent analysis conducted aim primarily to define a framework for the make-or-buy decision based on the three criteria identified by Mcivor et al. (1997). For this specific purpose, I have structured the analysis around the six themes in the final template, as shown here below. Themes one to four, grouped under the same heading, 'Outline FinTech Innovation', aim to clarify the core competencies; the analysis of the hazard profile aims to identify the internal and external capabilities of the incumbents; and finally, costs are a fundamental part of the valuation model and, as such, are covered under that section.

TABLE 19: SIX THEMES FOR DATA ANALYSIS

Outline FinTech innovation	**1**. Nature of innovation (disruptive or sustaining); **2**. Banking business model (adaptation); **3**. Organizational architecture; **4**. Regulatory framework.
5.Hazard profile	Strategic alignment, addressable market, density of the market, stage in the innovation cycle.
6.Valuation model	Banking model (solvency), valuation techniques (real options).

Identifying the innovation as either sustaining or disruptive has an influence on incumbents because the sense of urgency and subsequent response may differ. While a sustaining innovation could be regarded as a 'continuing' factor in a regular process of technological evolution, a disruptive innovation could make the incumbent more responsive to the challenge of the innovation. In this part, I evaluate the understanding of all participants of the main concepts and definitions of FinTech innovation.

Understanding the banking business model is important to ascertain the capacity of incumbents to eventually adapt their 'traditional' way of doing banking business to the new FinTech 'reality.' For this purpose, I identify the value drivers of the FinTech business model, namely the customer proposition, the banking value chain, and the IT legacy systems. I also explore the threats of platform business for the banking sector and elaborate on the importance of challenger banks, new peer competitors for traditional banks.

The part on organizational architecture is about alternative organizational structures, ambidexterity, integration, and collaboration. It is also about people and management, as incumbents must be prepared to incorporate FinTech innovation into their organizations. With this purpose in mind, I review the role of resources available on the incumbent's side and the quality of the management of the FinTech firm itself when facing the options to either integrate the FinTech firm or enter a partnership. The scalability of the innovation is decisive for decision-making, and it is, therefore, taken as one of the 'real options' in the valuation model.

The costs of regulation are a key element in the specific decision-making regarded in this research, namely the decision to either make or buy the innovation. The high costs that incumbents must incur to comply with regulations, e.g., anti-money laundering, have a clear influence on their decision to enter partnerships with FinTech firms. I end this section with a thorough analysis of the influence of FinTech on the banking regulatory framework and reflect on potential inequalities incurred when charging the extra costs of the regulation to either incumbents or FinTech firms, as well as the subsequent effect on the estimation of the value of the investment. I elaborate further about the opportunities that lay open for incumbents to reduce these costs.

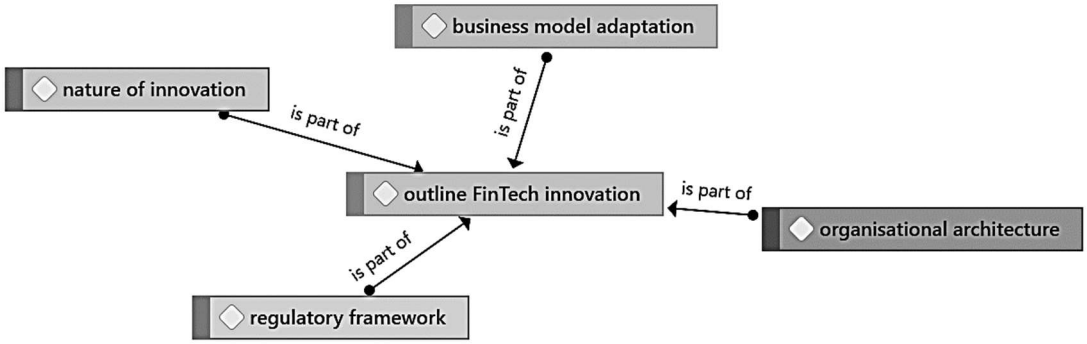
The fifth theme of the data analysis is the risk of the investment, also in the context of FinTech innovation. The hazard profile stands for the level of uncertainty and controversy associated with the investment, and it forms the basis for the calculation of the discount rate in the valuation model. To ascertain the risk profile, I analyzed the following four factors: First, strategic alignment, as incumbents are more open to making the switch when they can find themselves in the strategy of the disruptor. Second, the market potential, or 'addressable' market, is a common subject in any kind of investment in innovation, though put it into the perspective of a valuation model for FinTech investments. Third, the density of the market or the presence of other incumbents that eventually might arise as potential competitors in the race for the target investment. Finally, I reflect on the 'timing factor' of the investment by elucidating the relevance of the stage in the innovation lifecycle at that moment when incumbents make their decision to enter the innovation.

The sixth and last theme of the data analysis is about the valuation techniques commonly used by incumbents and equity investors to support their decision-making on risky investments. Special attention is paid to the use of real options, as this technique forms the basis of the valuation model. The incumbents in this research are traditional banks. Due to the specific nature of the banking business, this section pays extra attention to some specific tweaks in valuation models when used by banks, namely the solvency requirements for the estimation of the capital invested and discount rates, both necessary for the valuation model as well.

4.4 Outline of the FinTech Innovation

The following four themes are used for data analysis to put the decision-making into the perspective of FinTech innovation.

FIGURE 11: NETWORK RELATIONSHIPS FOR THE OUTLINE OF FINTECH INNOVATION



Source: Database transcripts interviews in CAQDAS

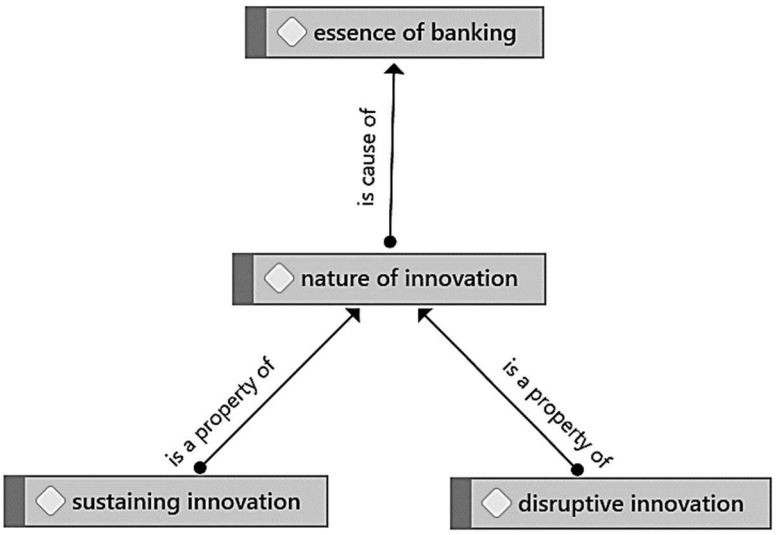
TABLE 20: DEFINITIONS OF THEMES FOR DATA ANALYSIS

Theme[18]	**Definition**
The Nature of the Innovation	The effects of the technological innovation considered can lead to either the improvement of an existing product (sustaining innovation), or to the creation of a fundamentally new one (disruptive innovation).
Business Model Adaptation	The capacity to adapt the business model of the incumbent to the FinTech innovation is a factor of the value of the current (traditional banking) and new (FinTech) business models.
Organizational Architecture	The capacity to adapt the incumbent's organization, meaning people and IT systems to a new dominant design based on the FinTech innovation.
The Regulatory Framework	The influence of banking regulation on incumbents and disruptors, namely the way of dealing with extra costs and the stimulus for new forms of collaborations between both.

4.4.1 THE NATURE OF THE INNOVATION

The first theme for data analysis is the 'nature of the innovation.' This group consists of the following three subthemes in CAQDAS:

FIGURE 12: NETWORK RELATIONSHIPS NATURE OF INNOVATION



Source: Database transcripts interviews in CAQDAS

[18] Theme = Group code in CAQDAS

The research shows that the concept of disruptive innovation as introduced by Christensen (1997) is not a cast-in-stone definition when applied to FinTech innovation. To start with, though all participants are familiar with the concept, their interpretations differ.

All participants in the qualitative interviews agreed that the definition of "financial technology" remains unclear and is difficult for people to understand. When asked about the distinction between disruptive and sustaining innovation, the idea of disruption is often associated with technological developments affecting specific products and their proximity to the 'core' of the banking business. When referring to payments, interviewees almost immediately define the disruption as 'sustaining,' while when referring to lending or crowdfunding, the innovation is labelled as 'disruptive.' This lack of clarity about the nature of the innovation does not contribute to placing the decision-making in the right context, as it can lead to underestimating the risks for the incumbents of not taking the lead in the innovation.

> *"There is a lot of semantics in this question. To start with, what is fintech? What is the definition of fintech? You hear more than one, it is a broad definition, which is where the confusion starts."* 22:3 ¶ 8 in FTf0201

> *"Payments are sustaining, it started as a technological thing. Lending is more disruptive. For traditional lending, not for credits and stuff like that. Just as a lending proposition, though brought to you differently."* 23:12 ¶ 12 in FTf0301.

The Chief Financial Officer of a FinTech firm associates the starting point for the FinTech phenomenon with the introduction of the iPhone, the event that unchained the transition from online desktop-based banking to online mobile phone-based banking. The introduction and extensive use of Application Programming Interfaces (APIs) and the role played by the financial crisis of 2008 have accelerated this process.

> *"The disruption started with the introduction of the iPhone. In this sense, it was Steve Jobs and not the consumers who had this vision of combining the mobility unchained by the iPhone platform with financial services, and all this in the context of the Internet and the expectations of the consumers of financial products"* 21:7 ¶ 14 in FTf0101

The innovation was not triggered by traditional banks or governments but by FinTech firms. These not only have sheer expertise from a technological point of

view, but innovation is also in their genes, together with their ambition to create or facilitate technological disruptions. Traditional commercial banks, in contrast, do not have the right competencies in-house, as their major concern is to ensure the efficiency of their internal business processes. The decision-making on the innovation is therefore influenced and biased before it starts. Next to the design of new and fancy websites, sustaining innovations are the type of innovations they engage more often in, rather than the creation of new banking products and services based on these disruptive technologies. In this sense, traditional banks have responded slowly to innovation.

> *"Neither the traditional banks nor the governments have triggered financial innovation. FinTech firms have led from the beginning and are still in the lead because they listen to the needs of the customers, and how to improve the customer experience. The programming tooling used is triggered by these needs of the customers."* 21:9 ¶ 16 in FTf0101

While the first players ever to enter the FinTech ecosystem could claim that the disruption they were leading at the time was of a disruptive nature, most of their followers have worked on improvements to the first, and truly disruptive, innovation. Innovation is now about the underlying processes. There is no wow factor as such anymore. In fact, these 'new innovators' are not creating new business models or products, which would make them disruptive. They are working to improve the existing ones.

> *"Doing disruptive innovation in a big bank in Europe would account for 10%. 90% would always be about improving the bank's core services, trying to make them a bit better, a bit faster."* *26:14 ¶ 17 in INC0103*

> *"Another example, crypto compliance. You have the big main four players that are chain analysis, theorem labs, cipher trace and elliptic. They were the first. They were quite disruptive for the field but, now? Once it becomes a standard, all the rest that are coming are sustaining, simply improving certain parts of that process."* 26:8 ¶ 15 in INC0103

For incumbents, engaging with disruptive innovation is not that easy. Changing or adapting consolidated, well-tested business models is not only difficult, but it is an endeavour that requires time and the right understanding. Disruptive innovation is not a one-year project but rather one that takes three or five years. Moreover, the

management of business lines engaged in innovation is reviewed based on short-term KPIs[19], and not on their performances in the mid- or long-term.

Though the ambition of all Fintech departments on the incumbent side is to create or facilitate disruptive innovations, interviewees from incumbent organizations agree that barely 5% to 10% of all innovations may be labelled as truly disruptive. There are a few disruptive innovations, like blockchain, but at the mid- or back offices of banks, nothing has changed; it is all about incorporating interfaces.

> *"I think that if it is adding up to something existing, it is easier to understand, easier to allocate money and staff available. If deemed disruptive, it is going to be much more difficult because people will not understand, including myself. It will be more difficult to judge, and hence it will be more difficult to conclude."* 35:1 ¶ 6 in inV0301

Sometimes, groups of banks or the banking community introduce innovations that could be accepted as disruptive for the whole sector. This happened, for instance, with SWIFT, with real-time payments, and with the IPA[20]. Then, you see the banking community, and the banking industry, coming up with the innovation, though they do not execute it themselves. Regarding FinTech, initiatives taken by the European Commission in subjects like anti-money laundering and the Payments Service Directive (PSD2) come close to the aforementioned. These developments were disruptive innovations in the sense that they helped create new dominant designs. Put in the context of FinTech innovation, this way of acting might indicate that the banking community would have the last word when defining the new FinTech business models and not an individual incumbent.

The outcome of the interviews reveals that the underlying technologies of the banking business are changing, but not the essence of banking itself. FinTech firms take parts of the banking value chain and try to build businesses out of them. The vast offering of unbundled products and services by FinTech firms is an example of this, as the former CEO of a Dutch-based FinTech firm explains:

> *"I do not see a lot of fintech innovations that really change the base of banking. And the base of banking is, in my view, that you have people who have a surplus of money, and they need to park this money for a while, and you have people on the other side who have a deficit of money for good reasons, because they start businesses, or they*

[19] Key Performance Indicators
[20] International Payment Accounts

> *want to buy a house. The bank is in between the two and tries to connect the two together. That is, I think, one of the most basic functions of a bank, the transformation function"* 22:4 ¶ 9 in FTf0201

With the rise of challenger banks, it has become clearer how difficult it is to fund the banking business with a single payment application. The next question is, therefore, what should be next, savings, for example? And hereafter? Lending for the financing of small and medium-sized businesses? Although FinTech firms can do all this, a technological solution does not yet make a bank, whereas a product does.

> *"We do not need a technological solution to have a bank. What we want is the product."* 23:25 ¶ 23 in FTf0301

A bank may look like a bank, but from a phenomenological perspective, it is not. The question is, how does the bank interact with external reality? An answer to this question is not easy, as the roles that traditional banks are going to play in the next five, ten, or twenty years are still unclear, not only because FinTech firms are changing the banking industry but also due to the entrance of 'outsiders' like big technological firms or providers of financial services other than banking.

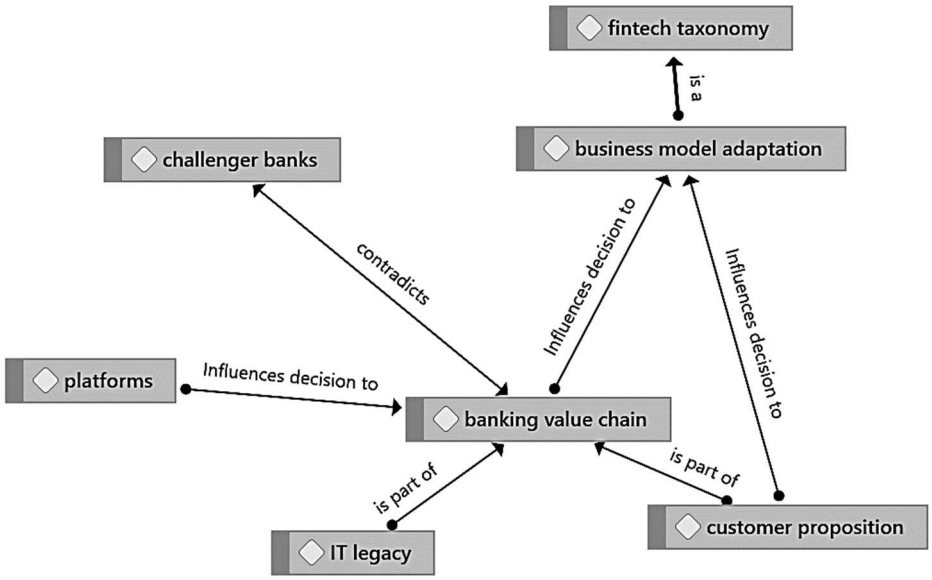
> *"BigTechs, you would see that they have the technological capacity to offer financial services themselves. What they do is that they start entering the innovation to facilitate the offer of their own products and services. It is at a later stage when they see the potential to expand from there and go beyond their own offer of products and services. Insurance companies, for example, also behave in this same way, namely in the payments segment or in mortgages."* 38:2 ¶ 7 in inV0601

If incumbents do not see these new entrants as their peers, their decision-making will ignore upfront the 'real' risks of not embracing innovation, missing in this way the initiative in the creation of new dominant designs that could lead to changing the 'essence' of banking and, consequently, their role in the banking industry.

4.4.2 Business Model Adaption

The second theme for data analysis is "business model adaptation," meaning the search for the most relevant characteristics or value drivers of the new FinTech business model. Learning about these new drivers is the first step before ‘adapting’ current banking business models to innovation. This group consists of the following six subthemes:

FIGURE 13: NETWORK RELATIONSHIPS BUSINESS MODEL ADAPTATION



Source: Database transcripts interviews in CAQDAS

4.4.2.1 Customer Proposition

How are consumers contributing to the reshaping of the financial services industry triggered by FinTech innovation? Though this question was not explicitly asked, it became clear during the conversations that customers do play a fundamental role in this transformation process.

While traditional banks offer trust based on the solidity of a bundled offering to their customers, FinTech firms offer a new and more enriched customer experience. Therefore, the willingness to change the value proposition of the banking business model should be the first node in the decision-making tree.

The importance of making this distinction is that customer profiles do have different needs. The change manager of a large incumbent bank observed that this distinction is often ignored or disregarded by decision-makers at traditional banks.

> *"In this sense, decision-makers underestimate the generational issue in discussions held around financial innovation. It is not only the appearance of new niches of customers what matters, but also that these customers may have a different profile, as they do belong to a new generation. The rules of engagement are different, as their needs regarding financial products and services might also be different."* 27:4 ¶ 10 in INC0201

The way consumers of financial services start their search for a new product has also changed. Potential customers do not go to a branch office to meet a bank representative and ask for advice. When they need a 'product,' consumers start by doing a search, e.g., for a mortgage, and then they go shopping around. They do not care where these mortgages can be found because they are not looking for a bank, they simply want a mortgage. Whether that specific product or service is offered by either a FinTech or an incumbent is not relevant for them at that stage. Once find what they search for, they accept it and go for it. In case that one option falls away, they will search further to find another way. FinTech firms are aware of this behaviour and act consequently by actively dealing with customer expectations, helped by a technology that makes the customer experience more tangible.

> *"I see three parties and ask myself, who provides the best customer journey. Then I go for that one. I think that depositing money is different because then they look at the guarantee behind. But if it has to do with other services, they just go for the most efficient way of getting the service, the online environment, the apps. And if that does not meet their requirements, and I think people are extremely critical in that, they just lose interest and go to the next party."* 28:7 ¶ 8 in INC0301

During the presentation of the 'Update 21', Ali Niknam, the CEO of the Amsterdam-based challenger bank Bunq, introduced a few features said to help users getting a better control of their finances in these times of high inflation rates (Niknam, 2022). Some of these features are 'Bunq Web', a tool that provides access to all Bunq features on any device, 'Widgets', for instant access, 'Group Expenses', that helps to split expenses with friends, and 'Green Tab', to find other features that contribute to becoming CO2-free. On the top of these and to reward customer loyalty, the 'Wheel of Fortune', where customers can spin a wheel every day and win prizes they can keep or give it away to their friends. This approach does not only attract customers from the traditional portfolios of banks, but it also triggers the discovery of new ones, meaning not exclusively new niches but different customer profiles.

By primarily differentiating the customer's journey between specific customer profiles, FinTech firms can develop and deliver single products that better match the expectations of these new niches discovered in the market, those they aim to serve with a proper customer proposition. By contrast, incumbents reflect from own product and customer portfolios, an approach that does not necessarily consider the customer journey as such a primary aim.

> *"The difference for me is that a traditional bank puts its own interest first and then tells the customers what they need to do, and a fintech or a RegTech or an InsurTech, they all start with the client's need, and then make a business model around it"* 23:14 ¶ 15 in FTf0301

Though most challenger banks have a banking licence, they are exclusively focused on one single product or service supported by a bank account. This unbundled offering is primarily focussed on what the average consumer of financial products and services more often has, namely a savings account, a payments account, and a mortgage. Participants in the research agreed that this is one of the differences when comparing newcomers with incumbents. Nobody asks why a Fintech firm comes to the market with one single product. Because they can get away with that, they are allowed to have a clearer focus in their offering. Paradoxically, this unbundled offer from FinTech firms, generally well received by the customers, would not be that easily accepted when coming from a traditional incumbent bank. Consequently, a potential collaboration with a FinTech firm for an unbundled offering could be jeopardized.

> *"They have a focused approach in their offering. I think that from the banks' perspective that would not be accepted because if a bank offers one product, then they would say, why one?"* 28:4 ¶ 8 in INC0301

4.4.2.2 The FinTech Taxonomy

Though not presented under an overarching 'BankTech' label, the FinTech taxonomy still refers to the provision of a banking service offering. The FinTech-banking taxonomy is unbundled not because the products offered are unbundled but because the delivery of the products is unbundled. Providers of technological applications are not the only ones providing this unbundled offering of banking services; consumers also do, as they want to be free when putting together their own 'bundled' package of banking services, disregarding who the provider of the services might be. This situation has little to do with the 'old' days when consumers

held a bank account at one bank and their mortgage at another to diversify their 'risk.' As expressed by the former risk manager of a Dutch-based FinTech company:

> *"There is a future, and it is happening already, in which a person—you, me, anyone who has a mortgage at that company—has his payments in this account, which also has a wallet with Revolut."* 23:43 ¶ 23 in FTf0301

> *"The 'bank' is nothing. In the first part of these suffixes, you see a solution, a product, a product category, and the idea that there is a technical innovation towards that. E.g., regulatory technology, insurance technology."* 23:23 ¶ 23 in FTf0301

After coining the term FinTech, first, in its relationship to banking, other industries followed. Meanwhile, the markets have incorporated other tech labels into the FinTech taxonomy: RegTech, LegalTech, InsurTech, HealthTech, or PropTech. The question is, however, whether these labels add any value to the discussion on innovation.

> *"I do not feel a lot of attachment to those terms like PropTech and InsurTech. It is nice to put a label on things. For me, it is, in any sense, distinctive."* 22:21 ¶ 21 in FTf0201

4.4.2.3 IT LEGACY

A bank is a trustworthy party that offers banking services to its customers. Nevertheless, a third-party expert in technological innovation can take care of the technological knowledge required by the banks to serve their customers. What FinTech firms are currently doing is what IT vendors of information technology did for banks in the past. Basically, to remove all concerns regarding the implementation of technological solutions on the incumbents' side, ensuring in this way that 'trust' stays at the core of the relationship with their customers. The approach followed by both providers is radically different, however.

While IT providers in the past developed and implemented solutions to keep banks' legacy systems running by using software applications, servers, and databases, FinTech firms nowadays use Application Programming Interfaces (APIs). It is not about improving or changing the bank's legacy systems, but rather about establishing proper connections or interfaces with them.

> *"FTf01 does what IT firms did in the past: develop back-office applications for financial institutions. The difference is that thirty years ago the coding was executed*

> *using software like Oracle, whereas nowadays companies as FTf01 use APIs (Application Programming Interfaces)."* 21:3 ¶ 6 in FTf0101

> *"I mean, payments were a disaster at traditional banks. However, with the introduction of Tikkie and Mollie[21] and all that stuff, banks have just commoditized the whole payments system."* 23:11 ¶ 11 in FTf0301

The specific point in the banking value chain where financial technology can be used is also different. 'IT providers' delivered applications to improve the technological architecture of banks at the 'back end,' closer to the 'core' of the IT legacy systems. By working with APIs, FinTech firms and other technological developers can enter the value chain at the front-end, somewhat bypassing the legacy systems while still staying well aligned with them.

Nonetheless, this same approach appears to be more difficult when banking products get closer to the core of the IT legacy systems. Payments, as referred to in the quote here above, are rather far away from this core and, therefore, easier to bypass through an external gateway, which could influence the decision in favour of the 'buy-option' instead of the 'make-it'. The closer the product is to the core of the IT legacy systems, the more difficult it is for incumbents to adapt, change or innovate their current business models, giving room in this way for the creation of new products and services based on these new technologies.

Incumbents' organizations are not tailored this way, as the importance of preserving their IT legacy is paramount. This underlying concern is not prompted by the complexity or adequacy of the legacy systems themselves, but rather because these are the gateways to customers' data, the 'real' cornerstone of the banking business.

> *"We are making big improvements in KYC, in the whole backbone of how KYC works, and we are making quite technological improvements. In the end, however, we are really bound by our legacy systems, by the core banking systems, where we do not have that much of a chance, and we have strict rules."* 26:23 ¶ 25 in INC0103

Nevertheless, FinTech firms have replaced the role of traditional 'IT providers' thanks to their ability to climb throughout the banking value chain, from the back end

[21] Tikkie is an online payment app that allows payment requests via WhatsApp. Mollie is a Dutch payment provider.

up to the front end and to the consumer. In fact, it is not the banking business model that has changed, but the ‘vendor’ model associated with it.

> *"With the only exception of bitcoin, the business model of commercial banks has not changed. Despite the extensive incorporation of innovative technologies to the financial ecosystem."* 31:5 ¶ 9 in inV0101

4.4.2.4 The Banking Value Chain

From the interviews, the perception is that the banking value chain has not changed in its totality, but the way FinTech firms enter the banking business and move throughout the value chain has. At the front end of the chain, from the consumers’ side, the unbundled offer of products and services makes it possible to take a part of the banking value chain and develop a new customer proposition from there. At the back end of the chain, the externalization of the IT vendor model, as discussed in the section on the IT legacy, has proven lethal for incumbents as they have lost control of certain parts of their own value chain, weakening in this way their further capacity for value creation.

> *"Does the value chain of fintech bank as a service differ from the value chain of traditional banks? No, it does not. It is the same. The customer experience is different, but the value chain is unchanged."* 29:8 ¶ 16 in INC0401

From a value chain perspective, where does the opportunity for innovation reside? The provision of complementary services by commercial banks is not a core activity because there is barely any marginal value in it. The real value for banks is in cost containment and the quality of the services provided. At this point, the acquisition and further integration of technological firms make sense; this is the moment when FinTech firms contribute to the survival of traditional banks. This phenomenon is even more evident in the case of large banks.

The alignment between back-end systems and front-end systems, still a pending subject, is a potential second area of improvement for incumbents when approaching innovation. From the perspective of two equity investors interviewed:

> *"A bank that was able to solve this alignment between the back end and the front end using a scalable technological innovation, could become a leader within the financial ecosystem."* 31:11 ¶ 14 in inV0101

> *"FinTech specifically, the company is interested in new developments in payments, infrastructure or companies providing with technological solutions to banks, and data analytics"* 39:3 ¶ 8 in inV0701

Nevertheless, banks still have competitive advantages over new entrants, namely branding, customer trust, and strict banking regulation that protects the core of the banking product proposition. Therefore, these advantages for incumbents should be incorporated into the decision-making process as an opportunity cost when estimating the net present values of potential cash flows generated by the innovation.

> *"From a banking perspective, you look at the highest value that a bank has, its client network, and the reputation of its brand. That is an asset which is difficult to copy."* 35:11 ¶ 11 in inV0301

> *"Lending is protected a lot by regulations because there is truly little innovation in that, especially in consumer lending. That is so much protected that you can still do that in a very old-fashioned way."* 28:37 ¶ 47 in INC0301

As a disruptor, competing against incumbents is not easy either. Whether they focus on liquidity in the short- and long-term or try to compete with banks with business models other than payments, FinTech firms encounter the same problems as traditional banks.

> *"Mortgages, which is the cork on which the whole banking industry floats, is also difficult because there is so much price fighting going on and people are not loyal anymore"* 23:6 ¶ 6 in FTf0301

4.4.2.5 Platform Business

FinTech innovation, though not altering the banking business model, has facilitated the creation of an unbundled offering of financial products and services that can operate as a platform while leaving the essence of banking intact. From this perspective, the boundaries between traditional and neo-banks blur away. In the words of the CFO of a large Dutch-based FinTech firm:

> *"The crucial question here is, what is a bank? A bank can become a platform that aggregates products, owns or others, or can work as a neo-bank. A bank is a bank no matter what it offers."* 21:30 ¶ 18 in FTf0101

Most FinTech and big technological companies operate as platforms, a business model that facilitates the interconnection between products and services, e.g., cross-selling within the same value network or different networks. For a newcomer trying to compete with consolidated incumbent banks, the possibility of accessing potential customers outside their value networks can make the difference when trying to gain a position in that specific market. Non-banking platforms like Google or Facebook have entered the value network of the financial services industry in this same way, from the outside of incumbents' value networks. If these players become too dominant, traditional banks will become factories, missing the first contact with the customer. The risk is then that these dominant players will charge incumbents for the leads they get, negatively influencing the bank's capacity for value creation.

For incumbents, operating as a platform makes connecting other products and services easier, which is important considering the bank's goal for customer engagement. Nonetheless, commercial banks want to be where their clients are—at the branch offices in the past and on these new dominating Internet platforms now. From the reflection of the head of finance and business banking at one of the incumbent organizations, traditional banks are very much aware of the threats posed and opportunities offered by these platform businesses. Being aware of the risks, however, should not be sufficient, which delivers an extra argument for incorporating the role of customers in the decision-making process.

> *"What is the real risk? It is Facebook. Yes, that is what the future needs to tell us. But we came a little bit back from that. A vision that we need to be a platform not only offering banking services but to be earlier in the value chain."* 24:33 ¶ 38 in INC0101

> *"We need to become the Facebook of banking. For example, looking at the housing market, Funda[22] has a lot of clients that every free Saturday look for houses on the Internet. As a bank, they can give you infinite leads because people looking for a house are maybe also looking for a mortgage."* 24:30 ¶ 36 in INC0101

Despite these apparent benefits, the transition to a platform model is not without risks for traditional banks. In the first place because the philosophy behind these business models is a direct threat to incumbents, as platforms 'aim' to eliminate the intermediary layer, and banks are intermediaries. In the second place, it is still unclear who is going to be at the steering wheel in the cockpit of the 'financial'

[22] Dutch website for the search of homes for sale

platforms: incumbents, fintech firms, challenger banks, big technological companies, or consumers.

Stepping away from this traditional intermediary's role and looking at technology not as a way to preserve the monolithic nature of the IT legacy but as a way of weaving multiple service options into disaggregated architectures should be the first question to be answered in the decision-making process around innovation.

Fighting competition is not new for incumbents. The same head of finance for business banking clearly stated that his bank is not afraid of the variety of upcoming FinTech firms that have managed to turn themselves into successful challenger banks. These newcomers are also banks, in the end. Incumbents should 'only' be afraid of losing market share to them, like with any other 'traditional' competitor.

What is new now is that banks' competitors are not exclusively their peers or other financial institutions but external parties to the financial services industry. The balance of forces within the ecosystem where banks operate has changed as the rules of engagement introduced by these platforms have changed as well.

> *"Many companies in the FinTech world, however, are operating in a way that ensures a monopolistic situation in the market. ADYEN, for example, is a global player in payments that can barely be beaten. Why is this so? Because they have a strong market position."* 39:4 ¶ 8 in inV0701

4.4.2.6 Challenger Banks

When they first showed up, challenger banks were no more than a second or third option for specific consumer niches of financial products and services. Meanwhile, these challenger banks have become larger and more versatile with time. The numbers confirm these trends. In 2022, the number of customers reported by the top 3 challenger banks was: Revolut (25.5 million), N26 (10.5 million), and Monzo (5.8 million). Amsterdam-based Bunq reported EUR 1.8 billion in deposits in 2022.

However, it was only very recently that banks realized that they were lagging regarding the exploitation of innovation and started experiencing these neo-banks as a real threat. Competition, taken as a variable in the hazard profile for decision-making, does not fully match the real threats posed by these challengers, which are to be found in the field of technological disruption.

> *"Revolut is just a bank, right? I have an app on my telephone, and I have a card. Everything they do, whenever they produce something new, I like it. You nailed it!*

> *This is exactly what I have. Incumbents will never do that. They will ask, Where can we make money? And do you want any in another product, and do you want this and this?"* 23:17 ¶ 16 in FTf0301

Most challenger banks start with an unbundled offering that they later upgrade by adding new features to the same products. Though very successful in getting consumers' attention about their offering, pursuing this strategy does not guarantee a profitable business because fees on one single product are not enough to cover all expenses incurred. At some point, challenger banks need to make a move in the direction of retail products, no matter where they come from. To scale up, challenger banks need to expand their single offerings towards more traditional banking services like lending, mortgages, deposits, or credit lines.

> *"You have seen the same thing in Germany with N26 and with Raisin, who is trying to connect itself to the institutional world again. It is building a bank, but the other way around."* 22:18 ¶ 18 in FTf0201

> *"I spoke to a lot of people around Bunq, and it became clear that, when you are a challenger bank, it is difficult to finance your business with payments only. And there came the first discussion: should we attract savings money? And, if we have savings money, should we try to give small loans to people because they want to finance their businesses?"* 22:15 ¶ 17 in FTf0201

By moving in this direction, challenger banks must adhere to stricter regulatory regimes, which will increase their cost level in the end. That is going to be a challenge for them. All requirements in the fields of compliance, anti-money laundering, and KYC, for example, are already becoming an issue for challenger banks. Their profitability will decline, and, in the end, they will start looking more and more like any other traditional bank.

The UK-based Revolut, for example, one of the best challenger banks, still does not make a profit. The question is, therefore, why and when will they?

> *"Revolut is a very good example. When are they going to make money? I pay €5 a month, which is cool, right? But they cannot scale up. I will not go to €20 a month because the yield spread is zero, so they will not make money from interest rates, traditionally the big profit source for banks. They need to have it for a fee. The only way to scale up fees is by increasing your customer base. But at some point, that will kind of level out."* 23:30 ¶ 27 in FTf0301

4.4.2.7 A NEW FINTECH TAXONOMY

Reflecting from the perspective of an unbundled banking taxonomy, the conclusion that could be drawn is that there is not a single banking business model adaptation, but as many adaptations as business models in the FinTech taxonomy. Sometimes the value proposition is at risk; in others, technology is the challenge, namely IT legacy systems.

When asked about threats and opportunities for incumbents in FinTech innovation, the chair of the supervisory board of the equity investor 'inV01' structured his answer around the FinTech (banking) taxonomy in the table below.

TABLE 21: THREATS AND OPPORTUNITIES FOR INCUMBENTS

Taxonomy	**Threats**	**Opportunities**
Payments	Extension of the offer of traditional financial products and services to the 'unserved', namely in rural areas of Africa and Latin America, but not exclusively. Islamic banking. Digitalisation of products, e.g., cash and treasury management, online payments, transborder payments, digital invoicing, money transfers using crypto currencies.	Solutions for the reduction of costs. APIs for platforms. Artificial intelligence for assessment on personal finance and lending. Applications run in the cloud.
Wealth Management	For the unserved, because no profitable. New distribution channels, improvement of decision-making systems and risk management.	Solutions to improve the customer journey, like techniques based on game theory (for learning and reward).
Crowdfunding	Financing of small and medium enterprises (SME). Also, charities.	Digital distribution channels. Collaboration agreements with telecom and GAFA companies (Google, Amazon, Facebook, Apple).
Lending	Namely P2P lending without intermediation. Though regulation applies to the entire banking spectrum, P2P lending is a clear disadvantage for incumbents, subject to strict solvency requirements.	Customer identification programs (KYC). Control of microeconomic flows, from security of internal processes to anti-money laundering or the Payments Service Directive (PSD2).
Capital Markets	Real-time risk management	

Source: Interview inV0101

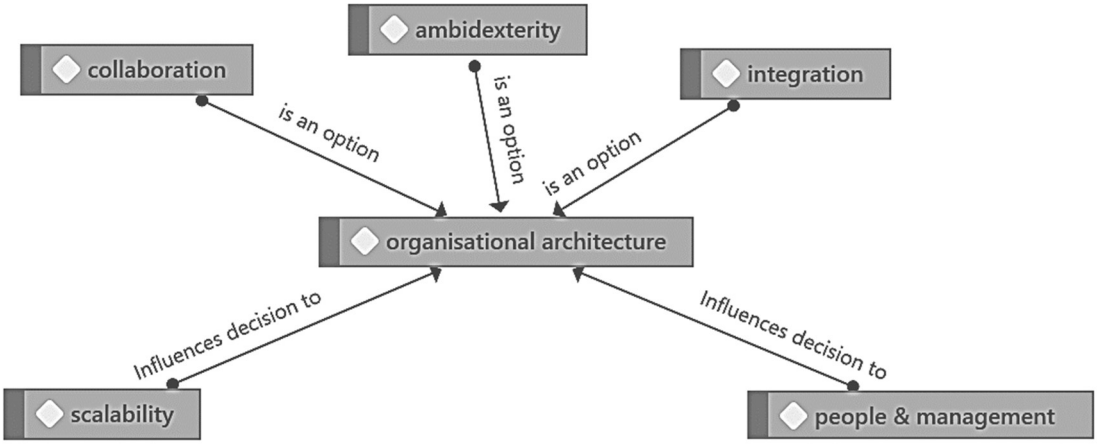
In a threat and opportunity context, FinTech firms represent the threat, and opportunities are the strategic responses to that threat that incumbents should undertake. From his answers, we can derive that the taxonomy goes beyond a pure classification of banking products to illustrate the different ways of earning income—the FinTech business models, ultimately. This could be regarded as an indication that the nature of the business model influences the decision-making about investments in FinTech innovation.

To a very large extent, FinTech firms trigger incumbents' need to come up with a reaction. This idea stands behind the selection of these two personae for the case study in this research.

4.4.3 Organizational Architecture

The third theme for data analysis is “organizational architecture.” This group consists of the following five subthemes:

FIGURE 14: NETWORK RELATIONSHIPS ORGANIZATIONAL ARQUITECTURE



Source: Database transcripts interviews in CAQDAS

There is general agreement among interviewees that a disruptive investment in technology is better done outside the incumbent organization.

> *"But if you do that in-house, in my experience, it is always going to fail because people have the habit of being conservative and not being able to go beyond what they already know."* 35:8 ¶ 9 in inV0301

The question remains, however, which organizational form is more adequate to exploit innovation. Simple integration is not regarded as adequate, as it could

disrupt the internal architecture of the bank in the end. Adapting the new organizational architecture could be an option as well, though banks are not willing to do that too soon because there is value in the legacy systems, the technology, the client network, and, most importantly, the reputation and brand image. The risk that this may go unnoticed is present, which explains why most banks explore these new developments beforehand through venture capital operations. In all cases, the innovation must be scalable.

4.4.3.1 AMBIDEXTERITY

Keeping different mindsets to set change, to set innovation, and to set disruption works better when separating them from the incumbent organization. It is a type of approach that works well when testing, e.g., innovation, to assess the chances of becoming successful as part of a learning process. According to the experiences of the participants, investments in technology are better when done outside the organization, and even better when the technological innovation is disruptive.

Ambidextrous organizations, however, are not that efficient in the case of technology testing. Failure is inherent to the testing, and, therefore, there is no guarantee that the ambidextrous organization will prevail. In addition, holding two organizations in place can be expensive. Monitoring innovation through a partnership structure does make more sense.

> *"Modern technology, new innovations—if you are an incumbent player, your clients are not interested in that innovation. And, if you want to do that, it means that you must support two business lines at the same time, e.g., the line of normal payments and the line of mobile payments. That means extra money. It does not save money at all."* 29:6 ¶ 12 in INC0401

4.4.3.2 INTEGRATION

Integration of a FinTech innovation generates friction that can undermine the potential for a successful implementation. Integration means time—the time required to integrate people, management, internal policies, and systems. If a FinTech firm, for example, needs to connect with bank apps, the business line at the bank they are willing to connect with must be well consolidated.

> *"For example, if it is not a very mature business, we are much more open to aligning with the business model of the Fintech firm. But if it is a very mature business at the bank, then we are quite strict on our requirements."* 26:43 ¶ 22 in INC0103

When the integration affects the whole value chain and value network of the incumbent, difficulties are even greater. Time is often longer than initially expected, and, therefore, it should be counted upfront in any valuation exercise because it could have a significant impact. Most of the time required goes, however, not in the acquisition phase but in the post-acquisition one.

> *"Another aspect of timing is how fast we can integrate and absorb the investment in the company (the fintech firm) and realise synergies and execution plans. After the acquisition, there is quite a lot of execution to be done, and that takes time, time that is always underestimated. E.g., integration changes, or additional innovation that you need to do after the investment"* 24:28 ¶ 34 in INC0101

4.4.3.3 COLLABORATION

Banks, still stigmatized because of the 2008 financial crisis, did tend to regard FinTech as a threat, which delayed them from embracing the innovation. To catch up with innovation, collaboration with Fintech firms is a legit option.

> "*You can also choose collaboration with a certain player. If we feel we are too late and they have the technology, we bring the clients. And then you have a collaboration model. We call it 'inorganic.'"* 24:23 ¶ 28 in INC0101

Entering a collaboration with a FinTech firm is not only an interesting option from an incumbent's perspective. FinTech firms and equity investors can also benefit from it. Participants from FinTech firms consider that their companies lack the expertise and funding required to bring their innovation to work within a limited space of time. They have remarkably high funding costs because their composition is mostly equity, which is more expensive for them, especially if the Fintech firm is one that offers complex financial products like lending or foreign exchange. In these cases, extra financing is required on top of the regular equity funding. A cooperation agreement with a bank can grant them access to cheap funding in 'abundance.'

Another topic that makes collaboration attractive to Fintech firms is the cost of acquiring new clients. What a FinTech firm needs to pay to get such a client base is very costly, and, in that sense, collaboration arises as a perfect 'win-win' situation. The challenge for a small start-up, of course, is how to keep your own processes efficient while being away from the ordinary organization of a traditional bank and benefiting from the client base they have.

Interviewees from equity investor companies also consider crucial the alignment[23] of the target FinTech firm with their own strategy. The executive director and portfolio manager of Global Financials & FinTech from equity investor 'inV07' referred to:

> *"In the case of investments, the company looks to see whether the target project matches any of the following three main global trends: one, ageing, as large layers of the population are ageing very rapidly; two, digital, as the world is digitalizing fast; and three, emerging markets, growing faster due to lower penetration of financial products. Regarding FinTech specifically, our company is interested in new developments in payments, infrastructure, companies providing technological solutions to banks, and data analytics."* 39:2 ¶ 8 in inV0701

From there, various elements could be considered relevant, namely, the capacity to adapt or align business models to each other, the quality of the management, the consequences for legacy systems, the need for a clear financial plan with scenarios, and a capital plan. Equity investors in FinTech companies want to see growth after a certain time, at least in client numbers, and positive cash flows. If the investor cannot bring these things to life because they lack the expertise to do so, they can seek cooperation with the traditional sector. Does the FinTech firm have the freedom to grow under the umbrella of the incumbent? Or does the FinTech firm need to commit to certain internal policies or procedures? These are the discussions that are currently held prior to establishing collaboration agreements between incumbents and FinTech firms or investments by incumbents in the latter.

On the incumbents' side, the discussion is about the option to either buy an existing firm with a proven client base and acceptable market share, though not having the new technologies, and then upgrade it to the new technological infrastructure, or to step into a FinTech start-up with a new state-of-the-art technology but no client database. Success is, however, not guaranteed. Stepping out of a failed adventure is easier when the incumbent is engaged in a collaboration with the FinTech firm rather than an equity investment. In the event of failure, aborting the operation is more difficult. The idea is to pursue innovation with minority participation.

> *"We call for collaboration setup or we take a minority stake that is so small that it is below 10%. And then we will see if it is a successful partnership. Then we can also step in later for a bigger stake."* 24:14 ¶ 17 in INC0101

[23] Strategic alignment is the subject of Section 4.4.1

In cases of collaboration, incumbents and their partners must speak the same language and follow a similar pace despite eventual differences between them. Tempos are different, however. While banks are on the slower side, FinTech firms try to weigh the struggle, improve their processes, and align with incumbents' stricter requirements. There must be full commitment and alignment, especially if the collaboration includes personal transactional data sharing. Risk and IT security are key in these cases. And, of course, a shared vision from the 'people' on both sides.

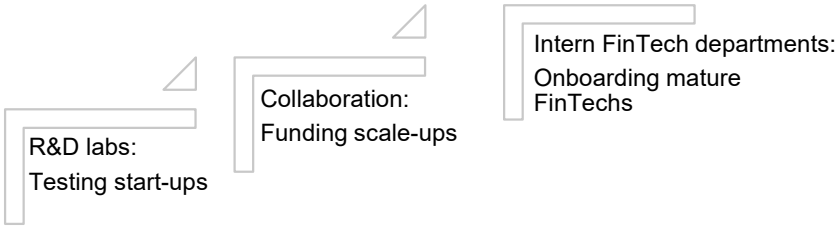
> *"Strategic alignment is one of the most critical things. That is the core of the collaboration. If you have the same end goal, and the same models, even if they are slightly different, we try to make it as common as possible. Because if you are not going for the same goal, then maybe, even if it is not in the first stages, once it becomes more entangled within the organization, then you get big issues."* 26:16 ¶ 20 in INC0103

Banking regulation[24] plays a significant role as well. If it is vague, then it is also hard for all parties involved to know how the ecosystem will turn out in a couple of years. More clarity is better for both sides—clarity that only the regulator can provide. In this sense, the role of the regulator clearly influences the path towards collaboration. The more innovative the regulator, the better for the whole ecosystem, for new entrants seeking collaborations and partnerships with incumbents, and for the onboarding of their own customers by the latter.

Regarding the specific forms of monitoring the collaboration, representatives from incumbent banks share a common structure in which the innovation is monitored at different layers, each one representing a different stage in the lifecycle of the FinTech firm. In the first layer, represented by the 'labs', incumbents work on 'ideas'. They aim to either turn their own ideas into viable companies or help start-ups with their own developments. In the second layer, incumbents are open to collaboration with scale-up firms searching for funding to become financially viable. The third layer consists of activities initiated by incumbents' FinTech departments towards more mature firms with the ambition to directly onboard both technology and customers into one of the business lines of the bank.

[24] Subject of Section 4.2.4

FIGURE 15: MONITORING THE COLLABORATION



Source: Author, based on interviews

From the perspective of the FinTech firms, this way of collaboration also makes sense, as their funding costs are more expensive because they are mostly equity. In cases where the nature of the business requires an extra funding base next to equity, like crowdfunding activities or foreign exchange products, collaboration with incumbents even makes more sense.

Finally, equity investors collaborate with FinTech firms in a similar way, though they lack the knowledge of the banking business that commercial banks have. For this reason, it is not that rare to see equity investors seeking to enter collaborations with incumbents. The table below shows how incumbent 'INC05' monitors internal and external innovation activities.

TABLE 22: MONITORING THE INNOVATION FROM THE PERSPECTIVE OF AN INCUMBENT

1	Technological Observatory	1. A collaborative sandbox with the central bank. 2. Proof-of-Concept, an internal initiative to stimulate collaboration with providers of FinTech innovation, namely start-ups, to test products and services offered by them. The Proof-of-Concept framework ensures the quality of the testing environment at the most adequate level of costs, risk, and use of internal resources. 3. Specific projects
2	Open Innovation	4. Launch Accelerator, an open format of collaboration consisting of a driving corporation and several facilitating organizations. Once the driving corporation presents a challenge, the accelerator seeks start-ups willing to take that challenge. The facilitating organizations support these firms further when addressing the challenge. 5. Start-Ups Program.
3	Intern Entrepreneurship Program	6. For the development of projects initiated at the Launch Accelerator.

Source: Author, based on information provided by interviewee INC05

4.4.3.4 PEOPLE AND MANAGEMENT

There is a common understanding among participants that FinTech is not only about customers' ability to comprehend new technologies but also about employees' ability to follow technological developments. It is about the legacy mindset, not only the systems. For people, it is much easier to stay with the old way of working than do something completely new. In addition, incumbents have too many layers in their organizations, too much bureaucracy, and it takes longer to make decisions. The management teams engaged in innovation must be open and willing to look for new opportunities.

> *"The organization itself? It is key, as most existing staff have a habit and even a drive or a desire to keep things as they are. Most people are comfortable with no change. It is human nature to embrace that"* 35:15 ¶ 15 – 16 in inV0301

People at traditional financial institutions are extremely risk-averse. Regulation also changes how people behave; it touches upon people's behaviour because of the penalties and fines you can eventually get. The combination of these two factors, for example, is an important aspect to explain why incumbents behave as they do—low profile.

> *"And hence, there is a natural tendency to 'stay' below the radar screen, to fight innovation, to fight disruption, to fight change. If you are in the driver seat of a company, you need to be very much aware of such tendencies. You need to think properly, how I deal with that?"* 35:16 ¶ 16 in inV0301

The new sorts of employees required to exploit the innovation are scarce or difficult to find. There is a real 'war on talent' at this moment not only in the banking industry but in the whole financial sector. Financial institutions are looking for employees with soft skills, namely flexibility, adaptability, and eagerness to learn.

During the 2021 FMA[25] Virtual European Conference, Professor John Kose, from the Leonard N. Stern School of Business, New York University, closed his session on FinTech making a call to educational institutions to provide them with the talent to cope with the current shortage of specialists in the FinTech field (Kose, 2021).

Regarding the valuation, interviewees agree that it is about the management of the firm, whether decision makers believe that the management is or will be able to

[25] FMA stands for Financial Management Association

execute the plans. The management is responsible for attaining the right growth and profitability margins in the future. In the experience of the partners' assistant at equity investor 'inV05', venture capitalists do not use discounted cash flow techniques for their decision-making. Forecasts provided by start-ups are not accurate, there is no accuracy at all, as they are of the kind 'hockey stick' forecasts. In the end, it is about the management of the firm: do you have confidence in the management? Do you believe they are, or will be, able to execute their plans?

> *"For instance, I think the quality of staff and your judgement on whether they will stay if you buy a disruptive company is more important than the pricing derived from a real options model based on the Black Scholes equation."* 35:34 ¶ 37 in inV0301

In the words of the same representative of an equity investor, 'inV05', the quality of the management is everything, whether they believe in what they are doing or not, and the investors believe that they can achieve their goals and deliver.

> *"The worst situation you could have been one in which you have a target company with a good and attractive customer base but unreliable due to mediocre management. You still may achieve your goals, but it is going to be more difficult."* 39:7 ¶ 11 in inV0701

4.4.3.5 SCALABILITY

Either as an incumbent or a FinTech firm, the ability to scale up innovation is a necessity. At some point, and regardless of where they come from, all challenger banks make a move towards retail products like mortgages or lending. A common perception among interviewees is that innovation remains very cool up to the point that it is not cool anymore. Banks keep fighting the intruders, and the only way for FinTech firms to become profitable and survive is through their ability to scale up.

Scalability is the point where FinTech firms meet incumbent banks. It is intrinsic to the nature of the first to be very creative, though they do not know how to scale up. Banks, on the contrary, know how to scale up but are missing the creativity to lead innovation.

Nevertheless, whether they opt for the option 'make it' vs. 'buy it,' or they are out for collaboration or equity investments, incumbents regard the potential for upside as a precondition to any further consideration of the innovation.

In the case of collaboration, which often ends with the incumbent taking a minority interest in the FinTech firm, there is overall agreement on the following three conditions: First, the potential to collaborate and to learn from the relationship must be truthful; second, the potential for an economic upside must be a 'real' possibility; and third, holding a minority interest is desirable by both parties.

> *"The second one was the potential for upside. That is because you only want to make it if you see that upside. What we typically did was take an interest around 5% in such a company. Not extremely high but small minorities to not to have to interfere with"* 28:19 ¶ 17 in INC0301

In the case of equity investments, the type of business and its proximity to the core of the legacy systems can negatively influence the integration of the innovation. A transformation initiated from the 'front end', which is often the case with FinTech innovation, only makes sense when the architecture of the 'back end' can consistently be aligned by the integrator. And even when there is perfect alignment, the added value of the transformation resides in the technological part of the innovation. Therefore, the importance of scalability when evaluating innovation.

> *"A simple integration is not adequate as it could disrupt the internal architecture of the bank in the end. It must be scalable. A bank that was able to solve this alignment between the back end and the front end using a scalable technological innovation, could become a leader within the financial ecosystem."* 31:10 ¶ 13 – 14 in inV0101

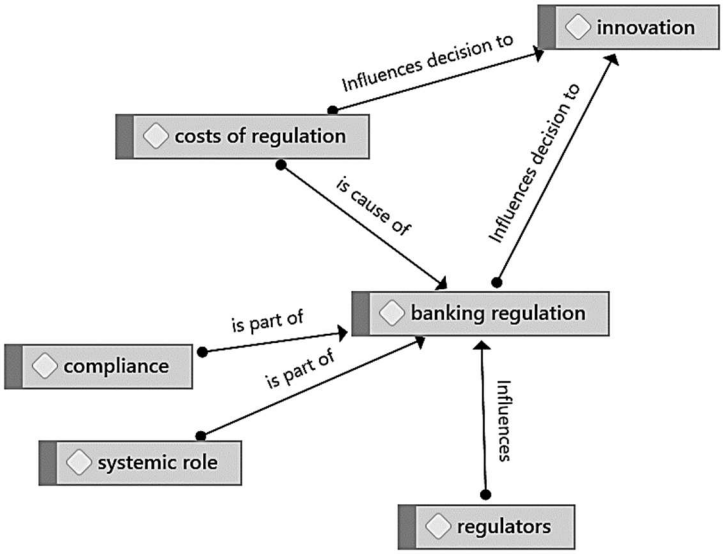
Scalability is also a relevant component in any valuation exercise when putting a price on the investment in innovation is required. Equity investors look at innovation from the perspective of the lifecycle of innovation. Though it is agreed that the best position to start with is at the 'maturity' stage, what investors are looking for is the capacity for scalability of the target firm. The threshold between the 'emergent' and the 'maturity' stages is, therefore, the ideal starting point. Incumbents look different from the business perspective, as this is more correlated with the proximity of the banking products to the legacy systems, which is considered a determinant factor for any successful integration.

> *"It is also dependent on the kind of business. So, for instance, if it is closer to lending, we also made different assessments. It is more logical to look at price-to-book because lending is typically less scalable than other businesses and if it is more decorrelated than when you are closer to valuations often used for, e.g., SaaS companies"* 28:23 ¶ 25 in INC0301.

4.4.4 THE REGULATORY FRAMEWORK

The fourth theme for data analysis is the “regulatory framework.” This group consists of the following five subthemes:

FIGURE 16: NETWORK RELATIONSHIPS REGULATORY FRAMEWORK



Source: Database transcripts interviews in CAQDAS

4.4.4.1 COMPLIANCE

All three participating ‘personae acknowledged that banking regulation is becoming increasingly important in the decision-making process about FinTech innovation. Banks are proud of banking rules and regulations; they are inherent to the banking industry, and they feel protected by regulation despite frequent discussions with regulators. Although there is no different legislation for FinTech companies than for banks, the latter also see that regulation may become a hurdle in their approach to FinTech firms. Nevertheless, compliance also has the advantage of becoming a barrier to other entrants. You have it, and your competitors do not.

In Europe, despite the European Commission’s will to foster innovation in the financial services industry, the European regulator is imposing too many rules in the eyes of FinTech firms. Paradoxically, while consumers make transactions seamless, other leading actors in the Fintech ecosystem still go through contracts in a much longer way. ‘Legal’ is in the way, hampering further developments.

On the incumbents’ side, the challenges of regulation are both about the time spent on onboarding clients and the reliability of the data collected. The recent

announcement from the Global Legal Entity Identifier Foundation (GLEIF) that over half of front office staff spend 27% of their average working week onboarding new ‘clients’ highlights today’s widespread organizational challenges around data set-up and data quality. The GLEIF’s research shows that 50% of financial institutions use, on average, four identifiers to help identify client organizations and that the onboarding process takes, on average, six weeks. Fifty-seven percent (57%) of respondents also agreed that the reliability of referenced data is a challenge. The pressure of these new rules and regulations on the costs of operations is getting so high, that it could even force banks to stop onboarding new customers.

Among the full array of banking regulations, compliance with Anti-Money Laundering Directives (AML) is the one that absorbs most of the time and money of incumbent banks, as KYC and the corresponding customer due-diligence process are highly labour-intensive activities (Holland Fintech, 2022). Whatever other priorities, there is overall agreement that banks will have to integrate the delivery track of the KYC technology within the existing IT infrastructure and the global KYC business, namely CD lead screening and lead transaction monitoring.

> *"How are we going to keep up our commitments to the regulator? What do we want to become in five years, moving from rule-based to an AI-based overall KYC machine?"* 26:4 ¶ 13 in INC0103

As a FinTech firm, there is not one single modus operandi when approaching regulation. There are companies that, after encountering difficulties entering these highly regulated ecosystems, restrict their activities to stay outside the radar of regulation. They choose to deliver their products to regulated entities instead. Another way is to stay compliant, though without a licence, by simply following all the rules and regulations. Investors in these companies know that their target companies adhere to the legislation because they are under the regulation of the central bank themselves. A third development is to enter a joint venture with a licensed institution to deliver our own products and services under the regulatory umbrella of the venture. A fourth development is when the FinTech firm itself obtains a licence. A fifth category starts from the other side when the firm has a banking licence and decides to step out of the traditional way of doing things. The bottom line is that not all FinTech firms carry and charge the costs of regulation in the same way.

> *"Revolut is probably the only challenger bank that does better in this respect, monetizing the regulation by means of paying the overheads created from the interest margin."* 40:5 ¶ 10 in inV0801

Investors in FinTech innovation are also sensitive to regulation. When a due diligence process produces adequate evidence that good policies and internal procedures are in place and that there are no pending fines from regulators, all this will be regarded as a plus compared to acquiring a firm with a more questionable reputation.

> *"If you are regulated, if you have already gone through that pain, your organization is then well equipped for that specific regulation. This can be a strategic advantage for a bank investing in a FinTech."* 38:7 ¶ 12 in inV0601

The overall perception is, nevertheless, that high regulatory pressure may favour investors' strategies to gain dominant positions in specific markets. As expressed by the CEO of the Global Financials/FinTech department at investor 'inV007':

> *"Regarding FinTech, our company acknowledges the existence of higher levels of regulation or regulatory pressure in this specific ecosystem. On one side, you could regard this as negative. On the other side, you could argue that your internal control mechanisms are very intense when the regulatory pressure is very high, which in the end makes it easier for you to get into a monopoly or duopoly position."* 39:10 ¶ 14 in inV0701

Finally, regulation plays a fundamental role in the valuation of investment opportunities, as we could argue that heavier regulation leads to higher discount rates. The real issue with regulation is getting confronted with unknown regulatory items. One option when approaching investments in such scenarios is to spread the risk by using holding structures, which explains the popularity of such structures within the FinTech ecosystem.

4.4.4.2 REGULATORS

When operating within a highly regulated industry, the position of the regulators, namely the central banks and related market authorities, becomes the centrepiece of the regulatory framework. Despite their claim to be supportive of FinTech innovation, the role of these regulators remains controversial.

> *"The original idea of Blockchain was to get rid of banks altogether and the regulator, particularly the regulator. And you know, to have everything organized by*

> *themselves. That is the philosophy behind blockchain. But it is an extremely complicated process to execute it. I do not see replacing the traditional payments at any moment in time happening. That will not happen."* 29:21 ¶ 106 – 107 in INC0401

Collaborative sandboxes with central banks, e.g., initially meant to stimulate innovation, often work counterproductively due to delays in the provision of feedback, monitoring, and supporting mechanisms from the central banks. On other occasions, when the savings of the customers are at stake, the regulator steps immediately into action. Moreover, not all regulators are innovative. The Monetary Authority of Singapore, a frontrunner in this respect, has recently launched an ESG hub to spur collaboration within the industry on this topic (Holland Fintech, 2022).

> *"Regulation is especially important, and if you have innovative regulators, like the one in Singapore, that are really playing a leading role in the innovations, they are quite pioneering in creating those regulations. The better the regulator, the more innovative the regulator, the better it is for the whole ecosystem."* 26:28 27 in INC0103

Requirements for market entry are also important due to discrepancies in the interpretation of regulations at a country level. The Dutch regulator, for example, is fair but strict. Lithuania is more lenient in applying regulation as the country pursues an active policy to attract FinTech firms. Finally, the willingness to face the risks associated with innovation can also differ between regulators.

> *"I think it may play a role. It also depends on the risk appetite of the bank. The Dutch are quite innovative but, at the same time, very risk-averse too. You do not see Dutch banks very much pioneering, let us say, in crypto execution. You see it more in the UK or the US, where the regulations are a bit less strict, and the consequences are a bit less strict as well."* 26:36 36 in INC0103

Central banks are so worried about their own image and reputation that they prefer to stick with the old rather than give it to the new. One of the interviewees brought forward the case of Bunq, a Dutch challenger bank. DNB[26] fined Bunq due to their refusal to implement legislation already in force in the Netherlands regarding anti-money laundering (AML). DNB considered Bunq's method of customer verification for AML purposes inadequate. Bunq's CEO argued in his defense that their

[26] DNB: De Nederlandsche Bank (Dutch Central Bank)

algorithm for screening private customers, based on artificial intelligence, granted superior reliability to this process. DNB took Bunq to court, and the challenger bank appealed. At the time of writing this paper, the 'Trade and Industry Appeals Tribunal' of the Netherlands (CBb[27]) ruled in favour of Bunq on this appeal (October 18th, 2022). DNB's reaction to the Court's ruling was posted on its website the same day.

> *"We will assess the ruling and explore its implications for our supervision. We will also take the ruling regarding 'onboarding' into our dialogue with the financial sector on risk-based compliance with statutory requirements and the use of technology to combat money laundering"* (DNB, 2022).

4.4.4.3 Innovation and Banking Regulation

A well-aligned regulatory framework has many advantages for fostering innovation. The role of the European Commission in the creation of a common framework for FinTech innovation at a European level has proven to be a positive trigger for innovation in three very specific subjects, namely open banking, digital payments, and data access.

Specific banking regulation always plays a role when considering collaboration with FinTech firms. Banks are bound by many requirements and regulations. It is in the best interest of banks and FinTech firms to acknowledge this fact as a first step before making explicit any intention to collaborate.

Regulation constantly evolves, and legislation on FinTech is no exception. Most innovations are on the asset side rather than the liability side of incumbents' balance sheets. Savings are liabilities for the bank and, therefore, heavily regulated because it is the money of the consumer that comes in. On the contrary, the regulation of cryptocurrencies is lagging and, therefore, regarded by banks as a hindrance to innovation.

> *"Regulation is one of the key issues when addressing innovation. The idea behind the establishment of joint ventures with FinTech firms is just to circumvent potential complications derived from the application of banking regulations."* 30:10 ¶ 23 in INC0501

Regulation is a subject where many investment opportunities fail. FinTech firms go for innovation and entrepreneurship, but even when banks take a minority interest in

[27] CBb: College van Beroep voor het bedrijfsleven

those firms, there are still many internal policies based on banking regulation that will be applicable to them. And the smaller the FinTech firm, the worse. The bigger and more successful the collaboration, the more the activities will be regulated. From the incumbents' side, it is the issue that they most care about, the one that makes it difficult for incumbent financial services companies to embrace the disruption and explains why incumbents prefer to invest in different forms of collaboration. As the Chair of the Supervisory Board of a large international investment bank expressed during his interview, the contradiction here is that innovation and regulation are directly opposed terms.

> *"I would say that it should not play so large a role for new ventures and new companies with disruptive strategies because you can only disrupt when you are allowed to break the rules. If you cannot do that, then it is not going to be disruptive. But that is only on the part of the incumbent. And for sure, in finance, regulation is the dominant theme."* 35:18 ¶ 18 in inV0301

4.4.4.4 Systemic Role

One of the missions of commercial banks is to provide long-term capital and short-term liquidity to participants in the financial services industry. The importance of this mission partly explains the high level of regulation in the industry.

> *"The bank is systemically important, hence ECB-regulated. And if you look at the amount of time that we spent with all the reporting on compliance, combined with the fact that it has no credit portfolio because that is not what we do, we are still regulated. It is amazing."* 35:23 ¶ 20 in inV0301

The Supervisory Board Member and former CEO of a FinTech bank believes that this systemic role is intrinsically linked to banking products like mortgages, a big cornerstone of retail banks. Money, as such, is not systemic at all. The mortgage is a long-term 'affair,' 30 years in the Netherlands, for example. For a mortgage, customers remained tied to a commercial bank until they decided to sell the house. This relationship, the only systemic one for commercial banks, is not going to change with FinTech innovation. As long as FinTech firms do not get to the mortgage portfolio, the system is still in place. Mortgages are so highly regulated that you cannot start as a mortgage provider; you need to partner with one of the traditional banks or become one yourself. In addition, all savings accounts are covered by the deposit guarantee scheme, which means that the government backs

up deposits up to EUR 100,000[28]. If a bank fails, only one in one hundred people would lose in this situation, as this is the number of holders of accounts above the guaranteed amount.

> *"Revolut or ADYEN are suddenly kind of this unicorn company. They make payments, a commodity. They are not even an infrastructure company. If they go down tonight, you and I can make a payment. There is nothing. There is no systemic risk going on."* 23:38 ¶ 34 in FTf0301

4.4.4.5 RegTech

All participants agree that complying with banking regulations is very expensive. Among the full array of banking regulations, compliance with the Anti-Money Laundering Directive(s) is the one that requires the most time and costs the most money.

> *"And I think I would not be surprised if ABN AMRO says that 10%–15% of their cost base is KYC, anti-money laundering, AFM, or credit risk modelling related. You can kind of make a weighted average."* 23:54 ¶ 37 in FTf0301

Data Process Automation (DPA), supported by the proliferation of application programming interfaces and regarded as a kind of 'glue' between legacy systems, could alleviate these long-encrusted bottlenecks. The question is then why all internal processes are not yet automated and fewer people on the incumbents' side are working on the monitoring of transactions. As an example, one of the Dutch systemic banks announced in 2021 the recruitment of 5,000 employees to cope with the challenges posed by stricter anti-money laundering requirements. Not a single word about the role of technology was added to this note.

Despite incumbents' reluctance to accelerate this transition, higher costs due to increasing and changing regulation have created opportunities for FinTech firms specialized in this field, e.g., identity (biometric) verification and mobile capture of data. In this way, these RegTech firms are taking an important first step towards the digitalization of commercial banks.

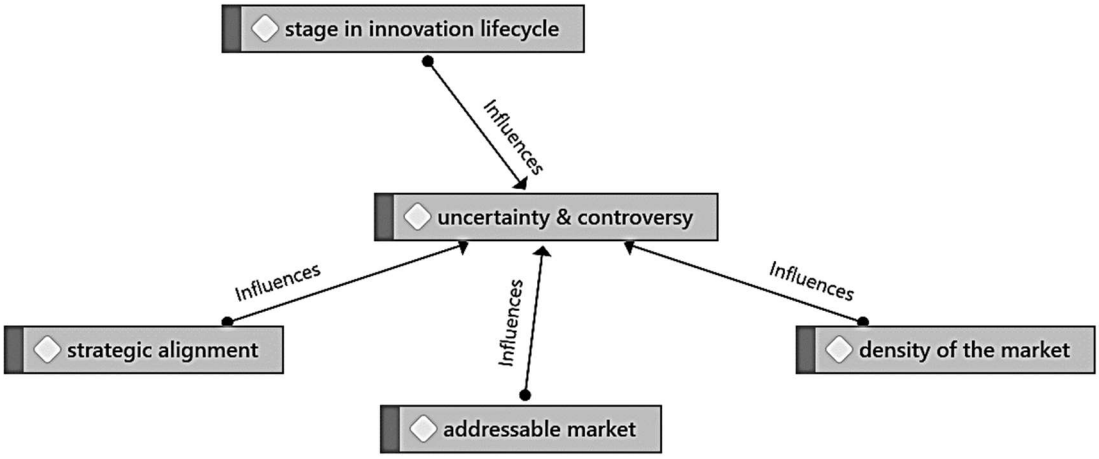
> *"KYC technology is not always a single view. We transition to position ourselves as a tech company, and not as a bank and that puts tech in the lead of quite a few decision aspects."* 26:45 ¶ 11 in INC0103

[28] In the Netherlands.

4.5 HAZARD PROFILE: FACTORS OF INFLUENCE

The fifth theme for data analysis is the “hazard profile,” meaning the degree of uncertainty and controversy associated with the decision-making regarding the entry timing. This group consists of the following four subthemes:

FIGURE 17: NETWORK RELATIONSHIPS HAZARD PROFILE



Source: Database transcripts interviews in CAQDAS

TABLE 23: DEFINITIONS OF THEMES FOR DATA ANALYSIS

Theme	**Definition**
Strategic Alignment	The capacity to align the business model of the innovation project with the current strategy of the incumbent
Addressable Market	Presence of alternative innovation projects to the one being considered by the incumbent
Density of the Market	Presence of active competitors in the same market segment of the project considered
Stage Lifecycle Innovation	Stage in the innovation lifecycle at the time of considering the investment: emergence, maturity, growth, saturation. Based on S-curve pattern of the innovation, where: Y = growth, X = time

4.5.1 STRATEGIC ALIGNMENT

When considering FinTech innovation, being everywhere is not an option for a bank; banks need to have a clear strategic fit first. How innovation fits incumbents' strategies is, therefore, critical, especially when considering that many commercial banks are listed companies and that alignment with their shareholders is a requirement.

> *"It has a substantial influence on us. In fact, all our investment or acquisition analyses start with the question of the strategic fit with the strategy of our bank, from a client perspective, from a product perspective, and from an operations perspective. And, if the strategic fit is not there, we will simply not look at the file anymore. So, we need to have a strategic fit first."* 24:7 ¶ 11 in INC0101

The decision on where and how to start with the innovation is, however, a little bit of a trial-and-error exercise in strategy. Banks aim to test and confirm some classic components of the decision-making process about investments, like the capacity to align the business model of the target company with the own business model, the financial feasibility of the project, the quality of people and management, the consequences for IT legacy systems, the commitment to comply with internal policies or procedures and external regulation, and the valuation analysis followed by a due diligence investigation.

Sometimes, the intuition of the decision-makers can be the first step that triggers the decision-making, even before they start putting together numbers to justify the investment. Alignment with shareholders is often a prerequisite. In any case, while items on the checklist to test the adequacy of the investment in innovation may differ between participants in this research, they all agree that strategic alignment is not only a fixed component on the list but one that always comes first.

Strategic alignment, based on the factors introduced above, becomes even more decisive when seeking to establish a relationship between incumbents and FinTech firms. Sharing the same end goal can prevent future trouble, which is irreversible when the collaboration is in full progress and entangled within the incumbents' organization. Does the FinTech firm have the freedom to grow under the umbrella of the incumbent? Is the FinTech firm willing to commit to certain internal policies and procedures? Is there a common ambition to create new business lines? These are examples of questions that need to be addressed before formalizing any collaboration agreement between incumbents and FinTech firms.

4.5.2 ADDRESSABLE MARKET

Market size, or the total addressable market, is one of the subjects where opinions between incumbents and equity investors differ the most. Participants from incumbent banks consider the size of the total addressable market less relevant for decision-making than in the case of equity investors. Incumbents should preferably look at investments that add strategic value to them. In that respect, it does not matter whether there are ten or a hundred players available. If the bank needs innovation to either serve its clients better or for the overall execution of the strategy, banks will try to get it regardless of market size, just because that specific capability is missing.

> *"Market size? Meaning the number of potential fintech firms 'available,' either many established players, or just a few or only one. It has no influence on the decision-making."* 25:7 ¶ 16–17 in INC0102

> *"What about the market size? Yes, I think there is a difference between us as a bank or an incumbent player and, let us say, a venture capital firm"* 24:15 ¶ 19–20 in INC0101

Some nuances are required in the approach to a FinTech firm by an incumbent. When aiming for a partnership, for example, having more partners available in the marketplace is better, especially when the FinTech firm swings between growth and saturation in an S-curve context. If the incumbent regards the FinTech firm as an 'equity investment,' then the bigger the market size, the lesser the potential becomes. From an investment point of view, it is better to have a smaller number of target competitors in the same field. In this respect, the approach of incumbents to the investment is like the one followed by equity investors.

> *"That, of course, plays a significant role. It plays a different role if you are planning to partner or invest. If you are planning to partner, I think the bigger the market, the better it may be, because then there would be more standardization. There could be more flavours that we can choose that better align with INC01's goals. You have more options, and then it also means it is becoming a market standard."* 26:30 ¶ 30 in INC0103

A second nuance is that innovations will become less disruptive the moment the market matures, and more companies come in. The innovations will then become more incremental, which will negatively affect the value of the investment.

For equity investors, the size of the addressable market is also relevant, though in a unique way compared to incumbents. Equity investors that prioritize the return on their investments are not keen to invest in cases of market saturation, like with 'payments,' for example. Equity investors do not want to be present in a market when the growth potential of a target FinTech firm is limited by saturation in that market. Equity investors look at markets that are not yet well developed but where future growth could still be achieved.

> *"Market size is relevant as it is an indication of the growth potential of the market you are investing in. When growth potential is one of the determining factors in decision-making, market size really matters."* 39:12 ¶ 17 in inV0701

Market saturation plays a different role when equity investors follow a portfolio strategy. In this case, the presence of several investment alternatives makes the investment more attractive to them.

> *"If you looked at something disruptive, it was not that you had alternatives, ABC, who all served the same purpose. You could look at Company A doing X and Company B doing Z, different things. And then what I have done is to build a portfolio of disruptive things and not so much make a choice between them."* 35:26 ¶ 24 in inV0301

4.5.3 Density of the Market

The density of the market and the presence of other incumbents interested in the same kind of innovation have significant importance. Before doing the valuation, whenever incumbents look at opportunities in innovation, they care about what their competitors are doing and who may be likely contenders in the race for that specific investment opportunity. They talk with investment banks. Competitors are not only other incumbents but also FinTech firms and big technological firms. The decision to invest will be positively influenced in cases where the innovation is close to becoming a market standard. When the perception is that a majority has already embraced the innovation, those who have not yet entered will want to follow, as nobody wants to have a shortcoming in their product offering. In these cases, the density of the market accelerates innovation.

> *"The number of active competitors in the same segment of the project considered plays a role when it comes to doing investments in Fintech innovation. Banks are investing more comfortably knowing all their counterparts are also entering that field."* 26:33 ¶ 33 in INC0103

As a matter of fact, whenever incumbents try to adapt or reinvent their business models, the first step should be to identify the competitor's model. In the FinTech environment, incumbents' competitors are not exclusively firms with a background in the financial services industry but also companies outside their value network. Big technological companies have proven that they have the technological capacity to offer financial services themselves. The way they do it is different, however. These companies enter the innovation as a complement, e.g., to facilitate the payment of their own products and services. It is at a later stage that they realize the potential to expand from there, going beyond the boundaries of their core businesses and becoming a financial institution in 'disguise.' Insurance companies, for example, also behave in this same way, namely in the payments segment or in mortgages.

From an equity investor's perspective, participants consider the density factor less important than regulation and market size. Investors follow their own strategy based on specific criteria, namely finding good companies with good-quality cash flows that match the strategic profile sought at the right price.

> *"Does the presence of other incumbents interested in the same kind of fintech firms have any influence on my decision-making? No, I mean, I have never been triggered by that. I would even put it the other way around."* 35:27 ¶ 25–26 in V0301.

The density of the market can also turn into a negative factor in the event of massive capital inflows. This was the case in the year 2021 when equity investors put a record amount of USD 127 billion into investments in FinTech firms (KPMG, 2021).

> *"Nevertheless, the density of the market does play a role in situations of high saturation of the market. In that case, it may indeed have a negative influence on the decision-making process because it can push prices up, which in the end results in higher valuations. This goes against the strategic target of investing in good companies at the right price."* 39:15 ¶ 21 in inV0701.

Interviewees shared their conviction that the situation in the FinTech markets is getting back to normal these days and that investors are truly interested in going back to the right fundamentals and promising returns. The market is getting more realistic now, swinging from the initial risk appetite for FinTech firms to a moderate level of risk aversion.

4.5.4 Stage in the Innovation Lifecycle

Like any other business, commercial banks have different ways to develop new products. Some of them do not want to be at the forefront of innovation and choose to wait until it is well developed before stepping in. Other banks, on the other hand, feel comfortable taking the lead in innovation by either integrating or collaborating with FinTech firms at an earlier stage.

> *"I might like a mature company that is free of issues. You know, I do not want to be at the forefront. I would rather have a well-developed, almost-finished product. So yes, I like that, and I am going to make the investment there. While other banks are at the forefront and say, I want to get ahead of a new fintech company, more often, banks do both. They have one budget, and they invite Fintech firms to do development in a small environment. Bigger developers take on more mature companies."* 29:20 ¶ 103 in INC0401.

It also depends on the purpose of the investment. Commercial banks may want to approach a FinTech firm either because they believe it might disrupt the industry and hope that it will continue growing in the future or because they want to integrate the firm to use the technology. These are two different perspectives, driven by incumbents' belief that integrations in technology do not work well, and FinTech is not an exception to this belief. When viewed this way, the size of both incumbents and FinTech firms plays a considerable role in decision-making.

> *"Timing is related to size. For our bank, it is easier because we can wait a bit to see if the development is interesting and then step into it. It also depends on the size of the company. So, if you are bigger, then you should start quite early in adapting."* 28:38 46 in INC0301.

That the size of Fintech firms plays a role can be seen in the way incumbent 'INC05' monitors innovation using a framework based on the S-curve model. FinTech firms are followed over their lifetime and monitored based on their level of improvement and progress. On the lifetime axis (Y), innovation activities are classified into four different size categories: emergent firms, firms at maturity, firms at growth, and saturation. On the progress axis (X), projects developed by FinTech firms are classified into two groups: innovation and business. Projects classified under the stages of emergent and mature are labelled as innovation projects and fall under the responsibility of the 'Technology, Processes, and Operations' department. Projects classified under the stages of growth and saturation are labelled as business

projects and fall under the responsibility of the Product Development Department of the corresponding business unit of the bank embracing that innovation. To check on the adequacy of the choice for a specific company or companies, banks look around to see what other peers are doing.

> *"I think Germany and the Netherlands care more about the robustness of the investment and how it is going to turn out than the timing. We try to see what the other banks are doing, how they are performing, and then, accordingly, enter a much safer environment after they know about plan A, plan B, and plan C."* 26:37 36 in INC0103.

Another factor of influence in the decision-making process to embrace innovation is when incumbents behave as investors. All equity investors interviewed agreed that the importance of entry timing, though still very relevant, depends on the specific profile of the investor and the purpose of the investment. In this respect, the stage in the lifecycle of the innovation is less important for them. While small equity investors focus on small targets using a portfolio approach to diversify their risks, larger equity investors step forward when they truly believe that the innovation is disruptive and, therefore, more likely to ensure the growth potential and earnings capacity required to recover the initial investment, which, in the end, is the main trigger for their decision-making on investments. From this perspective, small investors focus on the emergent phase of innovation and large investors on the mature phase, with special attention to the scalability of the target firm.

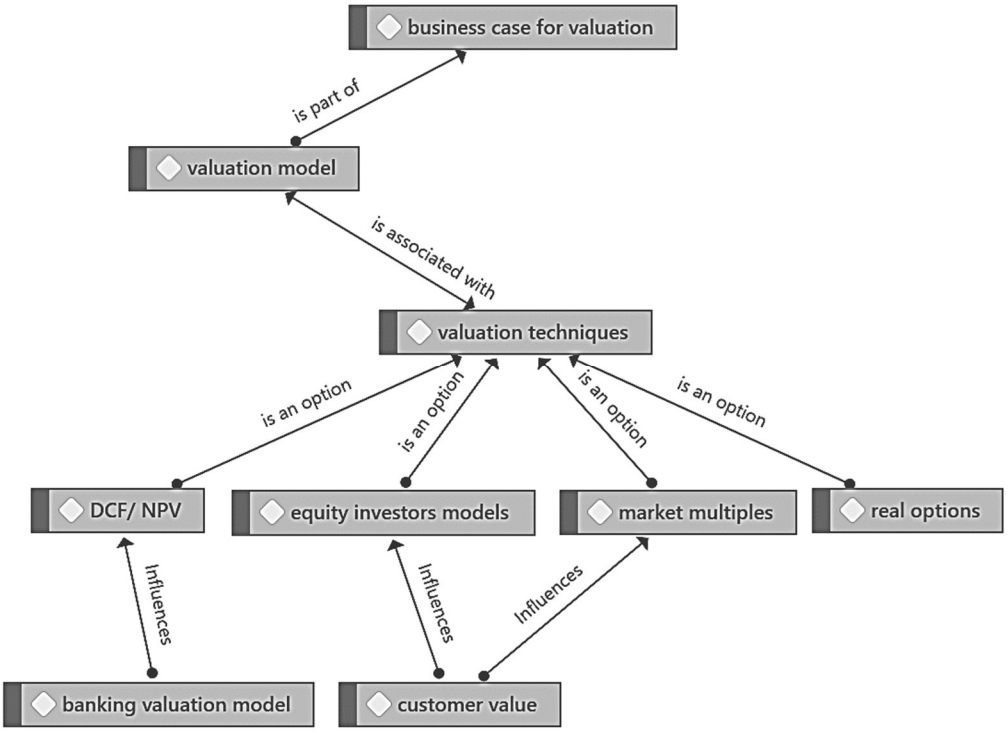
> *"Venture capitalists and private equity firms may be interested in small, unprofitable companies in the short term. Being an investor with a clear focus on growth potential and earnings capacity, our company does not look at small, unprofitable firms but at firms in a mature or growth phase."* 39:17 24 in inV0701.

Increasing cross-border operations also play a role. The incumbent companies active in the United States and the UK are much more focused on the future potential of the technology. Therefore, incumbents engage easier with start-ups in the early stages. In European countries, incumbents do not feel like pioneering; they rather watch and see, make medium- or long-term plans for all kinds of alternative scenarios, and, accordingly, enter innovation or not. Companies entering innovation in countries more risk-averse, like Germany or the Netherlands, can delay their entry until the perception stands that the innovation is going to be a definite success, a behaviour that is in clear opposition to the entrepreneurship mindset required.

4.7 VALUATION MODEL

The sixth and last theme for data analysis is the valuation model. This group consists of the following eight subthemes:

FIGURE 18: NETWORK RELATIONSHIPS VALUATION TECHNIQUES



Source: Database transcripts interviews in CAQDAS

4.7.1 THE BANKING VALUATION MODEL

There are three key basic components in valuation models based on a net present value approach: the amount of capital invested, the discount rate, and the future cash flows. For businesses, the cost of capital of the firm, or minimum return due when addressing decision-making on investments, is used as the discount rate for future cash flow projections. For banks, the cost of capital is 'core, and, therefore, the implications of using the cost of capital for valuation purposes are of a different nature due to its relationship to solvency. Regarding the required returns on investments, banks include the so-called CET1 capital in the calculation: $\frac{Net\ Profit}{\text{CET1 Capital}}$[29][30]

[29] Net profit = Annualised net profit attributable to shareholders
[30] Common Equity Tier 1 Capital

The introduction of the concept of CET1 capital requires some additional clarification. Following the 2008 financial crisis, the Basel Committee formulated a set of international standards to review and monitor banks' solvency and capital adequacy. Under these standards, collectively called Basel III, banks are required to hold capital to absorb unexpected losses in the case of a financial crisis. The Basel III framework provides a set of regulations over the type of capital that banks may use as the capital structure to fund their assets.

A bank's capital structure consists of Tier 1 and Tier 2 capital. Tier 1 capital is calculated as Common Equity Tier 1 capital (CET1) plus Additional Tier 1 capital (AT1). In the event of a crisis, any losses incurred are first deducted from the CET1 capital. If the deduction results in the CET1 ratio dropping below its regulatory minimum [1], the bank must rebuild its capital ratio back to the required level. Tier 2 capital refers to the second, or supplementary, layer of a bank's capital and is considered less secure than Tier 1 capital because it is more difficult to liquidate. A few examples of capital eligible for both tiers are shown below.

TABLE 24: TIER 1 AND TIER 2 CAPITAL

Capital Tiers	**Composition**
TIER 1	**CET1** = Common Equity Tier 1 Capital Common shares, stock surpluses resulting from the issue of common shares, retained earnings, common shares issued by subsidiaries and held by third parties, and accumulated other comprehensive income. AT1 = Additional Tier 1 Capital Instruments that are not common equity but are eligible for inclusion in this tier. An example of AT1 capital is a contingent convertible or hybrid security, which has a perpetual term and can be converted into equity when a trigger event occurs.
TIER 2	Revaluation reserves, hybrid instruments, and subordinated term debt.

Source: Author based on (BANK OF INTERNATIONAL SETTLEMENTS, 2022)

4.7.2 VALUATION TECHNIQUES

All interviewees were asked about the use of valuation techniques when putting together the business case for the assessment of their investments in innovation. This is probably one of the subjects where opinions between participants differed the most. For FinTechs, the value reflects either the price that an investor is eventually willing to pay for a stake in their firm or the price they must pay for their funding request.

> *"Discounted cash flow, multiple real options, whatever. It is a willingness to pay. The best valuation of any new entrant in the market is what somebody wants to pay for it. And that could be much worse if I were 'bank X' and had difficulty getting my payments up to standard. And there is this start-up, which is really promising. It has technology that I really need. Their customer base could be 3,000, and their fee business could be nonexistent. But if they want that technology and they think that they can use it, they will pay ten million for it."* 23:40 36 in FTf0301.

Traditional approaches do not work with start-ups. Consequently, venture capitalists and private equity firms do not use these techniques, as they are interested in the current and future capacity for revenue creation of the target company. They encounter the same kind of difficulties as incumbents when identifying meaningful cash flows that can be projected. Forecasts provided by start-ups are not reliable because it is difficult to back them up with credible assumptions or simply because there is no data available. Consequently, equity investors also look at factors like the history of the firm, precedent transactions of a similar nature, time-to-IPO, insights into a strategic exit, customer portfolio, market share, cost structure, company risk, and funding needs.

The size of the FinTech company primarily influences the choice of incumbent banks based on specific valuation techniques. For start-ups, valuations are based on the use of market multiples, like enterprise value-to-revenues or enterprise value-to-EBITDA. For firms at a ‘scale-up’ stage, multiples are preferably based on enterprise value-to-EBITDA. Discounted cash flows (DCF), though generally preferred, are only applicable to mature companies.

In cases where it is possible to use the DCF approach, special consideration is paid to the cost of capital, as its calculation is different than in models used for non-banking activities, where the cost of capital is calculated as a blended mix of equity

and debt. As previously seen in this section, only equity and compulsory solvency requirements are relevant for the calculation of the cost of capital by banks. Maturity periods of five years are the most common. The head of finance and business banking at incumbent ‘INC01’ stressed the importance of the banking nature of the business for valuation exercises.

> *"For banking valuation, we use the Dividend Distribution Model, and then we make a projection of the future cash flows and then we discount it. We discount it with the cost of capital for the bank. So, for our equity, that is 10%. The cost of capital is a little bit different than the models you use for non-banks, where you take in fact this blended mix of equity and debt. We discount cash flows that are above our cost of capital. Because as a bank, you need to hold a certain amount of capital for an investment. And that comes at a cost. And if the cash flow generated is higher than this cost, only that part will be discounted in the NPV calculation."* 24:26 ¶ 31 in INC0101.

4.7.2.1 A Note on NPV/ DCF

Despite its difficulties, the use of models based on NPV or DCF still makes sense, either as a merely starting point or as the cornerstone for the calculation. In a sense, it is a very qualitative method because the risk attached to the NPV calculation is not much more than a feeling about the process the incumbent should have to go through. In the pursuit of finding that single discount rate that fits them all, potential risks inherent to this process and how to deal with them are also considered. The estimation of the weighted average cost of capital (WACC) behind this rate is, in fact, the real issue.

> *"In addition, the problem with using DCF, NPV, or other income-based approaches is the estimation of the WACC. You can start with a risk-free rate of 2 or 3%, but then you need to add a risk premium of 40–50–60% on top of that, which makes the project become a guess."* 37:4 8 in inV0501.

4.7.2.2 A Note on Market Multiples

Although most participants acknowledge that the use of market multiples is not good enough as a valuation technique, they all use them as a proxy for DCF. The ‘time’ factor is often forgotten in this calculation, however. Multiples based on revenues and EBITDA are most commonly used, often complemented by factors like the number of customers, the number of ‘clicks, or the number of revenues in a licence

agreement. A multiple of ten times this last amount could be used to adjust an initial valuation based on an EBITDA multiple.

From an investor's perspective, multiples can be driven down when you have something extra to offer, like funding for Fintech. Incumbents also use them in combination with peer analysis.

> *"We use peer analysis, mostly of listed companies. So, for instance, if there is a transaction with another shareholder that has been made very recently, that is the basis for valuation. But what you see if you use peer analysis, especially with listed companies, is that they typically tend to pick towards an IPO, and then a lot of these fintech firms do not increase a lot in value or, in a lot of cases, even drop in value. So, the peer analysis based on listed companies is mostly more conservative than what the valuation is when they are still in the growth phase, which makes sense. So, if you only use peer analysis and list companies, then probably your conclusion is that the valuation is much too high in the growth stage."* 28:27 in INC0301.

4.7.2.3 A Note on Equity Investor Models

Despite the overarching label of "equity investors', as used in this research, the approach of venture capitalists and private equity firms to valuation is substantially different. While venture capitalists focus on small start-ups, private equity firms target larger and more mature firms, starting with the scale-up type.

These differences in approach influence, consequently, the use of valuation techniques. While the capacity of the venture capitalist to foresee the future growth potential of the innovation becomes the crucial element of the valuation, private equity investors are concerned with its alignment with the overall strategy of the private equity firm. In the words of the executive director and portfolio manager of investments in Fintech by a large international firm.

> *"Our company only invests in projects when we believe that they are large enough and profitability is achievable in the near future. And, of course, when we like the company. Sometimes, even though multiples paid might be high, you know that now is the time to pick that specific company up." 39:18 24 in inV0701.*

4.7.2.4 A Note on Real Options

Though all participants acknowledged being acquainted with the real options theory, none of them acknowledged its use when assessing investments of any kind. Most qualitative factors discussed here before are regarded as 'options' in decision-

making, though not in the context of the real options theory. In those cases, dealing with options is put into the perspective of scenario analysis, complementing the traditional NPV/DCF analysis with Monte Carlo simulations.

Likewise, in the review of the literature, the use of real options is regarded as a theoretical exercise of high complexity in both the formulation of assumptions and the construction of the model. Though it keeps coming back, what gives real options is that the image of complexity is not even the mathematics behind the model but the fact that it is barely used and that there are no references, which in the end does not help towards a better understanding of its functioning. From a technical point of view, however, there is no reason for a bank not to use real options theory as the basis for a valuation exercise. As the partners' assistant of a consulting firm specializing in share valuation confirms:

> *"The real options approach makes more sense than any of the other approaches discussed here above. However, most people do not understand this kind of specialized mathematics. If they did, if they were more aware of the use of the real options theory, it would make more sense to use it for the valuation of FinTech firms."* 37:9 17 in inV0501.

In the end, decision-makers are humans and are only willing to use techniques they feel confident in. As a former general director at an incumbent bank said.

> *"Well, that is the core of your research. I am a very traditional economist, so I would always go for the net present value based on discounted cash flows. But if that is true, I do not know. But I am a classically trained economist. This is where I would go; this is what I understand."* 29:15, 27 in INC0401.

4.7.2.5 Additional Considerations

In M&A processes, when several third parties are involved, banks get investment opportunities offered at values that can be based on different techniques and assumptions. In these situations, the controversy associated with the decision-making by the bank is not about the value itself but the technique used.

> *"What you also see is a situation when a party comes to us and says this is what we have around. This is the valuation; are you interested? Then we say, 'we must assess that', and 'how did you come up with that valuation?' Well, there are a lot of cases where there was a previous round of another company, and we did an assessment on that."* 28:22 24 in INC0301.

Despite the focus of this research being reflected from an incumbent's perspective, the approaches followed by the two other personas in the case study are also worth reviewing and, eventually, incorporating into the analysis.

For new entrants like FinTech firms, it is much easier to make a positive business case than for a big incumbent bank because these firms want to make it happen anyway and have the will to make a success out of it.

> *"I have been in all these strategy sessions, like, should we do project finance? And then somebody will make this kind of hockey stick, and we will earn money in six years' time. And first, we need to invest $150 million because we need eighty project managers and things like that. It does not work this way, while somewhere else somebody is sitting around with four guys and a monkey, making the same product. But because they are bootstrapping it, they can make the business case work."* 23:62 21 in FTf0301.

Equity investors' approaches to making the business case are different. Venture capitalists, for example, can consider the target FinTech firm as a project instead of a running business, a strategy that allows them to apply techniques used in the valuation of projects instead of traditional cash flow techniques. The investor can regard the project as an embryo of a future business. By operating this way, investors can focus on other factors other than those that are purely financial and more difficult to obtain.

> *"In a venture capital approach based on, e.g., the number of customers and the value per customer, the final target is not looking at the real potential that the company can achieve but at that specific number of customers that will cover the costs of the acquisition."* 39:23 ¶ 29 in inV0701.

Also, the fact that these investors do not regard investments as one firm's operation but rather as a portfolio of different opportunities gives a different dimension to the valuation exercise.

> *"I also have seen variances in the venture capitalist approach, where investors put money into different projects hoping that one is going to hit the jackpot once. What these investors do, however, is not an estimation of value."* 37:6 12 in inV0501.

4.7.2.6 SUMMARY OF THE VALUATION TECHNIQUES USED

To close this section, the table below provides a summary of the valuation techniques either used or known by the interviewees. For each option, a short indication has been added of the pros, marked as [+], and cons, marked as [-].

TABLE 25: CONCISE SUMMARY OF VALUATION TECHNIQUES

Discounted Cash Flow (NPV/ DCF)
[+] It provides with a solid starting point. [-] Inaccuracy of cash flow forecasts. [-] Difficulties when estimating cost of capital.
Market Multiples
[+] Good as benchmark mechanism. [+] Use as a proxy to DCF. [+] Single option when valuing start-ups. [-] It pushes up price per share, in the hope it ever will pay back.
Venture Capitalist Approach
[+] Single option when valuing start-ups. [-] Putting money into different projects does not say anything about value. [-] Pre-money makes more sense than post-money as investors do not regard ‘exit’ as an option.
Cost Approach
[-] The cost approach does not consider developments in the future. [-] Technological innovation occurring today has not yet been commercialised and, therefore, this approach does not make sense for the valuation of FinTech firms.
Real Options
[+] Incorporates flexibility in the valuation model. [-] Complexity inherent to the calculation. [-] Lacking references to benchmark own calculations.

Source: Author based on information collected from interviews

4.8 Ruling Out Plausible Rival Explanations

In this section, I review and eventually rule out the set of plausible rival explanations (PRE) introduced in the methodology chapter to eliminate potential threats to the internal validity of the research.

1. *Plausible Rival Explanation (Direct Rival): Incumbents regard FinTech exclusively as technological evolution, thus sustaining, not disruptive.*

The nature of Fintech innovation is technological. The distinction between disruptive and sustaining innovation does not yet play a relevant role in the decision-making process on investments, as barely 5%–10% of all innovations may be regarded as disruptive based on the definitions provided by Christensen et al. (2016).

However, banks are aware of the disruptive capacity of FinTech innovation in the near future. The actual discussion around the concepts of centralized finance (CeFi), governed by entities, and blockchain-based decentralized finance (DeFi), governed by communities, will prove the disruptive potential of FinTech for the financial services industry.

Therefore, this PRE may be ruled out.

2. *Plausible Rival Explanation (Direct Rival): Incumbents respond to innovation based on a sense of 'urgency when it gets closer to their core business and not because of an a priori strategic choice.*

Though the complexity of the IT legacy systems on the incumbents' side could explain the delays in embracing new technological developments, incumbents always respond to the challenges of innovation. In this sense, the proximity to the 'core' banking business, e.g., lending, or capital markets versus payments, is not the single factor that triggers the adoption of the innovation. Although each product requires a specific strategy when adopting innovation, the results of the interviews confirm that strategic alignment is at the heart of the decision-making process.

The purpose sought in the innovation is what really makes the difference with regard to FinTech firms. While the latter is about the transformation of the sector, incumbents' is about either preserving or reinforcing the stability of their IT legacy.

Therefore, this PRE may be ruled out.

3. *Plausible Rival Explanation (Rival Theory): Incumbents prefer to collaborate with FinTech firms instead of incorporating innovation and adapting their own business model. In this way, the aim is to obtain profit from the best of both worlds.*

For incumbents, the main reason to enter a partnership with Fintech firms is not exclusively the need to change or adapt their current business models. It is neither the search for ‘comfort’ nor the ease of becoming an innovation follower by shadowing their FinTech partners. The research shows a clear relationship between changes in regulation and the increasing number of partnerships. The incumbents’ interest in these partnerships is not to use them as an instrument to circumvent the regulations but as a way to manage discrepancies related to their implementation, which is less complex on the side of the FinTech firms.

Another reflection, perhaps less obvious but no less important, is the role of the Fintech firms when partnering with incumbents, as they are also keen to enter such collaborative relationships. If the aim of a collaboration agreement is to obtain a profit, that is the aim for both parties involved.

Therefore, this PRE may be ruled out.

4. *Plausible Rival Explanation (Rival Theory): Changes in the organization are too expensive. In addition, the need for specific talent to lead the change is not easy and can lead to operational bottlenecks.*

In cases of integration, the changes required to embrace the innovation are expensive, but not in terms of time-to-completion. The analysis of the data indicates that most of the time required in these situations does not go into the acquisition phase but into the post-acquisition one. In the case of partnerships, full commitment and strategic alignment between the partners are requirements. Therefore, the willingness of both parties engaged to enter into the collaboration tends to eliminate bottlenecks beforehand. Next to pure demographic issues, the ongoing digitalization of the world's economies and businesses is leading to a ‘war on talent’ throughout all economic sectors, not exclusively in the banking industry.

Therefore, this PRE may be ‘partly ruled out, as eventual bottlenecks are not specific to the financial services industry but a general phenomenon nowadays.

5. *Plausible Rival Explanation (Rival Theory): The use of multiples based on enterprise value-to-EBITDA, in combination with a traditional net present value calculation, is comprehensive enough and easier to apply than a model based on multiple real options.*

The analysis of the data indicates that incumbents' approach to the valuation of FinTech firms is carried out from a generic perspective based on the business lifecycle of the target company and is not Fintech-specific. The results confirm a relationship between the size of the target company and the valuation technique used. At early stages in the business lifecycle, when firms are unable to produce reliable cash flow projections, multiples on revenues, or EBITDA, are most commonly used.

Therefore, this PRE may be ruled out.

CHAPTER 5. DISCUSSION

5.1 INTRODUCTION

In this chapter, I interpret the significance of my findings regarding the subject of the research, test whether these findings either contradict or coincide with the research propositions previously established and explain how the contributions made by this research can be positioned with regard to the existing literature.

Before conducting the discussion of the findings, it is convenient to recapitulate the overarching objective of this study: to inquire into the experiences of decision-makers engaged in the valuation of FinTech innovation and to define the context in which these experiences can be interpreted. More specifically, this study aimed to explore "how traditional retail banks confronted with investments in FinTech innovation can use valuation models for a better make-or-buy decision on this subject" and, in doing so:

- To critically evaluate the essence of FinTech innovation by illuminating the boundaries between sustaining and disruptive innovation.
- To define the business model of FinTech and identify the value drivers essential for the make-or-buy decision.
- To explore alternative organizational structures that can help embrace FinTech innovation within the current organizational architecture of traditional retail banks.
- To design a valuation model based on decision tree analysis and real options theory to assess investments in FinTech innovation.

I address the first three research objectives here above, namely the configuration of the FinTech innovation and the control variables, in the hazard model required to ascertain the level of uncertainty and controversy associated with the decision-making. My goal is to illuminate alternatives that help incumbents turn their initial aversion to entering unsigned avenues where unreasonable prices are paid at the gate into an appetite to embrace FinTech innovation at this transition point in the transformation towards a digital-driven financial services industry. Finally, in the last section of this chapter, I present the framework for a ‘divergent’ valuation model based on a decision tree and multiple real options, namely the fourth research objective.

5.2 Outline of the FinTech Innovation

5.2.1 The Nature of the Innovation

This section addresses the first research objective, "to critically evaluate the essence of FinTech innovation by illuminating the boundaries between sustaining and disruptive innovation", with the aim of testing the following first proposition:

> "A FinTech innovation of a disruptive nature has a positive influence on incumbents' decision to pursue the innovation."

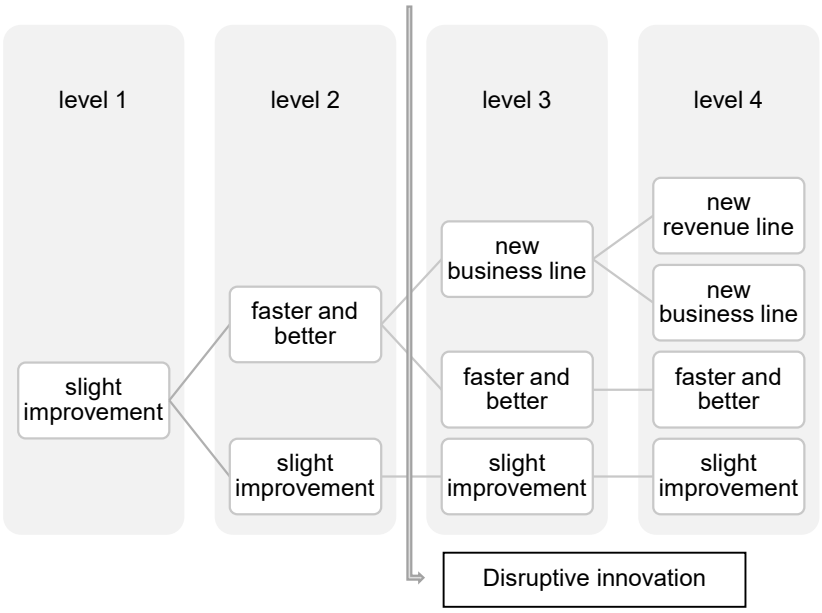
Incumbents do not see the 'essence' of banking being threatened by all these technological innovations. Although incumbent banks extensively use Application Programming Interfaces (APIs), these are rarely put into service to increase revenues or income but rather to comply with regulations that grant other parties access to their customer data, to support further integration with business partners and suppliers, and to reduce costs by increasing the efficiency of their internal business processes.

Incumbents' concern about the efficiency of their own internal business processes, a concept sometimes confounded with 'IT legacy systems,' has had a considerable influence on their subsequent approach to FinTech innovation. By improving the efficiency of these processes, technological innovations strengthen the external position of traditional banks by lowering their internal costs and improving the quality of the services provided. Though incumbents are not being disruptive in this way, they are securing their current dominant position by being more efficient in the use of their internal resources.

The incumbent organization coded INC03 distinguishes four levels of innovation. At the first level, innovation brings modest improvements to the current offer of products and services to make them a 'bit' better. At the second level, innovation helps make existing products faster and better, though it is still not disruptive. The disruption starts at levels three, with the creation of a new business line, and levels four, with the subsequent attachment to a revenue line.

Looking from this perspective, the boundary between sustaining and disruptive innovations can be found between levels two and three, as shown in figure 19 on the next page.

FIGURE 19: FOUR LEVELS IN FINTECH INNOVATION



Source: Interview INC0301

Technological solutions may be radically new in the way they manifest and interact with consumers of financial services, but the products provided thanks to these technologies may stay the same. Payments are still payments, whether you pay with cash or with your mobile phone. A technological solution does not yet make a bank. These findings, well aligned with Christensen et al. (2016), confirm that decision-makers should not regard every innovation that unchains a shock in a market as disruptive.

But then, what has changed if the essence of banking as such has not? How can incumbents ascertain whether their market position is at risk?

As a matter of fact, it is the way of doing banking that has changed. The ‘traditional’ push strategy followed by banks is being replaced by the ‘supply-push strategy’ identified by Markides (2006) in the context of radical product innovation. In this case, the technology providers on the ‘supply side’ are the FinTech firms. In an environment of growing platform businesses, these new technology providers are bypassing traditional banks in their approach to consumers of financial products and services. This approach is disruptive. Incumbents’ responses, therefore, should be positively influenced towards incorporating innovation when disruptors start to nibble at their customers’ portfolios.

5.2.2 Business Model Adaptation

This section addresses the second research objective, "to define the business model of FinTech and to identify the value drivers essential for the make-or-buy decision", with the aim of testing the following second proposition:

> *"The capacity of incumbents to accommodate current business models to new dominant designs has a positive influence on the growth expectations of the investment."*

The adaptation of traditional banking business models to FinTech innovation is controversial, as both business models are not only different but conflicting in key areas. The barriers that incumbents come across when attempting to adapt their business models to the new FinTech reality are well aligned with the findings of Chesbrough (2010). While the first barrier refers to conflicts that arise when innovation clashes with existing business models, the second barrier is about conflicts that arise from the inadequacy of the existing assets, namely IT legacy systems. To benefit from the innovation, incumbents must force themselves to overcome these potential barriers, as the technology itself has no objective value other than the commercialization of the innovation.

The barriers that incumbents could encounter when making decisions about the adaptation of their current business models are the subject of the next section.

5.2.2.1 Barriers for the Adaptation of the FinTech Business Model

The analysis of the data in Chapter 4 suggests that FinTech innovators are not creating radically new banking products but changing the customer proposition of existing ones by adding new features that enhance the customer experience. Product differentiation occurs, in fact, at the feature level rather than the product level. The product may be the same, but the features built around it are richer, more attractive, or simply better.

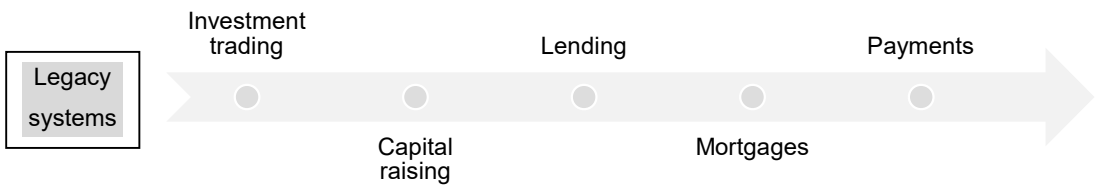
Reflecting from here, FinTech firms develop products that meet the expectations of traditional consumers and new market segments while improving the customer journey of both. Incumbents, on the other hand, reflect what they know about their current customer portfolios. The appreciation for the customer journey embedded in this approach clearly differs from the one followed by FinTech firms. A decision-making process on the incumbents' side disregarding the customer experience would be negatively biased towards the adoption of the innovation.

The second barrier identified by Chesbrough (2010), the existing assets, refers to the IT legacy systems at incumbents. The research also shows how the use of application programming interfaces has already delivered substantial benefits for incumbents by eliminating bottlenecks created after years of patching up and mending their legacy systems. While FinTech firms have managed to use these interfaces to disrupt the banking value chain and get closer to incumbents' customer portfolios, the latter have not yet found a way to use these interfaces to adapt their existing business models. The incumbents' focus is too much on preserving their IT legacy systems.

However, the complexity of the IT legacy systems could be regarded as a strategic advantage instead of a barrier when competing with FinTech firms. Embracing innovation with products that are 'less' close to the core of the legacy systems and therefore less dependent and with lower added value, e.g., payments, is easier than with products closer to that core, e.g., lending products or investment trading. Incumbents could be selective and leave those products with lower added value to FinTech firms and focus on those products closer to the core of the IT legacy and with higher added value.

The decision-making process should consider the added value of each individual business model in the context of its proximity to the core of the IT legacy systems. The closer to the core, the higher the opportunity cost of abandoning the IT legacy and embracing innovation.

FIGURE 20: BANKING BUSINESS MODELS AND PROXIMITY TO LEGACY SYSTEMS



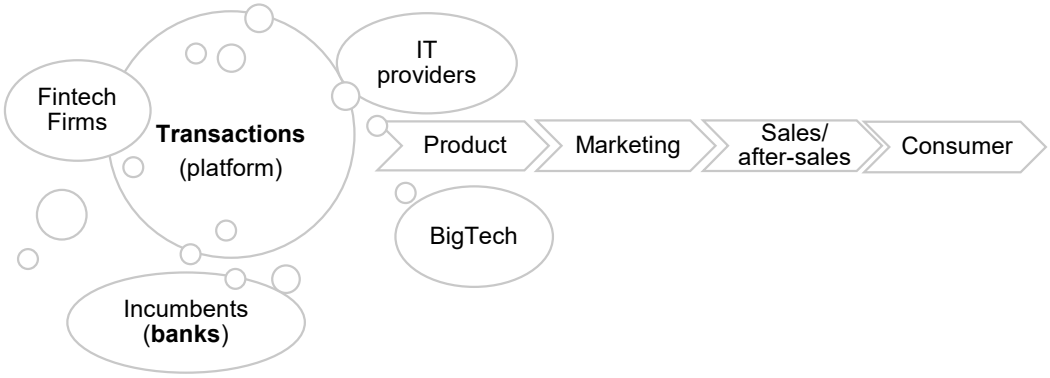
Source: Interview INC0102

5.2.2.2 THE FINTECH BANKING VALUE CHAIN

FinTech innovation has upgraded the provision of technology from a mere internal 'support' activity within the banking value chain to a more prominent, though externalized, 'primary' activity. Operating this way, FinTech firms have triggered a change in the banking value chain by turning the linearity of the traditional model, supply-leveraged, into a platform model, demand-leveraged, where consumers have the final say.

FIGURE 21: TRADITIONAL BANKING VALUE CHAIN: 'LINEAR'

FIGURE 22: FINTECH BANKING VALUE CHAIN: 'PLATFORM'



Source both figures: Author

In a linear model, transactions take place at the beginning of the chain; they are embedded in the infrastructure of the bank and, therefore, 'inaccessible' to external parties. By transforming the value chain into a platform, transactions become an open link in a chain that can be accessed by external parties as well, e.g., FinTech firms or big technological companies.

FinTech innovation has created disruption not only in the banking business model but also in the value chain and the value network. These results are aligned with the

proposal of Christensen and Rosenbloom (2013) to categorize innovation based on its flexibility to move throughout incumbents' value chains and value networks and not only on its technological character.

While FinTech firms operate on the front end of the banking value chain, banks work on the back end. This preference for working from the back end is behind incumbents' preference for entering partnerships with FinTech firms. From their perspective, changing the front end of the banking value chain does not guarantee any further success in the transformation process towards a digital bank. Though the rise of challenger banks has proven the opposite, the outcomes of this front-end vs. back-end competition are still uncertain.

5.2.2.3 Platform Business

Findings confirm that the entry of big technological companies into the financial ecosystems has disrupted the value network as well, as these companies have shown that there is no need to be a financial institution to offer financial services to their own customers and, eventually, to 'others.' The playing field for competition has changed by opening it up to other players other than financial institutions.

Traditional banks fear more the so-called GAFAM companies—Google, Apple, Facebook, Amazon, and Microsoft—than specific FinTech firms, as they pose a threat that goes far beyond competition. It is their way of doing business, the platform business, that incumbents fear most. Though FinTech firms also operate as platforms, it is the size, massive resources, and monopolistic behaviour of the GAFAMs that make them such fearsome contenders.

Platforms not only lead to monopolistic situations within a market (Nick Srnicek, 2017), but they also stimulate transparency in the relationship between the service provider and the final consumer. The elimination of the 'middleman' between the two—all non-adding-value intermediaries, in fact—gives a sharper end to their relationship.

That transparency arises as a crucial element in the relationship between consumers of financial products and services and FinTech firms can be seen in the role of regulation. Both the review of the literature and the analysis of the findings in Chapter 4 confirm that regulation, namely KYC and customer due diligence, makes a difference for the customer journey. Specifying these costs in the communication to the customers in a clear and transparent way is still a challenge. On the

traditional banks' side, the allocation of these costs often ends up as an overhead item in the income statement, as they are difficult to allocate to individual products and customers. The way FinTech firms charge for these costs if ever incurred, is indeed more transparent. The way of earning back these costs is at the origin of this situation. While banks trust the size of the interest spread to earn back 'all' these costs, FinTech firms rely on the individual fee charged per customer to do so. If commercial banks want to compete with FinTech firms on the cost of transactions, they will need to change the way they compute these costs as well as how they transfer them to their customers through the price.

5.2.2.4 Challenger Banks

Challenger banks have been built the other way around than traditional banks, starting not from the drawing board of product development departments but from technology. Strongly focused as they are on their customers, FinTech firms regard transparency as a solid base to enhance the customer journey. Challenger banks are, however, very conscious that it is very difficult to finance a banking business with a simple offering consisting of a bank account and a payments app. Now that challenger banks are competing with incumbents in a more equal way, they do not aim to change the financial landscape, say, radically, but try to connect themselves to the same institutional world as the incumbents. By doing so, challenger banks will have to adhere to a stricter regulatory regime, which will increase the overall cost structure and make them look more like any other regular retail bank.

From the perspective of business model adaptation, and as already said in the previous section, these developments are a clear indication of the need to 'adapt' current business models to accommodate this transparency in the communication of bank charges to customers, namely the pricing structure of banking products and services. It is not about being 'cheaper', as the gap with the challengers will be narrowed, but more about being transparent.

The costs on the incumbents' side are not only opaque but incomprehensible for their customers. As discussed here above, the addition of extra regulatory charges to the equation behind these costs has made things even worse. Hidden or unclear costs for the customers cannot be accepted in the business equation of challenger banks, which explains financial consumers' attractiveness to them. If competition between both is about transparency to ensure customer loyalty, traditional banks

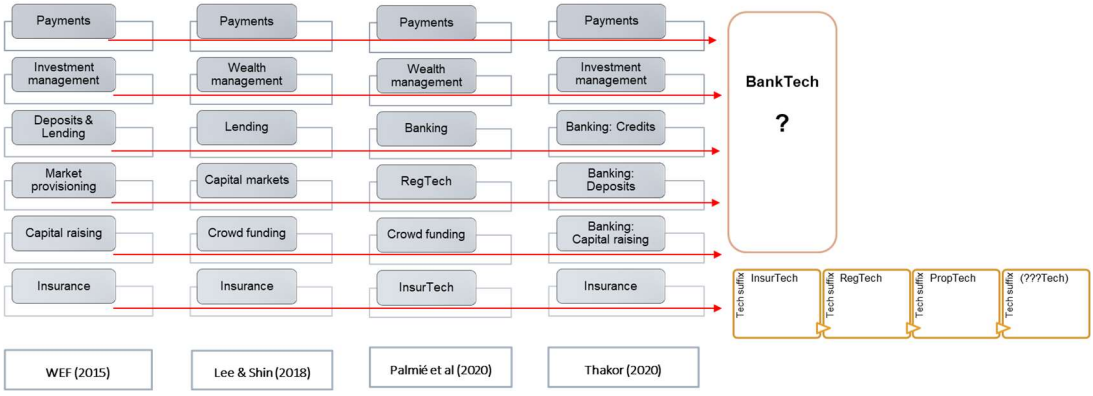
should aim for a clearer and more comprehensive charge of these costs in the final price of their individual products and services.

In the end, what is the real competitive advantage that challenger banks will bring, and is it sustainable? Rather than challenger banks, the 'traditional role' of IT vendors under FinTech innovation is now the biggest risk for incumbent banks. Players like ADYEN are more successful because they eat up a little bit of the banking value chain. That is a bigger threat than a more general FinTech bank. Incumbents, therefore, should not fear them.

5.2.2.5 A NEW FINTECH TAXONOMY

When reviewing the different FinTech taxonomies, we have observed how the tech suffix is commonly used to define activities other than banking. The latter, however, is never presented under such an overarching definition, e.g., Bank-Tech.

FIGURE 23: FINTECH AND BANKTECH



Source: Author, based on the four references above.

There are three reasons to explain this unbundled taxonomy of banking products and services. First, the nature of the banking offering is more complex than that of insurance, regulation, or property. Payments, for example, are very different as a product than lending or capital raising. The disruption, if any, is experienced as technological, e.g., the ease in the use of the payment app, rather than as a change in the business model, meaning the whole banking business model.

Second, the wave of partnerships triggered by the regulatory transformation currently in place Commercial banks, though keen to enter partnerships with FinTech firms, are afraid of the regulatory implications of such collaborations. Even though one of the defining characteristics of banking is the 'bundling' of the product offering (Navaretti et al., 2017), collaborations and partnerships, when entered, are

at a product level and not at the level of the whole banking product package. From the perspective of technological innovation, banks regard each of the products in the bundle as ‘different, and, therefore, they handle them unbundled.

A third factor is the allocation of IT legacy costs, which can substantially differ between individual products and services because of their proximity to the core of these systems. A likely downsizing of the IT legacy architecture and costs following the deployment of the technological innovation should also differ per individual product.

Despite all the above-mentioned developments, two developments indicate that the further bundling of products and services towards a new banking taxonomy could still be a feasible option, namely the appearance of Big Tech firms and the role of trust.

The presence of Big Tech firms at the doorstep of the FinTech ecosystem, though representing a serious threat to the survival of the incumbents, could help with a thrust in the direction of a bundled FinTech banking taxonomy. An example is provided hereafter. Square is a company incorporated in 2009 in the USA by the founder of Twitter. The company, which offers digital payment solutions for SMEs like cash registers, terminals, and readers, is already operating in three countries of the European Union: France, Ireland, and Spain. In December 2021, Square, now Block, entered into a deal worth US 29 billion for the acquisition of Afterpay, an Australian FinTech firm operating in the Buy-Now-Pay-Later (BNPL) segment (Yahoo Finance, 2021). In its functioning, the BNPL offering comes close to a regular banking credit card. With these two firms reunited under one single roof, Afterpay for the B2C market and Block for the B2B market, the threat to the traditional banking sector has reached the core of the current dominant designs. The incumbents are set now.

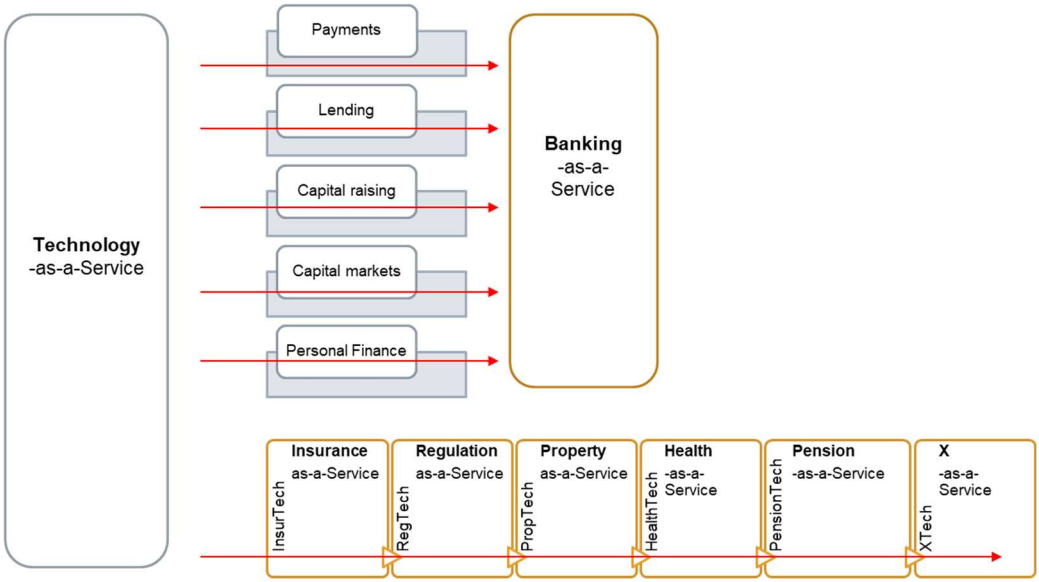
A second development is about the balance sought by customers between the attractiveness of the banking apps offered by FinTech firms and the trust offered by incumbents as traditional safe harbours for their savings. The numerous partnerships between FinTech firms and incumbents can partly be explained by this phenomenon of seeking to reinforcing the customer experience from this perspective of trust (EY Global Fintech Adoption Index, 2019; Thakor, 2020).

Based on all these considerations, a likely development of the FinTech taxonomy could be one where the tech comes loose of the fin to foster the offering of products

and services tailored to specific customer needs or experiences, e.g., banking experience, insurance experience, health experience, property experience, regulation experience, pension experience, etc.

In the case of banking, though presented under the overarching label of 'banking-as-a-service', the offering is unbundled because the customer experience substantially differs per each business model.

FIGURE 24: THE FINTECH TAXONOMY



Source: Author

5.2.2.6 FinTech Business Model

To assess the likelihood of success in the adaptation by incumbents of FinTech innovation, the following five areas should be considered: customer, product offering, value chain, IT architecture, and regulation. The current and target situations for each of the five key areas are shown in the table below.

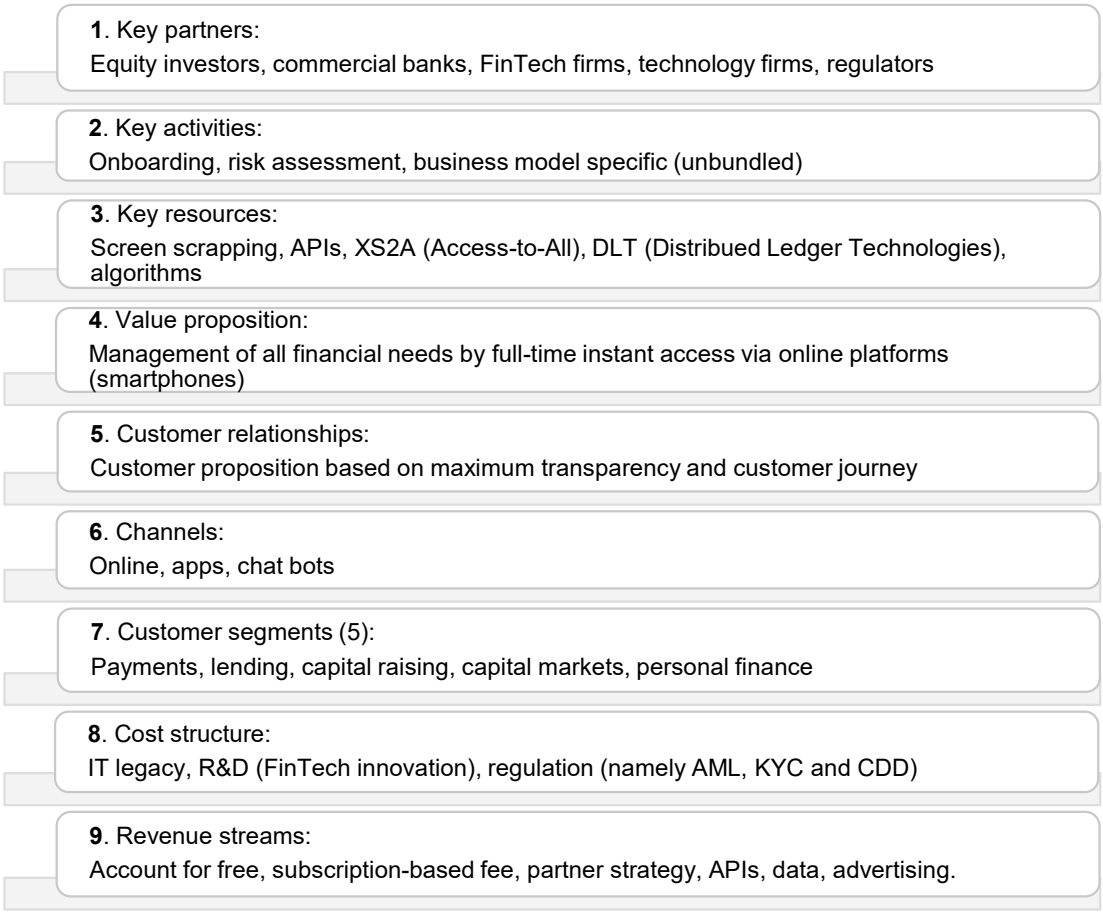
TABLE 26: BUSINESS MODEL ADAPTATION (BANKING)

Key areas		**Incumbents**		**FinTech**
Customer	From	Trust	To	Customer experience
Product offering	From	Bundled	To	Unbundled
Value chain	From	Linear	To	Platform
IT architecture	From	Monolithic IT legacy	To	Microservices architectures (MSA)
Regulation	From	Manual handling	To	Artificial intelligence/ machine learning

Source: Author.

For further analysis of the aforementioned and to link with the findings in Chapter 4, I apply a concise version of the design template of Osterwalder and Pigneur (2005) and its nine building blocks, as shown in the figure below.

FIGURE 25: FINTECH BUSINESS MODEL CANVAS



Source: Author, based on Osterwalder and Pigneur (2005)

5.2.3 Alternative Organizational Structures

This section, together with the next on the regulatory framework, addresses the third research objective, "to explore alternative organizational structures that help to embrace FinTech innovation within the current organizational architecture of traditional retail banks", with the aim of testing the following third proposition:

> *"The capacity of incumbents to adapt the organization to the new dominant design has a positive influence on incumbents' decision to adopt the innovation before the appearance of the dominant design."*

Ambidexterity

Keeping different mindsets and approaches in mind works better when separating new activities from the existing organization. As an option to do so, ambidexterity makes sense when traditional banks run two different business models coming from in-house development and not when testing the innovation at an early stage. Creating ambidextrous organizations to host the collaboration between incumbents and FinTech start-ups does not work that well, as size and individual interests are very different. In addition, ambidextrous organizations not only demand more attention but also cost extra money. These findings are aligned with the definition of Birkinshaw & Gibson (2004) of contextual ambidexterity, though they partly contradict those of O'Reilly & Tushman (2013) over the superiority of ambidextrous organizational structures when pursuing incremental innovation.

Integration

In general, banks only integrate technological firms when there is a clear need to do so. For example, with AML and KYC, the delivery track requires integration within the IT infrastructure of the bank. Incumbents will, subsequently, be open for the integration of a FinTech firm that ensures them that such a required 'integration' can successfully be executed.

The integration of people, management, internal policies, and systems requires time, often longer than expected. Execution plans are, therefore, a requirement. The post-acquisition phase is even more important. As a matter of fact, the impact of the time required for post-acquisition activities should be considered in any valuation exercise. The adaptation of our own organization prior to the integration of the FinTech firm is also an option, though the timing of doing so is crucial. If the incumbent steps too early into innovation, the integration of a FinTech firm could

turn into trouble not only for the core of the IT legacy, people, and management, but also for the client network, reputation of the firm, and brand image. Integrating the innovation requires an adequate level of maturity on the part of the business line taking over and adapting the innovation.

From the perspective of the Competing Value Framework of Quinn & Rohrbaugh (1983), a combination of compete and control strategies would stand for a make-decision and be close to integration, while a combination of create and collaborate strategies would stand for a buy-decision, either as fully outsourced or as a partnership.

Collaboration

The financial services industry also shows that firms in technology-intensive industries do not avoid alliances to protect their technologies (Mauri & McMillan, 1999). The earlier the stage in the innovation cycle, the higher the propensity to conduct joint research and development (R&D). The later the stage in the innovation cycle, the higher the propensity to conduct joint, or single, 'production.' In earlier stages, cooperative agreements are likely to occur as a means to spread the technological base, seeking to stabilize the technology around a product standard.

This phenomenon is a common factor in FinTech innovation. As an incumbent, a way to avoid paying the full price for innovation is to enter into a collaboration agreement with a FinTech firm. Banco Santander, for example, created an internal department in 2014 to monitor venture capital activities. Later in 2019, this department became an independent venture capital firm with total available funds of USD 400 million, Mouro Capital (Banco Santander, 2021).

Successful collaborations between incumbents and FinTech firms rely on three key factors: strategic alignment, regulation, and the existence of a mutual benefit. Strategic alignment is one of the most critical aspects of collaboration. If the parties involved share the same goals, they will both try to find a way to foster collaboration. If not, then big issues can arise. The role of the regulator is also crucial to guaranteeing the success of the collaboration. The more innovative the regulator, the better for the whole ecosystem. For new entrants when seeking to collaborate with incumbents, and for the latter when onboarding new customers. Collaboration or partnerships also help spread the risk in case regulatory surprises pop up. Finally, the existence of a mutual benefit. A one-directional approach does not work well, e.g., for a FinTech firm only seeking funding or an incumbent bank only

seeking to catch up with innovation. The proof-of-concept approach, for example, allows incumbents to test products and services when collaborating with start-ups. The proof-of-context framework ensures the quality of the testing environment at the most adequate level of cost, risk, and use of internal resources for the incumbent. Providing funding to FinTech or access to a broader customer base closes the circle.

Coming back to the Competing Value Framework (CVF) developed by Quinn & Rohrbaugh (1983), the analysis of the data suggests that most of the collaborations entered by incumbents are of the type ‘create and collaborate’, which indicates incumbents’ preference for the buy-option.

People and Management

The first step to acknowledging the importance of people and management for decision-making is to recognize and accept that incumbents often have difficulties developing the knowledge they seek for themselves.

On the incumbents’ side, the nature of the banking business plays a substantial role. Consistent with Nguyen et al. (2019), the research shows the influence of the banking culture on management and employees dealing with innovation. Very strict regulation, e.g., in the field of anti-money laundering, influences how people behave. People's behaviour is an important aspect of traditional financial services, as they need to explain why they behave as they do. The intrinsic risk aversion of people working at commercial banks has not diminished with FinTech innovation, as they fear the imposition of fines and other financial penalties following the implementation of stricter regulation. The required commitment for senior management to operate ambidextrously even when they are not ambidextrous themselves becomes a challenge when facing FinTech innovation (O’Reilly & Tushman, 2004).

On the side of the FinTech firms, the quality of the management plays a clear role in the decision-making around the investment, not only when considering a specific investment but always. In organizations with short hierarchical lines or none, the management is directly responsible for attaining the right growth and profitability margins. In the specific case of start-ups, the quality of the management is everything when putting a price on a transaction. Whether they themselves believe in what they are doing and the investors, either incumbents or equity firms, believe that they can achieve their goals

Scalability

Scalability of the innovation, or the potential for upside, is not only a challenge for incumbents but a key requirement when considering any kind of collaboration or integration with FinTech firms.

Scalability is a challenge because it is often unknown. Investing in innovation is somewhat comparable to testing drilling in the oil industry. Finding that single well that will reward you with an abundance of oil production is difficult. Therefore, oil companies purchase larger areas to increase their chance of success. Investments in FinTech innovation should be regarded in the same way, as it is not about the acquisition of a single firm but about how to increase the chance of success in innovation by increasing the area of influence of this specific transaction. The value network of the FinTech firms and their relationships with other firms are truly relevant. Therefore, prior to the valuation exercise itself, the search for a broader base of FinTech firms is of paramount importance.

For a commercial bank aiming to embrace technological innovation, an alliance with a start-up or scale-up firm is therefore only meaningful at the first stage of innovation, as identified in the model of Utterback & Abernathy (1975), namely when the new technology competes with the old one and companies strive towards product innovation. Cooperation in the early stages not only fosters the consolidation of product standards but can also help ensure the ownership of a new dominant design.

Regarding the specific form of collaboration between incumbents and FinTech firms, namely start-ups, the two new models of programmes identified by Weiblen & Chesbrough (2015) fit well in an environment of financial innovation and platform businesses. With the Outside-In programmes, start-ups collaborate with incumbents as suppliers of technology. With Inside-Out programmes, start-ups develop products based on prototypes provided by incumbents.

5.2.4 The Regulatory Framework

Compliance

Banks may be proud of well-functioning rules and regulations in the financial services industry. However, traditional banking is not designed to cope with the workloads created by regulators. While traditional banks cannot easily get rid of these costs by charging them to their customers, not all FinTech firms carry and

charge compliance costs in the same way. The competition between them is therefore unequal.

Incumbents are making considerable efforts to meet their commitments with the regulator, bearing in mind that they will have to move from rule-based and paper-supported policies and procedures to artificial intelligence-based KYC machines. In a period of five years from now, probably. The crucial role played by financial technology in lowering the regulatory burden, increasing transparency towards regulators and consumers, and increasing trust is pushing some incumbents in the direction of positioning themselves as a technological firm rather than a bank.

Despite the extra time and costs required to cope with increasing compliance requirements, the overall perception is that clear regulation favours technological innovation, like in the case of KYC. When regulation is vague or barely existent, like with crypto now, innovation is hampered by different players coming from quite different angles. The analysis of the data collected from all three personas coincides with this conclusion.

Regulators

The role of regulators is ambiguous, to put it kindly.

From a European perspective, regulations issued by the European Commission are often overruled or differently interpreted by the local regulations of the member countries. The perceptions of risk appetite and risk aversion can significantly differ among countries as well.

From the position of regulators, e.g., central banks, these are also banks and, therefore, traditional in their perception of image and reputation, afraid that their credibility could be dented. This behaviour negatively influences the use of tools and instruments, often put in place by the regulators themselves, to foster innovation. The dynamics in the use of collaborative sandboxes are a good example of this. For both FinTech firms and incumbents, working on new projects using these sandboxes can be very discouraging. Though they offer the possibility to cooperate with the regulator in the development of new products by using innovation, the way they function has more of the old and bureaucratic way of doing banking than the transformation impetus inherent to a process of change as represented by FinTech innovation. However, when ‘time’ is a key requirement to ensure the success of the innovation, lengthy processes and delays when moving back and forth in the

sandbox can be devastating. Examples of regulators sticking to tradition, worried about their image and reputation, are not an exception. Regulators should, therefore, first embrace FinTech innovation themselves before helping other participants in the FinTech ecosystem in the same direction.

Innovations and banking regulation

When associating innovation with regulation, it is important to make a distinction between specific banking regulations and the regulations put in place by central regulators to foster FinTech innovation. An example of the latter is the role played by the European regulator, namely the European Commission, when creating a common framework for the development of open banking, payments, and data access. FinTech firms have flourished under this framework, which has proven a real stimulus to foster innovation thanks to the possibility offered to them of working in a less regulated environment. Banks, however, remained sceptical.

Indeed. FinTech investment opportunities fail often because of regulations and internal policies that ‘specifically’ belong to the banking business. Even in cases where incumbents take a minority stake in a FinTech company, these banking regulations will still be applicable. If the target firm is small, say a start-up with 30 or 40 people on the payroll, there is always the risk of ‘killing’ the collaboration. While the FinTech firm goes for innovation and entrepreneurship, the incumbent forces them into the rigidity of a legacy of internal rules and regulations. The more successful and bigger the FinTech firm goes, the more it will be regulated. For incumbents, this is the only thing that they care about, which makes it difficult for them to embrace disruption.

Central regulators, incumbents, and FinTech firms are constituent parts of the FinTech ecosystem (Lee & Shin, 2018). If the ecosystem makes the disruption possible (Palmié et al., 2020), the existence of other internal banking regulations in addition to the new FinTech regulatory framework will form an extra hurdle to embracing innovation. By keeping these internal regulations internal, the opportunities for innovation are better, which explains why collaboration with FinTech firms is benefiting from other forms of partnership and ownership.

Systemic role

Banks are important from a systemic perspective; hence, they are regulated. Most of the extra internal baking regulation introduced here above derives from this

specific role of incumbents as institutional investors, linked to the solvency framework. FinTech firms doing innovation on commodity products, like payments, or not delivering to the aforesaid framework are not a threat to the system and, therefore, are less regulated.

5.3 Hazard Profile: Factors of Influence

This section addresses the influence of some critical factors when assessing the degree of uncertainty and controversy associated with the decision-making on FinTech investments, with the aim of testing the following fourth proposition:

> *"The capacity of incumbents to ascertain the strategic importance of an investment in FinTech innovation has a positive influence on incumbents' decision to take the lead in the creation of a new dominant design."*

Strategic alignment

Though the findings confirm that seeking strategic fit is the very first step in decision-making, the way incumbents execute this does not favour a balanced discussion around the make-or-buy choice. By assessing consequences for customers, products, and operations, the alignment sought could still help in the specific case of FinTech. It is the reasoning behind it that makes the difference, however. Incumbents naturally reflect their position in the market as members of the group of 'current dominant parties.' Reflecting from this angle, incumbents not only tend to ignore the implicit risk of losing their dominant position but also underestimate the consequences of being too late with innovation for their own survival as a firm. This is in clear contradiction with the functioning of the hazard profile equation put forward by Suarez & Utterback (1995) to ascertain the uncertainty and controversy associated with investments in innovation.

The research shows that the disruptive nature of FinTech innovation is not relevant for incumbents, but how to fit strategic trends identified by them within the overall strategy of their banks Data-driven projects or online banking are considered more disruptive than FinTech, for example. Based on the definition of Christensen et al. (2016), the research has also shown that barely 5% to 10% of all FinTech innovations could be labelled disruptive'. From these results, incumbents' position is very defendable, as technological innovation is making the current offering of products and services more attractive and sustaining it. Two other factors require special consideration, however.

First, the developments in innovation regarding the current banking taxonomy Leaving aside blockchain and cryptos, the innovation focuses on one of the business models, namely payments. FinTech firms working on technological infrastructure for merchants are also working on the business model of payments. At least in Europe, this development cannot be a surprise considering that the European Commission has made the harmonisation of payments one of her priorities on the way to a digital single market (European Commission, 2020).

Second, the impact of FinTech developments on the banking value chain. The 'sustaining' character of payment applications developed by using Application Programming interfaces and seamless integration into incumbents' current offering of banking products does not mean that a disruption is not under way. As previously discussed in Section 5.2.2, by transforming the banking value chain into a demand-leveraged platform, FinTech firms have bypassed the IT legacy systems, gaining access to incumbents' customer portfolios.

FinTech firms are not only competing for the same product offering as traditional banks but also challenging them in the struggle for new dominant designs. If technology is the disruptive factor, FinTech firms have an advantage over incumbents that cannot exclusively be addressed by entering into collaborations and partnerships between them. When the strategic alignment sought prioritises maintaining the IT legacy above working towards a new dominant design, a decision-making process disregarding the strategic importance of this move will be biased towards the 'buy-it' decision.

Addressable market

In accordance with their dominant 'position,' it is the necessity to obtain a 'missing' feature or capacity that triggers incumbents to step into that specific trend. From this perspective, the role of the addressable market is, once again, subordinated to maintaining incumbents' status or position.

The addressable market does play a significant role, however, and not only when incumbents function as investors in innovation, like venture capitalists or private equity firms. The addressable market needs to be put in the context of the lifecycle of innovation and not just in numbers about how many FinTech firms are operating in the market and are, eventually, available. Activity before or after the 'maturity'

stage of the innovation sends a clear signal about the nature of the disruption itself. Before reaching the maturity stage in a S-curve framework, FinTech firms in the market tend to be more disruptive and, therefore, more capable of contributing to the creation of a new dominant design. Like the observations of Dutch FinTech firms active in the payments segment of the market confirm, once the maturity stage has been left behind, standardisation takes over from pure innovation as the dominant payment design is already in place. This should not be an issue for products with low added value in the banking value chain but can have devasting effects for incumbents when products affected by the innovation get higher in the same banking value chain, like personal lending or mortgages.

Density of the market

The density of the market is a factor that accelerates innovation, as it clearly indicates an increasing interest in innovation, unless it is speculatively driven. Increasing interest by peers in the innovation may be interpreted as an indication that the new dominant design is in sight. Considering that the dominant position of incumbents is exercised as a 'group' and, though they 'all can still be very wrong, the increasing density of the market hints at an upcoming standard.

An issue of a different type is the definition of peer competitors. Regarding a traditional commercial bank as a peer has different implications for the decision-making of the incumbent than when GAFAM companies are taken into the same equation. As for FinTech firms, though the IT vendor model has changed, incumbents still regard them as IT vendors instead of peer competitors, with the only exception of challenger banks. Incorporating the density of the market in the hazard profile should, therefore, be preceded by the subsequent adaptation of incumbents' competitor models.

Stage in the innovation lifecycle

When accommodating the development of new products to technological innovation, the lifecycle of the innovation is critical. Commercial banks' approach, however, is more driven by the urgency or need to step into the innovation than by the specific stage in the innovation itself. From this angle, looking around at what other peers are doing is a better hint about the likely success of the investment than any other considerations around the concept of new dominant designs.

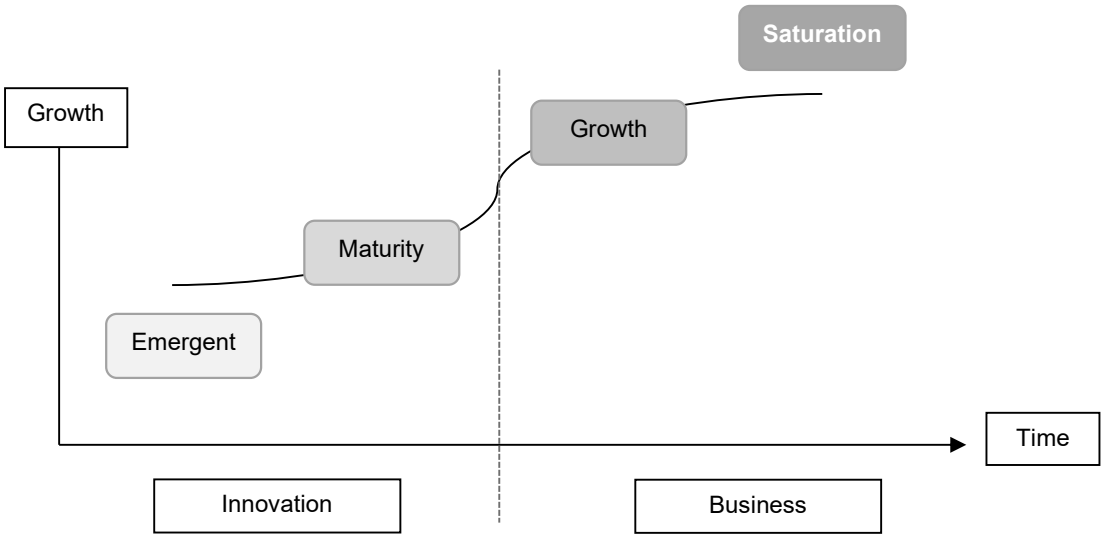
Reasoning this way, commercial banks do not put ‘time’ in a proper perspective. The analysis in Chapter 4 confirms that the ‘time’ variable, though considered relevant by all incumbents, is either forgotten in the estimation of the opportunity cost of the innovation or considered a collateral effect. At an early stage of innovation, in the absence of other comparable cases, for example, an incumbent can refrain itself more than when other similar cases are present in the market, cases that incumbents or equity investors eventually could use as a benchmark or reference.

For valuation purposes, the time factor is important due to its effect on the discount rate. When dealing with start-ups at the beginning of innovation, the makers of business cases for investments will preferably use higher discount rates. In later phases, where companies operating in the market have reached a critical size or are consolidating, the choice of the decision-makers will probably lead to the use of lower discount rates because the associated risks could be assessed lower.

Time, in its broadest sense, the fact that the investor might either be too late or too early when embracing the innovation, does certainly play a critical role in the decision-making. As an indication of ‘time’, the stage in the lifecycle of the innovation is a determinant factor, though not in the same way as used by incumbents. The analysis suggests that the stage in the lifecycle where the innovation can be placed is related to the size of the FinTech firm(s) being monitored by incumbents and not to the lifecycle of the innovation. If the ‘size’ of the FinTech firm is the leading variable, the focus of the decision-making is not put on the opportunity cost of the investment but on the ease of incorporating the innovation within the incumbents’ organization. The stage in the lifecycle of the innovation blurs away among other factors that are not relevant for a sound decision to either ‘make’ or ‘buy’ the innovation. The decision to monitor a specific FinTech firm comes first; the option to integrate or collaborate comes second.

This can be seen in the way incumbent ‘INC05’ spreads FinTech firms along the X-axis in an S-curve framework. This same allocation along the S-curve has implications for the selection of the valuation technique, namely market multiples at the innovation side of the S-curve and net present value at the business side.

FIGURE 26: S-CURVE FOR INNOVATION



To recapitulate, the hazard profile associated with investments in FinTech innovation is a factor of the four control variables introduced here above and influences the time to adopt the new dominant design from an incumbent's perspective.

Strategic alignment is more than accommodating market trends to incumbents' internal goals. Strategic alignment should eventually be regarded the other way around. For example, how to turn market trends that might indicate the emergence of new dominant designs into internal strategic goals that would lead to ownership of that emergent dominant design, e.g., by supporting the 'make-it' option in the decision-making.

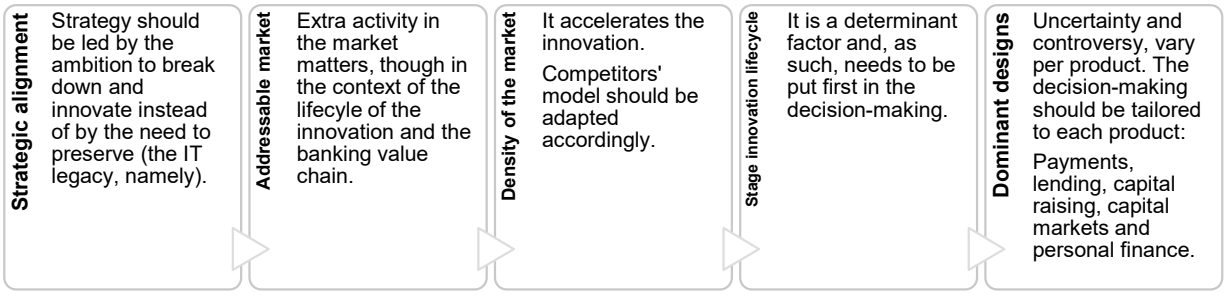
The extra activity of FinTech firms around a specific technological innovation is one of the first indicators that the market is in the presence of a dominant design, one that could help redefine incumbents' strategies. Bringing together FinTech start-ups under a collaboration agreement or partnership is a way to monitor innovation. These forms of collaboration could involve either incumbents' ownership, e.g., inside-out incubation, or not, e.g., outside-in start-up programmes and inside-out platform programmes. The lifecycle of the innovation in the context of the incumbents' value chain should be leading, though.

From an incumbent's dominant position, the innovation activities of peers could be ignored or disregarded, as their own strategy is leading. However, the FinTech ecosystem comprises forms of approaching consumers of financial products that cannot be attached to those peers. When assessing the risk profile of an investment

in FinTech innovation, incumbents should, therefore, look at competition from a different and broader perspective.

The stage in the lifecycle of the innovation is a determinant factor when identifying and interpreting those trends that might indicate the proximity to a new dominant design. This exercise, conducted for each product in the FinTech taxonomy, should trigger the decision-making process.

FIGURE 27: UNCERTAINTY AND CONTROVERSY ON THE WAY TO DOMINANT DESIGNS



5.4 Valuation Model

The discussion on the fourth research objective, namely "to design a model based on decision tree analysis and real options valuation to assess investments in FinTech innovation", is split into two parts. First, the discussion around the use of valuation techniques by participants in the case study is the subject of this section. Second, the design of the valuation model itself is the subject of Chapter 6, ‘Practical Implications’.

5.4.1 The Approach to Valuation in the Decision-Making

The results of the research confirm that, when looking at disruptive technologies and the companies that apply them, a large part of the valuation is anybody’s guess; there is not too much mathematics involved. The potential creation of value is about finding that opportunity that will earn back the investment outlay. The answer to this conundrum is not exclusively based on numerical outcomes obtained from specific valuation techniques. Decision-makers look at the price they should pay and the results they would achieve once they are confident about the investment, an approach that requires more perspectives than the one derived from a mathematical model.

None of the interviewees has ever used real options to evaluate investments in FinTech innovation, either stand-alone or in combination with decision tree analysis. This fact is well aligned with the claim of Triantis (2005) about the use of heuristics to cope with the intrinsic complexity of models based on the real options theory.

Incumbents' choice, instead, is for valuation models based on an S-curve framework that captures the pattern of innovation from the 'size' of the target FinTech firm. This way of monitoring innovation influences incumbents' choices for the valuation technique(s) required in the business case to support their decision-making. While companies at an 'emergent' stage are namely start-ups, companies at the 'maturity' stage are often scale-ups seeking extra funding. Once the target companies have reached the status of 'business, they are regarded as 'regular' companies for valuation purposes.

This classification intrinsically implies the use of discounted cash flow techniques whenever the cash flows are available and market multiples when they are not, namely enterprise value-to-revenues (EV-to-Revenues) or enterprise value-to-EBITDA (EV-to-EBITDA). The rate used to discount the cash flows, when available, is the bank 's cost of common equity Tier 1 capital (CET1). This capital tranche consists of common shares, stock surpluses resulting from the issue of common shares, retained earnings, common shares issued by subsidiaries and held by third parties, and accumulated other comprehensive income. The table below shows the relationship between the innovation lifecycle and the subsequent approach to valuation. The Cost of Capital is marked with '=' when it is the base for the discount rate and with '+' or '++ when a risk adjustment is required, the latter being higher.

TABLE 27: INNOVATION LIFECYCLE AND APPROACH TO VALUATION

	Innovation	Innovation	Business	Business
Stage lifecycle	**Emergent**	**Maturity**	**Growth**	**Saturation**
Cash flows	Hockey stick or not available.	Available, though not much reliable.	Available plus 'best case'	Available plus 'worst case'
Discount rate	Cost of Capital '++'	Cost of Capital '+'	Cost of Capital '='	Cost of Capital '='
Valuation technique	EV-to-Revenues	EV-to-EBITDA	DCF/ NPV	DCF/ NPV

Source: Author

The consequences of this approach are multiple. In the first place, valuation models designed this way neither incorporate flexibility into decision-making nor reduce exposure to uncertainty. Classifying investments into taxonomies, e.g., modular, irreversible, platform, and learning (Amram & Kulatilaka, 1999), does not apply here. In the second place, this approach does not include the upside potential for risk prized by Damodaran (2018); uncertainty, therefore, is not regarded as a source of additional value. In third place, it ignores the reversibility and scalability of the valuation horizon, as argued by Lee and Lee (2015) in their study of the valuation of investments in the so-called "Internet of Things". In addition, some of the key contributions of real options valuation to strategic decision-making, as put forward by Trigeorgis and Reuer (2017), are missing as well: there is no possibility to stage any alternative values a project can take unless no additional scenario analysis has been conducted; market valuations cannot be explained well as variations in value are excluded during the life of the project; the behavioural component of the decision-making is excluded, namely, the constraints to face and adapt to changes. The analysis of the data suggests that though internal factors like product cannibalization or distrust of the capacity to manage innovation are conveniently considered in the decision-making process, the role of financial markets as deterrents to innovation is either disregarded or underestimated.

Uncertainties resolve over time. Valuation approaches based on plain net present value calculations do not stimulate a proactive attitude by decision-makers when approaching uncertainties associated with an investment decision. If more flexibility in the handling of uncertainty results in better decision-making (Triantis, 2005), the flexibility to do so is out of the equation in these traditional approaches. Irrespective of the ‘make-it-or-buy-it’ alternative.

TABLE 28: COMPARISON OF VALUATION TECHNIQUES

Valuation technique	**Levers**
Net Present Value	- Present value fixed costs. - Present value future cash flows.
Real Option Value	- Present value fixed costs. - Present value future cash flows. - *Value lost over the duration of the option.* - *Unpredictability of expected cash flows.* - *Yield of a riskless security.* - *Period for which opportunity is valid.*

Source: Author.

5.4.2 Traditional versus Divergent Valuation Models

Using models constructed around decision trees and real option valuation implies approaching the valuation analysis from a different point of view. In the first place, the FinTech ecosystem should be regarded as a 'partially complete market.' In other words, a market with neither perfect nor imperfect competition; a market where competitors struggle with each other to gain a dominant position by offering a diverse array of products and services where pricing might be an issue; a market in which, though ambiguous at times, there might be protective barriers to entry, e.g., due to changing regulation.

Secondly, and derived from the assumption of partly complete markets, uncertainties around a project could be split between market uncertainties and private uncertainties. The first can be hedged by, e.g., trading securities; the latter are project-specific and cannot be hedged (Smith & Nau, 1995). In a divergent approach to valuation, the hazard profile could be associated with the private uncertainties around the FinTech innovation, which implicitly assumes that the incumbent is at risk of survival and that a relationship can be established between the hazard profile and the corresponding explanatory and control variables (Suarez & Utterback, 1995).

Finally, and though the values of the multiple real options are not additive, a model based on this approach should exploit its embedded flexibility by capturing the downside (e.g., the option to 'abandon') and the upside risks (the option to 'extend') of the decision-making (Trigeorgis, 1993). Factors other than technology should also be included.

5.5 Discussion in the Context of the Conceptual Model

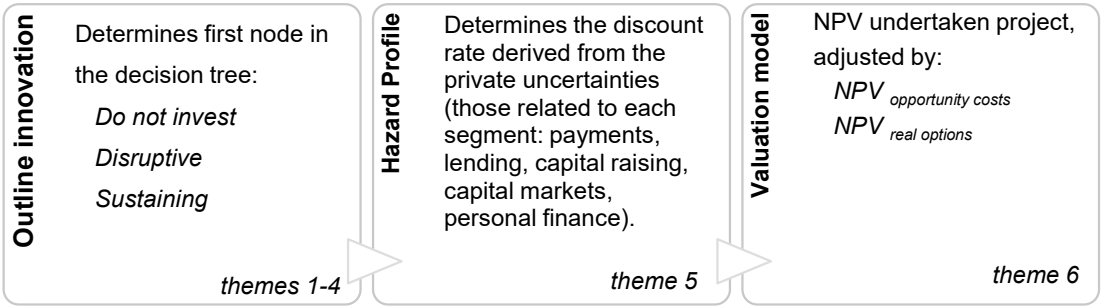
The discussion in this chapter has been structured around the themes and subthemes in the final template that resulted from the analysis of the data collected during the semi-structured interviews. This selection has made it possible to address all variables in the conceptual model of this research.

The discussion on the outline of the innovation, themes one to four, is meant to put the make-or-buy decision in the specific context of the FinTech innovation. The starting point is the disruptive innovation theory of Christensen (1997). The capacity to adapt business models and organizational architectures to the new FinTech taxonomy, and the specific role of regulation in this transformation, together,

determine the first node in the decision tree. Uncertainties and controversies around the innovation can be captured in a hazard profile that will help calculate the discount rates on each path in the decision tree. The hazard profile, covered by theme five, is specific to each business model or segment in the FinTech taxonomy. Finally, the valuation model, covered by theme six, stands, in fact, for a gap identified in the literature that triggers the search for financial metrics as enablers of disruptive innovations. The latter is associated in this research with the discovery and implementation of new dominant designs based on FinTech innovations.

The purpose of each variable is indicated in the figure below.

FIGURE 28: PURPOSE VARIABLES IN CONCEPTUAL MODEL



Source: Author.

CHAPTER 6: PRACTICAL IMPLICATIONS

6.1 INTRODUCTION

This chapter addresses the fourth research objective, namely "to design a model based on decision tree analysis and real option valuation to assess investments in FinTech innovation."

The research propositions used to outline the FinTech innovation help determine the first node in the tree for decision-making, whether to invest or not. Uncertainty and controversy, critical when assessing risky investments, are taken into account in the hazard profile and framed in the decision tree within a multiple real-world options context. The proposed ‘divergent’ valuation model is based on a multi-stage option approach, as investment opportunities considered this way have a significant growth option value (compound) that could justify strategic investments despite a negative net present value of the underlying project.

This section consists of three parts: the structure of the decision tree, the role of the hazard profile, and the design of the ‘divergent’ valuation model.

6.2 THE DECISION TREE

The first node in the tree for decision-making stands not only for the recommendation to follow a specific path but also for the selection of the corresponding valuation technique. Therefore, ascertaining the nature of the innovation is the first step. What is then a disruptive innovation? One that contributes to the creation of a new dominant design. In this case, additional decision-making is required to further identify the changes required in the business model and IT architecture, both supported by real-option reasoning (Trigeorgis & Reuer, 2017).

If that is not the case, there is no need for further decision-making on business models or IT architecture. Incorporating sunk costs on IT legacy systems into the value calculation, for example, is an assumption that needs to be made in the calculation itself but is not an option.

While the buy-it option in any form (either as full outsourcing or collaboration) is the most sounded decision in the case of sustaining innovations, the disruptive path in the decision tree still needs to be further explored to determine which of the two

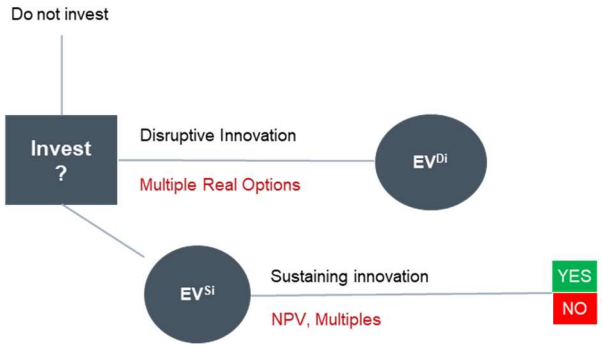
options, make-it or buy-it, is the best for the incumbent. The table below provides criteria to ascertain the nature of the innovation and the specific questions that need to be answered by incumbents at each step.

TABLE 29: ASCERTAINING THE NATURE OF THE INNOVATION

1. Nature of the innovation	**Disruptive**	**Sustaining**
Could the innovation contribute to the creation of a new dominant design?	YES	NO
2. Business model adaptation	**Make-or-Buy**	
Can the current business model be accommodated to the innovation?	YES/NO	NA[31]
3. Alternative organizational architectures	**Make-or-Buy**	
Can the organization be adapted when accommodating the innovation?	YES/NO	NA
4. Regulation (complementing three here above!)	**Make-or-Buy**	
Can the organization be adapted to comply with regulatory requirements?	YES/NO	NA

For sustaining innovations, the corresponding estimated value of the project could be approached using either market multiples, in the case of start-ups, or a net present value calculation, in the case of firms swinging between the stages of maturity and growth. For innovations regarded as disruptive, an approach based on multiple real options should be preferred (see figure below).

FIGURE 29: THE FIRST THREE OPTIONS IN THE DECISION TREE



[31] NA = not applicable

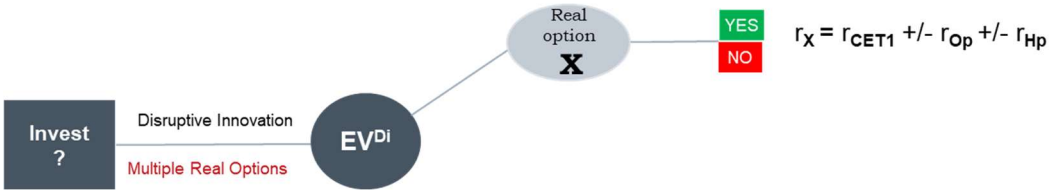
Each node in the decision tree stands for an alternative to the internal and external factors considered. For incumbent banks at the first node in the tree, the base discount rate for the calculation of the 'estimated value' in both investment paths (EV^{Si} and EV^{Di}), is the cost of CET1 capital of the bank. When following the disruptive innovation path, this base discount rate should be further adjusted by the risk associated with each option, as represented by their hazard profile.

6.3 The Hazard Profile

The estimated value of the disruptive innovation for each of the options in the decision tree could be based on the net present value of the cash flows associated with that option. I base my analysis on the integrated approach proposed by Smith and Nau (1995), which considers partly complete markets, and two risk types. The partly complete market scenario is one of the five scenarios described by Borison (2005) for approaching real options valuation.

By assuming that the markets are partly complete, we are implicitly assuming that not all uncertainties can be hedged. When uncertainties can be hedged, e.g., demand for the specific product considered, the price of the associated real option can be modelled as 'market uncertainty' (rOp). When uncertainties cannot be hedged, e.g., the effect of regulation on that specific product, the hazard profile could be modelled as a 'private uncertainty' (rHp). Consequently, the rate required (rX) to discount the cash flows of a specific real option path in the decision tree could be based on the cost of CET1 capital of the bank (rCET1), likewise with sustaining innovations, adjusted by the rates associated with the hedging of the market uncertainties (rOp) and the hazard profile of the private, or project-related, uncertainties (rHp). In this way, the estimated value of the project (EV) is based on the compounded value of all options considered at their specific risk.

FIGURE 30: DISCOUNT RATES AT EACH NODE IN THE TREE



6.4 A (DIVERGENT) VALUATION MODEL

6.4.1 SELECTION OF THE MULTIPLE REAL OPTIONS

Once on the disruptive innovation path, each subsequent node in the tree represents a further alternative in the decision-making process, an alternative that could be captured by a 'real' option. Though the value of each of these real options is not additive, they do add to the flexibility required in the strategic process around the investment decision. When flexibility is the only way to cope with the degree of uncertainty associated with the project, the choice of real options could be justified.

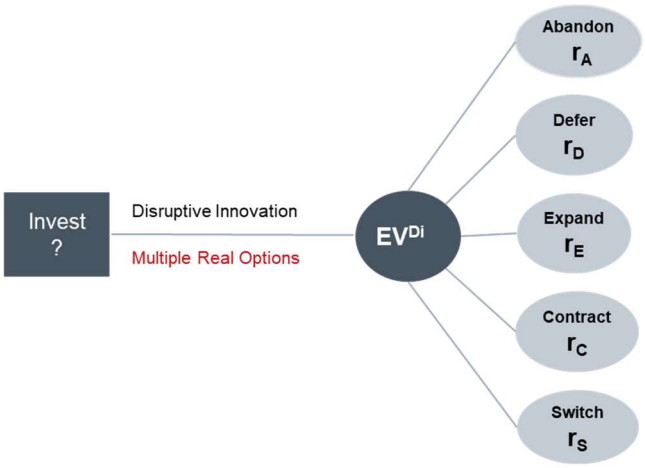
Bearing this in mind and taking Trigeorgis (1993) as a starting point, I have identified five 'real' options when considering FinTech investments, all five reasoning from the concepts of dominant design and survival of the firm from the perspective of a traditional commercial bank. The definition of the five options proposed is given in the table below.

TABLE 30: SELECTION OF MULTIPLE REAL OPTIONS FOR VALUATION

Option to abandon
When considering that the project will not be leading to a new dominant design. It is analogous to compound call option on the project.
Option to defer
When considering that the project is still at an early stage in the innovation lifecycle. It is analogous to an American call option
Option to expand
When scalability of the innovation, which is a critical point in the decision-making, is already becoming a fact. It is analogous to a European call option to acquire part of the project
Option to contract
When considering that the option, though not leading to a new dominant design, is still desirable. It is analogous to a European put option on part of the project.
Option to switch (to an alternative project)
When considering that this new alternative makes a better chance of ending up as a new dominant design. It could be valued as an American put on the project.

The estimated value of the investment once on the disruptive innovation path should be further calculated based on the compound value of each of the options considered in the table above.

FIGURE 31: FIVE REAL OPTIONS



6.4.2 Estimated Value of the Option (Compounded!)

In full alignment with previous considerations over the hazard profile and discount rates, the cash flows of each option in the tree could be discounted at the corresponding opportunity costs of the option, namely rA, rD, rE, rC, and rS. In a traditional approach to net present value calculation, a positive outcome of this multi-stage option approach would inform the decision to pursue the investment in the innovation. A negative outcome, on the contrary, would inform the decision-making process to drop the investment in the innovation. The compounded value of this multi-stage option approach could be expressed in the following way:

$$NPV_P = NPV_B +/- NPV_{OP} +/- NPV_{MRO}$$

TABLE 31: COMPUND VALUE OF A MULTI-STAGE APPROACH

Variable	Definition
NPV_P	Net present value of the project, for the decision-making.
NPV_B	Net present value of the project assuming it has been undertaken.
NPV_O	Net present value of the opportunity costs associated with the option, derived from business model adaptation and changes in the organizational architecture due to, e.g., regulation or IT legacy activities.
NPV_{MRO}	Net present value of the multiple real options

6.4.3 An Integrated Approach to Real Options Valuation in Practice

The four steps in the integrated approach described by Borison (2005) form the basis for the design of the valuation model. In the first step, the first node in the decision tree and the real options are identified and defined. In the second step, replicating portfolios to hedge market risks associated with the option needs to be found. In the third step, subjective probabilities for those risks that cannot be hedged need to be attached to each option. The fourth step is about the calculation of the estimated values associated with each option and path by bringing their values back to the first decision-making node in the tree.

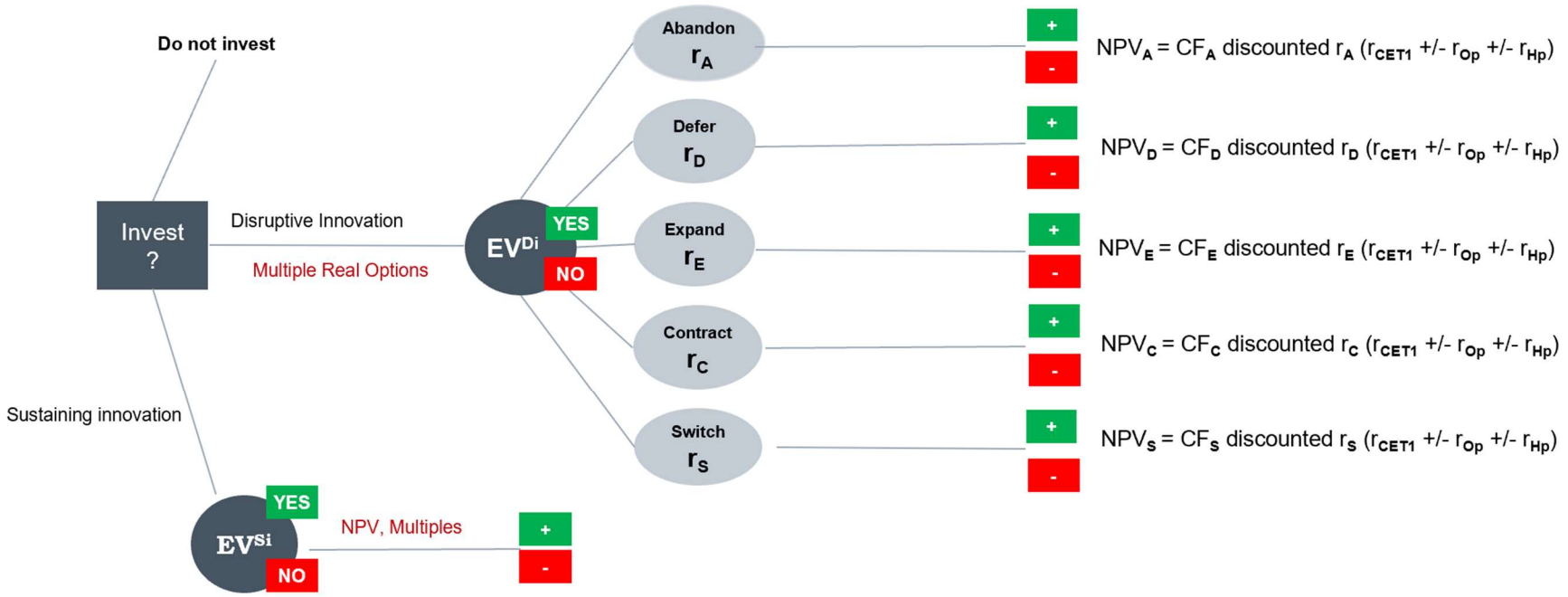
TABLE 32: THE MECHANICS OF AN INTEGRATED APPROACH TO REAL OPTIONS VALUATION

Step 1. **Build a decision tree to capture the alternatives of the investment.**
Three alternatives at the first node in the tree, based on an analysis of the outline of the innovation: - Do not pursue the investment. - Pursue the investment, investment is disruptive. - Pursue the investment, investment is sustaining. Five alternatives at the second node in the tree, on the disruptive innovation path: - Based on real options: defer, abandon, expand, contract, switch.
Step 2. **Identify the replicating portfolio for market risks (those that can be hedged!).**
Based on the spread between the STOXX Global FinTech index and the MCSI WRLD Financial index (traditional institutions, incumbents namely)
Step 3. **Assign subjective probabilities to project-related risks (those that cannot be hedged).**
Based on the hazard profile identified by each product/ option combination.
Step 4. **Go back in the tree to find out the optimal strategy and its value.**
Based on the estimated value of the option, compound!

6.4.4 Multiple Real Options in the Decision Tree

Bringing together all the considerations in previous sections of this chapter, the combination of a decision tree and a real options valuation approach would result in the valuation model shown below.

FIGURE 32: DECISION TREE AND MULTIPLE REAL OPTIONS FOR FINTECH INNOVATION



SOURCE: AUTHOR.

CHAPTER 7: CONCLUSIONS

7.1 INTRODUCTION

The purpose of this chapter is to present the conclusions of my research, my contribution to both academic knowledge and practice, my personal reflection, and my recommendations for further research.

7.2 RESEARCH PROPOSITIONS AND MAIN RESEARCH QUESTION

This section aims to answer the main research question by structuring the conclusions of the research around the propositions initially derived from the conceptual model.

7.2.1 FIRST RESEARCH PROPOSITION

> *"A FinTech innovation of a disruptive nature has a positive influence on incumbents' decision to pursue the innovation."*

The idea of 'preserving' the legacy is primarily linked to the technological character of the innovation. New technological developments make it easier to preserve incumbents' legacy. From this perspective, there are two alternatives for incumbents to embrace FinTech innovation: Incumbents can either 'buy in" to the innovation by using the traditional IT vendor relationship or enter into a collaboration or partnership with a FinTech firm, the owner' of a specific API interface, for example. The latter is often the most valid option and the one that most incumbents follow, as they can get access to innovation and maintain the IT legacy. In addition, this is an option that does not imply large transformations of the current organizational structure. The way in which valuation techniques are used in this process does not have any influence on incumbents' decisions between the 'make-it' and the 'buy-it' options because, in fact, the first does not have a fair chance at all. The 'make-it' option, however, does deserve a fair chance in the decision-making regarding FinTech innovation.

Online banking was no more than a switch from a physical environment—the brick-and-mortar branch offices of commercial banks—into a digital space made of websites online. Despite the name, FinTech innovation is more than a technological innovation to further streamline and automate business and financial processes. FinTech is not only about making the current financial products and services more attractive, e.g., instant payments at anytime and anywhere, but also about

reshaping the financial landscape from its inner foundations. FinTech stands for digital transformation. When the magnitude of the innovation is of such a calibre that the survival of the firms can be at risk, the option to lead the transformation (make it) should have, at least, the same chance as the option to preserve the legacy (buy it). Take, then, these considerations into the decision-making equation and grant the make-it option a fair chance.

7.2.2 Second Research Proposition

> *"The capacity of incumbents to accommodate current business models to new dominant designs has a positive influence on the growth expectations of the investment."*

There is not a single dominant banking design. The banking offering can be bundled; incumbents and consumers operate unbundled. And so does FinTech innovation. Therefore, embracing the innovation that leads to a new dominant design means embracing as many innovations as business models in the banking offering. In fact, there should be a decision tree for each business model, as specific factors inherent to that business differ too much from others to be captured in one single model.

Factors like the proximity of the business model to the core of the IT legacy systems or their position within the banking value chain are critical for decision-making and different per business model. The capacity of incumbents to accommodate their business models to new dominant designs should consequently be addressed separately by identifying specific trees and paths for innovation per model.

This approach will result in higher added value, compounded cumulatively throughout the banking value chain.

7.2.3 Third Research Proposition

> *"The capacity of incumbents to adapt the organization to the new dominant design has a positive influence on incumbents' decision to adopt the innovation before the appearance of the dominant design."*

Moving from the idea of innovating to preserve to the idea of innovating to survive not only means abandoning the IT legacy but also undertaking profound organizational changes. It is not only the technology behind the new offering that is changing but the entire way of doing banking, from the customer proposition to the internal business processes. The incumbents' capacity to adapt to this new mindset

should be considered in the decision-making process and not only as an ordinary post for sunk costs.

At the front of the value chain, the ‘journey’ of the consumer of financial products and services has ‘dramatically’ changed since the moment that FinTech firms managed to tap customer segments, either served or unserved, by simply relying on their ‘core technological competencies. Meanwhile, FinTech firms have replaced the idea and concept of ‘front office’ with others with a name. Adapting the value proposition of the banking offering to this new reality of the customer journey is a necessity. It is now up to the incumbents to make the first move in this direction.

At the back of the value chain, managing internal business processes requires a radical change as well. Taking anti-money laundering regulation as an example, the transformation unchained by FinTech in the handling of the onboarding of new customers is massive. Moving from people-based, pen-and-paper processes to machine learning will undoubtedly lead to transformations in incumbents’ organizations.

The adaptation of the own organization to this new reality is a necessity as well, e.g., by means of implementing customer authentication algorithms supported by biometrics and artificial intelligence. Therefore, corresponding decision-making on these subjects should consider the innovation that helps incumbents on the way to this transformation as one that can be integrated with the ‘new-to-be-constituted’ IT architecture required to support the aforementioned transformation process.

7.2.4 Fourth Research Proposition

> *“The capacity of incumbents to ascertain the strategic importance of an investment in FinTech innovation has a positive influence on incumbents’ decision to take the lead in the creation of a new dominant design.”*

Decentralized finance, a technology that promotes the use of peer-to-peer transactions, aims to eliminate the middleman from the equation. From this upcoming perspective, the survival of the incumbent as middleman is clearly at risk.

In alignment with these developments, incumbents’ strategic analysis still regards cost reductions in association with technology as an ‘opportunity’, and FinTech innovation as a ‘threat.’ This mindset, however, does not contribute to identify alternatives for the survival of their own firms. When cost reductions become strategic objectives, the option for innovation will be the one that contributes to that

objective. Consequently, the choice is for forms of innovation that contribute to the streamlining and subsequent automation of systems and processes rather than for innovations that would foster their digital transformation.

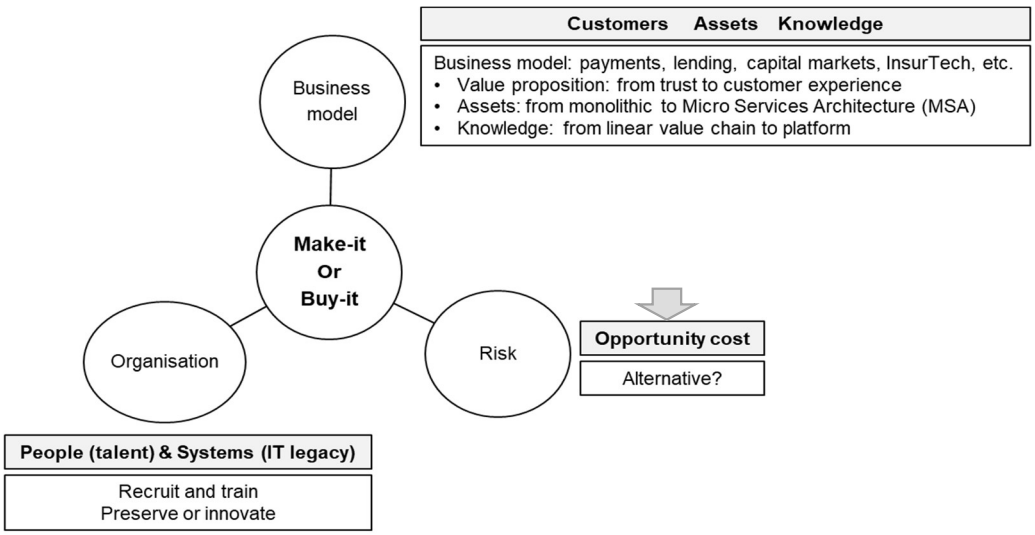
The decision to 'make it' will have a fair chance once incumbents incorporate digital transformation as one of their strategic objectives. Taking FinTech innovation into the strategy of the incumbents is, therefore, a prerequisite prior to any other strategic discussions.

7.2.5 Initial Construct: Opportunity Cost of the FinTech Innovation

The initial construct of this research revolves around the opportunity cost of investment in FinTech innovation. As previously stated, in the context of digital transformation and the survival of firms, the opportunity cost of investment from the incumbents' perspective is not only high but also one that discourages investment in innovation. Moreover, the link between the estimation of the opportunity cost and 'value drivers' in decision-making is lacking. The discount rate works more as a barrier than as an indication of alternatives to the investment, measured as an opportunity cost.

A decision tree integrating multiple real options incorporates the flexibility required to illuminate the aforementioned alternatives and corresponding opportunity costs. While the analysis from the perspective of the business model and the organization informs the decision-makers about the urgency of the decision, ascertaining the right opportunity cost associated with the investment should help traditional commercial banks make a better make-or-buy decision. The figure below shows, in short, the most relevant variables in this model.

Figure 33: The Initial Construct: Opportunity Cost of the Investment



7.2.6 MAIN RESEARCH QUESTION

"How can retail banks confronted with investments in FinTech innovation use valuation models for a better make-or-buy decision?"

A valuation approach based on real options and decision tree analysis offers several advantages over traditional approaches like enterprise multiples or net present value analysis.

In the first place, incorporating real options into the discussion enriches the quality of the decision-making process. Needless to say, this is the most important argument to favour the use of this approach. From the perspective of risky investments, like Fintech, it is difficult to assume that there will be no major changes during the life of the project and that all risks related to the project considered can be captured with one single discount rate, even though the discount rate might be the cost of equity of the bank, which is substantially high. Furthermore, a high single discount rate works towards the option to preserve rather than towards the option to innovate. Incorporating Monte Carlo Simulation, Multiple Probability Simulation, or assigning multiple values to an uncertain variable is an option, though one that assumes perfectly efficient markets. This is not the case when considering a disruptive innovation of this magnitude. Working from the assumption of partly complete markets facilitates differentiating discount rates per option and, more importantly, the estimation of project-specific rates associated with each individual project considered.

In the second place, decision-making is about flexibility. More flexibility in handling uncertainty and controversy results in better decision-making, whatever the subject of the decision might be or the technique we decide to use. In this context, the eventual complexities inherent to a real-options approach weigh less than the flexibility that such a model offers decision-makers and, therefore, should be set aside.

Decision trees are implicitly attached to any decision-making process. Our brain handles alternatives and probabilities intuitively. A decision on disruptive innovation is not about considering one single option. Real options valuation helps to eliminate the bias inherent to the use of decision trees and to work towards the multi-option combination that would secure the path to the new dominant design.

7.3 Research Contribution to the Knowledge

The use of real options for the valuation of risky investments in contexts similar to FinTech innovation dates back to the turn of the 20th century, with the emergence of the Internet. Though real options are often used in the context of the valuation of complex, risky investments, professional practitioners stay away from more extensive use of these models, which are almost immediately disregarded as being too complex or impenetrable.

My approach to real options in this research is heuristic, not mathematical. I do touch upon the topic, primarily praising the flexibility that it incorporates into the decision-making process. I have plans to deepen the valuation model by incorporating quantitative elements that are currently missing. I also intend to publish a paper on the use of real options in the context of FinTech innovation. I see my idea to bring together real options valuation and FinTech innovation as the most relevant contribution to the knowledge of my research.

7.4 Research Contribution to the Practice

I believe that this research has already had an impact on professional practise. I have designed a new module for the master's programme 'Digital-Driven Business' at the Amsterdam University of Applied Sciences. The name of the module is Digital FinTech Strategy and Innovation, and it is based on the content of my DBA research. The structure of the module revolves around four FinTech business models: payments, lending, capital markets, and Insurtech. I will add blockchain to the module starting in September 2023.

Prior to the delivery of this module, I organised a FinTech Academy Day. We had the presence of the Dean of our Faculty, and several companies attended, including a leading Dutch bank and a representation of FinTech firms active in the Amsterdam metropolitan area. The idea was to bring our master's and bachelor's students closer to businesses that are already active in FinTech innovation. The event was a success, and it will be continued in the 2023–2024 course with one event per semester. In addition to hosting this event, I am currently arranging company visits for our students with a selection of incumbent banks and FinTech firms, including neo-banks, that have already shown interest in participating. I have also launched a FinTech research lab for bachelor's and master's students who are interested in writing their theses on this subject. The thesis is written in collaboration with companies that offer students an internship for the duration of their research. In

addition, I have started working on a project about the implementation of RegTech at housing associations, which are major players in the Dutch housing market.

In the broadest sense of a contribution to professional practise, raising awareness about the importance of the interaction among the independent variables in the conceptual model is a relevant contribution that this research claims to make. From an incumbents' perspective, namely commercial banks, the determination of the discount rate in any valuation model is primarily related to solvency issues, not to the nature of the investment in itself. Solvency is, however, not the issue in the make-or-buy decision in the context of FinTech. It is more than a straightforward discussion of the outsourcing of activities or processes to third parties.

To start with the first independent variable in the conceptual model, understanding the nature of the innovation will help incumbents in practise place their decisions on these investments from the right perspective. Sustaining innovations that are a continuing factor in the lifecycle of the company may be outsourced without major risks for the future of the incumbent. Disruptive innovations should not. By taking this survival perspective as a starting point, commercial banks can better understand how to take control of innovation. Placing FinTech innovation in the context of incumbents' survival is not meant to be dramatic but rather a wake-up call to face innovation from a distinct perspective. Collaborating with FinTech firms is driven by this idea of embracing innovation and staying safe.

Reflecting from the perspective of business models and value drivers, the second independent variable, the findings of this research are relevant to evaluating the requirements of incumbents to eventually switch business models. Likewise, my reflections on the new FinTech taxonomy aim to trigger a discussion on future dominant designs. My analysis of business models, though not radically new, also sheds new light on this discussion. I regard the latter as one of the main contributions to practice. The core of the new module Digital FinTech Strategy & Innovation introduced above is based on the comparison of the current banking business models and the new FinTech ones. The transition from traditional to new is based on a Canvas business model analysis that results in a blueprint of the required transition and the corresponding cost-benefit analysis required to face innovation. The strategic analysis part may be regarded as a checklist for incumbents that have already decided to enter innovation.

The decision to either integrate the innovation or collaborate requires a thorough exploration of the current organisational architecture on the incumbents' side, the

third independent variable. This research provides insights into those elements that are critical not only to assimilating the innovation but also to completing the integration successfully, the real challenge of the decision-making process. The current way of collaborating to innovate preserves the IT legacy but will not ensure the survival of incumbent firms. After payments, other banking business models are already following. FinTech innovation will come closer to the core of the transactions on the incumbents' side. In this scenario, more internal development, the make-it option, should be preferred over other forms of outsourcing and collaboration, the buy-it option. In that sense, I believe that my reflections on the IT vendor model in its relationship to the banking value chain and value network are relevant for the identification of risks beyond those internal to the company alone.

Comprehending the magnitude of changes undergone by 'traditional' regulatory frameworks is necessary to understand the inequality in the competition between newcomers and incumbents for a dominant position in the financial services industry. It also helps to understand the difficulties of the latter in absorbing the extra compliance costs imposed by the regulators. For the analysis of this fourth independent variable, the review of the literature on regulation is thoroughly done and includes not only the review of academic papers but also information from discussions between officials of the European Commission and representatives of FinTech firms. This information has been one of the motivations behind the project for the Dutch housing market introduced above.

In the context of valuation, the hazard profile stands for risk. Illuminating those factors of influence that define the risk profile of an investment is, therefore, key to estimating the associated discount rate. All four factors considered in the hazard profile—the need for strategic alignment, the size of the addressable market and its density, and the stage of the innovation lifecycle—are well-known and widely used in practise. Bringing all four together, however, will help incumbents ascertain the time to adopt the new dominant design and the opportunity cost embedded in the discount rate, the basis of the real option valuation exercise.

Finally, there is the valuation model itself. The heuristic approach followed to define the multiple real options and the supporting decision tree aim to capture all relevant variables necessary for the decision-making process. As previously said, it is not about the numerical outcome of the valuation exercise but about identifying those variables that really matter for FinTech innovation. When approaching an investment decision on FinTech innovation exclusively from the perspective of an S-

curve pattern, we are only tracking the progression of the innovation, leaving aside some other fundamental elements for the decision-making. We are approaching the decision-making from the stage of the lifecycle of the target company and not from the perspective of the consequences for incumbents' legacy, people, and systems of incorporating the innovation. The use of, e.g., a net present value calculation in combination with the S-curve model is, therefore, not relevant. It is not about the choice of a specific valuation technique but rather about the core concepts of the innovation considered, in our case FinTech. The proposed decision tree and multiple real options approach will help incumbents identify those variables relevant to mitigate the uncertainty and controversy of the decision-making process.

All these variables, as fundamentally regarded in this research, provide a practical blueprint for incumbents to address the changes required. If technology is leading the transformation, incumbents should embrace it. Nevertheless, all alternatives deserve to be handled in the same way. By granting more flexibility to strategic decision-making, a model based on real options valuation would give the 'make-option' a fairer chance.

7.5 Personal Reflection

This work has been more than a long and exhausting journey of conducting research. Lecturers like me, joining academia from the professional and business worlds, often have the tendency to think that they know it better and go lecturing from their own intuition and professional experience, teaching cases, for example, to compensate for the lack of academic experience in the subjects that we deliver. By the latter, I am not meaning to say that such an approach is wrong or that we are not well prepared. The knowledge used in this way gets outdated rather easily, however. In my case, I really need to go a long way back in time to remember me back in Madrid, sitting on the benches of the Universidad Complutense. Working on my DBA has not only refreshed the good and the bad memories from that time, but it has also provided me with a more structured approach to lecturing. Something that I am already giving back to my students today.

Meanwhile, the work done has already paid off. Over the course of one week from the moment of the writing of these lines, I will start delivering a course on Digital FinTech Strategy and Innovations, a course that is, to a very large extent, based on this DBA dissertation. I could not be more grateful to all who made this possible. I consciously left unchanged the initial thoughts about my position as a researcher in

the introduction chapter of this dissertation to have the chance of reflecting on this development at the end.

This DBA endeavour was not easy. To start with, I underestimated that a DBA is not only a lot of work but also a very creative process, and that creativity does not go well together with a nine-to-five job. Despite getting the hours to do the job, we cannot simply assume that our intention to write will result in a text that can be directly incorporated into our thesis. One could say that there is no creation without inspiration. I know for certain that lacking inspiration does lead to frustration and, sometimes, even desperation.

In terms of the methodology, I faced three major issues: the choice of a philosophical position, the planning of the interviews, and the data collection and analysis.

For a novice researcher like me, understanding the underlying philosophy of my research was a real challenge. Meanwhile, I may say that I have read numerous books on philosophy and consulted a myriad of online websites. Being phenomenology my choice, and though I have extensively reviewed the literature on this philosophical perspective, I felt the need to go directly to one of the sources, Heidegger. And I did. Going through Heidegger's seminal work 'Being and Time' was, simply put, terrifying. Despite all my efforts, it is sad to say that I am not yet even close to mastering the subject.

I still believe that conducting semi-structured interviews with decision-makers was a very suitable approach to the main purpose of my research. From the very beginning, indeed, it was my choice to do qualitative research instead of quantitative research. However, and though I may not say that it came as a surprise, finding the candidates for the interviews and getting their confirmation in black and white consumed a considerable amount of time.

My choice for qualitative research demanded extra attention from my side. I enrolled in a course about software for qualitative data analysis, Atlas.ti. With the help of this software, I built a database to conduct an analysis of all the data collected during the interviews. Finally, the countless hours that I spent working on the transcripts of my interviews paid off, and the ideas about how to present the findings became clear to me.

Although I have no professional experience in the banking industry, I got a sense of "déjà vu" while doing the interviews with the three participants. It was almost painful

to see how the financial tools available are disregarded or ignored for complex decision-making processes.

Regarding the specific content of my research, I have learned how firms navigate the transition to a digital-driven world, not only in the banking industry but in all sectors and industries. By doing this research on FinTech, I was able to distance myself from the daily reality of a technological innovation that is dominating our lives. In this sense, I am very happy that, halfway through the review of the literature, I decided to add a separate section about the regulatory framework. FinTech and regulation interact so closely that one is almost impossible without the other.

As part of my data collection, I have interviewed professionals in decision-making at the frontlines of technological disruption. These professionals made it very clear to me that, when it comes to decision-making, it is about them. It is their decision, and they all know what they are talking about. In this sense, I have been very fortunate to meet some of the brightest minds, and I am very grateful for the time they made available to help me in my research.

Finally, the confirmation that when you want to survive as a firm in your industry, preserving what you already have is not a good strategy to hold on to in the future, unless you want to become a 'follower'. Leading innovation means daring to take risks—controllable risks, but risks in the end. Risks that are intrinsically linked to uncertainty and controversy. As a firm, you need to deal with both. While the first is about making choices among available options, the latter is about resolving differences. We can narrow down uncertainty by identifying and weighing the right alternatives. Controversy can be better approached by turning the will to lead innovation into a strategic goal with the aim of ensuring congruency throughout all executive management layers within the firm.

The major learning point I take with me is that, in the end, more flexibility in handling uncertainty and controversy results in better decision-making, whatever the subject of the decision might be or the technique we decide to use.

"Do open the shutter of the bedroom so that more light may enter".

Let us interpret the request to open the shutter in Goethe’s last words as a request to illuminate decision-making by increasing flexibility when approaching the assessment of the alternatives considered.

7.6 Recommendations for Further Research

A further deepening of the nine blocks used to outline the FinTech business models would provide a better grip on the adaptation process of each individual model to the new FinTech taxonomy.

Regarding regulation, I have not provided any information about costs incurred by incumbents on anti-money laundering activities, e.g., Know-Your-Customer (KYC). An estimation of these costs, e.g., KYC per customer, would be very helpful to identify the opportunity costs of the regulatory factor in the calculation of the compounded value of the multi-stage option.

The valuation model proposed does not contain specific information, neither about the calculation of the value of the separate options nor about the discount rates for each of the options considered. Therefore, further research about these two subjects is recommended, namely the modelling of the discount rates associated with the hedging of market uncertainties and the discount rates associated with the hazard profile.

A calculation of the spread between the STOXX Global Fintech index and the MSCI WRLD Financial index, as shown under step 2 in Table 31, would help feed the model to calculate the discount rates associated with the market uncertainties.

This dissertation has mainly focused on FinTech developments from the perspective of centralized finance, assuming that traditional banking institutions, the incumbents, will keep their ‘central’ control role intact. Decentralized finance, a technology that promotes the use of peer-to-peer transactions (P2P) for the offering of financial products and the reduction of transaction times, is on the rise and becoming a threat to this centralized banking system. If the middleman is the target, the mediator role of incumbents will be compromised. These developments have been touched upon very tangentially in this dissertation and would therefore deserve further deepening by undertaking specific research on the subject.

LIST OF REFERENCES

Alsaigh, R., & Coyne, I. (2021). Doing a Hermeneutic Phenomenology Research Underpinned by Gadamer's Philosophy: A Framework to Facilitate Data Analysis. International Journal of Qualitative Methods, 20.

Amram, M., & Kulatilaka, N. (1999). Real Options: Managing Strategic Investment in an Uncertain World. Choice Reviews Online.

Amsterdam. (2022). I amsterdam.

Anagnostopoulos, I. (2018). Fintech and regtech: Impact on regulators and banks. Journal of Economics and Business, 100, 7–25.

Ansari, S., & Krop, P. (2012). Incumbent Performance in the Face of a Radical Innovation: Towards a Framework for Incumbent Challenger Dynamics.

Arner, D. W., Barberis, J., Buckley, R. P., & Law, U. (2017). The Emergence of Regtech 2.0: From Know Your Customer to Know Your Data. In UNSWLRS (Vol. 63).

Arner, D. W., Zetzsche, D. A., Buckley, R. P., & Barberis, J. N. (2019). The Identity Challenge in Finance: From Analogue Identity to Digitized Identification to Digital KYC Utilities. European Business Organization Law Review, 20(1), 55–80.

Balakrishnan, J., & Cheng, C. H. (2005). The Theory of Constraints and the Make-or-Buy Decision: An Update and Review AUTHORS The Journal of Supply Chain Management: A Global Review of Purchasing and Supply.

Banco Santander. (2021). Banco Santander. Web Banco Santander.

Bank of International Settlements. (2022). Basel Committee on Banking Supervision.

Benner, M. J. (2008). Financial market reactions following technological discontinuities: A non-event study in two industries. Industrial and Corporate Change, 17(1), 109–154.

Birkinshaw, J., & Gibson, C. (2004). Building ambidexterity into an organization. In MIT Sloan Management Review.

Boblin, S. L., Ireland, S., Kirkpatrick, H., & Robertson, K. (2013). Using stake's qualitative case study approach to explore implementation of evidence-based practice. Qualitative Health Research, 23(9), 1267–1275.

Boell, S. K., & Cecez-Kecmanovic, D. (2014). A hermeneutic approach for conducting literature reviews and literature searches. Communications of the Association for Information Systems.

Borison, A. (2005). Real Options Analysis: Where Are the Emperor s Clothes. Journal of Applied Corporate Finance, 17(2).

Bouncken, R. B., Qiu, Y., Sinkovics, N., & Kürsten, W. (2021). Qualitative research: extending the range with flexible pattern matching. Review of Managerial Science, 15(2), 251–273.

Buchanan, L., & O'Connell, A. (2006). Analytics And Data Science a Brief History of Decision Making.

Buckley, R. P., Arner, D., Veidt, R., & Zetzsche, D. (2020). Building Fintech Ecosystems: Regulatory Sandboxes, Innovation Hubs, and Beyond.

Casadesus-Masanell, R., & Zhu, F. (2013). Business model innovation and competitive imitation: The case of sponsor-based business models. Strategic Management Journal, 34(4), 464–482.

Ceyssens, J. (2022). Open Finance: The Backbone of Digital Economy.

Chesbrough, H. (2010). Business model innovation: Opportunities and barriers. Long Range Planning, 43(2–3), 354–363.

Christensen, C. (1997). The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail. In Harvard Business School Press.

Christensen, C., Altman, E., McDonald, R., & Palmer, J. (2016). Disruptive Innovation: Intellectual History and Future Paths.

Christensen, C., Horn, M. B., & Staker, H. (2013). Is K-12 Blended Learning Disruptive?

Christensen, C. M. (1997). The Innovator' s Dilemma When New Technologies Cause Great Firms to Fail How Can Great Firms Fail? Insights from the Hard Disk Drive. Harvard Business School Press, 1–15.

Christensen, C. M., Raynor, M., & McDonald, R. (2016). What is disruptive innovation? Harvard Business Review, 2015 (December).

Christensen, C., McDonald, R. M., Altman, E. J., & Palmer, J. (2017). Disruptive Innovation: Intellectual History and Future Paths. Academy of Management Proceedings, 2017(1), 14218.

Christensen, C., Raynor, M., & McDonald, R. (2016). What is disruptive innovation? Harvard Business Review, 2015(December), 1–22.

Christensen, C., & Rosenbloom, R. S. (2013). Explaining the attacker's advantage: Technological paradigms, organizational dynamics, and the value network. Advances in Strategic Management, 30, 389–429.

Cliffe, A. (2021). To what extent does European law ensure a level playing field for fintechs in the payment services sector? An analysis of past and future developments from a competition law perspective. European Competition Journal.

Cox, J. C., Ross, S. A., & Rubinstein, M. (1979). Option Pricing: A Simplified Approach*.

Cozzolino, A., Verona, G., & Rothaermel, F. T. (2018). Unpacking the Disruption Process: New Technology, Business Models, and Incumbent Adaptation. Journal of Management Studies, 55(7), 1166–1202.

Creswell, J. W. (2014). Research Design - Qualitative, Quantitative, and Mixed Methods Approaches.

Crotty, M. (1998). The foundations of social research: Meaning and perspective in the research process. In Sage.

Damodaran, A. (2018). The Dark Side of Valuation: Valuing Young, Distressed, and Complex Businesses.

Daughtery, C. (2016). An Exercise in Rigor: A Review of Robert K. Yin's Case Study Research Design and Methods. The Qualitative Report.

Denzin, N.K., & Lincoln Y.S. Handbook of Qualitative Research. Sage, Thousand Oaks, CA, 1994.

DNB. (2022, October 18). Response to Tribunal ruling in Bunq case. Official Website.

Ducoulombier, E. (2022). Open Finance: The Backbone of Digital Economy.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research Published by: Academy of Management Stable. The Academy of Management Review, 14(4).

Enriques, L., & Ringe, W.-G. (2020). Bank-Fintech Partnerships, Outsourcing Arrangements, and the Case for a Mentorship Regime.

European Commission. (2020a). COMMITTEE AND THE COMMITTEE OF THE REGIONS on a Retail Payments Strategy for the EU.

European Commission. (2020c). Digital Strategy for the EU CELEX_52020DC0591_EN_TXT.

EY Global Fintech Adoption Index. (2019). Gary Hwa EY Global Financial Services Markets Executive Chair and EY Asia-Pacific Financial Services Regional Managing Partner.

Financial Times Ltd. (2021). The Banker.

Fleming, V., Gaidys, U., & Robb, Y. (2003). Hermeneutic research in nursing: Developing a Gadamerian-based research method. In Nursing Inquiry (Vol. 10, Issue 2).

Forbes Advisor, S. W. M. S. (2021, June 24). Forbes Advisor.

FSB. (2019). FinTech and market structure in financial services: Market developments and potential financial stability implications. www.fsb.org/emailalert

George, T. (2020). Stanford Encyclopaedia of Philosophy Hermeneutics.

Harmancioglu, N., Sääksjärvi, M., & Hultink, E. J. (2020). Cannibalize and combine? The impact of ambidextrous innovation on organizational outcomes under market competition. Industrial Marketing Management, 85, 44–57.

Heidegger, M. (1953). Being and Time (Revised Stambaugh). University of New York Press.

Heukelom, F. (2011). Kahneman and Tversky and the Origin of Behavioral Economics. SSRN Electronic Journal.

Holland Fintech. (2022). Holland Fintech Meetup. Holland Fintech Meetup.

Holland Fintech. (2022, October). Global Fintech News.

Hopp, C., Antons, D., Kaminski, J., & Salge, T. (2018). Disruption Innovation: Conceptual Foundations, Emperical Evidence, and Research Opportunities in the Digital era .pdf. Product Development & Management Association.

Imerman, M. B., & Fabozzi, F. J. (2020). Cashing in on innovation: a taxonomy of FinTech. Journal of Asset Management, 21(3), 167–177.

Infosys. (2018). Fintech Revolution in Banking: Leading the Way to Digital.

Kahneman, D., & Tversky, A. (2018). Prospect theory: An analysis of decision under risk. In Experiments in Environmental Economics.

Kang, H. G., Woo, W., Burton, R. M., & Mitchell, W. (2018). Constructing M&A valuation: how do merger evaluation methods differ as uncertainty and controversy vary? Journal of Organization Design, 7(1).

Ketokivi, M., & Mahoney, J. T. (2017). Transaction Cost Economics as a Theory of Management. Oxford Research Encyclopedia of Business and Management.

King, N., & Brooks, J. M. (2018). Template Analysis for Business and Management Students. In Template Analysis for Business and Management Students.

Knight, B. (2016). FinTech: Who Regulates It and Why It Matters. October 2014, 1–30. www.milkeninstitute.org/publications/view/665.

Kose, J. (2021, June 16). 2021 FMA Virtual European Conference.

KPMG. (2019). Pulse of Fintech H2 2019. KPMG-Fintech-Report 2019, February 1–85.

KPMG. (2020). Pulse of Fintech H2 2020. KPMG-Fintech-Report, February 1–85.

KPMG. (2021). Pulse of Fintech H2 2021.KPMG-Fintech-Report, February 1-85

Kuzel, A.J. “Sampling in Qualitative Inquiry”, IN BF Crabtree and WL Miller (EDS.) Doing Qualitative Research (2nd. Ed.), Sage, Thousand Oaks, CA 1999, 33-45.

Laínez, M. (2022). Open Finance: The Backbone of Digital Economy.

Laverty, S. M. (2003). Hermeneutic Phenomenology and Phenomenology: A Comparison of Historical and Methodological Considerations. International Journal of Qualitative Methods, 2(3), 21–35.

Lee, I., & Lee, K. (2015). The Internet of Things (IoT): Applications, investments, and challenges for enterprises. Business Horizons, 58(4), 431–440.

Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. Business Horizons, 61(1), 35–46.

Magee, J. F. (1964). Decision Trees for Decision Making. Harvard Business Review.

Magretta, J. (2002). Why business models matter? In Harvard Business Review.

Markides, C. (2006). Disruptive innovation: In need of better theory. In Journal of Product Innovation Management (Vol. 23, Issue 1, pp. 19–25).

Markides, C., & Charitou, C. D. (2004). Competing with dual business models: A contingency approach. In Academy of Management Executive.

Markides, C., & Chu, W. (2009). Innovation through Ambidexterity: How to Achieve the Ambidextrous Organization Constantinos Markides. In London Business School.

Mauri, A. J., & McMillan, G. S. (1999). the Influence of Technology on Strategic Alliances: An Application of the Utterback and Abernathy Model of Product and Process Innovation. International Journal of Innovation Management, 03(04), 367–378.

Mayer, T., & Steneck, N. (2011). Section Iv Codes of Conduct. Promoting Research Integrity in a Global Environment, 129–189.

Mcivor, R. T., Humphreys, P. K., & Mcaleer, W. E. (1997). A strategic model for the formulation of an effective make or buys decision. Management Decision, 35(2).

McKinsey, Galvin, J., Han, F., Hynes, S., Qu, J., Rajgopal, K., & Shek, A. (2018). McKinsey Synergy and disruption: Ten trends shaping fintech.

Mention, A. L. (2019). The Future of Fintech. In Research Technology Management (Vol. 62, Issue 4, pp. 59–63). Taylor and Francis Inc.

Morgan Stanley. (2005). Applied Corporate Finance. Journal of Applied Corporate Finance, 17(2).

Morse, J.M. “Determining Sample Size”, Qualitative Health Research, (10:1), 2000, 3-5.

Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. Nursing Research.

Myers, C. (1977). Determinants of Corporate Borrowing. Stewart C. Myers. Journal of Financial Economics, Vol. 5, No. 2, 147–175.

Navaretti, G. B., Calzolari, G., & Pozzolo, A. F. (2017). FinTech and Banks: Friends or Foes?

Nguyen, D. D., Nguyen, L., & Sila, V. (2019). Does Corporate Culture Affect Bank Risk-Taking? Evidence from Loan-Level Data. British Journal of Management, 30(1), 106–133.

Nick Srnicek. (2017). Platform Capitalism (Polity Press, Ed.). Polity Press.

Niknam. (2022, October 11). Bunq Update 21 (online).

Northumbria University. (2016). Governance Handbook. London: DfE, January 27–29.

Olsson, J. (2022). Open Finance: The Backbone of Digital Economy.

O'Reilly, C. A., & Tushman, M. L. (1996). Ambidextrous organizations: managing evolutionary and revolutionary change. California Management Review, 38(4), 8–30.

O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. Academy of Management Perspectives, 27(4), 324–338.

O'Reilly, C., & Tushman, M. (2004). The Ambidextrous Organization. In The Ambidextrous Organization.

Packer, M. J. (1985). Hermeneutic Enquiry in the Study of Human Conduct.

Palmié, M., Wincent, J., Parida, V., & Caglar, U. (2020). The evolution of the financial technology ecosystem: An introduction and agenda for future research on disruptive innovations in ecosystems. Technological Forecasting and Social Change, 151.

Parra Moyano, J., & Ross, O. (2017). KYC Optimization Using Distributed Ledger Technology. Business and Information Systems Engineering, 59(6).

Paterson, M., & Higgs, J. (2015). Using Hermeneutics as a Qualitative Research Approach in Professional Practice. The Qualitative Report.

Polasik, M., Huterska, A., Iftikhar, R., & Mikula, Š. (2020). The impact of Payment Services Directive 2 on the PayTech sector development in Europe. Journal of Economic Behavior and Organization, 178, 385–401.

Portolano, A. (2022). Open Finance: The Backbone of Digital Economy.

Puca, A. (2020). Early-Stage Valuation: A Fair Value Perspective.

Quinn, R. E., & Rohrbaugh, J. (1983). Spatial Model of Effectiveness Criteria: Towards a Competing Values Approach to Organizational Analysis. Management Science, 29(3).

Riege, A. M. (2003). Validity and reliability tests in case study research: A literature review with “handson” applications for each research phase. Qualitative Market Research: An International Journal, 6(2), 75–86.

Romānova, I., Grima, S., Spiteri, J., & Kudinska, M. (2018). The Payment Services Directive II and Competitiveness: The Perspective of European Fintech Companies the Payment Services Directive II and Competitiveness: The Perspective of European Fintech Companies 4. In European Research Studies Journal: Vol. XXI (Issue 2).

Saunders, M., Lewis, P., & Thornhill, A. (2009). Research methods for business students. Fitfth Edition. In Pearson Education, UK.

Schulmerich, M. (2010). Real options valuation: The importance of interest rate modelling in theory and practice. In Real Options Valuation: The Importance of Interest Rate Modelling in Theory and Practice.

Shanaev, S., Sharma, S., Ghimire, B., & Shuraeva, A. (2020). Taming the blockchain beast? Regulatory implications for the cryptocurrency Market. Research in International Business and Finance, 51.

Shashank, R. B., Chhabra, C., & Cholli, N. G. (2020). Application of Blockchain in KYC Compliance. European Journal of Engineering Research and Science, 5(7).

Silverman, D. (2017). A Very Short, Fairly Interesting and Reasonably Cheap Book about Qualitative Research. In A Very Short, Fairly Interesting and Reasonably Cheap Book about Qualitative Research. SAGE Publications, Ltd.

Silverman, D. (2022, October 14). Rethinking the Justifications for Qualitative Research.

Sinkovics, N. (2018). Pattern matching in qualitative analysis Information and communicatoin technologies View project Qualitative Methods View project.

Smith, D. W. (2013). Phenomenology (Stanford Encyclopedia of Philosophy). In Stanford Encyclopedia of Philosophy.

Smith, J., & Nau, R. (1995). Valuing risky projects: Option pricing theory and decision a. Management Sciencefiction, 41(5), 795–816.

Srnicek, N. (2017). Platform capitalism (Theory Redux). In Platform Capitalism.

Statista 2019. (2022). IT spending as a percentage of company revenue worldwide as of 2019, by industry sector. Statista.

Strategy&. (2021). Capturing the value in “knowing your customer” | Strategy&. www.pwc.com/structure

Suárez, F. F., & Utterback, J. M. (1995). Dominant designs and the survival of firms. Strategic Management Journal, 16(6).

Teece, D. J. (2010). Business models, business strategy and innovation. Long Range Planning, 43(2–3), 172–194.

Terentev, S. (2021, November 19). How Fintech Is Meeting the Needs of The Unbanked - Now and In the Future. Forbes.Com.

Thakor, A. v. (2020). Fintech and banking: What do we know? Journal of Financial Intermediation, 41(August 2019).

Thomson Reuters. (2022). Anti-Money-Laundering-Insights Survey 2022.

Triantis, A. (2005). Realizing the Potential of Real Options: Does Theory Meet Practice. Journal of Applied Corporate Finance, 17(2).

Trigeorgis, L. (1993). The Nature of Option Interactions and the Valuation of Investments with Multiple Real. In Source: The Journal of Financial and Quantitative Analysis (Vol. 28, Issue 1).

Trigeorgis, L., & Reuer, J. J. (2017). Real options theory in strategic management. Strategic Management Journal, 38(1), 42–63.

Utterback, J. M. (1971). The Process of Technological Innovation Within the Firm. Academy of Management Journal.

Utterback, J. M. (1974). Innovation in industry and the diffusion of technology. Science. https://doi.org/10.1126/science.183.4125.620

Utterback, J. M., & Abernathy, W. J. (1975). A dynamic model of process and product innovation. Omega.

Weiblen, T., & Chesbrough, H. W. (2015). Engaging with startups to enhance corporate innovation. California Management Review.

World Economic Forum WEF. (2015). The Future of Financial Services. www.deloitte.com/about

World Economic Forum WEF. (2016). A Blueprint for Digital Identity the Role of Financial Institutions in Building Digital Identity an Industry Project of the Financial Services Community | Prepared in collaboration with Deloitte Part of the Future of Financial Services Series.

World Economic Forum WEF. (2016). The future of financial infrastructure an ambitious look at how blockchain can reshape financial services An Industry Project of the Financial Services Community | Prepared in collaboration with Deloitte Part of the Future of Financial Services Series.

Yazan, B. (2015). Three Approaches to Case Study Methods in Education: Yin, Merriam, and Stake. The Qualitative Report. https://doi.org/10.46743/2160-3715/2015.2102

Yin. (2018). Case Study Research and Applications. In Case Study Research and Applications.

Yin. (2018). Case Study Research and Applications.

Zavolokina, L., Dolata, M., & Schwabe, G. (2016). The FinTech Phenomenon: Antecedents of Financial Innovation Perceived by the Popular Press. Financial Innovation Vol. 2, Issue 1.

APPENDIX 1: SUMMARY SHEET

Title

FinTech and the Make-or-Buy Decision: A Valuation Model for Retail Banks Facing Disruptive Innovation

Purpose Statement

The purpose of this qualitative, phenomenological research is to explore the experiences of **decision-makers engaged in the valuation of FinTech innovation**, and to define the context in which these experiences can be interpreted.

By conducting a **case study** from three different perspectives, incumbents (traditional retail banks), FinTech firms (start-ups and challenger or neo-banks) and equity investors, I will describe the phenomenon of the decision-making experience around the valuation of investments in FinTech innovation.

Main Research Question

"How can retail banks confronted with investments in FinTech innovation use valuation models for a better make-or-buy decision?"

Research Objectives

The conceptual framework required to shape the research design, outline the literature review, and answer the main research question is based on the following four research objectives:

- Objective 1: To understand the **essence of FinTech** innovation by illuminating the boundaries between sustaining and disruptive innovation.

- Objective 2: To define the **business model FinTech** and to identify the value drivers essential for the make-or-buy decision.

- Objective 3: To explore **alternative organizational structures** that can help nesting FinTech innovation within the existing organizational architecture of traditional retail banks.

- Objective 4: To design a model based on **decision tree analysis and real options valuation** to assess investments in FinTech innovation.

Context and Initial Construct

As disruptive innovation, FinTech has evolved from the scenario as sketched by (C. M. Christensen, 1997b), where disruptors try to find ways to serve niches either unexplored or abandoned by incumbent organizations, to a broader ecosystem with unclear boundaries between both. The ‘essence’ of banking itself is at discussion.

FinTech firms, the disruptors in the FinTech ecosystem, do not simply need capital to pursue growth, they need customers who **trust** their products and services. Scaling-up is becoming an issue, the so-called ‘challengers’ or ‘neo-banks’ are in the surge.

Traditional financial institutions, the incumbent organizations, may have branding recognition and adequate capital resources, when it comes to the make-or-buy decision about investments in FinTech innovation, the business case is unfavourable for the ‘make’ option. The burden of legacy systems and the use of valuation models that **penalize** uncertain, long-term investments with volatile discount rates partly explains this negative outcome.

The role of equity investors, venture capital (VC) and private equity firms (PE), is also putting pressure at the side of the incumbents. Total global investments in FinTech reached USD **210.2 billion in 2021**, of which 60.5% came from VC and PE activities. To compare, total global investments for the full year 2020 was USD 121.5 billion, of which 39.0% came from VC and PE firms (KPMG, 2020, 2021) .

The inflow of these massive amounts of capital in the FinTech markets has increased the **aversion** of banks to paying exorbitant prices for the option value of future growth based on multiples paid for FinTech firms by these VC and PE investors. If the alternative to a plain valuation using NPV is the use of these overstated **multiples**, banks are not being helped to change their initial aversion into appetite for investments in FinTech innovation.

The identification of opportunity costs associated with the investment in FinTech innovation has been taken in the initial construct of this research because it is the cornerstone of the conceptual framework introduced here above. The construct further assumes that a decision on disruptive innovation favours the use of a **divergent approach to valuation**:

> “A decision tree analysis integrating option pricing and decision analysis methods puts the degree of uncertainty and controversy associated with investments in disruptive innovation into perspective. The outcome of this exercise helps retail

banks towards a better and ‘unbiased’ decision when assessing the opportunity cost of the investment in FinTech innovation.”

Gap in the Literature

In a working paper about the evolution of the disruptive innovation theory from a technology change framework to a causal theory of innovation and competitive response (Christensen, Elizabeth, McDonald, & Palmer, 2017), the authors acknowledge the limitations of the existing literature on disruptive innovation and **recommend further research** on the following aspects: performance trajectories, hybrid response strategies, platform businesses, modular architectures, and **financial metrics as enablers of disruption**.

The authors’ claim for future research into the latter, financial metrics as enablers of disruption, stands at the base of this phenomenological research.

Contributions

1. The use of multiple real options theory to design a valuation model for FinTech innovation. Hence, the role of **financial metrics as enablers of disruption** is the most relevant potential contribution to knowledge of this research.
2. A second contribution of the research will be the further clarification of the role of regulation in the FinTech ecosystem. More specifically, the reduction of the regulatory burden for FinTech firms, which in the end creates a **disadvantage (?)** for the incumbents, either when adopting the innovation themselves or teaming up with the disruptors.
3. A third and last contribution will be the exploration and analysis of **alternatives for collaboration** between incumbents and FinTech firms.

Methodology

Philosophy	Phenomenology (Interpretivism)
Approach, choices	Inductive, qualitative, multi methods research
Strategy, time horizon	Exploratory case study, cross-sectional
Data collection	Semi-structured interviews based on non-probability criterion sampling
Data analysis	Flexible pattern matching, template analysis

APPENDIX 2: QUESTIONNAIRE INCUMBENTS

Questionnaire Incumbents: Part 1

The purpose of this interview is threefold: first, to understand the essence of FinTech innovation by illuminating the boundaries between sustaining and disruptive innovation; second, to define the FinTech taxonomy by reflecting on the 'essence' of banking; third, to identify the value drivers essential for the assessment of investments in FinTech innovation.

- Is FinTech innovation a threat or an opportunity for traditional retail banks? Have retail banks left the innovation over to the FinTech firms?
- How do you regard FinTech innovation: as 'sustaining' (leading to the improvement of an existing product or service) or 'disruptive' (leading to the creation of a fundamentally new product or service)?
- How does the business model of FinTech Banking-as-a-Service differ from the traditional retail banking model?
- How does the value network (value chain) of FinTech Banking-as-a-Service differ from the value network of traditional retail banks?
- From the perspective of FinTech Banking-as-a-Service, is the offer of unbundled products and services what makes the difference with traditional retail banks?
- The 'Tech-suffix': why RegTech, PropTech, InsurTech, and not BankTech, yet?
- In which way differs the business model of a challenger bank from the business model of a traditional retail bank? Is becoming a challenger bank a natural step in the scaling-up process of FinTech firms, rather than collaborating or integrating with traditional financial services institutions?
- From the perspective of traditional retail banks, is regulation (looser!), a hurdle for entering cooperation with FinTech firms?
- What could trigger an incumbent to take a step towards the fully integration with a FinTech firm?
- Which valuation technique gives a better insight in the value of the FinTech innovation: recent deals using multiples e.g., Enterprise Value/revenues, EV/EBITDA, other (?), net present value approach considering the option to reject the investment as an opportunity cost or forgone opportunity, and including sunk costs, e.g., from legacy systems, in the calculation.

Questionnaire Incumbents: Part 2

When ascertaining the level of uncertainty and controversy associated with the decision-making on investments in FinTech innovation, from an incumbents' perspective[32], how would you assess the importance of the following variables[33]?

	Variable	1	2	3	4	5
1	The nature of the disruption: Whether the investment is of a sustaining nature (leading to an improvement of an existing product or service) or disruptive (leading to the creation of a fundamentally new product or service).					
2	Strategic Alignment: The capacity to align the business model of the new project with the current strategy of the incumbent firm.					
3	Business Model Adaptation: The capacity to adapt the business model of the new project to the existing business model of the incumbent firm.					
4	Organizational Architecture: The capacity to adapt the organization to the new dominant design.					
5	Regulation: Does specific banking regulation play a role when considering investments in FinTech innovation?					
6	Market size: Does the number of other alternatives to the project being considered play a role when considering investments in FinTech innovation?					
7	Density of the market: Does the number of active competitors (other incumbents) in the same segment of the project being considered play a role when considering investments in FinTech innovation?					
8	Timing of the investment: Does the momentum in the business cycle of the FinTech innovation play any role when considering investments in FinTech innovation? (e.g., payments are now in a mature phase of development)					

[32] Incumbent = traditional commercial bank

[33] In a scale from 1 to 5, where 1 = very low importance and 5 = very high importance

APPENDIX 3: QUESTIONNAIRE FINTECH FIRMS

- Is FinTech innovation a threat or an opportunity for traditional retail banks? Have retail banks left the innovation over to FinTech firms? Why?
- How do you regard FinTech innovation: as 'sustaining' (leading to the improvement of an existing product or service) or 'disruptive' (leading to the creation of a fundamentally new product or service)?
- How does the value chain of FinTech 'Banking-as-a-Service' differ from the value chain of traditional retail banks?
- How does the FinTech 'Banking-as-a-Service' business model differ from the traditional retail banking model? Is the offer of unbundled products what makes the difference?
- The FinTech taxonomy: why RegTech, PropTech, InsurTech, and not BankTech, yet?
- In which way differs the business model of a challenger bank[34] from the business model of a traditional retail bank? Is the 'essence' of banking in both the same?
- What is the role of regulation in FinTech innovation? Is regulation (stricter!) a hurdle for FinTech firms when entering cooperation with retail banks?
- What could trigger a FinTech firm to take a step towards collaboration, or even integration, with a traditional retail bank?
- Where does the value of the FinTech innovation lie (what are the value drivers)?
- Which valuation technique gives better insight in the value of the FinTech innovation:
    - recent deals using multiples e.g., enterprise value/revenues, EV/EBITDA.
    - net present value based on discounted cash flows at one single discount rate, including sunk costs, e.g., from legacy systems and, eventually, the option to reject the investment as an opportunity cost (forgone opportunity).
    - net present value based on a multiple real options approach, discounting at specific discount rates by each of the options considered, namely: [1]option to abandon, [2]option to defer, [3]option to expand the size of the initial investment, [4]option to contract the size of the initial investment, and [5]option to switch to an alternative project.

[34] Neobank, internet-only bank, virtual bank, digital bank

APPENDIX 4: QUESTIONNAIRE EQUITY INVESTORS

The purpose of this interview is to identify relevant factors when assessing investments in (FinTech) innovation. From the perspective of venture capital or private equity firms.

- How would you define your entry model, as strategic investment or as a project?
- What role does the nature of the innovation play in your decision?
- What internal and external factors are most decisive when considering the investment? Name three of each kind.
- Does an existing, or potential, collaboration between the (FinTech) target firm and an incumbent play any role in your decision-making? How do you bring that into the valuation?
- Does regulation play any role in your valuation of the (FinTech) firm? How do you approach regulation (e.g., PSD2, KYC in the case of Fintech)? How do you discount its potential effect in the final estimation of the value?
- How do you ascertain the level of uncertainty and controversy associated with the decision-making in innovation? How do you estimate the corresponding hazard or risk profile?
- From your perspective as an equity investor, are there any other, better, alternatives to the Venture Capital Model?
- How would you assess the following valuation techniques?
    - recent deals using multiples e.g., EV-to-Revenues, EV-to-EBITDA.
    - other (?)
    - net present value/ DCF approach
    - Free Cash Flow to Equity (FCFE)
    - Free Cash Flow to Firm (FCFF)
- Do you ever consider (multiple) real options as a valuation technique?
- In a valuation based on multiple real options, which options would be more relevant and, therefore, susceptible of being taken into the calculation? Name three.
-

APPENDIX 5: FINTECH FIRMS OBSERVED

TABLE 33: FINTECH FIRMS OBSERVED (DUTCH INTEREST GROUP)

	Date	Firm	Activity	Description
1	06-Nov-20	HFT01	Payments	Ensuring optimally effective, safe, reliable, socially efficient payment system.
2	13-Nov-20	HFT02	Cloud services	AWS Technology consulting and managed services.
3	20-Nov-20	HFT03	Consultancy	Digital transfromation consulting firm.
4	26-Nov-20	HFT04	Payments	Batch payments. API that replaces Internet Banking.
5	11-Dec-20	HFT05	Consultancy	Market data integration and analytics solutions for financial services.
6	18-Dec-20	HFT06	Cloud services	Cloud banking native platform.
7	15-Jan-21	HFT07	AML - identity	Cyber security, software escrow, SaaS Assured, data registration, information escrow, authors authentification.
8	29-Jan-21	HFT08	AML - identity	Digital Identity, Data Sharing and Payments. Strategy, product development and implementation support in the three aforementioned fields.
9	05-Feb-21	HFT09	Consultancy	Technology, business processes, analytics, risk, compliance, transactions, internal audit.
10	12-Feb-21	HFT10	AI robotics	Robotic Process Automation (RPA, AI).
11	26-Feb-21	HFT11	AML - identity	Biometric verification. Is it really you?
12	12-Mar-21	HFT12	Consultancy	Product development and software consultancy.
13	19-Mar-21	HFT13	Payments	Payment Service Provider. BlackFin Capital is the financer behind.
14	26-Mar-21	HFT14	Cloud services	Cloud-platform; ESG non-financial reporting. Increasing transparency is demanding these changes.
15	02-Apr-21	HFT15	AML - identity	Data Privacy.
16	09-Apr-21	HFT16	Payments	Cross-border payments. Global platform for pay-in, pay-out, card issuances.
17	16-Apr-21	HFT17	Blockchain	GDPR supporting blockchain platform. Brings together an ecosystem of technology providers, system integrators and commercial partners.
18	23-Apr-21	HFT18	Blockchain	Blockchain technology protocol. Make financial markets more fair.
19	30-Apr-21	HFT19	Consultancy	Smart online accounting for SMEs. Use robots to get the automation as high as possible.
20	07-May-21	HFT20	Blockchain	Global Blockchain and digital asset investment firm. Venturing in the blockchain industry ($150,000 is minimum amount to join the platform).
21	14-May-21	HFT21	AML - identity	Global Credit Risk Platform. Open banking is different than Fintech!
22	21-May-21	HFT22	Consultancy	Leading source of critical information. Address strategic and operational challenges; executive management.
23	28-May-21	HFT23	Mortgages	Mortgage service provider.
24	29-May-21	HFT24	Payments	API first, cloud-native platform for payments. Enables financial institutions to outsource payments.
25	18-Jun-21	HFT25	Capital markets	Platform for peer to peer trading. They can tokenice everything.
26	02-Jul-21	HFT26	Payments	Mobility and Payments. International ticketing, clearing and settlement platform for mobility.
27	22-Jul-21	HFT27	Equity investor	Funding.
28	11-Nov-22	HTF28	Cloud services	Cloud performance.
29	11-Nov-22	HFT29	AML - identity	Digital policy manager to support KYC.
30	11-Nov-22	HFT30	Consultancy	Prediction engine for ESG.
31	11-Nov-22	HTF31	Consultancy	Provides ESG analytics based on asset managers' projections views .
32	09-Dec-22	HTF32	Challenger bank	Inclusive, diverse, and better different fo the 'unbanked'
33	09-Dec-22	HTF33	Cloud services	Custom software based on AI and earth observation (sustainable platform)
34	12-Jan-23	HTF34	Payments	Innovation is coming from integrating cards
35	12-Jan-23	HTF35	AML - fraud	AI-powered risk fraud management and prevention platform
36	12-Jan-23	HTF36	AML - fraud	Real-time fraud detection during payment transactions
37	12-Jan-23	HTF37	Pension	Fully online and European pension provider
38	12-Jan-23	HTF38	Payments	Ineficient operations make transactions more expensive