University of Cyprus

DEPARTMENT OF BUSINESS AND PUBLIC ADMINISTRATION

AN EXPLORATION OF HOW ESTABLISHED FINANCIAL INSTITUTIONS RESPONDED TO THE FINTECH REVOLUTION AND THE FINANCIAL IMPACT OF THEIR RESPONSE STRATEGIES

DOCTOR OF PHILOSOPHY DISSERTATION

GEORGE C. MARKIDES

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GEORGE C. MARKIDES

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DECLARATION OF DOCTORAL CANDIDATE

The present doctoral dissertation was submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy of the University of Cyprus. It is a product of original work of my own, unless otherwise mentioned through references, notes, or any other statements.

George C. Markides

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ΠΕΡΙΛΗΨΗ

Η μελέτη μας αποτελείται από τρία κεφάλαια που συνοψίζουν τον τρόπο με τον οποίο τα χρηματοπιστωτικά ιδρύματα αντέδρασαν στην εμφάνιση νεοσύστατων εταιρειών FinTech και τα αποτελέσματα τους.

Στο πρώτο κεφάλαιο, εξετάζονται τρεις από τις πιο δημοφιλείς στρατηγικές που έχουν χρησιμοποιήσει οι καθιερωμένες εταιρείες για να αντιμετωπίσουν τις νεοσύστατες εταιρείες FinTech: Εξαγοράζοντας τις εταιρείες, συνάπτοντας στρατηγικές συμμαχίες μαζί τους και εξαγοράζοντας μικρό ποσοστό μετοχών σε αυτές. Εξετάζουμε τόσο τις βραχυπρόθεσμες όσο και τις μακροπρόθεσμες αποτιμήσεις αυτών των συναλλαγών. Το γενικό μας συμπέρασμα είναι ότι βραχυπρόθεσμα, οι εξαγορές δημιουργούν αξία, οι συμμαχίες καταστρέφουν την αξία και οι επενδύσεις σε μετοχές έχουν αμελητέο αντίκτυπο στις αποτιμήσεις. Αντίθετα, και οι τρεις στρατηγικές καταστρέφουν την αξία των μετόχων μακροπρόθεσμα.

Το δεύτερο κεφάλαιο κτίζει πάνω στα ευρήματα του κεφαλαίου 1, και προχωρεί στη διάκριση των νεοσύστατων εταιρειών FinTech σε καταστροφικές (Disruptor) ή μη καταστροφικές (non-Disruptor) για τις καθιερωμένες εταιρείες. Εξετάζουμε εάν η συνεργασία με "καταστροφικές" νεοσύστατες εταιρείες δημιουργεί μεγαλύτερη αξία για τις καθιερωμένες εταιρείες από ότι η συνεργασία με μη καταστροφικές. Η μελέτη μας αποδεικνύει ότι ο καταστροφικός χαρακτήρας μίας νεοσύστατης εταιρείας FinTech παίζει σημαντικό ρόλο στην αξία που δημιουργείται από αυτές τις συναλλαγές. Συγκεκριμένα, οι καταστροφικές εξαγορές στόχων, κατά μέσο όρο, δημιουργούν μεγαλύτερη αξία για τους αγοραστές από τις μη καταστροφικές εξαγορές στόχων. Ταυτόχρονα, η συνεργασία με καταστροφικούς εταίρους μειώνει την καταστροφή αξίας για τις καθιερωμένες εταιρείες παρά με μη καταστροφικούς εταίρους. Επιπλέον, δείχνουμε ότι οι επενδυτικές τράπεζες αξιοποιούν καλύτερα τις νέες τεχνολογίες FinTech από τις εμπορικές τράπεζες.

Το τρίτο κεφάλαιο εξετάζει πώς η αξία της τεχνολογίας που κατέχει κάθε νεοσύστατη εταιρεία επηρεάζει τη δημιουργία αξίας, επεκτείνοντας περεταίρω τα ευρήματα του κεφαλαίου 1. Παραδοσιακά, η αξία μιας τεχνολογίας έχει μετρηθεί από τον αριθμό των διπλωμάτων ευρεσιτεχνίας που έχει δημιουργήσει. Όμως, αυτή η προσέγγιση αποτυγχάνει να λάβει υπόψη την ποιότητα της γνώσης που περιέχεται στην τεχνολογία. Το τρίτο κεφάλαιο προτείνει μια νέα μέθοδο μέτρησης της αξίας της

αποκτηθείσας τεχνολογίας, δηλ. ένα συνδυασμό διπλωμάτων ευρεσιτεχνίας και επενδύσεων που έγιναν για την συγκεκριμένη τεχνολογία, την οποία ονομάζουμε "πολυπλοκότητα τεχνολογίας". Η μελέτη μας δείχνει ότι όσο πιο πολύπλοκη είναι η τεχνολογία, τόσο μεγαλύτερη αξία φέρνει στους ιδιοκτήτες. Αυτό το εύρημα είναι συμβατό με την θεωρία των 'Πόρων' και υποδηλώνει ότι τα κεφαλαιακά στοιχεία μίας εταιρείας που είναι σπάνια, δύσκολο να αντιγραφούν και δύσκολο να ανταλλαχθούν είναι πιο πολύτιμα από τα κεφάλαια που είναι απλά και εύκολα να αντιγραφούν ή να ανταλλαχθούν.

Συνολικά, τα τρία κεφάλαια προσφέρουν γνώση σε ένα φαινόμενο που έχει σημαντικό αντίκτυπο στον χρηματοπιστωτικό τομέα τα τελευταία 20 χρόνια. Παρόλο που υπάρχουν στοιχεία που δείχνουν ότι οι καθιερωμένες εταιρείες έχουν αντιδράσει στην 'εισβολή' των εταιρειών FinTech, εντούτοις η βιβλιογραφία δεν λαμβάνει υπόψη τον οικονομικό αντίκτυπο τους με συστηματικό τρόπο. Επίσης, η βιβλιογραφία δεν φαίνεται να εξετάζει τους πιθανούς λόγους γιατί κάποιες στρατηγικές δημιουργούν αξία ενώ κάποιες άλλες όχι. Η μελέτη μας συμβάλλει στην κάλυψη αυτού του κενού στη βιβλιογραφία.

ABSTRACT

This thesis comprises of three papers that collectively examine how established financial institutions responded to the emergence of FinTech start-up firms in the period 2007-2019.

The first paper explores three of the most popular strategies that established firms have utilized to respond to the FinTech disruption: acquiring the disruptor, forming strategic alliances with them, and purchasing an equity stake in them. We examine both the short term and long-term valuation effects of these transactions, and our overall conclusion is that in the short term, acquisitions create value, alliances destroy value and equity participation investments have an insignificant valuation effect. By contrast, all three strategies destroy value for the shareholders in the long run.

Chapter 2 builds upon the findings of chapter 1 by differentiating between FinTech startups that can be considered disruptive to the established firms versus those that are not disruptive. We examine whether transactions with "disruptive" startups create more value to established firms than transactions with non-disruptive ones. We argue and show that the disruptive nature of the target or alliance partner plays an important role in the value created by these transactions. Specifically, acquisitions of disruptive targets, on average, create more value to the acquirers than acquisitions of non-disruptive targets. At the same time, alliances with disruptive partners are not as value-destroying as alliances with disruptive targets. In addition, investment banks are shown to exploit the new disruptive technologies in a better way than commercial banks.

Chapter 3 also builds upon the findings of chapter 1 to examine how the value of the technology that each start-up firm possesses impacts value creation. Traditionally, the value of the technology has been measured by how many patents it has generated but this measure is problematic in that it fails to capture the quality of the knowledge embedded in the technology. In this chapter, we propose a new way to measure the value of the technology acquired, a combination of patents and investment made for the technology, one that we call complexity of technology. We show that the more complex a technology is, the more value it can bring to its owner. This finding is consistent with the Resource based View of the firm which proposes

that that an asset that is rare, difficult to imitate and difficult to substitute will be more valuable than a simple, easy to imitate or substitute asset.

Collectively, the three papers shed light on an interesting phenomenon that has greatly affected the financial services industry in the last twenty years. Although there is a lot of anecdotal evidence that shows that established firms have been responding to the FinTech disruption, the literature has not examined the financial impact of the various response strategies in any systematic way, nor has it explored the theoretical reasons why some of these response strategies create value while others don't. This thesis addresses this gap in existing literature.

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I would like to express my sincere gratitude to my advisors, Dr. George Kassinis, Dr. Andreas Soteriou and the late Dr George Nishiotis, for their invaluable guidance and mentorship throughout my doctoral studies. Their unwavering support and encouragement have been instrumental in my academic success.

My brother Dr Costas Markides has always been my role model, the source of knowledge, generosity, and love. I am sure I wouldn't have reached my dream if he wasn't by my side all the time. I will always be grateful for his ideas, constructive criticism and 'pushing' to complete the marathon of my doctoral studies.

Finally, I would like to thank my family, especially my wife Demetra, for their unconditional support and encouragement throughout my academic journey. Their understanding and support have been a constant source of inspiration.

DEDICATION

This dissertation is dedicated to my parents who have taught me that the best investment in life is education and that we should always strive for continuous improvement through learning (Δια Βίου Εκπαίδευση). They have always been my source of inspiration and my motive to keep going, even when my strengths were giving up. 'The building of the church has finished'.

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INTRODUCTION

Financial technology (FinTech) has revolutionized the financial industry over the past twenty years by introducing innovative and more efficient ways of delivering financial services to customers. These innovations were driven by advancements in technology, favorable regulation, the rise of the sharing economy, and new or shifting customer needs. According to Sanicola (2017), FinTech is 'the new applications, processes, products or business models in the financial services industry, composed of one or more complementary financial services and provided as an end-to-end process via the internet'. Schueffel (2017: 32) defines FinTech as the 'new financial industry that applies technology to improve financial activities." The impact of FinTech on financial institutions has been significant, with the industry experiencing unprecedented transformation. The integration of technology into financial services has led to the creation of new business models, products, and services that have disrupted traditional banking practices.

Many FinTech innovations can be conceived as architectural innovations because, as per the World Economic Forum (2015), they have the potential to: (i) streamline infrastructure and diminish the role of banks—see for example the effect of blockchain and P2P on banks; (ii) elevate the strategic importance of data in strategic decision making, and the automation of high value activities; and (iii) allow customers to have more options as well as visibility into products and control over a bank's decisions. Those innovations that are architectural can be considered as "disruptive innovations" for established firms (Christensen, 1997). Many FinTech innovations are disruptive for financial institutions because they undermine the traditional role of these institutions, their distribution channels, skills, and competencies and cannibalize their products/ services or offer them based on a different value proposition.

It has been argued that the fintech revolution is taking the financial sector through its third era of disruptive innovation (Consumers International, 2017; Arner et al., 2016), which will change the role and business model of financial institutions. Fintech has affected all major functions of financial services: payments, deposits and lending, capital raising, investment management, market provisioning (platforms), insurance. FinTech has enabled financial institutions to offer their customers a wide range of services that are more accessible, convenient, and cost-

effective. For instance, mobile banking apps have made it possible for customers to access their accounts and perform transactions from anywhere at any time. Additionally, peer-to-peer lending platforms have made it easier for individuals and small businesses to access credit without having to go through traditional banks. This impact is not limited to customer-facing services. FinTech has also transformed back-end operations by automating processes such as risk management, compliance, and fraud detection. This has led to significant cost savings for financial institutions while improving the accuracy and efficiency of these processes.

Selective FinTech statistics indicate that the FinTech impact on incumbents is huge and will continue to grow. For example:

- Consumer adoption: (1) 64% of consumers worldwide have used one or more FinTech platforms in 2019, up from 33% in 2017; (2) 96% of global consumers are aware of at least one FinTech service; (3) The consumer adoption of FinTech in China is 87%, in the US 46% and in Japan 34% (E&Y Global FinTech Adoption Index 2019); (4) Almost half of consumers use digital banking services exclusively for their financial needs (Fortunly, 2022).

- Financial Impact: (1) In a 2015 study, Goldman Sachs estimated that FinTech may eventually disrupt up to US$4.7 trillion of revenue that traditional financial service companies enjoyed (US International Trade Administration, 2016); (2) According to the Guardian (2019), Banco Santander will suffer a 84% loss in its payment services and international money transfers, from similar services offered by FinTech firms, such as Transferwise; (3) Technology has decreased the connection cost (cost/ megabytes per second) from $1245 to $23 and the storage cost (cost/ gigabyte of storage) from $569 to $0.03 between 1992 and 2012 (Deloitte, 2019) (4) Blockchain Technology Could Reduce investment banks' Infrastructure Costs by 30 Percent (Accenture, 2017) (5) Up to 28% of banking and payment services will be at risk of disruption due to new business models brought about by fintech. (PwC, 2020).

- FinTech Industry worth and Growth: (1) According to a report by Expert Market Research (2023), the global fintech market attained a value of approximately USD 226.76 billion in 2023 and is expected to grow in the forecast period of 2024-2032 at a CAGR of 16.8% to reach USD 917.17

billion by 2032; (2) FinTech market share across 48 FinTech unicorns is worth over US$187 billion as of the first half of 2019, or over 1% of the global financial industry (CB Insight, 2021); (3) The global transaction value in the fintech market is forecast to continuously increase between 2023 and 2027 by in total 4.5 trillion U.S. dollars or 94.88% increase (Statista, 2023).

The rise of FinTech has also brought about new challenges for established institutions. Traditional banks had to respond to these innovations in order to survive. They were forced to invest in activities which would upgrade their technological capabilities/ knowledge and maintain their competitiveness in terms of cost and efficiency. According to a McKinsey report (2020) traditional financial institutions have responded to the FinTech invasion in various ways, including: (1) Buying FinTech companies, e.g. BNP acquiring Compte-Nickel to provide online banking services; (2) Partnering with FinTech companies, e.g. JP Morgan partnering with OnDeck to offer loans to small businesses; (3) Investing in FinTech companies, e.g. BBVA invested in Atom Bank to offer savings accounts and mortgages; (4) Transforming themselves to be more like FinTech companies; (5) Building their own (internal) FinTech capabilities, e.g. Bank of America building its own mobile banking capabilities; (6) Serving FinTech companies; and (7) Ignoring the FinTech invasion and focusing on what they already do. Some of these responses proved to be successful but others proved to be less successful.

Surprisingly enough, the limited existing literature has so far failed to examine to a sufficient degree whether these transactions with FinTech start-up firms create value for the incumbents. This can be explained by several reasons: Firstly, FinTech is a relatively new phenomenon, and there has not been enough time to conduct extensive research on its impact. Secondly, the FinTech industry is highly fragmented, with many startups operating in different niches. This makes it difficult to generalize the impact of FinTech on financial institutions as a whole. Thirdly, many FinTech startups are privately held, and there is limited information available about their operations and financial performance. Fourthly, the regulatory environment for FinTech is still evolving, and there is a lack of clarity on how FinTech firms will be regulated. Finally, there is a lack of consensus on how to define or extract data from databases on FinTech companies, which makes it difficult to compare studies and draw meaningful conclusions.

Our dissertation aims to mitigate this literature gap by focusing on the three more popular response strategies of incumbents: acquiring the startup, investing in an equity ownership of the startup (<50%) or entering into a strategic alliance with them (McKinsey, 2020). A strategic alliance is defined as a relationship between two organizations that have decided to share resources to undertake a specific, mutually beneficial task. This relationship involves low costs, no control from any party involved, low risk, no new legal entity is formed and can easily be terminated. According to Statista (2021), 75,3% of incumbents prefer to collaborate with FinTech firms, 18,5% prefer to compete and 6,2% prefer to do M&A.

Our study is broken into three, complementary and sequential themes:

1. Chapter 1 examines the value creation impact of these three different types of responses by established firms. We approach this task from a number of different angles. We first examine each strategy by itself and calculate the value created (or destroyed) upon the announcement of the transaction. A lot of money has been invested in responding to FinTech and we believe the different levels of commitment (cost), risks and participation in startups for each strategy would impact the performance of incumbents differently. Second, we examine the value created by each strategy for different financial institutions, such as banks, insurance companies and investment houses. It would be interesting to see if different institutions derive different benefits from each of these three strategies because of their unique characteristics and services provided. Third, we examine, through different methodologies the short-term impact (i.e., upon the announcement of the transaction) but also the long-term impact. We use the event study methodology to assess the short-term effect of these transactions, and we employ Buy-and-Hold Abnormal Return (BHAR) methodology to assess their long-term effect. Finally, we examine a few of the factors that might determine the variance in the value created by these transactions. Many of these factors have already been examined in the M&A literature but not in the strategic alliances and equity participation literatures.

2. Chapter 2 builds upon the findings of chapter 1 by differentiating between FinTech startups that can be considered disruptive to the established firms versus those that are not disruptive. We examine whether transactions with

"disruptive" startups create more value to established firms than transactions with non-disruptive ones. The existing literature has failed so far to sufficiently examine whether these transactions create value for the transacting parties if and when one of them is employing a business model which is "disruptive" to the other partner. This is surprising because over the past twenty years, we have witnessed a dramatic increase in the number of companies that are employing new and disruptive business models (e.g. Foss and Saebi, 2017; Markides, 2022; Snihur, Zott and Amit, 2021). This chapter tries to fill this gap in the literature.

3. Chapter 3 again builds upon the findings of chapter 1 by looking at the value of the technology that each start-up firm possesses. Traditionally, the value of the technology has been measured by how many patents it has generated but this measure is problematic in that it fails to capture the quality of the knowledge embedded in the technology. In this chapter, we propose a new way to measure the value of the technology acquired, a combination of patents and investment made for the technology, one that we will call complexity of technology. We then examine whether the "complexity" nature of the startups impacts the value created to the incumbents by these transactions.

Our study differs from previous studies and contributes to the literature in the following ways:

1. There is limited literature on the financial performance of incumbents in the financial industry when they cooperate or acquire FinTech firms. The existing literature has studied the impact of M&As and strategic alliances in general but not in the context of FinTech. Moreover, research on strategic alliances and equity participation investments is largely fragmented and dispersed (Kale et al., 2002). The focus of our research is very specific: it is to study the financial impact on established firms of three response strategies to the FinTech 'challenge'. Our analysis approaches this task from several different angles: the impact per strategy, per type of financial institution, and short term versus long term. We also study a few of the factors that may explain the variability in the value created by these transactions, something that the

existing literatures on strategic alliances and equity participation investments have not done so far.

2. We introduce a new factor—that of 'disruptiveness'—to explain the variability in financial performance of incumbents. We study this factor in the context of the financial industry, but it can also be useful in other industries where companies are employing new and disruptive models in their businesses.

3. We introduce a second factor—that of complexity of technology—to explain the variability in financial performance of incumbents. We argue that the more complex a technology is, the more valuable it is, and therefore, the more value it creates for its owner. This finding is consistent with the Resource Based View of the firm which proposes that an asset that is rare, difficult to imitate and difficult to substitute will be more valuable than a simple, easy to imitate or substitute asset.

There are some other points that differentiate our study. Specifically, we explore this phenomenon not just in the US, Europe, and Japan like most of the existing literature but also globally, in developing countries. We will also use more recent data than previous studies and will use multiple sources of information (five main sources), which demand significant effort and time in filtering and using the 'right' data.

The study examines several interesting and important research questions which have several managerial implications. These have been missed by current literature and we believe our research can shed light on them. It is essential for financial institutions to understand the impact of FinTech on their operations and business models and decide on what should be the best strategy for their organizations. There is no 'right strategy' for all organizations, and we cannot generalize the impact of FinTech on financial institutions as a whole. Each one should consider their own characteristics/ status, the specifics of the transactions and their working environment before they make the decision exactly how to respond to FinTech innovations.

CHAPTER 1:
A COMPARATIVE ANALYSIS ON HOW ESTABLISHED FINANCIAL INSTITUTIONS RESPONDED TO THE FINTECH EVOLUTION

ABSTRACT

Radical Financial Technology (FinTech) innovations have undermined the foundations of the traditional financial industry over the last twenty years. Established firms have responded in a variety of ways including acquisitions, alliances and equity investments in the FinTech innovators. The existing literature has so far failed to examine in a satisfactory way whether these transactions between established firms and FinTech start-up firms create value. This paper uses a sample of 85 acquisitions, 98 strategic alliances and 64 equity participation investments to examine the topic from a number of perspectives. We first study whether these strategies create value for the established firms, both in the short term and long term. We also examine whether the value created is different for different financial institutions—specifically Banks, Insurance companies and investment houses. In addition, we examine a few of the factors that might determine the variance in the value created by these transactions. We find that in the short-term acquisitions create value, whereas alliances destroy value and equity participation investments have no effect. Banks seem to be the worst performers and investment houses the best performers. We also find that the factors examined in the M&A literature for explaining the variability in the results are also significant for alliances and equity participation investments. Finally, we find that all three strategies destroy value for the shareholders in the long run.

INTRODUCTION

Over the past twenty years, radical Financial Technology (FinTech) innovations have undermined the foundations of the established financial industry. These innovations have been driven by advancements in technology, favorable regulation, the growth of the sharing economy and shifting customer preferences and needs. Even though there are still many uncertainties regarding the evolution of these innovations, there is no question that FinTech start-up firms have already successfully revolutionized the financial industry in all aspects, financial, consumer behavior, and organizational. For example, according to Ernst & Young, 64% of

consumers worldwide used one or more FinTech platforms in 2019 (E&Y Global FinTech Adoption Index 2019). Similarly, Goldman Sachs estimated that FinTech may eventually disrupt up to US$4.7 trillion of revenue that traditional financial service companies enjoyed (The Economist, 2015).

According to the World Economic Forum (2015), FinTech has disrupted financial institutions in six major functions, namely: (i) Consumers have alternative lending and deposit options through platforms (ii) The world is becoming a cashless society through new decentralized schemes, such as bitcoin and Ripple, mobile and streamlined payments, and cybersecurity (iii) Retail investment management empowered customers through automated management and advice tools, social investment trading and algorithms (iv) Capital markets became more diversified and accessible through the platforms which empower ordinary people to provide capital to investment opportunities (v) Telematics increased the connectivity between insurers and customers and helped them personalize products, manage risks, price better and lower their claims and (vi) New advanced machines (Artificial Intelligence) allowed faster, broader and more accurate decisions.

Traditional banks had to respond to these innovations in order to survive. There were obviously several response options available to them, but the most popular ones were three: acquiring the FinTech disruptor, entering into a strategic alliance with them or investing in acquiring a certain portion of their equity (equity participation). Another option was to compete head-on with their FinTech disruptors, but the evidence suggests that this has not been their preferred strategy. A survey undertaken by Statista (2021), found that only 18.5% of the established firms in the sample under study had chosen to compete outright with the disruptors, with the remaining 81.5% choosing to either collaborate with them or acquire them.

The existing literature has so far failed to examine in a satisfactory way whether these transactions between established firms and FinTech start-up firms create value. The limited research on this topic is probably due to the unavailability of data, and the assumption people make that there is not much difference between FinTech firms and other technology firms that research has already studied. However, this might not be the case. The term FinTech encompasses radical new technologies and fundamentally different business models that can undermine the competitive advantages of established firms and can even determine their eventual success and

survival. It is this disruptive nature of FinTech innovations that makes them different, important and worthy of study. The challenge for established firms is that they must find ways to adopt or integrate new technologies and new business models that are not only different from their existing technologies and business models but also undermine their existing distribution channels, brands, skills and competencies as well as cannibalize their products and services. This is a far more challenging task than adopting or integrating any other technology—radical as it may be—that is sustaining as opposed to disruptive to the existing ways of doing business. Our study aims to fill this gap and examine whether the three most popular strategies, M&As, strategic alliances and equity participation, create value for the established players in the financial services industry.

This paper contributes to the existing literature in a number of ways. We first examine the value creation impact of these three different types of responses by established firms. We approach this task from different angles. We first examine each strategy by itself and calculate the value created (or destroyed) upon the announcement of the transaction. A lot of money has been invested in responding to FinTech and we believe that the different levels of commitment required, and the risks and costs for each strategy would impact the performance of incumbents differently. Second, we examine the value created by each strategy for different financial institutions, such as Banks, Insurance companies and Investment Houses. It would be interesting to see if different institutions derive different benefits and value from each of these three strategies. Third, we examine both the short-term impact (i.e., upon the announcement of the transaction) but also the long-term impact of these strategies. We use the event study methodology to assess the short-term effect of these transactions, and we employ the Buy-and-Hold Abnormal Return (BHAR) methodology to assess their long-term effect. Finally, we study the factors that might determine the variance in the value created by these transactions. Many of these factors have been examined in the M&As literature but not in the literatures on strategic alliances and equity participation investments.

There are some other things that differentiate our study. Specifically, we will explore this phenomenon not just in the US, Europe and Japan like most of the existing literature but also globally, in developing countries. We will also use more recent data than previous studies and will use multiple (five) sources of information to make sure we filter the raw data so as to use the “right” data.

Theory and Hypotheses

The first section examines whether the three strategies—acquisitions, strategic alliances and equity participation investments--create, on average, value upon the announcement of the transaction.

Mergers and Acquisitions

Undertaking the acquisition of the FinTech disruptor is one of the most popular response strategies for incumbent firms because, at least in theory, acquisitions can confer significant benefits to the acquiring firms. The literature has already developed a large list of what these benefits might be (e.g. Capron and Shen, 2007; Ismail et al. 2011; Vazirani, 2012). However, the empirical literature examining whether M&As actually create value for acquirers, has so far produced inconsistent results (see table 1).

Table 1: Literature Review on Performance of M&As

M&A Sample	Impact	Authors
All sectors	Positive	Lau et al. 2008;
All sectors	Negative	Majumdar et al. 2007;
All sectors	Neutral	Kumar, 2009;
Financial Sector	Positive	Daniya et al., 2016;
Financial Sector	Negative	Akben-Selcuk and Altiok-Yilmaz, 2011;
Financial Sector	Neutral	Bao, 2017;
High-Tech sector	Positive	Porrini, 2004
High-Tech sector	Negative	Laamanen and Keil, 2008;

Despite these inconsistent empirical findings, we believe that in the specific context of FinTech, acquisitions will create value in the short term. We believe that this will be the case because FinTech innovations are architectural innovations (Henderson and Clark, 1990) that generate large and unique benefits to the innovators that introduce them. However, despite their value-creating potential, most established companies will fail to introduce them on their own because they are disruptive to them. This implies that acquisitions can provide an alternative mechanism for established firms to partake in the benefits of innovations that they, themselves, have failed to pioneer. They can do this by moving fast after their introduction by start-up firms to acquire these pioneering firms and scale up their innovations, a

strategy that has been shown to be very profitable for established firms (Markides and Geroski, 2004). Thus, acquisitions are the means through which established firms acquire the huge and unique benefits of FinTech innovations, even when they themselves fail to introduce them.

The first point in our argument is that FinTech innovations are architectural innovations that, on the one hand, generate huge benefits, and on the other hand are disruptive (and therefore unattractive) to the established firms. Henderson and Clark (1990) classified innovations according to two dimensions: their impact on the core concepts of the established firm's product (reinforcing or overturning) and their effect on the linkages between core concepts and components (changed or unchanged). Based on this classification, they identified four types of innovations: incremental, modular, radical, and architectural innovations. The innovations that are of interest to us here are architectural innovations. These are innovations that reinforce the core concepts of the established firms' products but change the linkages between core concepts and components. These innovations destroy the value of the incumbents' existing architectural knowledge because they minimize the value of the firm's existing architectural knowledge (embedded in the firm's routines and channels).

Architectural innovations reconfigure existing components of an established system in a new way. This reconfiguration maintains the value and usefulness of some of the firm's knowledge and skills but simultaneously reduces the value of some others. The skills that become less useful may even hinder the firm from reacting to market trends and competition. Firms find it difficult to recognize which knowledge or skills remain useful and which have lost their usefulness because of the way these skills are organized and managed. As a result, incumbents find it hard to react to architectural innovations (Henderson and Clark, 1990).

The new business models that new FinTech start-up firms introduce in the market are architectural innovations and are therefore disruptive to the established firm (Christensen, 1997). By disruptive we mean that their value chain configuration is incompatible to that of the established firm, something that makes many of the established firm's core competences less valuable. They also create new markets that often conflict with the established market (Gilbert, 2003; Porter, 1996). As a result, established companies will find it difficult to: (i)recognize early enough the

potential of these architectural innovations (ii) develop the new architectural innovations by themselves (iii) apply the new architectural knowledge in their existing business models due to their legacy systems and business models and (iv) apply the new architectural knowledge in their own business model or respond to it in a timely fashion. Several empirical papers have provided evidence that support these predictions, documenting the many difficulties that established firms face in incorporating architectural innovations such as new disruptive business models in their existing ways of doing business (Cooper and Smith, 1992).

Since established firms are unlikely to develop architectural innovations by themselves, an alternative strategy might be to acquire them. We expect that such acquisitions will be beneficial to the established firms for several reasons. First, by acquiring disruptive innovations, established firms will be gaining access to the new markets that these innovations create on the periphery of the core markets where the established firms are operating. These new markets often grow enormously and can be a source of great value for firms operating in them (Gilbert, 2003). Second, they will be taking possession of new technologies or ways of doing business that they themselves cannot develop. They can then use this difficult-to-develop knowledge to re-engineer their own business models in a quick and effective way (Khanagha et al., 2013). Third, left unchecked, these architectural innovations have the potential to destroy the established firms' business models and markets (Markides, 2013). By acquiring them, established firms give themselves the opportunity to have an impact on how these innovations grow and evolve. As a result, they can grow them in ways that may not be as destructive to their core markets as they would have been if they were grown unchecked by the disruptive innovators themselves. Finally, by acquiring a potential disruptor, established firms are removing a dangerous competitor from the market and buy themselves some time to learn and adjust. These arguments suggest that, on balance, the acquisition of disruptive FinTech innovators would be value creating for established firms in the short-term. Therefore:

H1.a: The acquisition of FinTech companies by established financial firms will, on average, create value for the acquirers in the short run.

Strategic Alliances

As in the case of M&As, the limited empirical literature on alliances has produced inconsistent results as to whether strategic alliances create value or not (see table 2).

Table 2: Literature Review on Performance of Strategic Alliances

Sample of alliances	Impact	Authors
All sectors	Positive	Merchant and Schendel, 2000;
All sectors	Negative	Chen et al., 1991;
Financial Sector	Positive	Marciukaityte et al., 2009;
Financial Sector	Negative	Hornuf et al., 2018.
High-Tech sector	Positive	Ajao et al., 2015.
High-Tech sector	Neutral	Hagedoorn, Sadowski & Schakenraad, 1997.

In the specific context of alliances between FinTech firms and established companies, we expect that alliances would, on average, destroy value for the parties concerned. It is true that strategic alliances, like acquisitions, will be an alternative way for established firms to access the benefits of disruptive innovations that FinTech firms introduce. However, unlike acquisitions, alliances have certain characteristics that make their successful implementation difficult, especially in the context of FinTech. We would expect the difficulties of managing alliances between big established firms and FinTech start-up firms to outweigh the benefits associated with these alliances.

The empirical literature on the performance of alliances has found the failure rate of strategic alliances to be over 50% (Russo and Cesarani, 2017). The poor performance record of alliances is also reflected in the results reported by several event studies that calculated the abnormal returns generated upon the announcement of alliances. For example, Chen et al. (1991) reported negative stock price reactions to both parties and no evidence of value creation on the announcement of their alliance.

Unlike acquisitions where the established firm has full control over the target, alliances require the cooperation of two different parties over a sustained period of time. This is difficult to achieve for a number of reasons, including incompatible cultures (e.g. Park and Ungson, 1997), misaligned objectives (e.g. Das and Teng, 2003), and inappropriate governance structures (e.g. Russo and Cesarani, 2017). For example, Bodnaruk, Massa and Simonov (2013) as well as Russo and Cesarani

(2017) have argued that loose relationships, such as self-enforcing or contractual provisions often seen being applied in alliances, will not be the most appropriate governance structures to manage a relationship between parties that operate in situations where the risks of opportunistic behavior and environmental uncertainty are high. In these situations, equity ownership will be a much superior governance structure. The literature has identified numerous other sources of friction in strategic alliances and has therefore suggested that because of the unique problems that these relationships face, alliances will be a rugged road to success (Das and Teng, 2003).

These problems will be particularly pronounced when it comes to alliances between FinTech firms and established banks. According to Klus, Lohwasser, Holotiuk and Moormann (2019), there is misalignment in the goals and motives between financial institutions and FinTech start-up firms. In their study, they analyzed the motives of both incumbents and FinTech firms and concluded that: (i) the two types of firm had only one motive (i.e. learning) in common and a number of other motives that were fundamentally different; (ii) the prioritization in motives between the two partners was different—for example, Banks had as their top priority to access innovative ideas quickly whereas FinTech firms had as their top priority to win credibility and trust; and (iii) some motives were complementary but most were not and this meant that only one party in the alliance stood to gain at any given time. Incompatible motives led to conflict, coordination problems and frustration among the two partners. Another source of conflict is the fact that FinTech firms and incumbents are not compatible in terms of cultural and organizational fit. FinTech firms are mostly comprised of young people, who don't like policies, bureaucratic procedures and processes. They like to set their own program and work with freedom. On the other hand, incumbents are usually large organizations, that work according to policies, procedures, and rules. They are bound by regulations and routines and employees can be penalized for deviating from company processes. The differences could give rise to conflicts between the partners (Park and Ungson, 1997).

In addition, the huge difference in size and power between incumbents and FinTech firms allow opportunistic practices on behalf of the larger and more powerful incumbents. Therefore, loose relationships, such as self-enforcing or contractual provision alliances may not be the most appropriate governance structure for incumbents and FinTech. The misalignment in the goals and motives, the

incompatibility in terms of cultural and organizational fit and the inappropriate governance structure between established firms and FinTech start-ups lead us to predict that alliances between FinTech firms and established companies will face serious implementation problems. Based on the above rationale and the empirical evidence available, we would expect that, on average, alliances between established firms and start-up FinTech firms will destroy value for the parties involved.

H1.b: Strategic alliances between FinTech companies and established financial firms will, on average, destroy value for the financial firms in the short run.

Equity Participation Investments

As in the case of M&As and alliances, the limited empirical literature on equity participation has produced inconsistent results as to whether they create value or not (see table 3).

Table 3: Literature Review on Performance of Equity Participation Investments

Sample of Equity Participation	Impact	Authors
All sectors	Positive	Peck-Ling et al., (2022);
All sectors	Negative	Berezinets and Ilina (2022);
Financial Sector	Positive	Heffernan and Fu (2010);
High-Tech sector	Positive	Marjit and Mukherjee (2001);
High-Tech sector	Negative	Goergen et al. (2003);

We would expect that these types of investments will face similar implementation problems to those that partners in alliances face because incumbents have no control over Fintech start-ups. Our argument here is similar to the one we outlined above for alliances: there will be little cooperation between the two parties over a sustained period of time because of loose relationships, the misalignment in their goals and motives, the incompatibility in terms of culture and organizational fit and the inappropriate governance structure between established firms and FinTech start-ups in a high-risk environment. We would therefore expect equity participation investments to destroy the value for the established firms.

Therefore,

H1.c: ***Equity Participation investments between FinTech companies and established financial firms will, on average, destroy value for the financial firms in the short run.***

Factors Explaining the Variation in Returns

The literature on M&As and to a smaller degree the literature on strategic alliances have examined not only whether these transactions create value but also the factors that influence the level of value creation (e.g. Malhotra, Zhu, and Reus 2015). Several factors have been found to affect value creation, including: (i) the *characteristics of the transacting parties*, such as their relative size, their previous experience in acquisitions or alliances, and the strength of their corporate governance; (ii) the *characteristics of the transactions themselves*, such as the method of payment and the strategic rationale underpinning the investments; and (iii) a number of other *external factors* such as the macroeconomic environment, the nature of the industries of the transacting parties and the response of other stakeholders to the announced acquisition or alliance.

In this study, we will examine the effect of seven factors that have already been identified as important factors in the M&A literature but have so far been ignored in the literature on alliances and equity participation investments. In this way, we hope to contribute to these two bodies of literature, while also testing whether these factors are important in the case of transactions between FinTech startup firms and established banks. The seven factors that we will examine are listed in table 4.

Table 4: Factors Examined in Existing Literature.

Factor	Results for M&As	Results for Strategic Alliances	Results for Equity Participation	Rationale for the Result
Economic Status of Incumbent Country	CAR Developed > CAR Developing Literature: Dranev et al., 2019;	Not Examined	Not Examined	The risks and supportive ecosystem in developed countries favors the adoption of new technologies/ business models

Transaction domestic or Cross Border	Inconsistent Literature: Cummins et al., 2015;	CAR Domestic > CAR Cross Border Literature: Marciukaityte et al., 2009;	Inconsistent Literature: Malhotra et al., 2015	Domestic transactions have lower transaction costs, cultural issues and communication problems
Relatedness of Involved Parties	CAR Related > CAR Non-Related Literature: Chen and Findlay, 2003	Inconclusive Literature: Marciukaityte et al (2009)	Not Examined	Related parties have higher potential synergies, smoother integration and higher absorptive capacity.
Incumbent's previous Experience in similar transactions	Inconclusive Literature: Dranev et al., 2019;	CAR Experience = CAR Non-Experience Literature : Marciukaityte et al., 2009.	Not Examined	Experience helps the exploitation and integration process
Relative Size of Involved Parties	CAR Large > CAR Small Literature: Song and Walkling, 1993.	Not Examined	Not Examined	Larger partners offer greater synergies than smaller partners
Age of the target/ partner	CAR Young > CAR Mature Literature: Kohers & Kohers, 2001.	Not Examined	Not Examined	Young companies have unrealized benefits, due to no capital that can help incumbent realize higher returns
Market-to-Book Value of Incumbent	CAR High < CAR Low Literature: Rau &Vermaelen, 1998;	Not Examined	Not Examined	Glamour bidders often overpay for the target and lead to poor post-merger performance

The Long-Term Performance Effect of the Three Strategies

Recent research has questioned the Efficient Markets hypothesis EMH (Fama, 1970) and has concluded that the EMH does not always hold, does not capture the actual future value created through a transaction and may lead to wrong conclusions (Shleifer, 2000; Zajac and Westphal, 2004). This is relevant to our study because so far, we have used the Event study methodology to assess the short-term valuation effect of the three strategies, and this is a methodology that is based on the efficient market hypothesis. Therefore, we want to verify the short-term valuation results by using alternative methodologies to estimate the long-term performance effects of these three strategies.

Most studies examining the effect of acquisitions in the long term have found negative abnormal returns. This result has been explained by researchers in several ways. Oler, Harrison and Allen (2008) argued that transactions such as acquisitions and strategic alliances are more complex than other routine transactions, such as introducing new products. They also contain many elements of risk and uncertainty that are difficult to predict. As a result, the initial market response could be mistaken. Other studies (e.g. Rau and Vermaelen, 1998) argued that markets assess the value of the strategic event by extrapolating the past performance of the bidders. As a result, the market reacts enthusiastically because it expects the bidder to emulate past performance and capitalize on the motives/ synergies of the transaction. However, the performance of the bidders is reassessed over time and re-adjusted based on their actual performance. Yet other studies have suggested that overpayment could be another reason for having negative long-term results. Bidders may end up paying more than the fair value of the target for a number of reasons such as: (i) overvaluation of anticipated future synergies (Sirower, 1997); (ii) complexity and incomplete information (Lubatkin, 1983); and (iii) lack of a sound financial methodology to value the target (Demyanova, 2018). Finally, some studies have argued that the actual estimation of ARs relies heavily on the method used and modelling errors could lead to the wrong conclusions (Fama, 1998; Kothari and Warner, 2008). A long list of benchmark models can be found in the literature, each one trying to address modelling problems.

We believe that many of these reasons are particularly valid in the case of transactions with FinTech start-up firms. Firstly, the proper integration of these

targets is critical for success, yet it entails high risks which need to be effectively managed. For example, the business model of many of the FinTech companies very often conflicts with the business models of incumbents—it may, for example, cannibalize the customers of the established firm or undermine its existing distributors. For example, a bank with a large branch network that acquires a digital start-up may end up destroying its branch network in the process. The presence of conflicts and tradeoffs makes it extremely difficult for the established firm to manage two different and conflicting business models simultaneously (Markides, 2015). Moreover, the many differences between the two organizations, such as size, culture and working practices, make it even harder to achieve smooth integration. Secondly, we also expect overpayment to be the case in the acquisition of FinTech companies. The arrival of the fintech revolution has been greeted with enthusiasm by the business press and there was a state of euphoria associated with technologies and business models introduced by fintech startups. Established firms have rushed into acquiring these FinTech firms in response to excessive media attention and for fear of losing out. Such an environment has encouraged bidding wars and payment of huge premiums for the acquisition of FinTech firms, made worse by the absence of proper valuation methodologies.

In the case of strategic alliances, the literature has reported no significant returns in the long-term (Marciukaityte et al., 2009). Hornuf et al. (2018) claimed that only an appropriate digitization strategy can help banks create value in the long run. We believe that the performance of strategic alliances and equity participation investments has been problematic (value-destroying) in the short-term and we see no reason why this trend will not continue in the long-term. Alliances and equity investments have weaker forms of controls and given the significant risks surrounding these complex transactions, we expect them to perform poorly in the long term.

Given the above, we expect that the long-term performance will be problematic for all strategies and we should see destruction of value for the established firms. Therefore,

H2: ***Strategic transactions (acquisitions, strategic alliances, equity participation investments) between FinTech companies and established***

financial firms will, on average, destroy value for the financial firms in the long run.

In summary, in table 5, we list the predictions of our hypotheses for FinTech transactions relative to what the empirical literature has shown in general.

Table 5: Synopsis of Existing Literature Findings Compared to our Hypotheses.

	Short Term		Long Term	
Strategy	**Literature**	**Our prediction**	**Literature**	**Our prediction**
M&As	Inconsistent	Create Value	Destroy Value	Destroy Value
Strategic Alliances	Inconsistent	Destroy Value	Insignificant	Destroy Value
Equity Participation	No Evidence	Destroy Value	No Evidence	Destroy Value

EMPIRICAL ANALYSIS

The sample

We developed a sample of acquisitions, alliances and equity participation investments undertaken between big established financial institutions (FIs) and FinTech start-up firms in the period 2007-2019. To do so, we searched three financial databases, Thomson Reuters, Factiva, CapitalQ, as well as the newsletter/ website Paymentandbanking.com to identify transactions undertaken in the study period. We initially used the Standard Industrial Classification (SIC), already used in the limited available literature (60 Depository institutions, 61 non-depository credit institutions, 62 security and commodity brokers, 63 insurance carriers and 87 engineering, accounting research and management). This search produced an initial sample of 836 transactions. The next step was to determine which of the sample target firms are FinTech firms as opposed to just software companies. This was an important step to take because there is no specific 'code' for FinTech companies in the databases. We therefore examined how each start-up firm was described in the three databases, using the start-up industry, sector and description as well as extracting information from the fields 'source of the deal' and the 'deal synopses' provided by the databases, to make an initial assessment if the firm can be considered a FinTech. We supplemented this analysis by examining the detailed business description of each start-up firm in several sources, such as PitchBook,

Crunchbase and Bloomberg. Finally, we used two artificial intelligence databases (Chat GPT and Bing AI) to better understand the business of each target firm, how their business models were described and what their key technologies were. This screening process eliminated the majority of the targets as non-FinTech companies and reduced our sample size significantly. In addition, because of missing information on several other firms, the sample size was further reduced to 247 transactions: 85 M&As, 98 strategic alliances and 64 equity participation investments.

Data

Transaction-specific data (such as the announcement date, incumbent name, target name, target industry & sector, incumbent industry & sector, and transaction type), was collected from three databases: Thomson Reuters, Factiva, and Capital IQ. The established firm's stock price and ISIN/ SEDOL code, and the Stock Market Index for its country were collected from Bloomberg and Datastream.

Company-specific data, i.e., establishment date, number of employees, number of transactions performed before and market-to-book were extracted from annual reports of incumbents and cross-checked with other sources, such as PitchBook, Crunchbase, and Bloomberg. The economic status of incumbent country was extracted from the International Monetary Fund (IMF) website.

The seven factors used in the analysis of the variance in the value created were defined and calculated as follows:

- Economic status of incumbent country: As classified by the IMF, i.e., Developed or Developing.
- Relatedness of involved parties: Activities of involved parties share common operating characteristics, as described in industry and sector description, i.e. Fintech startup main industry is the same as the incumbent.
- Incumbent Experience: Incumbent performed at least one similar transaction (M&A, Alliance, EP) before.
- Relative Size: The number of employees of the startup relative to the number of employees of the incumbent. The startup was classified as small if it had at most 25% than the incumbent, otherwise it was classified as large.

- FinTech Age: Years between date of establishment and transaction; Threshold set at 7 years for Young or Mature.
- Market-to-Book: Market Value over Book value of the incumbent; Threshold set above and below sample Average.

METHODOLOGY

Valuation Effects in the Short Term

We use Cumulative Abnormal Return (CAR) Event Study Methodology to test our first 3 hypotheses. Event studies typically examine the effect of an event on the value of assets, such as stocks or bonds. The event study methodology is based on the efficient market hypothesis developed by Fama (1970), which states that new information is quickly and accurately incorporated in the stock price of a firm. This results in share prices changing to reflect the effect of this new information on the discounted value of the future cash flows of the asset under consideration. As such, significant price changes can be attributed to specific events that resulted in the release of this new information.

There is a general framework for undertaking an event analysis (MacKinlay, 1997; Kothari and Warner, 2007). First, the date of the event must be specified, i.e. the announcement of the acquisition or alliance. Following that, the "estimation-period" and the "event-period" (and "post-event" period) need to be defined for the purposes of the time-series analysis. For our study, we have defined them as follows:

- The estimation period was determined to be -180 to -30 days before the announcement of the transaction.
- The event period was determined to be -10 to +10 days relative to the announcement.

The next step involves using the market model to estimate the parameters ai and bi which can then be used to determine the expected return for firm (i) during the event period. As such, for each firm (i) we estimate the following equation:

$$Rit = ai + biRmt + eit$$

Where:

$Rit =$ the return on the security of firm i at time t.

$Rmt =$ the return on the market portfolio at time t. In this study, we use the equally-weighted Market Return of the main Stock Market Index in the market where firm i is listed.

$ai \ \& \ bi =$ parameters of the regression of the return on security i (Ri) and the market return (Rm) over the period -180 and -30 trading days prior to the event day.

$eit =$ the error term of the regression.

Abnormal returns (AR_{it}A) can then be estimated as the difference between the actual returns and the expected returns for each day and for each firm during the event period; these may be computed as follows:

$$AR_{it} = R_{it} - E(R_{it}) = R_{it} - (a_i + b_i R_{mt})$$

A two-day return is calculated for each transaction. Day t=-1 is the day the news of the transaction is announced in the stock market, usually after the market closes. The market responds the day after the announcement, i.e. t=0. Thus, there is a two-day announcement window (-1,0). Therefore, the cumulative abnormal return is calculated as follows:

$$CARi(0,+1) = \sum_{t=0}^{+1} ARit$$

For N securities, the average cumulative abnormal return is calculated as following:

$$CAR\ (0,+1) = \left(\frac{1}{N}\right) \sum_{i=1}^{N} CARi(0,+1)$$

Finally, to test the statistical significance of the CAR, we perform a standard t-test as follows:

$$t = \frac{CAR(0,+1)}{(S\ CAR(0,+1)/\sqrt{N})}$$

Where:

$S\ CAR(0,+1) =$ the standard deviation of the two-day AR

N = the number of firms in the sample

Valuation Effects in the Long Run

To test the performance of the transactions relative to the market benchmark index over a long period, we used the Buy-and-Hold Abnormal Returns (BHAR) methodology (Barber and Lyon, 1997). Although BHAR methodology is similar in design to CAR methodology, BHAR methodology allows for the effect of compounding and is preferred over CAR study for long term analysis since the latter may lead to incorrect inferences and significant biases (Barber and Lyon, 1997).

For our BHAR study:

- The Estimation period was determined to be -6 to -1 months.
- The post-event periods were determined to be 12, 18, 24, 30 and 36 months.

The next step involves the determination of the expected return for firm (i) during the event period, by using the following equation:

$$BHARi = \Pi\ (1 + Ri, t) - \Pi(1 + ARm, t)$$

Where:

$Rit =$ the monthly return on the security of firm i at time t.

$Rmt =$ the return on the market portfolio at time t. In this study, we use the Equally-weighted Market Return of the main Stock Market Index in the market where firm i is listed.

Π = The Mean Cumulative multiply

Analysis of the Seven Factors

We performed independent samples t-tests between the two categories of each factor to determine whether the factor can explain the variance in AR, e.g. between developed and developing countries or domestic and cross-border transactions.

RESULTS

Characteristics of Observations

Table 6 shows the distribution of transactions by the type of established financial institution (FI) that undertook the transaction. Almost 70% of FIs in our sample are banks, 24% are investment houses and only 6% are Insurance companies. Table 7 shows the distribution of transactions by announcement year. We can see that transaction activity picked up significantly after 2014, suggesting a possible bandwagon effect. Table 8 shows the distribution of transactions by the country of the FI undertaking the transaction. The US accounts for roughly one third of all acquisitions and alliances undertaken, followed by Germany and the UK with 13% each. Most of the transactions—almost 93% of them—took place in developed countries.

Table 6: Distribution of Transactions by Type of Financial Institution

	M&As	Strategic Alliances	Equity Participation	Total	% Total
Banks	53	91	28	172	69,9%
Insurance companies	10	3	2	15	6,1%
Investment Houses	22	4	33	59	24,0%
Total	85	98	64	247	

Table 7: Distribution of Transactions by Announcement Year

	M&As	Strategic Alliances	Equity Participation	Total	% Total
2007	4	1	0	5	2,0%
2008	2	2	3	7	2,9%
2009	1	0	2	3	1,2%
2010	2	1	0	3	1,2%
2011	1	3	1	5	2,0%
2012	4	2	7	13	5,3%
2013	1	5	3	9	3,7%
2014	8	12	3	23	9,4%

2015	6	16	5	27	11,0%
2016	13	21	7	41	16,7%
2017	11	17	9	37	15,0%
2018	22	9	15	46	18,7%
2019	10	9	8	27	10,9%

Table 8: Distribution of Transactions by Country of FI

	M&As	Strategic Alliances	Equity Participation	Total	% Total
Australia	4	0	4	8	3,3%
Belgium	1	0	1	2	0,8%
Brazil	2	1	0	3	1,2%
Canada	3	1	1	5	2,0%
China	1	0	0	1	0,4%
Cyprus	1	0	0	1	0,4%
Denmark	0	1	0	1	0,4%
Egypt	1	0	0	1	0,4%
Finland	1	0	0	1	0,4%
France	4	1	2	7	2,8%
Germany	3	24	5	32	13,0%
Hong Kong	1	2	0	3	1,2%
India	1	2	1	4	1,6%
Ireland	1	0	1	2	0,8%
Israel	0	2	0	2	0,8%
Italy	1	0	3	4	1,6%
Japan	4	0	8	12	4,9%
Latvia	0	0	1	1	0,4%
Luxembourg	0	0	1	1	0,4%
Malaysia	1	1	0	2	0,8%
Mexico	1	0	0	1	0,4%
Netherlands	1	0	0	1	0,4%
Norway	1	0	1	2	0,8%
Pakistan	0	1	0	1	0,4%
Philippines	0	1	0	1	0,4%
Poland	0	0	1	1	0,4%

Russia	0	1	2	3	1,2%
Senegal	1	0	0	1	0,4%
Singapore	0	2	1	3	1,2%
South Africa	3	0	0	3	1,2%
South	0	0	1	1	0,4%%
Spain	1	1	1	3	1,2%
Sweden	1	4	4	9	3,6%
Switzerland	0	2	1	3	1,2%
Turkey	0	1	1	2	0,8%
UK	10	12	10	32	13,0%
USA	36	38	12	86	35%

Table 9 shows the abnormal returns generated by all transactions (246) between FIs and FinTech start-up firms and then subdivided into acquisitions (85), alliances (98), and equity participation investments (63). The abnormal returns have been calculated for a number of time windows (10) and their statistical significance has been assessed using two tests—the first is NCAAREt for cross-sectional independence (Serra, 2003) and the second is NCAARE_GrankT for cross-correlation to cater for skewedness (Kolari and Pynnonen, 2011). The table also reports minimum and maximum values of CARs generated for each time window as well as the percentage of abnormal returns that are positive for each time window.

As shown in table 9, the abnormal returns generated *for the whole sample* for 8 out of 10-time windows are insignificant, except for windows (-1,0) and (-1,1) which have positive returns. However, when the sample is divided into the three types of transactions, results change dramatically. Looking first at acquisitions, the abnormal returns generated are positive and statistically significant for 8 out of the 10 time windows used. The percentage of positive CARs is above 50% for all windows. On the contrary, the abnormal returns generated by strategic alliances are negative and statistically significant for 8 out of 10 time windows used. The percentage of positive CARs is below 50% for all windows. Finally, the abnormal returns for equity participation investments are insignificant for 9 out of 10 time windows used and the percentage of positive CARs is above 50% for six-time windows and below 50% for four time windows.

For all three types of transactions, the abnormal returns are getting worse (decreasing) as we move further from the date of announcement of the transaction.

This result may be an early indication of what results we should expect in the long-run.

These results provide early support for our argument that the performance (value creation) of the three strategies will differ by strategy. Acquisitions of FinTech companies by established financial firms seem to create value for the acquirers in the short run, whereas *strategic alliances* destroy value and *equity participation investments* have neutral or negative effects.

Table 9: Estimated CARs for Transactions Between FIs with FinTech Start-ups

T	CAR	NCAAREt test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Total Sample (246 observations)						
[-10;10]	-0.0074	-1.02922	1.887325	-0.7994819	0.4867039	50.81
[-5;5]	-0.0012	-0.2400998	0.3730357	-0.3147488	0.3336056	48.37
[-3;3]	0.00134	0.3318422	1.419592	-0.3500366	0.3785833	50.00
[-1;0]	0.00101	0.4740136	**2.313969***	-0.2018431	0.2047703	51.63
[-1;1]	0.00415	1.588798	**2.652989****	-0.3620836	0.3445837	50.81
[0;1]	0.00404	**1.895487**†	0.9522985	-0.2171003	0.3352898	49.59
[0;3]	-0.0007	-0.2341949	0.2503118	-0.3292835	0.3535677	46.75
[0;5]	-0.0004	-0.1134534	-0.0207713	-0.3095331	0.2274565	47.15
[0;30]	-0.0132	-1.427419	-0.4691064	-0.9175493	0.5537958	44.31
[0;60]	-0.02	-1.061831	-1.638906	-1.214882	0.7661593	46.34
Acquisitions (85 observations)						
[-10;10]	0.00782	0.848682	**3.635019*****	-0.3076061	0.2113908	56.47
[-5;5]	0.00798	1.244652	1.491406	-0.3147488	0.2227494	55.29
[-3;3]	0.00968	**1.891472**†	**2.211671***	-0.1560467	0.1772516	54.12
[-1;0]	0.00192	0.7102156	**3.147727*****	-0.0467979	0.0769367	58.82
[-1;1]	0.00714	**2.135326***	**4.375498*****	-0.0519924	0.1465535	58.82
[0;1]	0.00897	**3.289116****	**2.320462***	-0.0402034	0.1683025	52.94
[0;3]	0.00865	**2.250696***	**3.866278*****	-0.1214588	0.1803135	52.94
[0;5]	0.00865	**1.840523**†	**2.916121****	-0.1018642	0.208784	52.94
[0;30]	0.00801	0.6738542	**2.402059***	-0.161208	0.3687432	52.94
[0;60]	0.0166	0.6596779	1.610276	-0.3022343	0.7661593	52.94

Strategic Alliances (98 observations)						
[-10;10]	-0.0135	**-2.10751***	**-2.43439***	-0.1609649	0.1170307	44.9
[-5;5]	-0.009	**-1.980005†**	**-2.564234***	-0.1575792	0.101982	39.8
[-3;3]	-0.004	-1.089535	-1.24426	-0.1320205	0.1520413	44.9
[-1;0]	-0.0017	-0.8669823	**-1.74343†**	-0.0602177	0.0736951	41.84
[-1;1]	-0.002	-0.8297082	**-1.703819†**	-0.0811649	0.069692	45.92
[0;1]	-0.0028	-1.417566	-1.027085	-0.0900398	0.0807191	46.94
[0;3]	-0.0049	**-1.787055†**	**-2.639171****	-0.1404773	0.1423202	42.86
[0;5]	-0.0064	**-1.890848†**	**-3.535668*****	-0.1595613	0.1083218	35.71
[0;30]	-0.0169	**-2.058688***	**-2.710625****	-0.3815973	0.220541	41.84
[0;60]	-0.0302	**-1.91923†**	**-4.300478*****	-0.4002625	0.2963588	40.82
Equity Participation (63 observations)						
[-10;10]	-0.0199	-0.920152	**2.051948***	-0.6687729	0.5261257	50.79
[-5;5]	-0.0041	-0.2657388	0.5817978	-0.2395547	0.35508	50.79
[-3;3]	-0.0045	-0.3617286	0.4259115	-0.3967514	0.393506	49.21
[-1;0]	0.00319	0.4856924	1.39115	-0.1983481	0.2108827	53.97
[-1;1]	0.00841	1.045686	1.106206	-0.3557602	0.3516607	50.79
[0;1]	0.00699	1.063893	0.4329771	-0.2122706	0.3423921	52.38
[0;3]	-0.0088	-0.9441515	-0.8571504	-0.3679097	0.3613949	41.27
[0;5]	-0.0055	-0.4825131	0.3401064	-0.2966341	0.2419007	46.03
[0;30]	-0.0392	-1.465503	-0.9309331	-0.6943011	0.4584777	44.44
[0;60]	-0.0585	-1.315742	-1.17276	-1.019145	0.534456	41.27

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**
- Measure NCAARE GranKT was used as a Non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change (Sorokina, Booth, and Thornton, 2013; Kallenos and Nishiotis, 2020).

There is a significant gap between min and max values for each transaction. This could be explained by the fact that we have three different types of Fis in our sample (banks, insurance companies and investment houses), each displaying different characteristics. We therefore examined the valuation effects of these transactions by type of FI.

We first look at banks (172). Table 10 shows that transactions undertaken by banks destroy value for six out of 10-time windows. However, this result is only applicable for strategic alliances and equity participation investments undertaken by banks. For example, for strategic alliances and equity participation investments, six out of the ten-time windows show statistically significant negative returns and a percentage of positive CARs well below 50% for all classes. On the other hand, acquisitions undertaken by banks generate statistically significant positive returns in one out of 10-time windows, (-10,10) and positive but not significant returns in another four windows.

Table 10: Estimated CARs for Transactions Between Banks and FinTech Start-up

T	CAR	NCAARE t test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Total Sample Banks (172 observations)						
[-10;10]	-0.0067	-1.45702	0.5288677	-0.1609649	0.1939916	51.16
[-5;5]	-0.006	**-1.851144†**	**-2.066061***	-0.1609497	0.1694535	42.44
[-3;3]	-0.0036	-1.399774	-1.00419	-0.1320205	0.1748265	45.35
[-1;0]	-0.0008	-0.5802085	-0.6930664	-0.0602177	0.0764774	47.09
[-1;1]	-0.0015	-0.8562231	-0.6081443	-0.0811649	0.1137471	45.35
[0;1]	-0.0021	-1.487793	**-2.546523***	-0.0900398	0.0807191	42.44
[0;3]	-0.0044	**-2.250805***	**-2.59769***	-0.1404773	0.1423202	40.7
[0;5]	-0.005	**-2.096088***	**-3.499073*****	-0.1595613	0.1083218	38.37
[0;30]	-0.0135	**-2.327971***	**-3.301316****	-0.3815973	0.220541	44.77
[0;60]	-0.0215	**-1.980761***	**-4.935276*****	-0.4002625	0.2963588	41.28
Acquisitions Banks (53 observations)						
[-10;10]	0.00805	1.09416	**3.555229****	-0.1429574	0.2100352	64.15
[-5;5]	0.00392	0.7595955	1.081913	-0.0910784	0.1704419	52.83
[-3;3]	0.0021	0.5128976	1.096691	-0.0987125	0.1772516	50.94
[-1;0]	0.00108	0.4961983	1.219522	-0.0467979	0.0769367	54.71
[-1;1]	6.4E-05	0.0240397	1.233577	-0.0519924	0.1152818	49.05
[0;1]	-0.0006	-0.2764238	-1.518571	-0.0402034	0.042863	37.74
[0;3]	-0.0015	-0.4953502	0.1135681	-0.0718002	0.0617331	41.51
[0;5]	-0.0018	-0.4756602	-0.4542653	-0.0659323	0.0632292	43.4
[0;30]	-0.0052	-0.5393887	-0.7357621	-0.1192424	0.1240905	50.94

[0;60]	-0.0063	-0.3010345	-1.107191	-0.1676729	0.1311654	47.17
Strategic Alliances Banks (91 observations)						
[-10;10]	-0.0129	**-1.898092†**	**-2.313239***	-0.157732	0.1541597	47.25
[-5;5]	-0.0089	-1.845124	**-2.148982***	-0.1370634	0.1145619	41.76
[-3;3]	-0.004	-1.029302	-1.081368	-0.1204913	0.1399788	46.15
[-1;0]	-0.0016	-0.7557376	-1.563949	-0.0576775	0.0739315	43.96
[-1;1]	-0.0019	-0.7704197	-1.566959	-0.0794624	0.0642325	46.15
[0;1]	-0.0028	-1.353448	-1.073298	-0.0905372	0.0783796	43.96
[0;3]	-0.0051	**-1.747052†**	**-2.527264***	-0.1367601	0.1379348	43.96
[0;5]	-0.0061	**-1.716512†**	**-2.965746****	-0.1513503	0.1081678	39.56
[0;30]	-0.0169	**-1.935449†**	**-2.239262***	-0.359404	0.2658432	38.46
[0;60]	-0.0331	**-1.964253†**	**-4.129943*****	-0.390222	0.2921888	38.46
Equity Participation Banks (28 observations)						
[-10;10]	-0.0122	-1.146038	1.394715	-0.0888924	0.0852973	42.86
[-5;5]	-0.0147	**-1.918453†**	-1.300113	-0.1609497	0.0879061	35.71
[-3;3]	-0.0128	**-2.110326***	**-1.755684†**	-0.0730398	0.0514257	35.71
[-1;0]	-0.0017	-0.5107761	-0.5139925	-0.0359377	0.0433717	46.43
[-1;1]	-0.0026	-0.6556112	-0.5355572	-0.0416041	0.0468815	42.86
[0;1]	-0.0025	-0.76696	**-1.658294†**	-0.0313341	0.02607	42.86
[0;3]	-0.0076	**-1.654978†**	**-2.273653***	-0.0444139	0.0378197	28.57
[0;5]	-0.0074	-1.321663	**-2.412005***	-0.0895716	0.0842489	25
[0;30]	-0.0152	-1.14588	**-2.957639****	-0.1550247	0.0901165	42.86
[0;60]	-0.006	-0.2688589	**-2.131313***	-0.1641827	0.1836505	42.86

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**
- Measure NCAARE GranKT was used as a Non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth, and Thornton, 2013; Kallenos and Nishiotis, 2020).

The number of transactions undertaken by Insurance companies is only 15 so no conclusions can be derived and are presented only for completeness of the study. Table 11 indicates that overall, transactions undertaken by Insurance companies generate positive, statistically significant returns for three windows, (-1,1),(0,1) and

(0,3), and negative returns for one window (-10,10). Acquisitions undertaken by insurance companies generate positive and statistically significant abnormal returns for 7 out of the 10-time windows used. The percentage of positive CARs is above 50% for all windows. By contrast, the abnormal returns generated by strategic alliances undertaken by insurance companies are negative and statistically significant for 5 out of 10-time windows used. The percentage of positive CARs is below 50% for all windows. Finally, the abnormal returns generated by equity participation investments undertaken by insurance companies are positive and statistically significant for 4 out of 10-time windows.

Table 11: Estimated CARs for Transactions Between Insurances and FinTech Start-ups

T	CAR	NCAAREt test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Total Sample Insurances (15 observations)						
[-10;10]	-0.0256	-0.7349756	**-2.846999****	-0.1266055	0.0742738	26.67
[-5;5]	0.00277	0.1135015	-0.783376	-0.0572543	0.0765065	40
[-3;3]	0.00749	0.38333	0.4024906	-0.0241222	0.0797271	53.33
[-1;0]	-0.0004	-0.0417337	1.591534	-0.0346124	0.023947	60
[-1;1]	0.01081	0.8412226	**2.20726***	-0.0141088	0.0738404	66.67
[0;1]	0.02041	**1.947206†**	**2.802948****	-0.0199979	0.1683025	73.33
[0;3]	0.02105	1.439326	**2.239058***	-0.0173239	0.1803135	60
[0;5]	0.01791	1.002791	1.420408	-0.0224892	0.208784	53.33
[0;30]	0.01405	0.3206198	1.278853	-0.161208	0.3687432	53.33
[0;60]	0.04311	0.4925075	0.5010203	-0.1924985	0.7661593	53.33
Acquisitions Insurances (10 observations)						
[-10;10]	-0.0225	-0.4341799	**-2.933569****	-0.0782523	0.0742738	20
[-5;5]	0.00635	0.1744433	-0.6373789	-0.0572543	0.0765065	40
[-3;3]	0.00824	0.282555	-0.1920104	-0.0207998	0.0797271	50
[-1;0]	0.0016	0.1037702	**2.12798***	-0.0346124	0.023947	70
[-1;1]	0.01729	0.9014653	**3.03038****	-0.0086113	0.0738404	80
[0;1]	0.03175	**2.029471***	**3.461824*****	-0.0048113	0.1683025	80
[0;3]	0.03072	1.407387	**2.94084****	-0.0081828	0.1803135	60
[0;5]	0.02952	1.107909	**2.295577***	-0.0224892	0.208784	60

[0;30]	0.0339	0.5183554	**2.76137****	-0.161208	0.3687432	70
[0;60]	0.06621	0.5065238	**1.73624**†	-0.1924985	0.7661593	50
Strategic Alliances Insurances (3 observations)						
[-10;10]	-0.0764	**-2.463662***	**-2.993262****	-0.117625	-0.0485771	0
[-5;5]	-0.0287	-1.279612	**-2.106802***	-0.0392117	-0.0190232	0
[-3;3]	-0.0021	-0.1154977	-0.9453529	-0.0232611	0.0323213	33.33
[-1;0]	-0.0101	-1.05276	-1.246824	-0.0254252	0.0013257	33.33
[-1;1]	-0.0041	-0.3537854	-1.123582	-0.0145475	0.0119649	33.33
[0;1]	-0.0018	-0.1907207	-0.5886806	-0.0203214	0.0095229	66.67
[0;3]	-0.0003	-0.0224937	-0.7217873	-0.0183078	0.0202965	33.33
[0;5]	-0.016	-0.9645809	**-2.504997***	-0.0246913	-0.0078104	0
[0;30]	-0.0329	-0.8720018	**-2.908331****	-0.0616624	0.0057733	33.33
[0;60]	-0.0019	-0.0352981	**-2.227551***	-0.0298425	0.0152593	66.67
Equity Participation Insurances (2 observations)						
[-10;10]	0.03607	1.113984	**2.534958***	0.0089678	0.0603185	100
[-5;5]	0.03213	1.373958	**2.632506****	0.0136875	0.0492368	100
[-3;3]	0.01753	0.9381894	**2.634895****	0.0132928	0.0212048	100
[-1;0]	0.00344	0.3426293	1.195621	-0.0010311	0.0080112	50
[-1;1]	0.00041	0.0335077	0.5963918	-0.0066954	0.007464	50
[0;1]	-0.0029	-0.2871068	-0.0700964	-0.0097803	0.0040225	50
[0;3]	0.00506	0.3580275	0.7258952	0.0012466	0.0088166	100
[0;5]	0.01193	0.6899226	**2.635021****	0.0026332	0.0207578	100
[0;30]	-0.0073	-0.1844757	1.172462	-0.0122014	-0.00667	0
[0;60]	0.00071	0.0123327	-0.0350582	-0.043902	0.0386566	50

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**
- Measure NCAARE GranKT was used as a non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020)

There are 59 transactions undertaken by investment houses. As shown in table 12, the abnormal returns generated *for the whole sample* are positive and statistically significant for all windows. However, when the sample is divided into

the three types of transactions, results change dramatically. Looking first at acquisitions undertaken by investment houses, the abnormal returns generated are positive and statistically significant for 9 out of the 10-time windows used. The percentage of positive CARs is above 50% for all windows. Observations on strategic alliances are limited (4) and results are presented only for completeness of study. The abnormal returns generated by strategic alliances are all statistically insignificant, split into five windows with positive returns and five windows with negative returns. The abnormal returns generated by equity participation investments are positive and statistically significant for 4 out of the 10-time windows used.

Table 12: Estimated CARs for Transactions Between Investment Houses and FinTech Start-ups

T	CAR	NCAAREt test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Total Sample Investment Houses (59 observations)						
[-10;10]	-0.0104	-0.4079576	**2.786883****	-0.7994819	0.4867039	55.93
[-5;5]	0.00839	0.4682605	**2.118351***	-0.3147488	0.3336056	59.32
[-3;3]	0.01189	0.8340651	**2.527924***	-0.3500366	0.3785833	57.62
[-1;0]	0.0058	0.7721353	**3.296233****	-0.2018431	0.2047703	59.32
[-1;1]	0.01774	**1.92376†**	**3.899581*****	-0.3620836	0.3445837	59.32
[0;1]	0.01691	**2.245759***	**4.854025*****	-0.2171003	0.3352898	66.1
[0;3]	0.00286	0.2670754	**3.189685****	-0.3292835	0.3535677	59.32
[0;5]	0.00601	0.4595194	**4.406773*****	-0.3095331	0.2274565	64.41
[0;30]	-0.0285	-0.8732546	**3.173933****	-0.9175493	0.5537958	47.46
[0;60]	-0.0506	-0.773696	**2.78792****	-1.214882	0.6977738	55.93
Acquisitions Investment Houses (22 observations)						
[-10;10]	0.02109	0.9898028	**2.637779****	-0.3076061	0.2113908	54.54
[-5;5]	0.01851	1.263955	1.295797	-0.3147488	0.2227494	68.18
[-3;3]	0.02859	**2.446894***	**2.411717***	-0.1560467	0.153566	63.64
[-1;0]	0.00411	0.6621457	**2.273521***	-0.0394949	0.0679123	63.64
[-1;1]	0.01957	**2.575047***	**3.364166*****	-0.0324964	0.1465535	72.73
[0;1]	0.02167	**3.492435****	**5.388627*****	-0.0214717	0.1366104	77.27
[0;3]	0.02312	**2.62315****	**4.922365*****	-0.1214588	0.1295528	77.27

[0;5]	0.02434	**2.255681***	**4.679046*****	-0.1018642	0.1446247	72.73
[0;30]	0.02806	1.012189	**3.512975*****	-0.1515149	0.2874618	50
[0;60]	0.04917	0.8251597	**3.618671*****	-0.3022343	0.3663793	68.18
Strategic Alliances Investment Houses (4 observations)						
[-10;10]	0.02189	1.069734	1.546752	-0.0130147	0.0678859	75
[-5;5]	0.0046	0.3128832	0.915944	-0.0100906	0.0363341	50
[-3;3]	-0.0044	-0.3753296	-0.5693588	-0.0299963	0.0294481	50
[-1;0]	0.002	0.3184712	0.2847541	-0.0150933	0.0157507	50
[-1;1]	-0.0007	-0.0906961	0.2599625	-0.0169813	0.0123266	50
[0;1]	-0.0024	-0.3900793	-0.4202513	-0.0117134	0.0053013	50
[0;3]	-0.0038	-0.4246958	-0.6561159	-0.0202008	0.0154311	50
[0;5]	-0.0037	-0.3449721	-0.3338635	-0.0152939	0.0051758	25
[0;30]	-0.0025	-0.0980823	0.4087411	-0.0825735	0.0641154	50
[0;60]	0.01792	0.4221139	1.24419	-0.0687373	0.0560113	75
Equity Participation Investment Houses (33 observations)						
[-10;10]	-0.0297	-0.73476	0.761403	-0.7994819	0.4867039	54.55
[-5;5]	0.00265	0.0911642	1.242931	-0.3144418	0.3336056	57.76
[-3;3]	0.00131	0.0565709	1.554671	-0.3500366	0.3785833	57.76
[-1;0]	0.00729	0.5923469	**1.825989**†	-0.2018431	0.2047703	60.61
[-1;1]	0.01825	1.209925	**1.8067**†	-0.3620836	0.3445837	54.55
[0;1]	0.01564	1.269111	**2.036582***	-0.2171003	0.3352898	60.61
[0;3]	-0.0106	-0.6089113	0.8109431	-0.3292835	0.3535677	48.48
[0;5]	-0.0049	-0.2294494	**1.726793**†	-0.3095331	0.2274565	63.64
[0;30]	-0.0614	-1.22662	0.9831262	-0.9175493	0.5537958	45.45
[0;60]	-0.1066	-1.283153	0.3679083	-1.214882	0.6977738	45.45

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**
- Measure NCAARE GranKT was used as a non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020).

We summarise our results so far in table 13 below.

Table 13: Synopsis of Abnormal Returns Generated by Type of Financial Institution

	Acquisitions	Strategic Alliances	Equity Participation	Total
Banks	Insignificant	Negative	Negative	Negative
Insurance companies	Limited Sample	Limited Sample	Limited Sample	Positive
Investment Houses	Positive	Limited Sample	Positive	Positive
Total	Positive	Negative	Insignificant	

In summary, our results suggest the following:

1. The value created by each strategy is influenced by whether the firm undertaking the transaction is a bank or insurance company or investment house.
2. The inconsistency of the results reported in the existing literature could be because previous studies mixed the 3 different types of companies in their samples and treated them as one and the same.
3. Strategic alliances, irrespective of the type of financial institution undertaking them, destroy value, on average, for the parties involved.
4. Acquisitions by investment houses create much more positive value than acquisitions by banks. This suggests that investment houses may be better at exploiting FinTech innovations. Banks are the worst performers when dealing with FinTech transactions.

Factors Affecting the Variance in Value Created

So far, we have examined whether each of the 3 response strategies creates value on average. There is obviously a lot of variance in the value created so we now examine if the seven factors identified above can explain this variance.

Table 14: Factors Explaining the Variance in the ARs Created by Mergers & Acquisitions

Factor	Categories	Number of Observations N=85	AR (Mean)	T-stat	P-value
Economic Status of Incumbent's Country	Developed	78	0.90436%	0.0744	0.9409
	Developing	7	0.81545%		
Cross-Border	Domestic	63	1.0898%	1.96	**0.0269**
	Cross-Border	22	0.34504%		
Relatedness of Involved Parties	Related	46	1.74447%	2.9438	**0.0042**
	Non-Related	39	-0.10249%		
Incumbent Experience	Non-Experienced	60	0.52606%	1.7824	**0.0783**
	Experienced	25	1.78741%		
Relative Size	Small Relative HR	74	0.64409%	2.0466	**0.0439**
	Large Relative HR	11	2.59874%		
FinTech Age	Until 7 Years	52	1.60023%	2.8116	**0.0061**
	More than 7 Years	33	-0.21101%		
Market to Book	More than Average	19	-0.85465%	2.9272	**0.0045**
	Less than Average	58	1.45285%		

Table 15: Factors Explaining the Variance in the ARs Created by Strategic Alliances

Factor	Categories	Number of Observations N=98	AR (Mean)	T-stat	P-value
Economic Status of Incumbent's Country	Developed	90	-0.29255%	0.2616	0.7942
	Developing	8	-0.08218%		
Cross-Border	Domestic	38	0.34526%	2.3034	**0.0234**
	Cross-Border	60	-0.66844%		
Relatedness of Involved Parties	Related	65	0.5021%	5.7413	**<0.001**
	Non-Related	33	-1.80675%		
Incumbent Experience	Non-Experienced	47	-0.9866%	3.2674	**0.0015**
	Experienced	51	0.38008%		
Relative Size	Small Relative HR	86	-0.62979%	4.7956	**<0.001**
	Large Relative HR	12	2.26465%		
FinTech Age	Until 7 Years	74	0.26329%	4.7772	**<0.001**
	More than 7 Years	24	-1.93624%		
Market to Book	More than Average	20	-2.53294%	5.9801	**<0.001**
	Less than Average	73	0.32992%		

Table 16: Factors Explaining the Variance in the ARs Created by Equity Participation

Factor	Categories	Number of Observations N=63	AR (Mean)	T-stat	P-value
Economic Status of Incumbent's Country	Developed	59	0.74739%	0.1899	0.85
	Developing	4	-0.01312%		
Cross-Border	Domestic	45	1.43558%	1.2061	0.2324
	Cross-Border	18	-1.14209%		
Relatedness of Involved Parties	Related	29	4.08217%	3.5057	**0.0009**
	Non-Related	34	-2.18645%		
Incumbent Experience	Non-Experienced	15	-1.12929%	3.7058	**0.0005**
	Experienced	48	6.54994%		
Relative Size	Small Relative HR	44	-1.57431%	3.9734	**0.0002**
	Large Relative HR	19	5.96385%		
FinTech Age	Until 7 Years	41	2.96793%	3.4693	**0.001**
	More than 7 Years	22	-3.52917%		
Market to Book	More than Average	14	-4.53457%	2.9796	**0.0043**
	Less than Average	43	2.39499%		

Six of the seven factors under study appear to be important in explaining the variance in the value created by the 3 strategies. The only factor that is not significant is the economic status of the incumbent's country (developed or developing). In summary, these results suggest the following:

- The seven factors under examination were found to be important in the M&A literature. Our results show that at least six of them are equally important for strategic alliances and equity participation investments, at least in the context of the financial services industry. Our study has contributed to the literature on alliances and equity participation because these factors have not been studied in this content and can explain the inconsistency in results of existing studies.
- Even though the conclusions of our study on the creation of value for FinTech transactions differ from the predictions of the existing literature, the results on the factors explaining the variance are in agreement with the existing literature and there are no surprises. Six factors, (with the exception of the Economic status of incumbent country), have P<0.05%, which indicates statistically significant results. The reason that might explain the insignificance of the seventh factor is the fact that we have a small number of observations for developing countries.

Long Term Performance

BHAR Analysis

The long-term analysis examined whether the promised benefits of FinTech innovations materialized beyond the initial stock price response. Table 17 summarizes the results.

Table 17: BHAR Analysis per Response

Total Sample (180 Observations)					
t (in Months)	**BHAR Mean**	**BHAR Median**	**Minimum**	**Maximum**	**% Positive BHAR**
[1;12]	**-0.061725*** **	**-0.0257645*** **	-0.996654	0.7100717	43.33
[1;18]	**-0.060232** **	**-0.0305718** **	-1.097322	1.748837	45.56
[1;24]	**-0.086029** **	**-0.0677484** **	-1.217155	2.648167	41.67
[1;30]	**-0.13574*** **	**-0.0971338*** **	-1.280175	1.679136	32.78

[1;36]	**-0.166639*** **	**-0.1478304*** **	-1.22066	1.865215	33.33
Acquisitions (57 Observations)					
[1;12]	**-0.0617063** **	**-0.0048334** **	-0.9966535	0.4909396	45.61
[1;18]	-0.0720592	**-0.0324645**	-1.097322	1.185857	42.11
[1;24]	**-0.1073602*** **	**-0.0389513*** **	-1.147358	0.9367841	42.11
[1;30]	**-0.1613463*** **	**-0.0781227*** **	-1.148261	0.6813453	35.09
[1;36]	**-0.1860858*** **	**-0.1093211*** **	-1.22066	0.7220737	42.11
Strategic Alliances (81 Observations)					
[1;12]	-0.0319736	-0.0256271	-0.5142919	0.7100717	44.44
[1;18]	-0.0152338	-0.0426982	-0.6069242	1.748837	45.8
[1;24]	-0.0232677	-0.0713358	-0.6326598	2.648167	38.27
[1;30]	**-0.0816097* **	**-0.099572** **	-0.7493724	1.679136	29.63
[1;36]	**-0.1134319** **	**-0.2029066** **	-0.8321876	1.865215	25.93
Equity Participation (52 Observations)					
[1;12]	**-0.1191276** **	**-0.0561793** **	-0.9804753	0.5500436	38.1
[1;18]	**-0.1309612** **	**-0.0523372** **	-1.030264	0.6927847	50
[1;24]	**-0.1781176** **	**-0.0497772** **	-1.217155	0.8029205	47.62
[1;30]	**-0.2053833*** **	**-0.1642412*** **	-1.280175	0.8046921	35.71
[1;36]	**-0.2428606*** **	**-0.2510841*** **	-1.137695	0.7512123	35.71

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**

The results show that acquisitions, alliances and equity participation investments destroy value in the long run. The results are consistent for all periods under study (12, 18, 24, 30 and 36 months after the announcement) except for one period (1,24 months) for strategic alliances. It is also important to note that value destruction, as measured in terms of the size of the BHAR and the percentage of positive BHARs, increases over time for all three strategies.

CONCLUSIONS

FinTech firms have disrupted the business models of established firms in the financial services industry and have radically changed the sector dynamics by introducing new core competencies, new business models and new key success factors. Incumbents had to respond, and our study has examined 3 different response strategies undertaken by them in the period 2007-2019.

We also examined the value created by each strategy by type of financial institution (Banks, Insurance companies and investment houses) and explored through different methodologies the short-term impact (i.e., upon the announcement of the transaction) and also the long-term impact of these transactions. Finally, we studied the factors that might determine the variance in the value created by these transactions. Many of these factors have been examined in the M&As literature but not in the strategic alliances and equity participation literatures.

There are several results that stand out. First, the three strategies produce different results for the incumbents. Overall, acquisitions create value, in the short term, compared to destruction of value by strategic alliances and no effect by equity participation investments. However, when we subdivide strategies by the type of financial institution undertaking them, we find that acquisitions may not create value for all financial institutions. Banks seem to be the worst performers for all responses since they destroy value for strategic alliances and equity participation while they create value in acquisitions only in one window (-10,10). On the contrary, investment houses and Insurance companies seem to benefit by undertaking both acquisitions and equity participation investments. On the other hand, strategic alliances, irrespective of the type of financial institution, destroy value, on average for the shareholders. Overall, investment houses are the best performers and appear to be able to exploit the benefits of FinTech innovations better than Banks and Insurance companies.

Our study has also examined seven factors that could explain the variability in the results. The general conclusion is that six factors are important in explaining the variance in the value created by the 3 strategies and not just acquisitions. This implies that these are factors that the literature on strategic alliances and equity participation needs to take into consideration, just as the M&A literature has been doing all along.

Our results for the long-term analysis show that all 3 strategies destroy value for the shareholders in the long run. Results are consistent for all periods (12, 18, 24, 30 and 36 months) and statistically significant. It is also important to note that value destruction increases over time for all three strategies.

We believe our study has significant managerial implications. It provides a structural approach for companies to decide how to deal with the FinTech challenge by providing insights that have to be considered before making a decision on how to respond to FinTech. It also shows that different financial institutions need to approach the FinTech challenge differently. Each organization has its own unique characteristics that will influence which response strategy is ideal for it. The characteristics of the potential target or partner, such as its size, culture or business model activities, should also be considered before deciding whether to acquire or partner with it.

Our study is not without its limitations. First, we faced various problems in collecting the necessary data given the absence of a specific flag 'FinTech' in the databases. We had to use multiple databases and multiple sources to ensure that we were using the "right" data. Second, the sample has only limited observations from emerging/ developing countries. Even though our objective was to include global data, we ended up with only 19 (about 8% of the sample) financial institutions from emerging/ developing countries because of limited or unreliable data from these countries.

The findings and limitations of this study can lead researchers to investigate additional issues in the area of FinTech. The most significant issue is to understand why big established financial institutions continue to invest in acquisitions or equity participation investments or alliances with FinTech start-up firms when all three strategies seem to destroy value for the incumbents, at least in the long term. In addition, further research needs to explore why and how some established firms create value through these transactions while others don't. Factors such as the degree of disruptiveness of the target/ partner to the incumbent and how the established firm manages this disruptiveness can explain the success or failure of these transactions and further research needs to explore this. Similarly, the complexity of the technology that each FinTech firm introduces may be another factor that determines success or failure, and future research needs to study this

further. Furthermore, it would be interesting to explore in more detail why transactions undertaken by investment houses create more value than transactions undertaken by banks. Why are investment houses better at exploiting the benefits of FinTech innovations or managing the costs associated with such disruptive innovations? Finally, the difference in value created in the short term versus the long term needs to be examined further.

CHAPTER 2:
THE VALUATION CONSEQUENCES OF ACQUIRING OR COOPERATING WITH "DISRUPTIVE" FINTECH START-UP FIRMS

ABSTRACT

Over the past twenty years, the established financial industry has come under attack from new FinTech start-up firms. Established banks have responded by either acquiring or partnering with these disruptors. We explore whether these responses have created value for the established firms. Although the existing literature has examined acquisitions and strategic alliances from a number of perspectives, it has not yet examined whether the disruptiveness of the target or alliance partner impacts whether value is created. Using a sample of 85 acquisitions and 98 strategic alliances between FinTech start-up firms and established financial institutions, we show empirically that the disruptive nature of the target or alliance partner plays an important role in the value created by these transactions. Specifically, acquisitions of disruptive targets create more value for the acquirers than acquisitions of non-disruptive targets whereas alliances with disruptive partners destroy less value than alliances with non-disruptive targets.

INTRODUCTION

The vast literature on mergers and acquisitions (M&As) and strategic alliances has examined not only whether these transactions create value, on average, for the transacting firms but also the factors that influence the level of value creation (e.g. Duysters, Saebi and De Man, 2011; Malhotra, Zhu, and Reus 2015; Yuce and Ng, 2005). Prominent factors found to influence value creation in these transactions include: (i) the characteristics of the transacting parties, such as their relative size, their previous experience in acquisitions or alliances, and the strength of their corporate governance; (ii) the characteristics of the transactions themselves, such as the method of payment and the strategic rationale underpinning the investments; and (iii) a number of other external factors such as the macroeconomic environment, the nature of the industries of the transacting parties and the response of other stakeholders to the announced acquisition or alliance.

Surprisingly, the literature has failed to sufficiently examine whether these transactions create value for the transacting parties if and when one of them is

employing a business model which is “disruptive” to the other partner. This is surprising because over the past twenty years, we have witnessed a dramatic increase in the number of companies that are employing new and disruptive business models (e.g. Foss and Saebi, 2017; Markides, 2022; Snihur, Zott and Amit, 2021). As a result, the number of acquisitions or alliances involving a party that is employing a disruptive business model has increased accordingly. It would be interesting to examine if the disruptive nature of the target or alliance partner plays a role in the value created by these transactions.

By “disruptive” business model, we mean one that: (i) is made up of value chain activities that are incompatible to the activities of the business model of the other transacting party (Porter, 1996); and (ii) creates markets that conflict with the core market of the other transacting party (Christensen, 1997; Gilbert, 2003). The first source of disruptiveness—incompatible value chain activities—is what Porter (1996) referred to when he argued that a firm cannot compete in two different strategic positions at the same time without running the risk of paying a huge straddling cost and degrading the value of its existing activities. The second source of disruptiveness—market conflicts—arises because the markets created by the new disruptive business models often cannibalize the core market of the other transacting partner (Christensen, 1997) or undermine the existing distributors and brands (Gilbert, 2003; Gilbert and Bower, 2002).

In this paper, we examine whether the “disruptive” nature of the acquisition target or alliance partner impacts the value created by these transactions. We do this in the context of the financial industry, where established firms have faced continuous disruption from FinTech firms in the last fifteen years. According to Schueffel (2016, p.32), FinTech is ‘the new applications, processes, products or business models in the financial services industry…. that applies technology to improve financial activities.” The growth of the FinTech industry over the past two decades has been explosive (Fortunly, 2022; Statista, 2022). Companies such as PayPal, Venmo, Revolut, Stripe and Ant have made significant inroads in the financial industry. In response, established companies have been busy acquiring or forming alliances with FinTech firms (McKinsey, 2020). We will exploit this rich context to explore how the disruptiveness of FinTech firms affects the value of incumbents when they acquire them or partner with them.

THEORY AND HYPOTHESES

Acquisitions

There is no question that acquisitions can potentially confer significant benefits to the acquiring firms, and the literature has developed a large list of what these benefits might be (e.g. Capron and Shen, 2007; Ismail et al. 2011; Vazirani, 2012). However, the empirical literature examining whether M&As actually create value for acquirers has so far produced inconsistent results. Several studies found that acquirers on average gain from acquisitions (e.g. Groff et al. 2007; Lau et al., 2008; Rossi and Volpin, 2004). However, several other studies reported zero or insignificant value creation (e.g. Bao, 2017; Choi and Harmatuck, 2006; Kumar, 2009;). Yet other studies found acquisitions to destroy value for the acquirers. (Andre et al. 2004; Majumdar et al. 2007; Yook, 2004).

Studies on M&As in the financial sector have reported similar results. A number of studies found that M&As have a positive impact on acquirers (Abbas et al., 2014; Daniya et al., 2016; Gattoufi et al. 2009). Others found that M&As have an insignificant impact on acquirers (Bao, 2017; Correa, 2009) or that M&As have a negative impact on the acquirers (Akben-Selcuk and Altiok-Yilmaz, 2011; Beccalli and Frantz, 2009).

Unsurprisingly, the same pattern of results emerged in the study of M&As where the targets came from the high-tech sector (Eckbo, 1983; Ranft and Lord, 2000 and 2002; Rossi and Volpin, 2004). Some studies found positive post-acquisition performance for the bidders (Porrini, 2004) while other studies reported negative post-acquisition performance (Dalziel, 2008; Laamanen and Keil, 2008; Ragozzino, 2006).

A variety of reasons have been proposed to explain these inconsistent results (e.g. Calipha et al. 2010; Koi-Akrofi, 2016; Renneboog and Vansteenkiste, 2019). One set of reasons focuses on the *specific characteristics of the target*, such as the quality of its CEO and governance (e.g. Wulf and Singh, 2011), its pool of resources (e.g. Cording et al., 2002), its relatedness to the acquirer (e.g. Ramaswamy, 1997), its financial strength at the time of the acquisition (e.g. Clark and Ofek, 1994), and the strength of its culture (e.g. Bereskin et al, 2018). Missing from this list of target characteristics is the business model of the target and the degree to which it is

disruptive to the business model of the acquirer. It is quite surprising that this variable—the degree to which the business model of the target (or alliance partner) is disruptive to the business model of the acquirer (or alliance partner)—has not been examined so far *empirically* because theory suggests that this variable can be very influential in how successful a firm might be in responding to a disruptive business model (Govindarajan and Trimble, 2005; Markides and Oyon, 2010; Snihur and Tarzijan, 2018). Case study research as well as simulations have also emphasized the importance of this variable and have suggested that it is so influential that it should be the primary factor that would determine whether a firm responds to a disruptive business model through the creation of a separate unit or not (Christensen and Raynor, 2003; Gilbert and Bower, 2002; Harren, zu Knyphausen-Aufsess and Markides, 2022; Khanagha et al., 2013; Porter, 1996).

A business model has been defined as the system of interdependent activities that the firm puts together to implement its strategy (Amit and Zott, 2001; Markides, 2013; Teece, 2010). The existing literature has already explored this concept in depth and has developed typologies of the most frequently used business models and examined its relationship to the concept of strategy (Amit and Zott, 2001; Foss and Saebi, 2017; Lanzolla and Markides, 2021; Zott, Amit and Massa, 2011). Developing in parallel to this literature is a body of research on the concept of business model innovation which is defined as the discovery of a fundamentally different business model in an existing industry (Amit and Zott, 2012; Foss and Saebi, 2017; Massa and Tuchi, 2021). A business model innovation represents what Henderson and Clark (1990) call an architectural innovation. This is an innovation that reinforces the core concepts of the established firms' products but changes the linkages between core concepts and components. These innovations have the potential to destroy the value of the incumbents' existing architectural knowledge that is embedded in the firm's routines and processes (Henderson and Clark, 1990).

New business models display two characteristics that can create "conflicts" with the business models of the existing players in an industry (Christensen, 1997; Porter, 1996). The number of conflicts present and the radicality of each conflict will determine how "disruptive" a new business model might be (Harren et al., 2022; Porter 1996). The first characteristic of a new business model that might create conflicts is the fact that its component value chain activities are often incompatible

with the value chain activities of the business model of the established firm (Porter, 1996). For example, new FinTech banks distribute their products and services through an online channel whereas traditional banks use their branch network. Investing in online distribution will inevitably undermine the branch network of the established bank and may meet with resistance from the managers of the existing business. Similarly, low-cost, point-to-point airline operators such as Southwest in the US and EasyJet in Europe have put in place a number of value chain activities to implement their business models that are fundamentally different from the activities that traditional airline companies use for their own business models. The existence of such incompatible activities creates tradeoffs for the established firm. Porter (1996) identified three main factors that give rise to such tradeoffs: (i) inconsistencies in the company's image, or brand or reputation; (ii) limits in trying to coordinate incompatible activities; and (iii) incompatible activities for the specific strategic position a firm is occupying. Attempting to adopt a set of activities that conflict with its existing set of activities is a difficult challenge for a firm and can lead to inefficiencies, conflicts and the degrading of the existing activities (Porter, 1996).

The second characteristic of a new business model that might create conflicts is the fact that the new business model often creates new markets that undermine the market that the established business model is serving (Christensen, 1997; Gilbert and Bower, 2002). For example, the new market may cannibalize the existing market; or it might take away resources from the existing market. In addition, certain kinds of business model innovations offer products and services that the existing customers might not want—at least initially. This creates incentives in the established firm to ignore the innovation (Christensen, 1997).

That such conflicts and tradeoffs exist has been documented by empirical studies (e.g. Khanagha et al., 2013). However, the mere presence of conflicts does not make the new business model disruptive to another firm. What does affect the disruptiveness of a new business model are two things: first, how many of these conflicts are present between the new and established business models; and second, how serious (or radical) these conflicts are. This implies that not all new business models are equally disruptive. A new business model A may have many serious conflicts with business model B but may have few and minor conflicts with business model C. This means that business model A is disruptive to a firm

operating business model B but not disruptive to a firm operating business model C.

The more conflicts present and the more serious these conflicts are, the more disruptive would a new business model be to another firm. And the more disruptive a new business model is, the lower the probability that the established firm would be the one to discover it (or introduce it into the market in the event that its own managers think about it first). This would be the case because disruptive innovations would appear unattractive to the managers of the established firm for a number of reasons. First, the core managers will fail to see the potential of the new business model quickly enough because as Christensen (1997) demonstrated, the customers that initially get attracted to the new business models are different from the customers of the established firm. Why invest in something that your own customers do not want? Second, the markets created by the new business model are originally too small relative to the core market to make them attractive enough for investment (Newman et al., 2021). Third, the new markets take time to grow and become profitable and so run into the impatient capital problem present in big, established corporations (Laverty, 1996). Fourth, because the markets created by disruptive business models conflict with the established core market, the existing managers will look at them more as a threat to defend against than an opportunity to invest in (Gilbert, 2003). Finally, because the activities of the new business model are incompatible with the activities of the firm's existing business model, the managers of the core business will again consider them too problematic or unattractive for them to invest in.

For all these reasons, therefore, the probability is high that established firms will pass on the opportunity to introduce disruptive business models. The more disruptive a new business model is, the less likely a big, established firm will introduce it. Unfortunately, failure to do so will deprive the established firm of many potential benefits that disruptive innovations introduce. First, disruptive innovations create sizeable new markets on the periphery of the core market (Gilbert, 2003). By failing to invest in these disruptive business models, the established firms miss out on these new growth markets. As Gilbert (2003) demonstrated, the new markets can be huge and often grow to rival the existing markets in both revenue and profitability. Being able to participate in them is, therefore, an important source of growth for established firms. Second, disruptive business models introduce new

technologies and new ways of doing business that even established firms can use to reengineer their own processes and business models. By failing to pursue the new business models, they deprive themselves of the opportunity to learn from the new ways of doing business and improve their own business models (Khanagha et al, 2013). Third, left unchecked, disruptive innovations have the potential to destroy the established firms' business models and markets (Henderson and Clark, 1990; Markides, 2013). By pursuing them despite their disruptiveness, established firms give themselves the opportunity to have an impact on how these innovations grow and evolve. As a result, they can grow them in ways that may not be as destructive to their core markets as they would have been if they were grown unchecked by the disruptive innovators themselves. Finally, by investing in a disruptive innovation themselves, established firms may be preventing a start-up firm from doing so and in the process, they are removing a future dangerous competitor from the market. This buys them the time to learn and adjust.

It is obvious that disruptive business model innovations generate huge benefits that non-disruptive ones generally don't. Yet, the evidence is that it is start-up firms that introduce them in the market (Christensen, 1997; Christensen and Raynor, 2003). As already explained, this may be for the simple reason that these innovations conflict with the existing business of the established firms and are therefore treated more like threats than opportunities (Gilbert, 2003). There is, of course, another less-sinister reason why it is mostly start-up firms that introduce disruptive innovations. For each established firm trying to innovate, there are hundreds or thousands of entrepreneurs trying to do the same thing. The law of averages suggests that it is likely that it is one of these numerous entrepreneurs, rather than one of the few established firms that will discover the new thing. Whatever the reason, the end result is that it is start-up firms that introduce most of the disruptive business model innovations in established markets.

Missing out on all the benefits of disruptive business models could be disastrous for established firms but fortunately for them, there is a way to make up for their initial failure to discover or introduce disruptive innovations. Specifically, acquiring the original disruptive innovators will provide the established firms with the opportunity to access the numerous benefits of disruptive innovation, even if they themselves did not introduce them in the market to begin with. In fact, evidence suggests that even though it is often the case that it is start-up firms that introduce pioneering

radical innovations, it is big, established firms that benefit the most from these innovations, as long as they move fast after their introduction to acquire them and scale them up (Schnaars, 1994; Tellis and Golder, 2001; Watts, 2001). This implies that, other things being equal, the acquisition of disruptive innovators should create value for the acquirers. Certainly, the acquisition of firms operating disruptive business models will confer benefits to the acquirer that are not present when the target is operating a non-disruptive business model.

Therefore:

H1: The acquisition of* disruptive innovators *by established firms will, on average, create value for the acquirers, and this value will be greater than the value created by the acquisition of non-disruptive firms.

Strategic Alliances

Strategic alliances will be an alternative way for established firms to access the benefits of disruptive innovation even if they have not introduced the innovation themselves. However, unlike acquisitions where the established firm has full control over the target, alliances require the cooperation of two different parties over a sustained period of time. This is difficult to achieve for a number of reasons, including incompatible cultures (e.g. Park and Ungson, 1997), misaligned objectives (e.g. Das and Teng, 2003), and inappropriate governance structures (e.g. Russo and Cesarani, 2007). For example, Bodnaruk, Massa and Simonov (2013) as well as Russo and Cesarani (2007) have argued that loose relationships, such as self-enforcing or contractual provisions often seen being applied in alliances, will not be the most appropriate governance structures to manage a relationship between parties that operate in situations where the risks of opportunistic behavior and environmental uncertainty are high. In these situations, equity ownership will be a much superior governance structure. The literature has identified numerous other sources of friction in strategic alliances and has therefore suggested that because of the unique problems that these relationships face, alliances will be a rugged road to success (Das and Teng, 2003; Devlin and Bleackley, 1988; Inkpen and Ross, 2001; Lorange and Roos, 1991).

Unsurprisingly, the empirical literature has found the failure rate of strategic alliances to be over 50% (Madhok et al., 2015; Prasant and Harbir, 2009; Ruso and Cesarani, 2007). The poor performance record of alliances is also reflected in the

results reported by several event studies that calculated the abnormal returns generated upon the announcement of alliances. For example, Lee and Wyatt (1990) reported negative stock price reactions to both parties and no evidence of value creation on the announcement of their alliance. Based on this rationale and the empirical evidence available, we would expect that, on average, alliances between established firms and start-up firms will destroy value for the parties involved.

However, we would also expect that this result will be mitigated by whether the alliance is between parties whose business models are disruptive to each other as opposed to parties whose business models are not disruptive to each other. Specifically, given the unique benefits identified above that disruptive innovators bring into the relationship, we would expect that alliances between disruptive partners will be much *less* value-destroying than alliances between nondisruptive partners. This prediction is based on the argument that alliances with disruptive partners will provide significant and unique benefits that alliances with nondisruptive partners do not provide; but this will not be enough to make these alliances value creating because they will still suffer from all the problems that traditional alliances suffer from—such as incompatible cultures, misaligned objectives, and inappropriate governance structures. Not only that, but given their disruptiveness, they could prove even more difficult to manage than traditional alliances. Certainly, the literature on the management of dual business models (Gilbert, 2003; Govindarajan and Trimble, 2005; Harren et al., 2022; Markides and Oyon, 2010) has already identified several problems that might arise by trying to operate two disruptive business models together, suggesting that alliances among disruptive partners will face more challenges than traditional alliances. Thus, even though disruptive alliances will provide more benefits than nondisruptive ones, they will still fail to create value for the partners concerned; but their value-destroying effect will not be as big as the one generated through alliances among nondisruptive partners. Based on these arguments, we propose the following hypothesis:

***H2: Strategic alliances will, on average, destroy value for the parties involved but the value destroyed will be much lower for alliances among disruptive partners than for alliances among nondisruptive partners*.**

EMPIRICAL ANALYSIS

The sample

To test our hypotheses, we developed a sample of acquisitions and alliances undertaken in the period 2007-2019 between big established financial institutions and FinTech start-up firms. The choice of the financial industry is deliberate to maximize the probability that the targets or alliance partners employ business models that are disruptive to those utilized by the acquirers and alliance partners. A variety of new business models have been introduced by FinTech start-up firms over the last two decades that have undermined the established firms' differentiation, distribution channels and skills and competencies. They have also created new products, services and markets that have cannibalized the established firms' products and services. These innovations have significantly affected the way financial services are designed, distributed and consumed, in the following ways:

- Financial institutions act as intermediaries between savers and borrowers, whereas FinTech eliminates or minimizes the need for intermediaries—for example, blockchain undermines the need for banks.
- FinTech creates new intermediaries—for example, crowdfunding is a new intermediary which undermines the need of banks.
- Traditional financial institutions bundle services to customers, such as banking, insurance or investments, whereas FinTech firms are unbundling financial services. For example, the only product that Transferwise offers to its customers is the transfer of money in an efficient and low-cost way.
- Fintech allows for the emergence of business models that are platform-based, data intensive and capital light, whereas financial institutions have physical infrastructures, are capital heavy, and rely exclusively on their own resources, including data.
- FinTech streamlines infrastructure through platforms and decentralized technologies, improving connectivity and performance, compared to traditional institutions which have complex structures and bureaucratic procedures.
- Fintech introduces niche products that are cheaper and better relative to the products of traditional firms.

- FinTech empowers customers by giving them more control over their decisions and by providing them with more and better options, compared to the constrained solutions offered by traditional banks.
- FinTech elevates the importance of data in decision making, compared to the limited use of data by traditional banks.

For these reasons, we believe the financial services industry will be a good industry to test our hypotheses. To develop our sample, we searched three financial databases—Thomson Reuters, Factiva and CapitaIQ—to identify acquisitions and alliances between established banks and FinTech start-up firms. This search produced an initial sample of 836 observations. The next step was to determine which of the sample target firms are FinTech firms as opposed to just software companies. This was an important step to take because there is no specific 'code' for FinTech companies in the databases. We therefore examined how each start-up firm was described in the three databases to make an initial assessment of whether the firm can be considered a FinTech. We supplemented this analysis by examining the detailed business description of each start-up firm in a number of other sources, such as PitchBook, Crunchbase and Bloomberg. Finally, we used two artificial intelligence databases (Chat GPT and Bing AI) to better understand the business of each target firm, how their business models were described and what their key technologies were. This screening process eliminated the majority of the targets as non-FinTech companies and reduced our sample size significantly. In addition, because of missing information on a number of other firms, the sample size was further reduced to 183 transactions: 85 M&As and 93 strategic alliances. This represents our final sample on which all the analysis that follows is based. The study period is 2007-2019 but most of the transactions (68%) took place in the period 2014-2019.

The incumbents (financial institutions) involved in the transactions come from 23 nations but the majority of them (91.8%), as expected, come from developed countries. Similarly, most of the FinTech firms are start-up firms that come from developed countries, with two-thirds of them coming from the US, Germany, and the UK. We describe below the methodology we have used to determine whether these sample firms were classified as disruptive or not, but we ended up with 102 of them being classified as disruptive and 81 of them as non-disruptive.

Data

Transaction-specific data (such as the announcement date, incumbent name, target name, target industry & sector, incumbent industry & sector, and transaction type), was collected from three databases: Thomson Reuters, Factiva and Capital IQ. The established firm's stock price and ISIN/ SEDOL code, and the Stock Market Index for its country were collected from Bloomberg and Datastream.

To test our hypotheses, we had to first determine which of our FinTech target firms can be considered disruptive to their acquirers (or partners) and which are not. To do this, we first used public sources to develop detailed descriptions of the business and business model of each acquirer and each target firm. We then used this information to answer five questions for each pair of acquirer and target (or for each alliance partner set). The five questions were:

- Does the target utilize a *distribution method* that undermines or replaces the existing distribution of the acquirer?
- Does the target offer products or services that can potentially undermine or dilute the *brands* and *firm reputation* of the acquirer?
- Does the target's way of competing *leverages assets, skills and competences* that can potentially undermine the assets and competences of the acquirer?
- Does the target offer products or services that cannibalize the products and services of the acquirer?
- Does the target offer its products and services on a different value proposition than the one offered by the acquirer?

Each question was answered as Yes or No. A transacting pair that received at least one "Yes" answer on these five questions was labelled as disruptive. Answering these five questions was not straightforward and our assessment was often subjective. To mitigate against subjectivity bias, we asked a second academic researcher to undertake the same classification on our behalf and then compared the results. The second rater was based in another country and is unrelated to this research but is a well-known researcher on the topic of business model innovation. The second rater identified 11 cases where their classification differed from the first classification. Discussions among the raters led to the reconciliation of these cases. The final classification comprised of 102 transactions classified as disruptive and 81 as non-disruptive.

METHODOLOGY

We use Cumulative Abnormal Return (CAR) Event Study Methodology to test our hypotheses. Event studies typically examine the effect of an event on the value of assets, such as stocks or bonds. The event study methodology is based on the efficient market hypothesis developed by Fama (1970), which states that new information is quickly and accurately incorporated in the stock price of a firm. This results in share prices changing to reflect the effect of this new information on the discounted value of the future cash flows of the asset under consideration. As such, significant price changes can be attributed to specific events that resulted in the release of this new information.

There is a general framework for undertaking an Event Analysis (Kothari and Warner, 2007; MacKinlay, 1997). First, the date of the event must be specified, i.e. the announcement of the acquisition or alliance. Following that, the "estimation-period" and the "event-period" (and "post-event" period) need to be defined for the purposes of the time-series analysis. For our study, we have defined them as follows:

- The Estimation period was determined to be -180 to -30 days before the announcement of the transaction.
- The Event period was determined to be -10 to +10 days relative to the announcement.

The next step involves using the market model to estimate the parameters ai and bi which can then be used to determine the expected return for firm (i) during the event period. As such, for each firm (i) we estimate the following equation:

$$Rit = ai + biRmt + eit$$

Where,

$Rit =$ the return on the security of firm i at time t.

$Rmt =$ the return on the market portfolio at time t. In this study, we use the Equally-weighted Market Return of the main Stock Market Index in the market where firm i is listed.

$ai \ \& \ bi =$ parameters of the regression of the return on security i (Ri) and the market return (Rm) over the period -180 and -30 trading days prior to the event day.

$eit =$ the error term of the regression

Abnormal returns (AR_{it}A) can then be estimated as the difference between the actual returns and the expected returns for each day and for each firm during the event period; these may be computed as follows:

$$AR_{it} = R_{it} - E(R_{it}) = R_{it} - (a_i + b_i R_{mt})$$

A two-day return is calculated for each transaction. Day t=-1 is the day the news of the transaction is announced in the stock market, usually after the market closes. The market responds the day after the announcement, i.e. t=0. Thus, there is a two-day announcement window (-1,0). Therefore, the cumulative abnormal return is calculated as follows:

$$CARi(0,+1) = \sum_{t=0}^{+1} ARit$$

For N securities, the average cumulative abnormal return is calculated as following:

$$CAR\ (0,+1) = \left(\frac{1}{N}\right) \sum_{i=1}^{N} CARi(0,+1)$$

Finally, to test the statistical significance of the CAR, we perform a standard t-test as follows:

$$t = \frac{CAR(0,+1)}{(S\ CAR(0,+1)/\sqrt{N})}$$

Where:

$S\ CAR(0,+1) =$ the standard deviation of the two-day AR

N = the number of firms in the sample

RESULTS

Characteristics of Observations

Table 1 shows the frequency distribution of acquisitions and alliances by year. The distribution indicates that transaction activity picked up significantly after 2014, suggesting a possible bandwagon effect. Table 2 shows the frequency distribution of acquisitions and alliances by country. The US accounts for roughly one third of all acquisitions and alliances undertaken but Germany and Spain also feature prominently on the list, especially when it comes to strategic alliances. As expected, most transactions took place in developed countries. Finally, Table 3 shows that the majority of them are banks rather than insurance companies or investment houses. This is not surprising since the banking industry has been more impacted by FinTech than the other industries represented in our sample.

Table 1: **Acquisition and Alliance Frequency Distribution by Year**

Year	M&As	Strategic Alliances	Total
2007	4	1	5
2008	2	2	4
2009	1	0	1
2010	2	1	3
2011	1	3	4
2012	4	2	6
2013	1	5	6
2014	8	12	20
2015	6	16	22
2016	13	21	34
2017	11	17	28
2018	22	9	31
2019	10	9	19
Total	**85**	**98**	**183**

Table 2: Acquisition and Alliance Frequency Distribution by Country

Country of Established Firm	M&As	Strategic Alliances	Total
Australia	5	0	5
Brazil	2	0	2
Canada	3	1	4
China	1	0	1
Egypt	1	0	1
France	4	2	6
Germany	6	30	36
India	0	2	2
Indonesia	0	1	1
Italy	2	0	2
Japan	4	1	5
Malaysia	0	2	2
Morocco	1	0	1
Netherlands	2	0	2
Pakistan	0	1	1
Russia	0	1	1
Singapore	0	2	2
South Africa	2	0	2
Spain	4	18	22
Sweden	2	5	7
Switzerland	1	0	1
UK	4	9	13
USA	41	23	64
Total	**85**	**98**	**183**

Table 3: Acquisition and Alliance Frequency Distribution by Type of Financial Institution

	Disruptor		Non-Disruptor	
Type of Financial Institution	**M&As**	**Strategic Alliances**	**M&As**	**Strategic Alliances**
Banks	25	58	28	33
Insurance	7	2	3	1
Investment Houses	10	0	12	4
Total	**42**	**60**	**43**	**38**

Event Study Results by Response

Table 4 shows the abnormal returns generated by the whole sample of 183 transactions, and then subdivided into transactions that involved disruptive partners (102) and transactions that involved non-disruptive partners (81). The abnormal returns have been calculated for several time windows and their statistical significance has been assessed using two tests—the first is NCAAREt for cross-sectional independence (Serra, 2003) and the second is NCAARE_GrankT for cross-correlation to cater for skewedness/ Kurtosis (Kolari and Pynnonen, 2011). The table also reports minimum and maximum values of CARs generated for each time window as well as the percentage of abnormal returns that are positive for each time window. There is significant variance in the abnormal returns generated and the majority of the percentage positive CARs is close to 50%, indicating pluralism in data observations.

As shown in table 4, the abnormal returns generated *for the whole sample* for all time windows except two are statistically insignificant. However, when the sample is divided into disruptive and non-disruptive partners, the results change dramatically. For transactions involving *disruptive* partners, the abnormal returns generated are positive and statistically significant for 8 of the 9-time windows used. By contrast, for transactions involving *non-disruptive* partners, the abnormal returns generated are negative and statistically significant for five of the nine-time windows used. These results provide early support for our argument that the degree to which the business model of the target (or alliance partner) is disruptive to the business model of the acquirer (or alliance partner) is an important factor that affects value

creation by acquisitions and alliances. However, to directly test our two hypotheses, we need to examine acquisitions on their own and alliances on their own.

Table 4: Estimated CARs of Transactions with Disruptive and Non-Disruptive FinTech Start-ups

T	CAR	NCAARE T-test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
All (183 observations)						
[-10;10]	-0.003	-0.464	1.167	-0.308	0.211	51.37
[-5;5]	0.000	-0.107	-0.177	-0.315	0.223	47.54
[-3;3]	0.003	0.939	1.205	-0.156	0.177	49.73
[-1;0]	0.000	0.112	1.624	-0.058	0.077	50.82
[-1;1]	0.003	1.255	**2.181***	-0.079	0.147	51.91
[0;1]	0.003	**1.771†**	0.782	-0.091	0.168	48.63
[0;3]	0.002	0.791	1.129	-0.137	0.180	48.09
[0;5]	0.001	0.423	-0.325	-0.151	0.209	44.81
[0;30]	-0.004	-0.510	0.228	-0.359	0.369	45.36
Disruptive partners (102 observations)						
[-10;10]	0.004	0.647	**1.781†**	-0.158	0.208	55.88
[-5;5]	0.006	1.371	0.860	-0.119	0.170	48.04
[-3;3]	0.009	**2.615****	**2.585***	-0.120	0.177	51.96
[-1;0]	0.003	1.571	**3.000****	-0.047	0.077	54.90
[-1;1]	0.008	**3.412*****	**3.136****	-0.050	0.147	56.86
[0;1]	0.008	**4.264*****	**2.857****	-0.023	0.137	54.90
[0;3]	0.008	**3.106****	**2.591***	-0.034	0.138	50.00
[0;5]	0.007	**2.056***	1.263	-0.064	0.134	49.02
[0;30]	0.005	0.631	**1.893†**	-0.161	0.287	47.06
Non-Disruptive partners (81 observations)						
[-10;10]	-0.016	-1.511	-0.445	-0.299	0.225	45.68
[-5;5]	-0.012	-1.512	**-2.045***	-0.316	0.235	43.21
[-3;3]	-0.007	-1.126	-1.606	-0.150	0.161	44.44
[-1;0]	-0.004	-1.142	-1.167	-0.060	0.074	46.91

[-1;1]	-0.005	-1.201	-0.902	-0.081	0.062	44.44
[0;1]	-0.004	-1.217	**-2.112***	-0.090	0.146	39.51
[0;3]	-0.007	-1.588	**-2.066***	-0.140	0.139	44.44
[0;5]	-0.007	-1.314	**-3.054****	-0.160	0.149	39.51
[0;30]	-0.023	**-1.742†**	**-3.568*****	-0.382	0.127	43.21

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**
- Measure NCAARE GranKT was used as a non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020).

Table 5 shows the abnormal returns generated by all acquisitions and then broken down into acquisitions involving disruptive partners and acquisitions involving non-disruptive partners. When we look at the whole sample, the abnormal returns generated are positive and statistically significant for most time periods. The percentage of positive ARs is well above 50% for all periods and the gap between the minimum and maximum values wider than those in table 4. When we examine M&As that involve only disruptive partners, all ARs are positive and statistically significant for all time periods, and higher than the ARs generated for the whole sample. The percentage of positive ARs is much higher than those for the whole sample for all periods and the gap between the minimum and maximum values smaller.

On the other hand, when we look at the M&As involving only non-disruptive targets, the abnormal results generated for all except one time period are statistically insignificant. Six periods show negative ARs, one positive and two zero. Seven time periods show lower than 50% positive ARs and two periods higher. The gap between the minimum and maximum values is wider for all periods. These results demonstrate strong support for our first hypothesis. Specifically, acquisitions of disruptive targets create value for the acquirers and this value is higher than any value created by acquisitions of non-disruptive targets.

Table 5: Estimated CARs for Acquisitions of Disruptive and Non-Disruptive FinTech Start-ups

T	CAR	NCAARE T-test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
All M&As (85 observations)						
[-10;10]	0.008	0.849	**3.633*** **	-0.308	0.211	56.47
[-5;5]	0.008	1.245	1.492	-0.315	0.223	55.29
[-3;3]	0.010	**1.891†**	**2.211***	-0.156	0.177	54.12
[-1;0]	0.002	0.710	**3.146****	-0.047	0.077	58.82
[-1;1]	0.007	**2.135***	**4.375*** **	-0.052	0.147	58.82
[0;1]	0.009	**3.289****	**2.318***	-0.040	0.168	52.94
[0;3]	0.009	**2.251***	**3.867*** **	-0.121	0.180	52.94
[0;5]	0.009	**1.841†**	**2.914****	-0.102	0.209	52.94
[0;30]	0.008	0.674	**2.407***	-0.161	0.369	52.94
Disruptive M&As (42 observations)						
[-10;10]	0.020	**1.942†**	**3.341*** **	-0.072	0.208	61.90
[-5;5]	0.020	**2.798****	**1.924†**	-0.063	0.170	54.76
[-3;3]	0.019	**3.312*** **	**1.907†**	-0.075	0.177	54.76
[-1;0]	0.006	**1.933†**	**3.617*** **	-0.047	0.077	66.67
[-1;1]	0.016	**4.354*** **	**4.621*** **	-0.028	0.147	66.67
[0;1]	0.014	**4.739*** **	**2.766****	-0.018	0.137	57.14
[0;3]	0.016	**3.814*** **	**4.389*** **	-0.025	0.130	57.14
[0;5]	0.015	**2.973****	**4.032*** **	-0.030	0.134	59.52
[0;30]	0.015	1.106	**3.578*** **	-0.161	0.287	57.14
Non-Disruptive M&As (43 observations)						
[-10;10]	-0.010	-0.552	**1.768†**	-0.299	0.225	51.16
[-5;5]	-0.007	-0.551	-0.395	-0.316	0.235	48.84
[-3;3]	-0.001	-0.101	0.625	-0.150	0.161	48.84
[-1;0]	-0.002	-0.424	0.857	-0.055	0.033	55.81
[-1;1]	-0.002	-0.332	1.083	-0.051	0.048	48.84
[0;1]	0.003	0.608	0.587	-0.040	0.146	46.51
[0;3]	0.000	0.025	0.799	-0.119	0.139	48.84
[0;5]	0.000	0.015	-0.337	-0.103	0.149	46.51
[0;30]	-0.007	-0.326	-0.892	-0.156	0.127	46.51

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**

- Measure NCAARE GranKT was used as a Non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020).

Turning our attention to strategic alliances, Table 6, shows the abnormal returns generated by all alliances and then broken down into alliances involving disruptive partners and alliances involving non-disruptive partners. As predicted, the ARs for the whole sample of alliances are negative for all periods and statistically significant for five out of nine periods. The percentage of positive ARs is well below 50% for all periods. The gap between minimum and maximum values is wide. When we look at the ARs generated by alliances among only non-disruptive partners, these ARs are negative—often very negative—and statistically significant for all time windows. By contrast, the ARs generated by alliances among only disruptive partners are negative for just 3 of the 9 time periods and statistically insignificant. In fact, for five of the time windows, they actually turn positive, and they are statistically significant for the window (0,1). Even though the ARs for disruptive alliances are only statistically significant for just one of the time periods, there is no doubt that they are not as negative as the ARs for alliances among non-disruptive partners. At least 50% of the ARs for disruptive alliances are positive for four time periods. These results offer strong support for our second hypothesis. Specifically, alliances among disruptive partners destroy less value than alliances among non-disruptive partners.

Table 6: Estimated CARs for Strategic Alliances with Disruptive and Non-Disruptive FinTech Start-ups

T	CAR	NCAARE T-test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Strategic Alliances (98 observations)						
[-10;10]	-0.012	**-1.764†**	**-1.899†**	-0.158	0.154	46.94
[-5;5]	-0.008	**-1.672†**	**-1.893†**	-0.137	0.115	40.82
[-3;3]	-0.003	-0.823	-0.520	-0.120	0.140	45.92
[-1;0]	-0.001	-0.680	-0.957	-0.058	0.074	43.88
[-1;1]	-0.001	-0.622	-1.338	-0.079	0.064	45.92
[0;1]	-0.002	-1.209	-0.913	-0.091	0.078	44.90
[0;3]	-0.004	-1.480	**-2.312***	-0.137	0.138	43.88
[0;5]	-0.005	-1.555	**-3.363****	-0.151	0.108	37.76
[0;30]	-0.014	-1.594	**-2.131***	-0.359	0.266	39.80
Disruptive Strategic Alliances (60 observations)						
[-10;10]	-0.007	-0.904	-0.542	-0.158	0.154	51.67
[-5;5]	-0.004	-0.647	-0.793	-0.119	0.115	43.33
[-3;3]	0.002	0.553	1.583	-0.120	0.140	50.00
[-1;0]	0.001	0.388	0.669	-0.042	0.057	46.67
[-1;1]	0.002	0.712	0.122	-0.050	0.064	50.00
[0;1]	0.004	**1.942†**	**1.778†**	-0.023	0.078	53.33
[0;3]	0.003	0.771	-0.397	-0.034	0.138	45.00
[0;5]	0.000	0.119	-1.533	-0.064	0.108	41.67
[0;30]	-0.002	-0.161	-0.607	-0.148	0.266	40.00
Non-Disruptive Strategic Alliances (38 observations)						
[-10;10]	-0.018	-1.621	**-2.580***	-0.146	0.102	39.47
[-5;5]	-0.014	**-1.771†**	**-2.132***	-0.137	0.103	36.84
[-3;3]	-0.012	**-1.847†**	**-3.017****	-0.117	0.122	39.47
[-1;0]	-0.005	-1.451	**-2.451***	-0.058	0.074	39.47
[-1;1]	-0.007	**-1.728†**	**-2.458***	-0.079	0.062	39.47
[0;1]	-0.012	**-3.484****	**-3.885*****	-0.091	0.038	31.58
[0;3]	-0.015	**-3.070****	**-3.588*****	-0.137	0.050	42.11
[0;5]	-0.014	**-2.456***	**-3.324*****	-0.151	0.050	31.58
[0;30]	-0.033	**-2.212***	**-2.920****	-0.359	0.084	36.84

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**

- Measure NCAARE GranKT was used as a Non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020).

Overall, our results suggest that the degree of disruptiveness between the business models of the transacting parties has an important and positive effect on the ARs generated by these transactions. Specifically, acquisitions of disruptive targets create more value than acquisitions of non-disruptive targets. Similarly, alliances among disruptive partners destroy less value than alliances among non-disruptive partners. They may even have a positive impact if implemented and executed properly.

Event Study Analysis by Response and Type of Financial Institution

Our list of established firms included not only traditional banks but also insurance companies and investment banks. We therefore repeated our analysis by financial type. Since we did not have enough insurance companies in the sample, the results that follow compare transactions by traditional banks with transactions by investment banks.

Table 7 presents the ARs created by acquisitions of FinTech firms by traditional banks while Table 8 presents the ARs created by acquisitions of FinTech firms by investment banks. The first thing to notice is that the results follow the same pattern as before. Specifically, acquisitions of disruptive targets (whether by traditional banks or investment banks) generate more value than acquisitions of non-disruptive targets. However, the overall value created by acquisitions for traditional banks appears to be lower than the value generated for all financial institutions reported earlier in our study. Second, acquisitions of disruptive targets appear to be more beneficial for investment banks than for traditional banks. When investment banks undertake an acquisition, the ARs generated are all positive and larger than the ARs generated by acquisitions undertaken by the whole sample as well as acquisitions undertaken by only traditional banks. The difference between acquisitions of disruptive versus non-disruptive targets is particularly pronounced in the case of acquisitions by investment banks, possibly because investment banks receive all

the benefits that disruptive innovators bring into the transaction without the associated conflicts that traditional banks have to face.

Table 7: Estimated CAARs for Acquisitions Between Banks and FinTech Start-ups

T	CAR	NCAARE T-test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Banks M&As (53 observations)						
[-10;10]	0.008	1.094	**3.557*** **	-0.143	0.210	64.15
[-5;5]	0.004	0.760	1.081	-0.091	0.170	52.83
[-3;3]	0.002	0.513	1.096	-0.099	0.177	50.94
[-1;0]	0.001	0.496	1.221	-0.047	0.077	54.72
[-1;1]	0.000	0.024	1.235	-0.052	0.115	49.06
[0;1]	-0.001	-0.276	-1.518	-0.040	0.043	37.74
[0;3]	-0.002	-0.495	0.113	-0.072	0.062	41.51
[0;5]	-0.002	-0.476	-0.454	-0.066	0.063	43.40
[0;30]	-0.005	-0.539	-0.737	-0.119	0.124	50.94
Disruptive Banks M&As (25 observations)						
[-10;10]	0.010	0.941	**2.157***	-0.054	0.194	72.00
[-5;5]	0.008	1.013	-0.700	-0.052	0.169	40.00
[-3;3]	0.008	1.299	0.983	-0.067	0.175	52.00
[-1;0]	0.004	1.202	1.233	-0.045	0.076	60.00
[-1;1]	0.007	**1.767†**	**1.719†**	-0.024	0.114	52.00
[0;1]	0.005	**1.677†**	0.217	-0.019	0.041	44.00
[0;3]	0.004	0.913	1.177	-0.026	0.057	48.00
[0;5]	0.003	0.489	1.556	-0.031	0.058	52.00
[0;30]	-0.014	-0.983	0.389	-0.137	0.104	52.00
Non-Disruptive Banks M&As (28 observations)						
[-10;10]	0.004	0.399	**1.656†**	-0.138	0.179	64.29
[-5;5]	0.000	-0.058	0.922	-0.095	0.068	35.71
[-3;3]	-0.004	-0.644	0.471	-0.099	0.044	46.43
[-1;0]	-0.002	-0.559	0.329	-0.040	0.029	53.57
[-1;1]	-0.006	**-1.662†**	-0.176	-0.051	0.046	46.43
[0;1]	-0.006	**-1.932†**	**-2.090***	-0.040	0.043	39.29
[0;3]	-0.007	-1.535	-1.388	-0.073	0.034	42.86
[0;5]	-0.006	-1.127	**-1.847†**	-0.069	0.040	46.43
[0;30]	-0.001	-0.067	**-1.896†**	-0.107	0.105	46.43

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**

- Measure NCAARE GranKT was used as a Non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020).

Table 8: Estimated CAARs for Acquisitions Between Investment Banks and FinTech start-ups

T	CAR	NCAARE T-test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Investment Banks M&As (22 observations)						
[-10;10]	0.021	0.990	**2.641****	-0.308	0.211	54.55
[-5;5]	0.019	1.264	1.296	-0.315	0.223	68.18
[-3;3]	0.029	**2.447***	**2.409***	-0.156	0.154	63.64
[-1;0]	0.004	0.662	**2.272***	-0.039	0.068	63.64
[-1;1]	0.020	**2.575***	**3.366*****	-0.032	0.147	72.73
[0;1]	0.022	**3.492*****	**5.385*****	-0.021	0.137	77.27
[0;3]	0.023	**2.623****	**4.915*****	-0.121	0.130	77.27
[0;5]	0.024	**2.256***	**4.683*****	-0.102	0.145	72.73
[0;30]	0.028	1.012	**3.511*****	-0.152	0.287	50.00
Disruptive Investment Banks M&As (10 observations)						
[-10;10]	0.063	**1.991***	**2.083***	-0.010	0.208	70.00
[-5;5]	0.052	**2.464***	**2.774****	0.000	0.170	90.00
[-3;3]	0.048	**2.866****	**2.638****	-0.011	0.154	70.00
[-1;0]	0.011	1.289	**2.774****	-0.039	0.068	80.00
[-1;1]	0.034	**3.109****	**3.583*****	-0.018	0.147	80.00
[0;1]	0.032	**3.597*****	**4.141*****	-0.003	0.137	80.00
[0;3]	0.046	**3.658*****	**4.500*****	0.000	0.130	90.00
[0;5]	0.049	**3.204****	**4.828*****	0.000	0.134	90.00
[0;30]	0.099	**2.359***	**4.384*****	-0.021	0.287	60.00
Non-Disruptive Investment Banks M&As (12 observations)						

[-10;10]	-0.014	-0.479	1.473	-0.308	0.211	41.67
[-5;5]	-0.009	-0.442	-0.758	-0.315	0.223	50.00
[-3;3]	0.012	0.734	0.802	-0.156	0.149	58.33
[-1;0]	-0.002	-0.224	0.114	-0.039	0.030	50.00
[-1;1]	0.008	0.704	1.055	-0.032	0.045	66.67
[0;1]	0.013	1.466	**3.209****	-0.021	0.038	75.00
[0;3]	0.004	0.318	**2.328***	-0.121	0.099	66.67
[0;5]	0.003	0.222	**1.895**†	-0.102	0.145	58.33
[0;30]	-0.031	-0.825	0.637	-0.152	0.084	41.67

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**
- Measure NCAARE GranKT was used as a Non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020).

The examination of alliances between FinTech firms and only traditional banks offers further support for our second hypothesis. We do not have enough alliances in our sample between investment banks and FinTech firms, so we only report our results for traditional banks. As Table 9 shows, alliances between traditional banks and FinTech firms on average destroy value, and this result is particularly pronounced for alliances with non-disruptive partners. As expected, alliances with disruptive partners do not destroy as much value and are mostly value neutral. These results are in general agreement with H2.

Table 9: Estimated CAARs for Strategic Alliances Between Banks and FinTech Start-ups

T	CAR	NCAARE T-test	NCAARE GrankT	Minimum	Maximum	% Positive CAR
Banks Strategic Alliances (91 observations)						
[-10;10]	-0.013	**-1.898†**	**-2.312***	-0.161	0.117	45.05
[-5;5]	-0.009	**-1.845†**	**-2.147***	-0.158	0.102	41.76
[-3;3]	-0.004	-1.029	-1.082	-0.132	0.152	45.05
[-1;0]	-0.002	-0.756	-1.566	-0.060	0.074	41.76
[-1;1]	-0.002	-0.770	-1.567	-0.081	0.070	46.15
[0;1]	-0.003	-1.353	-1.074	-0.090	0.081	46.15
[0;3]	-0.005	**-1.747†**	**-2.527***	-0.140	0.142	42.86
[0;5]	-0.006	**-1.717†**	**-2.967****	-0.160	0.108	37.36
[0;30]	-0.017	**-1.935†**	**-2.239***	-0.382	0.221	41.76
Disruptive Banks Strategic Alliances (58 observations)						
[-10;10]	-0.005	-0.556	-0.100	-0.158	0.154	53.45
[-5;5]	-0.003	-0.477	-0.355	-0.119	0.115	44.83
[-3;3]	0.002	0.527	1.577	-0.120	0.140	50.00
[-1;0]	0.001	0.561	0.761	-0.042	0.057	46.55
[-1;1]	0.002	0.707	0.136	-0.050	0.064	50.00
[0;1]	0.003	**1.767†**	1.266	-0.023	0.078	51.72
[0;3]	0.002	0.703	-0.428	-0.034	0.138	44.83
[0;5]	0.001	0.298	-1.100	-0.064	0.108	43.10
[0;30]	0.000	0.032	-0.184	-0.148	0.266	41.38
Non-Disruptive Banks Strategic Alliances (33 observations)						
[-10;10]	-0.022	**-1.719†**	**-3.127****	-0.146	0.102	36.36
[-5;5]	-0.016	**-1.776†**	**-2.249***	-0.137	0.103	36.36
[-3;3]	-0.012	**-1.745†**	**-2.778****	-0.117	0.122	39.39
[-1;0]	-0.006	-1.492	**-2.310***	-0.058	0.074	39.39
[-1;1]	-0.008	-1.647	**-2.367***	-0.079	0.062	39.39
[0;1]	-0.013	**-3.304*****	**-3.701*****	-0.091	0.038	30.30
[0;3]	-0.016	**-2.938****	**-3.434*****	-0.137	0.050	42.42
[0;5]	-0.016	**-2.398***	**-3.177****	-0.151	0.050	33.33
[0;30]	-0.038	**-2.249***	**-3.059****	-0.359	0.084	33.33

- **†< 0.1, *< 0.05, **< 0.01, ***< 0.001**

- Measure NCAARE GranKT was used as a Non parametric test to cater for the Skewedness/ Kurtosis presented in pool of observations (Kolari and Pynnönen, 2011).
- As a Robustness test, we changed the parameter Estimation Window from (-180, -30) days to (-250, -30) days. The results did not change. (Sorokina, Booth and Thornton, 2013; Kallenos and Nishiotis, 2020).

Robustness Test: Independent Samples T-tests

Our Event Study analysis found that acquisitions of disruptive targets generated value whereas acquisitions of non-disruptive targets did not. Conversely, alliances between non-disruptive partners destroyed value whereas alliances between disruptive partners neither destroyed nor created value. To ensure the validity of our findings and test the robustness of our results, we also conducted independent samples t-tests on the data. This is a robustness test that compares the means of the outcome variable (i.e. abnormal returns) for different subgroups.

Table 10 shows that transactions (M&A and alliances) involving disruptive start-up firms generate higher ARs compared to transactions involving non-disruptive start-up firms, a difference which is statistically significant. The same result emerges when this test is undertaken for acquisitions alone (Table 11). Consistent with H2, Table 12 shows that alliances involving disruptive partners generate much higher ARs compared to alliances involving non-disruptive partners (that destroy value). We repeated the analysis by looking at the ARs generated for each type of transaction (M&A and alliances, with disruptive and non-disruptive partners) for banks alone and then for investment banks alone. Once again, the differences in means follow the patterns predicted by our two hypotheses and are statistically significant. Overall, the results of the independent samples t-tests align with our initial findings from the Event methodology, something that provides additional support for the robustness of our conclusions.

Table 10: All Transactions with Disruptive and Non-Disruptive FinTech Start-ups

Factor Disruptor	Hypothesis	Number of Observations N=183	Results (Means)	Mean Difference	T-stat	P-value
Yes	CARs Disruptive > CARs Non-Disruptive	102	.0079138	.0119138	3.1816	0.0017
No		81	-.004000			

Table 11: Acquisitions of Disruptive and Non-Disruptive FinTech Start-ups

Factor Disruptor	Hypothesis	Number of Observations N=85	Results (Means)	Mean Difference	T-stat	P-value
Yes	CARs Disruptor M&As > CARs No Disruptor M&As	42	.0140923	.0107454	1.7354	0.0864
No		43	.0033469			

Table 12: Strategic Alliances with Disruptive and Non-Disruptive FinTech Start-ups

Factor Disruptor	Hypothesis	Number of Observations N=98	Results (Means)	Mean Difference	T-stat	P-value
Yes	CARs Disruptive Str. Al. > CARs Non-Disruptive Str. Al.	60	.003588	.0153453	3.6411	0.0004
No		38	-.011756			

CONCLUSIONS

Our study has introduced the important issue of disruptive innovation into the literature on acquisitions and strategic alliances. A voluminous literature on disruptive innovation has developed in the last 25 years, based on the early work of Christensen (1997). A key finding of this literature is that disruptive innovation provides several unique benefits, not the least of which is the creation of huge new markets on the periphery of the existing markets. Disruptive innovation also introduces new technologies and new business models that existing competitors can adopt to improve their own ways of operating and improve their efficiency. It is this potential of disruptive innovation to enlarge the economic pie and create new sources of competitive advantage that has enhanced its popularity among both academics and practitioners and has led to the growth of academic studies exploring its antecedents and consequences.

Despite its value-creating potential, it is mostly start-up firms—rather than big, established companies—that introduce disruptive innovations into existing markets. This may be simply a reflection of the fact that there are many more entrepreneurs attempting to innovate compared to existing big firms, so we would naturally expect that it would be an entrepreneur (rather than a big firm) that would be the first to develop or introduce these kinds of innovations. However, the literature has also provided numerous other reasons why it is not the big, established firms that tend to introduce these disruptive innovations. As their name implies, these innovations are disruptive to the established firms in that they introduce business models whose value-chain activities are different and incompatible to those that the established firms are already using in their business models. Disruptive innovations also give rise to new markets that often grow at the expense of the existing markets. As a result, established firms tend to look at disruptive innovations as threats to defend against rather than as opportunities to exploit. The end result is that disruptive innovations are often introduced by start-up firms rather than established companies.

This, however, is not as bad for established firms as it sounds. As originally pointed out by Schumpeter (1942), successful innovation requires the linking of two distinct activities: the discovery of something new and its scaling-up into a big, mass market. More importantly, these activities do not need to be undertaken by the same firm. In fact, the literature on technological innovation has shown that it is often one type

of firm—the start-up firm—that pioneers new radical technologies or products, and it is another type of firm—the big, established company—that scales them up into big, mass markets (Schnaars, 1994). This implies that a firm need not be a pioneer to benefit from an innovation. It can still exploit the discoveries of other firms by moving fast to adopt somebody else's discovery and then scaling it up into a big market.

It is this logic that led us to propose in this paper that acquisitions and alliances can act as the means by which established firms can exploit the disruptive innovations introduced in their markets by other firms. The big firms may not be the ones that introduce these innovations, but they can still reap their unique benefits through acquisitions and alliances. We have therefore proposed that acquisitions of disruptive targets will, on average, create more value to the acquirers than acquisitions of non-disruptive targets; and that alliances with disruptive partners will not be as value-destroying as alliances with non-disruptive partners. Our empirical results provided strong support for both of these propositions.

Our study is the first one to introduce the topic of disruptive innovation in the literature on acquisitions and alliances and our results provide one possible reason why past studies have reported inconsistent results on whether these transactions create value for the parties involved. As we have shown, it makes a difference if the business model of the target (or alliance partner) is disruptive to the business model of the acquirer (or alliance partner). This implies that if the sample of firms being examined is primarily composed of disruptive firms, the value created by the transaction will be different than if the sample is made up of non-disruptive firms. Past studies that did not control for this variable may, therefore, have been reporting different results simply as a result of different sample composition.

Our study raises several managerial implications. Acquisitions proved to be more value-creating than alliances when it came to bringing disruptive partners together. This finding should affect the relative attractiveness of the various strategies (acquisitions versus alliances) that established firms choose to adopt to participate in disruptive technologies or business models (such as FinTech). In addition, our results suggest that investment banks exploited the new disruptive technologies (that they accessed through acquisitions or alliances) in a better way than

commercial banks. Further research needs to understand why and provide lessons to other financial institutions.

Our study is not without its limitations. We had limited cases of transactions taking place in developing countries, so our results are only applicable to the context of developed countries only. In addition, our research was based on the Event study methodology which has received its fair share of criticism because it relies on the Efficient Market Hypothesis. Future research should try to replicate our results using alternative methodologies.

CHAPTER 3: VALUE CREATED IN ACQUISITIONS AND STRATEGIC ALLIANCES: THE IMPACT OF THE COMPLEXITY OF TECHNOLOGY POSSESSED BY TARGETS AND PARTNERS.

ABSTRACT

Many factors influence how valuable a firm is to its acquirer or partner, including the technology in its possession—the more valuable the technology, the more valuable the target or the partner. Traditionally, the value of the technology has been measured by how many patents it has generated but this measure is problematic in that it fails to capture the quality of the knowledge embedded in the technology. In this paper, we propose a new way to measure the value of the technology acquired, a combination of patents and investment made for the technology, one that we will call complexity of technology. Using a sample of 143 acquisitions and 103 strategic alliances, we empirically demonstrate that our new measure is better than patents in capturing the value of the technology that acquisition targets and alliance partners bring to the table. Specifically, we show that that the more complex the technology, the higher the value it can create for the owners.

INTRODUCTION

Existing research has explored whether acquisitions and strategic alliances create value for the acquirers and partners and the factors that influence the value created (e.g. Amici, Fiordelisi, Masala, Ricci and Sist, 2013; Dranev, Frolova and Orhirova, 2019; Hornuf, Klus, Lohwasser and Schwienbacher, 2018; Marciukaityte, Roskelley and Wang, 2009; Yuce and Ng, 2005; Zhang, Wang, Li, Chen and Wang, 2018). Numerous factors have been identified and they can be classified into three main categories: (1) Deal specific factors, such as the relatedness of the two firms (Nicholson and Salaber, 2013), the level of control of one party over another (Aybar and Ficici, 2009;) and the payment mode (Faccio and Masulis, 2005) (2) Firm specific factors, such as the financial status of the transacting parties (Gubbi et al., 2010), the firm relative sizes (Uhlenbruck, Hill and Semadeni, 2006), the experience of the transacting parties in acquisitions or alliances (Wang and Larimo, 2020), the market power of the bidder (Gubbi et al., 2010), and how valuable the target or partner is (Li and Tong, 2018); and (3) Country specific factors, such as regional characteristics and the macroeconomic environment (Aybar and Ficici, 2009),

country risk – economic, financial and political (Cuypers and Martin, 2010) and level of M&A activity in the country (Aybar and Ficici, 2009).

One of the factors that can potentially create value in these transactions is the value of the target relative to the price paid—the more valuable the target, the more value will be created for the acquirer or alliance partner, assuming that the high value of the target is not wasted by over-paying for it (Cuypers and Martin, 2010; Li and Tong, 2018). The question, therefore, is what determines how valuable the target is to the acquirer or alliance partner. Many factors influence the value of the target or alliance partner, including the quality of its management team, the strength of its brand and its other tangible or intangible assets (Bahadir, Bharadwaj and Srivastava, 2008), the cultural fit with its potential acquirer or partner (Bronder and Pritzl, 1992), and so on. However, one of the most important determinants of its value that has been emphasized in literature is the technology in its possession (Bronder and Pritzl, 1992; Hussinger, 2010; Neill, Pfeiffer and Young-Ybarra, 2001; Rossi, Tarba and Raviv, 2013). The more valuable this technology—in the sense that it is valuable, rare, inimitable and difficult to substitute—the higher the value of the target to its acquirer or partner (Barney, 1988; Wernerfelt, 1984).

Traditionally, the value of the technology has been measured by how many patents it has generated (Breitzman and Thomas, 2016; Gittelman, 2008; Griliches, Hall and Pakes, 1991). However, this is a problematic measure of value because it only captures one dimension of knowledge—its *quantity*. But it fails to capture the *quality* of this knowledge. A firm may own many patents for its technology and that would be a good measure of how much knowledge it possesses. But we still do not know if this knowledge is of the type that makes it really valuable—that is, rare, difficult to imitate and difficult to replicate or substitute (Barney, 1988; Reitzig, 2003). In this paper, we will propose a new way to measure the value of the knowledge that is embedded in the technology that a firm possesses, one that we will call complexity of technology. We will then use this new measure to examine whether it affects how much value is created in acquisitions or alliances.

THEORY AND HYPOTHESIS

Past research has already found that the amount and type of technological knowledge that a target or partner possesses has an impact on the value created by acquisitions or alliances. For example, Yoon and Lee (2016) studied cross-

border M&As and found that the stock of technology in the possession of the target firm had a positive and significant impact on the acquirer's stock performance. Similarly, Ahuja and Katila (2001) quantified how acquiring firms gain through M&As and concluded that the absolute size of the acquired knowledge enhanced the acquirer's innovation performance while the relatedness of the two knowledge bases (target and acquirer) had a nonlinear impact on innovation output. Similar results have been reported in the literature on alliances. For example, Dacin, Hitt and Levita (1997) reported that an alliance partner's technological capabilities had a positive effect on the performance of the alliance. Similarly, Samson (2007) found that moderate technological diversity among alliance partners contributes to firm innovation.

The amount of technological knowledge that a target possesses has traditionally been measured by how many patents it has in its possession. The more patents, the higher the amount of knowledge embedded in the technology and by assumption, the higher the value of that technology. Even though patents can be considered a good proxy for the *quantity* of knowledge embedded in a technology, they fail to capture the *quality* of this knowledge. As demonstrated by the Resource Based View of the firm (Barney, 1988; Das and Teng, 2003), knowledge, assets and resources are all valuable but some of them are more valuable than others. The ones that are truly valuable are those that are rare and difficult to imitate or replicate or substitute. A company will value any asset based on its rareness, how difficult it is to be captured by other organizations, how difficult it is to be substituted and the potential it gives to the firm to position itself for success. For example, a red diamond is worth more than a colourless diamond, an educated and experienced employee is worth more than an unskilled, inexperienced employee, and structured investment products, such as capital secured products, are more valuable than simple deposit products.

This implies that the number of patents by themselves is not a good measure of how valuable the technological knowledge in the possession of a target or alliance partner really is. The patent measure has to be complemented with something else that captures the quality of the technological knowledge. This is especially necessary in the case of our empirical context of FinTech because this area offers plenty of opportunity for firms to patent their technological innovations. We will not be surprised to see start-up firms in this area patenting lots of innovations, but the

actual value of these innovations is another story. We therefore acknowledge patent intensity as an ingredient of the quantity of technological knowledge that a firm possesses but we must also find a way to capture how rare and difficult to imitate this knowledge is.

One characteristic of something that makes it difficult to imitate or replicate is its complexity. For example, Rivkin (2000) proposed that "complex" strategies—ones that contain many interrelated and interconnected value-chain activities—are much more difficult for competitors to imitate than simple strategies. Similarly, Lippman and Rumelt (1982) identified causal ambiguity—something associated with complexity—as one of the factors that increase the value of an asset because it makes it almost impossible for others to know how to replicate such an asset or competence. We can, therefore, capture part of how difficult it would be for a technology to be imitated by measuring how complex this technology is.

According to Singh (1997), complex technologies display certain characteristics: they are systemic (i.e., their components/ subsystems are inter-dependent, and they depend on the performance of higher-order systems); have multiple interactions (i.e., components within and across subsystems); and are non-decomposable (i.e., the technology cannot be separated into its components without degrading its capabilities). These characteristics are referred to as the architecture of the system (Henderson and Clark, 1990). An example of complex technology would be the technology used in nuclear power stations. This is much more difficult to imitate or replicate than say, the technology embedded in non-complex systems, such as residential lighting systems.

Several researchers have used the term 'complex technology' but there is no generally accepted definition or even more importantly an accepted way of measuring it. (Andriani, 2011; Holland and Miller, 1991; Huberman and Hogg, 1986; Weaver, 1948). As a result, there are few empirical studies that have measured the impact of this factor (complexity of technology) on performance. The application of complex technologies entails higher costs and risks but, if successful, can provide companies with significant benefits (Perrow, 1999). Due to the difficulty of measuring complexity, most researchers tend to use relative and subjective measures to capture it—for example, Product A is more or less complex than product B.

According to the Cambridge Dictionary, complexities are defined as 'the features of something that make it difficult to understand or find an answer to." This suggests that one way to assess the complexity of a technology is by looking at two things: the resources and investment that went in the effort to discover something (low to high); and the *amount* of new knowledge that is embodied in that discovery (low to high).

A technology can be considered as complex if a lot of resources have been invested in the effort to discover it but at the end of all that effort, the amount of new knowledge embedded in that discovery, as evidenced by the patents granted, was low. This suggests that simply having many patents—which previous research took as an indication of the value of knowledge—will not be enough to characterize a technology as complex. The plethora of patents may simply indicate many incremental innovations that others can easily substitute for and/ or do not add significant value to the holder. It is only the combination of huge investments and little output that can indicate complexity and difficulty of discovery. By contrast, if few resources have been invested in the discovery of a new technology, but it still manages to generate many patents, this may indicate that the new knowledge embedded in the technology is a collection of many small and incremental improvements. This is still valuable but not as valuable as complex technology because incremental improvements can be more easily replicated or substituted by something similar. We call such technologies patentable. A third category of technology is one where few resources have been invested and few patents generated. We call this type of new knowledge incremental. Finally, when a lot of resources have been invested and the discovery has generated many patents, the quantity of the new knowledge embedded in the discovery is obviously high, but it may not necessarily be rare or difficult to imitate or substitute. We call this discovery 'breakthrough' but we do not consider it as valuable as complex technology. The four types of new knowledge discussed here are presented in Table 1.

Table 1: Four Types of New Knowledge

Per Technology	Money Spent / Invested		
		Low	High
Number of Patents	Low	Incremental	Complex
	High	Patentable	Breakthrough

Other researchers have proposed alternative methods to measuring complexity of technology (e.g. Balland and Rigby, 2017; Broekel, 2019; Fleming and Sorenson, 2001; Hidalgo and Hausmann, 2009). However, none of them have approached the task from the perspective of the Resource Based View of the firm or made the connection between complexity and value. We believe that the complexity of a technology is a better measure of its true value. The more complex a technology, the more valuable it is because few firms would be able to develop it or imitate it. This has implications for our study of acquisitions and alliances. Relative to the acquisition of an incremental or simple technology, the acquisition of a complex one will be more valuable and will therefore create more value to an acquirer. Similarly, an alliance partner will benefit more from a partner who possesses complex rather than incremental or patentable technologies. In our empirical context, we know that most of the technologies developed by Fintech firms are valuable—for example, mobile technologies helped financial institutions reach unbanked or under-banked customers in places such as China and Africa; Cloud technologies minimized infrastructure costs; Blockchain and Crowdfunding improved efficiency by eliminating the need for intermediaries; and Big Data and Artificial Intelligence empowered customers by allowing greater access to options, visibility into products and control over decisions. All these technologies are valuable, but some may be more valuable than others depending on their complexity. Our goal is to empirically demonstrate this assertion.

Based on our discussion, we propose the following hypotheses for empirical testing:

***H1.a: The acquisition of FinTech companies that are utilizing complex technologies will on average create more value than the acquisition of FinTech companies that are utilizing non-complex* technologies.**

H1.b: ***Strategic alliances with FinTech companies that are utilizing complex technologies will on average create more value than strategic alliances with FinTech companies that are utilizing non-complex*** **technologies.**

EMPIRICAL ANALYSIS

The sample

To test our hypotheses, we developed a sample of acquisitions and alliances between established financial institutions and FinTech start-up firms in the period 2007-2019. We have deliberately chosen our sample from the financial industry where new technologies (FinTech) have disrupted the market and have revolutionized the way business is contacted. As a result of these new technologies, new business models have emerged which are more efficient, less costly and more customer friendly than the traditional business models.

To identify transactions, we searched 3 databases—Thomson Reuters, Factiva and CapitaIQ. This search produced a sample of 836 observations. Following an assessment of which of the sample target firms are FinTech firms as opposed to just software companies, the final sample was reduced to 246 transactions: 143 M&As and 103 strategic alliances. The incumbents (financial institutions) involved in the transactions come from 29 nations but the majority of them (90,6%), as expected, come from developed countries. Similarly, most of the FinTech firms are young and come from developed countries, with two-thirds of them coming from the US, Germany and the UK. Most of the transactions (68%) took place in the last five years.

METHODOLOGY

We use Cumulative Abnormal Return (CAR) Event Study Methodology to test our hypotheses. Event studies typically examine the effect of an event on the value of assets, such as stocks or bonds. The event study methodology is based on the efficient market hypothesis developed by Fama (1970), which states that new information is quickly and accurately incorporated in the stock price of a firm. This results in share prices changing to reflect the effect of this new information on the discounted value of the future cash flows of the asset under consideration. As such, significant price changes can be attributed to specific events that resulted in the release of this new information.

There is a general framework for undertaking an Event Analysis (Kothari and Warner, 2007; MacKinlay, 1997). First, the date of the event must be specified, i.e. the announcement of the acquisition or alliance. Following that, the "estimation-period" and the "event-period" (and "post-event" period) need to be defined for the purposes of the time-series analysis. For our study, we have defined them as follows:

- The Estimation period was determined to be -180 to -30 days before the announcement of the transaction.
- The Event period was determined to be -10 to +10 days relative to the announcement.

The next step involves using the market model to estimate the parameters ai and bi which can then be used to determine the expected return for firm (i) during the event period. As such, for each firm (i) we estimate the following equation:

$$Rit = ai + biRmt + eit$$

Where,

$Rit =$ the return on the security of firm i at time t.

$Rmt =$ the return on the market portfolio at time t. In this study, we use the Equally-weighted Market Return of the main Stock Market Index in the market where firm i is listed.

$ai \ \& \ bi =$ parameters of the regression of the return on security i (Ri) and the market return (Rm) over the period -180 and -30 trading days prior to the event day.

$eit =$ the error term of the regression

Abnormal returns (AR_{it}A) can then be estimated as the difference between the actual returns and the expected returns for each day and for each firm during the event period; these may be computed as follows:

$$AR_{it} = R_{it} - E(R_{it}) = R_{it} - (a_i + b_i R_{mt})$$

A two day return is calculated for each transaction. Day t=-1 is the day the news of the transaction is announced in the stock market, usually after the market closes. The market responds the day after the announcement, i.e. t=0. Thus, there is a two-day announcement window (-1,0). Therefore, the cumulative abnormal return is calculated as follows:

$$CARi(0,+1) = \sum_{t=0}^{+1} ARit$$

For N securities, the average cumulative abnormal return is calculated as following:

$$CAR\ (0,+1) = \left(\frac{1}{N}\right) \sum_{i=1}^{N} CARi(0,+1)$$

Finally, to test the statistical significance of the CAR, we perform a standard t-test as follows:

$$t = \frac{CAR(0,+1)}{(S\ CAR(0,+1)/\sqrt{N})}$$

Where:

$S\ CAR(0,+1)$ = the standard deviation of the two-day AR

N = the number of firms in the sample

To test our hypotheses, we have divided our sample of FinTech start-up firms into those that utilize complex technologies and those that utilize non-complex technologies. For the purposes of this study, we identified 9 technologies that the sample firms were using: Big data analytics; Biometrics; AI; IoT; Cloud Computing; API; Mobility; Blockchain; and Cybersecurity. To assess whether each technology is complex or not, we collected the annual investment per technology during the sample period and the annual number of patents by technology. We then position each firm in the 4 quadrants of table 1, based on the technology that each firm was utilizing. The vertical axis of the table measures the median annual number of patents that a given FinTech technology had earned during the period 2008-2019;

the horizontal axis measures the median annual investment for each FinTech Technology in the period 2008 – 2019. The dividing line separating “high” and “low” for each axis was the median number for Annual Investments and the average number for Annual Patents, respectively.

Based on this analysis, the nine technologies were classified as follows:

- ✓ Complex -High investments but Low Patents (2): Big Data Analytics, Biometrics
- ✓ Incremental or Breakthrough (5): Artificial Intelligence, IoT, Cloud, API, Mobility
- ✓ Patentable -Low investments but High Patents (2): Blockchain, Cybersecurity

Our goal is to show that transactions involving Fintech companies in possession of complex technologies create more value than transactions involving FinTech companies that possess non-complex technologies.

Data

Transaction-specific data (such as the announcement date, incumbent name, target name, target sector, incumbent sector, and transaction type), was collected from three databases: Thomson Reuters, Factiva and Capital IQ. The established firm’s stock price and ISIN/ SEDOL code, and the Stock Market Index for its country were collected from Bloomberg.

The number of patents per technology per year was provided by Relecura Technologies, (https://relecura.com/), a research and analytics company specializing in Artificial Intelligence. As per our requirements, Relecura Technologies provided us with the number of patents per year, during 2008-2019, for each of the nine technologies under study.

The investment per Technology (in millions of dollars) was derived mainly from Statista Database and supplemented with data from other sources, such as Financial Stability Board, McKinsey, GlobeNewswire and Cybercrime Magazine.

RESULTS

Table 2 shows the frequency distribution of acquisitions and alliances by year and indicates that transaction activity picked up after 2014. Table 3 shows the frequency distribution of acquisitions and alliances by country and indicates that the US accounts for roughly one third of all transactions. Most of the observations come from developed countries.

Table 2: Acquisition and Alliances Frequency Distribution by Year

Strategy/ Year Transaction	M&As	Strategic Alliances	Total
2007	7	1	8
2008	6	3	9
2009	2	0	2
2010	6	1	7
2011	7	4	11
2012	6	2	8
2013	7	5	12
2014	10	12	22
2015	13	17	30
2016	20	21	41
2017	13	18	31
2018	35	9	44
2019	11	10	21
Total	143	103	246

Table 3: Acquisition and Alliances Frequency Distribution by Country

Strategy/ Acquirer Nation	M&As	Strategic Alliances	Total
Australia	9	0	9
Austria	3	0	3
Bahrain	3	0	3
Belgium	1	0	1
Brazil	2	0	2

Bulgaria	0	1	1
Canada	10	1	1
China	1	0	1
Egypt	1	0	1
France	6	2	8
Germany	7	30	37
Greece	1	0	1
India	1	2	3
Indonesia	0	1	1
Italy	2	1	3
Japan	2	1	3
Malaysia	0	2	2
Morocco	1	0	1
Netherlands	2	0	2
Pakistan	0	2	2
Russia	1	1	2
Singapore	1	2	3
South Africa	2	0	2
South Korea	1	0	1
Spain	4	19	23
Sweden	3	5	8
Switzerland	3	0	3
UK	12	9	21
USA	59	24	83
	143	103	246

Patents Analysis

We have argued that patents on their own will be a problematic measure of value because it captures quantity but not quality of knowledge embedded in a given technology. To demonstrate this, we calculate the abnormal returns generated by acquisitions and alliances between targets with patents and targets with no patents. The results are shown in Table 4. Of the 143 M&As transactions, 27 were with start-up firms that had patents and 116 were with start-up firms that had no patents. The average abnormal return generated when the start-up firms had patents was

0.01085 and the average abnormal return generated when the start-up firms did not have patents was 0.01526. The difference between the two was not statistically significant, P=0.7443. Turning now to alliances, of the103 alliances in our sample, 41 were with start-up firms that possessed patents and 62 were with firms that did not have patents. The average abnormal return generated when the start-up firm had patents was - 0.00436 and the average abnormal return generated when the start-up firm did not have patents was -0.00093. Again, the difference is not statistically significant. These results show that the number of patents is not correlated with value creation in acquisitions or alliances that involve disruptive start-ups.

Table 4: Abnormal Returns Per Patents of FinTech Start-ups
Mergers & Acquisitions

Factor	Categories	Hypothesis	Observations	Average AR	T-stat Difference In Means	P-Value
Do targets possess patents?	Yes	CAR Patents > CAR no Patents	27	0.01085	0.3268	0.7443
	No		116	0.01526		

Strategic Alliances

Factor	Categories	Hypothesis	Observations	Average AR	T-stat Difference In Means	P-Value
Do partners possess patents?	Yes	CAR Patents > CAR no Patents	41	-0.00436	0.799	0.4261
	No		62	-0.0009		

Technology Type Analysis

We next examine whether acquisitions or alliances involving FinTech targets that possess complex technologies create more value than acquisitions or alliances involving firms that possess non-complex technologies. Table 5 shows the abnormal returns generated by acquisitions and alliances per technology category. Out of the 143 observations of M&As transactions, 29 observations were with firms possessing Complex technologies, 72 were with firms possessing incremental technologies and 42 were with firms possessing patentable technologies. The average Abnormal Returns generated for each group were 3,43%, 2,50% and -1,58% respectively. The difference in means between the first abnormal return and the other two was statistically significant at the 0.1% level, offering support to H1a.

Turning our attention to alliances, out of the 103 strategic alliances in the sample, 21 were with FinTech start-up firms that possessed Complex technologies, 45 were with firms that possessed incremental technologies and 37 were with firms that possessed patentable technologies. The average Abnormal Returns generated for each group were 1,62%, -0,11% and -1,38% respectively. The difference in means between the first abnormal return and the other two was statistically significant at the 0.1% level. This result supports H1b.

It is noteworthy that acquisitions on average create value while alliances destroy value. This is a result that our previous research has attributed to the disruptive nature of the acquisition targets and alliance partners. However, transactions involving complex technologies create value for both acquisitions and alliances. This is not the case for patentable technologies which seem to destroy value for both acquirers and alliance partners.

Overall, these results support both of our hypotheses and suggest that patents may not be a good proxy for the value of a technology. The patent measure has to be complemented with something else that captures the quality of the knowledge embedded in a technology--such as our variable complexity of technology.

Table 5: Abnormal Returns Per Type of Technology of FinTech Start-ups

Mergers & Acquisitions

Factor	Categories	Hypothesis	Observations N= 143	Average AR	T-stat Difference In Means	P-Value
What Technology does the target possess?	Complex	CAR complex > CAR incremental > CAR Pantentable	29	3,43	7,87	0,0006
	Incremental & Breakthrough		72	2,5		
	Patentable		42	-1,58		

Strategic Alliances

Factor	Categories	Hypothesis	Observations N= 103	Average AR	T-stat Difference In Means	P-Value
What Technology does the target possess?	Complex	CAR complex > CAR incremental > CAR Pantentable	21	1.62	18.14 18.18	<0.0001 <0.0001
	Incremental & Breakthrough		45	-0.11		
	Patentable		37	-1,38		

CONCLUSIONS

We have introduced a new factor, Complexity of Technology, to explain the variation in the value created by acquisitions and alliances between established firms and FinTech start-up firms. The existing literature uses patents as a proxy to measure the amount of knowledge that a firm possesses, which indirectly determines its value. According to this measure, the more patents a firm possesses, the more its knowledge and value. In our study, we argue that patents by themselves fail to capture the *quality* of this knowledge and we introduce a new proxy, which is a combination of the number of patents and amount of investment, related to a technology. A technology can provide more value depending on how complex it is. Our analysis of the complexity factor complements the Resource based view of the firm and the Knowledge based Theory of the firm in that it confirms the importance of assets that are rare and difficult to be imitated or substituted. Assets that display these characteristics are more valuable than other assets.

Our results support our hypotheses that the more complex the technology, the higher the value it can create for its owners. The main conclusions of this paper are:

- ✓ The acquisition of disruptive innovators by established firms, on average, create value for the acquirers in the short run compared to strategic alliances that destroy value.
- ✓ The more complex a technology is, the more value it can bring to its owner. This finding is consistent with the Resource based View of the firm which proposes that that an asset that is rare, difficult to imitate and difficult to substitute will be more valuable than a simple, easy to imitate or substitute asset.
- ✓ Incumbents can use a variety of strategies to acquire the knowledge and skills of FinTech firms. Complex technologies, which could have a significant impact on the performance of incumbents, may require the use of external strategies, such as M&As and strategic alliances. On the other hand, patentable technologies may be built in-house.
- ✓ The factors examined in our study can explain a significant percentage of the ARs created for incumbents when they engage in M&As and strategic alliances with FinTech start-ups.

Our study had to overcome several data-related obstacles and problems. The first data problem was to find the patents attributed only to each of the nine technologies under study in the financial services sector. We had to contact Data miners Relecura (https://relecura.com/) for help in collecting annual patents per technology. Relecura also provided the data on investments per technology, which had to be cross-checked with other sources, such as Statista, Gartner and Crunchbase.

Secondly, information on the Complexity of each technology was a challenge. There is no generally accepted definition for complex technology, no available literature on the complexity of FinTech and more importantly, no objective measure to capture it. Therefore, we had to develop our own measure to capture this variable.

Our study can trigger more research on the correct pricing of each financial technology. Given the huge developments in information technology and the impact it has on almost all sectors of the economy, researchers should put more effort and spend more time on understanding the value added by each technology and “price”

them accordingly. Not all technologies offer the same value to the users and thus, studies should focus on the impact of different technologies on the performance of each FinTech firm to the end user.

In addition, as more data on FinTech start-up firms becomes available, more studies should examine the valuation consequences of strategic alliances and equity participation investments between established financial institutions and FinTech start-up firms. The evidence is that these two strategies are particularly popular with established firms so more research is warranted to assess their impact on established firms. In addition, more research is needed to understand how established firms integrate the technologies and business models that they acquire from FinTech start-up firms.

OVERALL CONCLUSIONS

Over the past twenty years, FinTech innovations have disrupted the traditional ways of doing business in the financial services industry and have introduced new business models in the industry. Established firms have responded to this disruption in a number of ways, including acquiring their disruptors, entering into alliances with them, and purchasing equity stakes in them. This thesis has used this rich empirical context to examine whether these response strategies have created value for the established firms and whether the disruptive nature of FinTech innovations affects the value created by these transactions.

The thesis comprises of three papers. In the first paper, we examine three popular strategies that established firms have undertaken to respond to the FinTech disruption: acquiring the disruptor, entering into strategic alliances with them, and purchasing an equity stake in them. We have explored both the short term and long-term valuation effects of these transactions, and our overall conclusion is that in the short term, acquisitions create value, alliances destroy value and equity participation investments have an insignificant valuation effect. By contrast, all three strategies destroy value for the shareholders in the long run. We have also explored whether this value creation differs when the transaction is undertaken by traditional banks as opposed to insurance companies and investment houses. We found that investment houses gain the most from these transactions while commercial banks gain the least. Investment houses and Insurance companies seem to benefit from both acquisitions and equity participation investments whereas commercial banks destroy value when they undertake strategic alliances as well as equity participation investments. Strategic alliances, irrespective of the type of financial institution, on average destroy value for the shareholders. Finally, we explored whether 6 factors that have been shown in the M&A literature to affect value creation in M&As have a similar effect in the transactions under study in this thesis. We found that the six factors are equally important in explaining the variance in the value created of not only acquisitions but also strategic alliances and equity participation investments.

In the second paper, we explored whether the disruptive nature of FinTech influences value creation. We argued that although the existing literature has examined acquisitions and strategic alliances from different perspectives, it has not examined in any way whether these transactions create value for the focal firm when

either the target or the partner utilizes a technology-enhanced business model which is “disruptive” to the other party. We developed theoretical arguments why this variable will be an important determinant of value creation and tested our hypotheses on a sample of 85 acquisitions of FinTech start-up firms by established financial institutions as well as 98 strategic alliances between FinTech start-up firms and established financial institutions. We found that the disruptive nature of the target or alliance partner played an important role in the value created by these transactions. Specifically, acquisitions of disruptive targets, on average, created more value to the acquirers than acquisitions of non-disruptive targets. At the same time, alliances with disruptive partners were not as value-destroying as alliances with disruptive targets. In addition, Investment Banks exploited the new disruptive technologies in a better way than commercial banks.

In the third paper, we introduced a new factor, Complexity of Technology, to explain the variation in the value created by acquisitions and alliances between established firms and FinTech start-up firms. The existing literature uses patents as a proxy to measure the amount of knowledge that a firm possesses, which indirectly determines its value. In our study, we argue that patents by themselves fail to capture the *quality* of this knowledge and we introduce a new proxy, which is a combination of the number of patents and amount of investment, related to a technology. Assets that display these characteristics are more valuable than other assets. Our study concluded that the more complex a technology is, the more value it can bring to its owner. This finding is consistent with the Resource based View of the firm which proposes that that an asset that is rare, difficult to imitate and difficult to substitute will be more valuable than a simple, easy to imitate or substitute asset.

Our study had to overcome several obstacles to achieve its objectives. Firstly, we faced various problems in collecting the necessary data in four areas: (i) the identification of FinTech firms given the absence of a specific flag ‘FinTech’ in the databases; (ii) the extraction of strategic alliances given the different definitions of alliances used by researchers. For example, it was not rare for studies to confuse alliances with equity participation investments; (iii) the use of numerous sources to reconcile fragmented information, e.g. the use of Relecura research company (https://relecura.com/) to find the patents per acquirer and partner; and (iv) the identification of the financial technologies used by startup firms. Secondly, assessing the complexity of each technology was a challenge. There is no generally

accepted definition for complex technology, no available literature on the complexity of FinTech and more importantly, no objective measure to capture it. Therefore, we had to develop our own measure to capture this variable. Thirdly, even though our objective was to include transactions from different countries, the lack of key information from emerging/ developing countries meant that we have ended up with limited data from these countries. We believe that another study that examines our research questions in Emerging/ Developing countries can provide additional insights on the valuation consequences of these transactions.

Future Studies

The findings of this study can help researchers examine new issues in the area of FinTech. For example, investment houses seem to create more value than commercial banks through these transactions. It would be interesting to examine why. As the biotech vs big pharma battle in the 1970s showed, the biggest constraint that start-ups face may not be access to complementary assets (that established players possess) but rather access to capital. This raises the interesting possibility that this is the area where investment houses have an advantage in that they can help startup firms with the capital they need to grow. In addition, the term investment houses includes three different types of institutions: Investment banks, Private Equity houses and Venture Capitalists. Do all three types of investment houses offer the same benefits to FinTech start-up firms and do they create the same amount of value? These are interesting questions to explore further and compare the results with those generated by studies examining transactions between established pharma companies and biotech start-up firms, forty years ago.

In addition, our research was based on the Event study methodology which has received its fair share of criticism because it relies on the Efficient Market Hypothesis. Future research should try to replicate our results using alternative, more sophisticated methodologies. Furthermore, future research should examine the long-term valuation consequences of these transactions in more depth and with more sophisticated models. Dinoysiou (2015) admits that the existing literature has not developed a long run risk-adjusted model without biases. Our study showed that all three strategies destroy value, on average, in the long run. Therefore, how can we explain the paradox of investing huge amounts of money in FinTech when all three strategies destroy value for the shareholders in the long run. The factors that

we have examined in this study can explain the variance in value creation up to a point. Can the remaining variance be explained through a better model?

Finally, future research should examine in more depth the correct pricing of each financial technology as per its value added to the acquirer. Not all technologies offer the same value to their users and thus, studies should focus on the impact of different technologies on the performance of the end user and ‘’price’’ them accordingly.

Managerial Implications

The findings of our study have important managerial implications. Managers have no option but to respond to the FinTech challenge. In deciding how to respond to disruption, our study suggests that there is not one single winning strategy. Each institution should consider its own unique circumstances, as well as the specifics of the transaction and the specific opportunities that they give rise to. For example, strategic alliances may overall destroy value but when partnering with a disruptive start-up or a start-up which possesses ‘complex’ technology, it could create value. Moreover, any form of strategy with start-ups which possess ‘complex’ technology could create higher value. Managers should not view FinTech startups as a threat but as an opportunity to revamp their strategies, invest in innovation and improve their offerings to clients. Doing nothing does not appear to be a viable response. Rather than shy away from FinTech innovations, they need to embrace them and identify ways to introduce them into their existing operations. This is how big pharma responded to the biotech disruption more than 40 years ago and their experience should serve as a guide to how established financial institutions should respond to FinTech now. Managers should take vital decisions on whether they will own their own platform or lease it and whether they will offer their own services/ products or outsource them. Our study can help them answer some of these critical dilemmas and guide them on the factors they need to consider before taking a decision.

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