

Outsourcing Life Cycle Model for Financial Services in the FinTech Era

Tristan Lim

School of Business Management

Nanyang Polytechnic

Singapore

tris02@gmail.com, tristan_lim@nyp.edu.sg

Patrick Thng

School of Information Systems

Singapore Management University

Singapore

patrickthng@smu.edu.sg

Abstract

In today's financial services landscape, staying ahead of the innovation curve and being disciplined at enhancing core service offerings entail careful resource planning. A well-structured outsourcing arrangement can go a long way towards enhancing long term organizational strategic growth. In the post-2014 FinTech era, (i) strategic management with an innovation focus and (ii) financial technology-associated risks, have brought about changes to outsourcing in the financial services industry. Presently, most outsourcing life cycle models in existing literature seek to provide comprehensive, yet industry-neutral guidelines lacking industry context and depth of coverage. A newly licensed financial institution deciding to embark on outsourcing but is uncertain about how to thread the increasingly complex FinTech and financial regulatory landscape, will likely find domain-specific outsourcing life cycle models useful. A more targeted financial services outsourcing life cycle approach, with a focus on strategy and risk management in today's context, can contribute more effectively to the application and review of outsourcing implementation. This research contributes to present literature by proposing a new Strategy-Risk outsourcing life cycle model. This is an elegant and simple-to-use end-to-end framework which can be utilized by the financial services industry to guide outsourcing decisions. The paper also recommends areas for future research.

Keywords

Outsourcing, FinTech, Financial Services, Life Cycle Model, Strategy-Risk Model

1. Introduction

1.1 Financial Technology (FinTech)

FinTech is the technology-enabled innovation in financial services. FinTech, a combination of the terms “financial” and “technology”, is more aptly defined by Financial Stability Board (2017) as “*technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services*”. FinTech is not restricted to specific business models or actors; rather, it covers the full spectrum of the activities (Arner et al., 2015) involving:

- the provision of enabling technology for financial services, such as artificial intelligence (AI), internet of things (IoT), distributed ledger technology and cloud computing;
- business models, such as neo-banks, platform aggregators and data providers; and
- the activities involving the provision of innovative financial products and services, such as e-payment solutions and peer-to-peer lending.

As such, FinTech actors may broadly include financial institutions (FIs), FinTech companies (FinTechs) and BigTech companies (BigTechs). While FinTechs operate primarily in financial services, BigTechs relate to large non-financial companies who offer FinTech solutions or financial products as part of a broader set of business verticals. (Frost et. al., 2019). Examples of FIs are Citibank and American International Group (AIG); examples of FinTechs are Ant Financial, Stripe and Ayden; and examples of BigTechs include Amazon and Alphabet, among others.

The late 1980s saw the rise of digitalisation of financial services, or e-Finance (Arner et. al., 2015) (Gomber et. al., 2017). It was, however, noted that the term FinTech only started gaining widespread attention from regulators, industry participants, consumers and the academia from 2014 onwards (hereon defined as FinTech era) (Arner et. al., 2016). Since then, there has been a (i) growing pace of diffusion of innovative FinTech solutions, (ii) emergence of more non-banks and new startups offering financial services, (iii) evolution of customer behaviours that point towards preferences to online customer engagements, lower customer loyalty, and openness towards multiple financial service providers, and (iv) growing regulatory restrictions on traditional financial service providers, consequential partly due to the financial crisis of 2007-8. (Alt, et. al., 2018).

1.2 Transformations in the FinTech Era

These changes in the FinTech era have brought about financial industry transformation characterized at three levels (Alt et. al., 2018):

- Firstly, within an organisation, there is a shift towards adopting a customer-focused rapid digitalisation and innovation of processes, using agile methodologies and application programming interfaces (API). (Alt and Puschmann, 2016) (Ehrenfeld, 2017). These digitalisation and innovation efforts are less integrated with cumbersome legacy core banking systems, easing hindrances to external collaborations.
- Secondly, at the business eco-system level, many businesses in the FinTech era have adopted a culture of openness to strategic external relationships with, for instance, new startups and BigTechs. This is a result of intense business competitions, driving lower margins and customer retention (Shim and Shin, 2016) (Pousttchi and Dehnert, 2018).
- Thirdly, at the external organisation level, there are increasing regulatory constraints due to the growing trials, uses and decentralisation of digital infrastructure, such as payment and financing infrastructures. These infrastructures, if not well supervised, may result in systemic risks (Arner et. al., 2017) (Lawrence, 2016) (Němcová, and Dvořák, 2013). Across the financial value chain, there are reduced reliance on the conduct of business and technology processes and activities in-house. In turn, there are increased outsourcing, innovation, specialization and diversification efforts (Alt, et. al., 2018).

The Basel Committee on Banking Supervision (BCBS) is headquartered at the Bank of International Settlements (BIS), with memberships of 45 central bank governors from 28 jurisdictions. In 2018, the BCBS published a report detailing how FinTech may affect the financial services landscape and the activities of supervisors across the near and medium term. The report highlighted the growing use of third parties service providers, via outsourcing. In particular, the report cited increasing complexity and risks in the outsourcing value chain, due to regulatory requirements and the proliferation of innovation solutions and business models.

2. Literature Review

2.1 Outsourcing for Financial Services

Outsourcing is an act through which work is contracted or delegated to an external or related entity that can be physically located at different locations, an arrangement which includes offshore outsourcing, captive offshoring, nearshoring and onshoring (Oshri et. al., 2015).

In the context of the financial services industry, this definition is further extended. A regulated provider of financial services, either a FI, FinTech or BigTech, that outsources its business activities, must also be able to continue its provision of financial products or services, in the event its unregulated service provider fails or becomes dysfunctional (Ng, 2007). This is so that the regulators can ensure that regulated entities comply with the necessary measures, to ensure that the integrity of the financial markets and the interests of consumers are protected (Singh, 2005). Contextualizing outsourcing to the financial services industry, BCBS (2005) defined outsourcing “*as a regulated*

entity's use of a third party (either an affiliated entity within a corporate group or an entity that is external to the corporate group) to perform activities on a continuing basis that would normally be undertaken by the regulated entity, now or in the future."

Outsourcing of business and technology processes and activities relating to financial products and service are of significant scale. Research from Information Services Group showed that the combined annual contract value of financial industry-related outsourcing, comprising of Forbes® Global 2000 companies from the banking, insurance and diversified financial sectors, grew to US\$22.5B in 2017, outstripping all other industry verticals (Reynolds, 2018). This was, in part, due to the pressures for value creation, speed and agility to adapt to fast changing business conditions and regulatory environments in the financial landscape. Outsourcing allows FIs to rapidly leverage on FinTech enablers of automation, analytics, blockchain and cloud-based services (Walter, 2018).

Outsourcing in financial services can take many forms. Traditionally, these outsourcing may include, for instance, business operations such as call centre, and aspects of accounting and back-office activities; and information technology (IT), such as the development of applications and server maintenance (BCBS, 2005). Emergence of FinTech brings about outsourcing in new areas. These new outsourcing domains can include the provision of enabling FinTech, such as big data, distributed ledger technology and IoT; and the provision of FinTech activities, such as e-payment solutions, alternative credit scoring and peer-to-peer lending. One example of an outsourcing partnership is a white labelling financial product arrangement between ABN Amro, a FI headquartered in Netherlands, and solarisBank, a Berlin-based FinTech established in 2016, with a full banking license granted by the Federal Financial Supervisory Authority of Germany (BaFin). ABN Amro offers banking digital offerings through moneyou. To increase its activity, ABN Amro partnered with solarisBank to launch a fully digital immediate instalment credit product. Although the front-end customer interface and customer ownership are with ABN Amro, the backend system processes, validation and balance sheet risk are with solarisBank. The use of solarisBank's innovative credit scoring, video identification and digital signatory systems digitalised the entire application process, brought about significant value-add, and shortened the process to seven minutes (Glass, 2018). Another successful use case is N26, a pan-European mobile bank. N26 undertook outsourcing with a cloud banking platform, Mambu, to achieve rapid scalability through Mambu's flexible core banking cloud solution. Migration to the vendor's systems eliminated significant operating costs, and gave N26 sufficient flexibility to quickly bring new services to the market in support of its growth strategy (Mayo, 2020).

2.2 Outsourcing for Financial Services in the FinTech Era

Outsourcing in the financial services industry has evolved over time:

- In the 1960s to 1970s, the banking industry gained traction on the undertaking of outsourcing for facilities management and IT support, especially with the evolution of modern day data processing from mainframe centralized computers to decentralized mini-computers, facilitating the advent of technology used in electronic fund transfers, real-time point of sale terminals and automated teller machines (ATM) (Cane, 1992).
- In the 1980s to 1990s, high profile successes in Merrill Lynch (today known as Bank of America) and First Fidelity Bancorp, among others, in exploiting IT outsourcing captured the imagination of many FIs (Lacity and Hirschheim, 1993) (Altinkemer et. al., 1994). Research solely attributable to financial services outsourcing began appearing. Among many researches, Huber (1993) shared a classic successful outsourcing case study of Continental Bank (today known as JP Morgan). McLellan et. al. (1995) discussed about financial and strategic motivations pertaining to IT outsourcing, citing case studies of seven banks, where research found profound effects on cost savings, and strategic benefits such as restructuring and mitigation of technology risk. Jennings (1996) explored outsourcing opportunities in six building societies, emphasizing the need to have a formal outsourcing policy guidance and asserted the strategic benefits of outsourcing, such as cost savings, enhanced flexibility, manufacturing and maintenance of wider product portfolio ranges, and improved innovation development. Most publications in this era did not distinguish between FIs and non-FIs; rather, FIs served as useful outsourcing case studies, upon which lessons of outsourcing can be generalised and learnt by other corporations.
- Since the 2000s, financial service-related outsourcing publications have become more diversified in nature as evidenced by the nature of the journals the papers are affiliated to, and the titles of the papers. This can be

attributed to the increasing familiarity and maturity of financial services outsourcing, venturing into complex arrangements such as outsourcing coalitions (Beimborn, 2008); wide functional breadths, from internal audit (Caplan et. al., 2007), compliance (Duck, 2006), investment banking research (Grote and Täube, 2007), to asset management (FCA, 2013); and technology areas such as big data outsourcing (Austin and Bloggs, 2018) and cloud outsourcing (FCA, 2016) (Hon and Millard, 2018a, 2018b) (Cristanto et. al., 2018) (Gozman and Willcocks, 2019) (Scott et. al., 2019). A non-exhaustive high-level summary of the multi domain nature of recent publications is highlighted in Appendix 1. It is apparent that these research traverse across multiple fields, including business, finance, management, IT, engineering, and legal specific in nature to financial services. In addition, publications and guidelines from regulatory bodies (e.g. central banks), and standard boards (e.g. International Standards Organisation (ISO)) help provide outsourcing guidance to navigate increasingly complex outsourcing activities. For instance, the 2014 issuance of ISO37500 Guidance on Outsourcing was borne from the collective voice of outsourcing practitioners who seek a standardization of outsourcing guidelines (ISO, 2014). Pertaining to financial services, BCBS (2018) highlighted the growing importance of regulatory bodies in outsourcing supervision.

- In the post-2014 FinTech era, (i) strategic management with an innovation focus and (ii) FinTech-associated risks, have significantly impacted outsourcing in the financial services industry. Specifically:

A. *Strategic Management with Innovation Focus:* In the financial services industry, strategic management of outsourcing, with a focus on innovation, have increased in prevalence (Brynjolfsson and McAfee, 2014).

Arguably, the current rate of change of FinTech innovation and adoption are more rapid as compared to previous decades. When comparing the time it took to adopt different financial innovations, the adoption of ATM spanned over three decades (1960s to 1980s), whereas the maturity of cryptocurrency occurred over relatively shorter period (2008 until today). Driving such strategic management efforts are a generation of digital natives bringing about widespread change – changing customer behavioural patterns and changing demand for digital financial services. These innovations are bringing about new entrants such as BigTechs and FinTechs, and high level of collaborative innovativeness to stay ahead of the innovation curve. Increasingly, the innovation, use and delivery of FinTech disruptions stem from collaborative outsourcing relationships, benefiting all actors in the financial outsourcing value chain. (BCBS, 2018).

Such outsourcing strategic management efforts have proved beneficial, helping put FIs, FinTechs and BigTechs in a sustainable leadership position. Successful organisations have lowered innovation costs and risks in the order of 60% to 90%, while leveraging the impact of internal investments and reduced experimental cycle times in the order of ten to hundreds of times (Quinn, 2000).

B. *Emergence of FinTech-associated Risks:* As more parties are involved in an outsourcing process, ambiguity on the responsibilities of the various actors in the value chain, can lead to operational incidents. Further, if controls fail to keep pace, the expansion of the number of innovative products and services from third parties can lead to increases in such operational complexity and risks. One critical challenge is how to effectively monitor operational and risk management activities that take place at third party service providers. (BCBS, 2018).

Specifically, key FinTech-associated risks (BCBS, 2018) include:

- *Operational risks:* Legacy IT systems may be an encumbrance to changes associated with the outsourcing process. The use of a greater number of third parties through outsourcing may increase sophistication and lower the transparency of operations, such as the outsourcing of cloud services. Outsourcing risk would be especially notable if some or all of the services provided by third parties were to be dominated by globally active players, resulting in a risk concentration, especially if IT interdependencies are high. Further, if specialised FinTechs are the service providers, appropriate processes to conduct appropriate due diligence, contract management and ongoing control assurance and monitoring of operations will need to be considered in order to safeguard the regulated entity. The regulated entity's need to support a third-party service provider in financial duress may be required, as it may face a termination of critical services that are required for business as usual to continue.

- *Compliance risks:* Risks facing data security, privacy, money laundering, cyber-crime and customer protection needs to be managed. This is especially so if the regulated entity does not have required standards and controls to manage those risks in an outsourcing relationship. There are increasing difficulties in meeting compliance requirements, particularly with Anti-Money Laundering/ Combating the Financing of Terrorism (AML/CFT) compliance. Appropriate AML/ CFT processes will need to be in place. Else, a regulated entity may suffer from conduct risk where it may be held accountable for the actions of third-party service providers if a customer suffers loss or compliance requirements are not met. For instance, in certain regulatory regimes, it may be held responsible for the authentication of customers and the covering fraudulent transactions. Further, risks of non-compliance with data privacy laws may rise with the development of data analytics and big data, as outsourcing relationships grow between FIs, BigTechs and FinTechs relating to the use of data to derive competitive advantage.
- *Cybersecurity risks:* Outsourcing cloud computing, APIs and other new technologies can facilitate increased interconnectivity, creating benefits for both financial service providers and consumers. However, if security controls are not in place, heavy reliance on such technologies can amplify security risks, exposing large volumes of sensitive data to potential breaches. Hence, the need to promote effective management and control of cybersecurity risk cannot be overemphasized.

The factors mentioned above, that is, (A) *strategic management with innovation focus* and (B) *emergence of FinTech-associated risks* highlight complexities of outsourcing in financial services. This results in the need to utilize an industry targeted outsourcing implementation approach.

2.3 Outsourcing Life Cycle Management and Models

In this section, we discuss the importance of outsourcing life cycle management and introduce key models used in outsourcing life cycle management.

Most procurement activities are transactional in nature, that is, one-off or commoditized purchase of products or services such as office supplies. In contrast, outsourcing activities are partnering or collaborative in nature – with the expectation that the contract and relationship may be reviewed and renewed at the end of each term in a long-term client-vendor contractual relationship. For the latter, a life cycle approach is recommended, with the expectancy that at the end of each term, considerable effort will be applied to study various options and select the appropriate path forward. Organizations that regularly engage in complicated outsourcing deals have wisely adopted life cycle management. This is an indication of maturity in outsourcing capability, typically exhibited in organizations with experience of second- or third-generation outsourcing deals. (Babin and Quayle, 2016).

Lacity et. al. (2010) studied over a thousand peer-reviewed publications from 20 years of outsourcing research. The authors found that positive outsourcing outcomes occurred only in 60% of the cases. This appeared to persist even as buyer organizations have, across the years, developed competencies to improve the value and reduce the risk of outsourcing processes.

The use of an outsourcing life cycle provides for many benefits. Among other benefits, these include: (i) reduced risks from earlier identification of problems and remediation; (ii) predictability in the sequence of activities, staff and subject matter expert requirements, and funding requirements; and (iii) common outsourcing approach in planning, oversight and anticipation of the renewal phase of the life cycle, well in advance of the end of the contractual term (Babin and Quayle, 2016). However, challenges exist in the implementation of a life cycle model. These include: (i) additional costs that may be incurred in the rolling out of a life cycle model, as the governance overhead of managing a life cycle may be 4% of the contract value, or greater (Chou and Chou, 2009) (Willcocks et. al., 2011); and (ii) the wish to retain flexibility in the application of unique life cycle models in line with risk tolerance and profit goals of the business unit (Sullivan, 2013).

Some comprehensive non-proprietary outsourcing life cycle models have been described in publicly available academic literature, and regional or international professional organisations, and standard bodies (Cullen et al., 2006; Willcocks et al., 2011; IAOP, 2008; ISO, 2014; NOA, 2012). In addition, outsourcing providers and advisory firms have created proprietary life cycle models for the consistent management of outsourcing processes. This paper will

discuss the former; the latter is outside of the scope of this paper. Comprehensive non-proprietary outsourcing life cycle models include (Babin and Quayle, 2016):

- *ISO Standard 37500* (ISO, 2014): Recognizing the importance of outsourcing, the ISO developed a public domain outsourcing guide, ISO 37500. The ISO guide proposed a four-phase model, with outsourcing governance at the heart of the model. The first phase, or the Outsourcing Strategy Analysis phase, evaluates opportunities and initiates strategies. The second phase, or the Initiation and Selection phase, provides for requirement specification, vendor selection, and establishes agreements. The third phase, or the Transition phase, establishes the change management and governance process. The final phase, or the Deliver Value phase, examines the realisation and sustenance of value for both the supplier and client. The ISO guide brings standardization of life cycle model by providing a detailed industry-independent guidance on outsourcing life cycle, processes and their outputs. The standard does not provide templates or examples, and is intended to serve as a generic guideline for organisational adoption.
- *Managing Outsourcing: The Life Cycle Imperative* (Cullen et. al., 2006): Outsourcing implementation life cycle stages are well conceived in Cullen et al. (2006) and expounded in Oshri, Kotlarsky and Willcocks (2015). There are four phases in this industry-independent model. The first phase, or the Architect phase, looks to assess expectations, intelligence and insights in relation to outsourcing, determine the best organizational candidates for outsourcing, identify and assess suitable outsourcing strategies, and design appropriate outsourcing blueprint and metrics. This stage lays the groundwork for the outsourcing venture. The second phase, or the Engage phase, involves due diligence and the selection of the most fitting supplier(s), and the negotiation and contracting of the outsourcing agreement(s). The third phase, or the Operate phase, looks at rolling out appropriate organizational transition strategies to handle the outsourced function(s), and the managing of the outsourcing administration and relationship(s). The final phase, or the Regenerate phase, looks at the review of outsourcing outcomes and considers future outsourcing requirements. Post-review stage, the life cycle stages may enter into a new loop of outsourcing life cycle stages, either with new or different set of vendor(s) and/ or outsourced function(s), if required. The model does not provide templates or examples, and is intended to serve as a guideline for organisational adoption.
- *The Outsourcing Life Cycle* (NOA, 2012): The National Outsourcing Association (NOA) proposed an industry-independent four-stage model of “strategic leadership, relationship engagement, transition and change, and relationship management” that recognizes proactive governance and relationship management as vital mechanisms throughout the life cycle to maintain alignment and growth in a successful outsourcing deal. In addition, the model emphasizes the importance of effective feedback loops so that outsourcing activities are aligned with organizational leadership and strategy. However, the model is short, both in terms of having a predefined sourcing strategy, and depth in end-of-contractual-term considerations.
- *Outsourcing Professional’s Body of Knowledge* (IAOP, 2008): The International Association of Outsourcing Professionals (IAOP) life cycle model is an industry-independent five-phase model of “idea, assessment, implementation, transition, and management”. The model defines the key questions, actors, deliverables and the approximate timeline for each phase. The IAOP life cycle lacks detailed discussion regarding end-of-contractual-term considerations, and is at a higher level of abstraction when compared with Cullen et. al. (2006) and ISO (2014). However, the model acts as a standard for individual practitioners and its templates provide “how-to” toolkits for practitioners’ hands on execution of outsourcing processes.

It is noted that there exist other life cycle models proposed in late 1990s and early 2000s, such as Klepper and Jones (1998) and GAO (2001), based upon limited use cases (Cullen et. al., 2006). These models hence are not discussed in the scope of the study.

3. Strategy-Risk Model for Financial Services Outsourcing

3.1 Evaluation of Existing Models

In the models discussed above, all models seek to provide comprehensive industry-independent coverage of life cycles. While the life cycle models discussed earlier are relatively comprehensive, factors such as (A) *strategic management*

with *innovation focus* and (B) *emergence of FinTech-associated risks*, which are important and critical in financial services outsourcing, require further emphasis.

Risk management are discussed in all models, however, not in the specificity and depth that is relevant to the financial services industry, in the governance of regulated entities and the management of FinTech-associated risks.

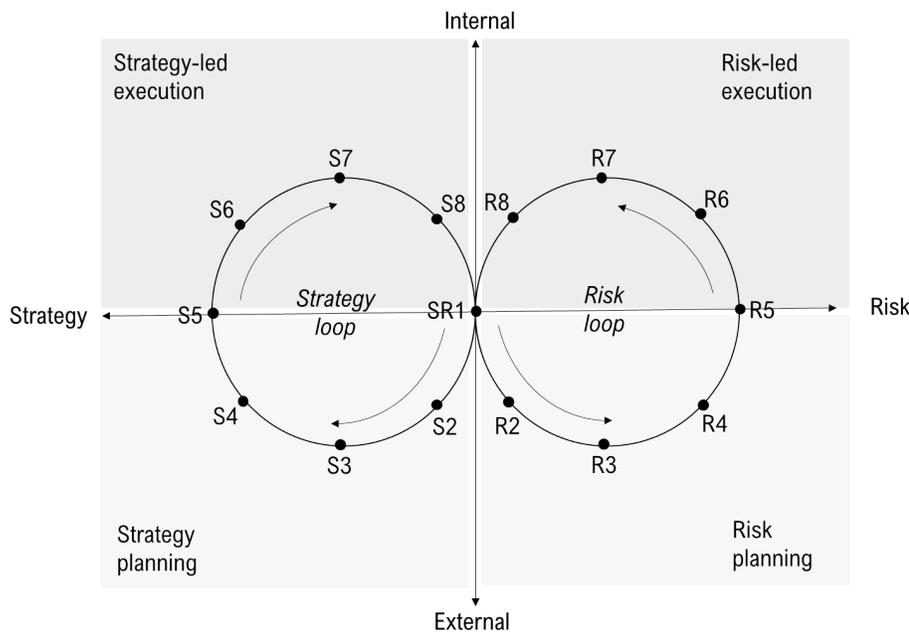
In addition, only ISO (2014) emphasized outsourcing strategic management with innovation elements, relevant to the financial services industry as an increasingly important component of outsourcing life cycles.

A financial industry related-outsourcing life cycle model, considering the nuances of financial services outsourcing in the FinTech era, is presently lacking in academic literature and industry standard guidelines.

3.2 Introducing the Strategy-Risk Model

This paper proposes an end-to-end model which can be used as a guide by the financial services industry for outsourcing decisions in the FinTech era. With emphasis on (A) *strategic management with innovation focus* (Strategy elements) and (B) *emergence of FinTech-associated risks* (Risk elements), this model is summarily known as the Strategy-Risk outsourcing life cycle model. This model builds on the life cycle model proposed in Cullen et al. (2006).

Figure 1 outlines the Strategy-Risk model. The lower two quadrants of the model involve outward looking (external) outsourcing planning activities, such as the collection and assessment of market intelligence, due diligence of service providers and designing of outsourcing strategic frameworks. The upper two quadrants of the model involve inward looking (internal) outsourcing execution activities, such as risk governance, contract monitoring and performance measurement.



NODE	STARTING POINT	DESCRIPTION
SR1	Investigate	<ul style="list-style-type: none"> Identify problem statement Understand market
NODE	STRATEGY STAGE	DESCRIPTION
S2	Opportunity	<ul style="list-style-type: none"> Identify opportunity for organizational improvement

S3	Planning	<ul style="list-style-type: none"> • Undertake feasibility study • Define strategy
S4	Design	<ul style="list-style-type: none"> • Design outsourcing deal configuration
S5	Engage	<ul style="list-style-type: none"> • Negotiation • Contracting
S6	Monitor	<ul style="list-style-type: none"> • Undertake contract management
S7	Feedback	<ul style="list-style-type: none"> • Undertake performance measurement
S8	Innovation	<ul style="list-style-type: none"> • Measure value creation through innovation

NODE	RISK STAGE	DESCRIPTION
R2	Relationship	<ul style="list-style-type: none"> • Identify stakeholders • Manage relationship dynamics
R3	Review	<ul style="list-style-type: none"> • Undertake due diligence
R4	Systemic Controls	<ul style="list-style-type: none"> • Control for organizational and industry level risk
R5	Idiosyncratic Controls	<ul style="list-style-type: none"> • Control for outsourced function and contract level risk
R6	Governance	<ul style="list-style-type: none"> • Establish guidelines for outsourcing risk management framework and governance structure
R7	Monitor	<ul style="list-style-type: none"> • Establish guidelines for business continuity planning (BCP) • Establish guidelines for multi-vendor monitoring • Establish guidelines for change management
R8	Feedback	<ul style="list-style-type: none"> • Risk audit • Regulatory compliance

Figure 1. Strategy-Risk Outsourcing Model

The start point of this model commences with SR1, the Investigate node. SR1 node entering a strategy loop is read on a counter-clockwise basis; SR1 node entering the risk loop is read on a clockwise basis. The nodes loop back to starting points SR1 and a sequential iterative feedback loop ensues.

Section 3.3 and Appendix 2 provides details to Figure 1, by expounding on the stages of a first pass of this framework, the type of driving questions to ask for each stage (or leading driving question(s)), and the activities that can be undertaken for each stage (or leading activities). Note that the leading questions and activities are guidelines, and are by no means exhaustive in the actual implementation of the framework.

Actual implementation should be undertaken with discretion, fitting to the unique scenarios of the outsourcing situation.

Further, the Risk-Strategy model shall be read from a sequential perspective. As outsourcing contracts are typically long-term client-vendor contractual relationships, there is an expectation that the contract and relationship may be reviewed and renewed at the end of each term. The first engagement of an outsourcing partnership will be considered the “first pass” of the Strategy-Risk model; the first renewal of this outsourcing engagement will be considered the “second pass”; and so on.

In addition, progression across the outsourcing stages is an iterative process. This means that, if there is a need to review approaches in earlier stages, an organisation can revisit earlier stages to improve the desired outcomes of outsourcing.

3.3 First Pass of the Strategy-Risk Model

At the starting point, at Investigate node SR1, the outsourcing organization (or regulated entity) asks: what are the organizational needs and motivation for outsourcing. At this stage, the organization will need to be able to clearly define its outsourcing business requirements, and gather market intelligence on related FinTech outsourcing, related suppliers, and similar FinTech outsourcing decisions in peer organizations (Cullen et. al., 2005) (Lacity, Khan and Willcocks, 2009) (Oshri, Kotlarsky and Willcocks, 2015). The tools that may be used at this stage include value chain analysis and deconstruction, augmented with stakeholder interviews, and market and competitive intelligence.

3.3.1 Stages of the Strategy Loop

At the strategy loop, post Investigate node SR1, at Opportunity node S2, the outsourcing organization identifies and evaluates FinTech outsourcing opportunities for organizational improvement, such as cost reduction, operational flexibility, increased security, operational resilience, strategic growth, and/ or innovation (BCBS, 2018) (Lacity, Khan and Willcocks, 2009). The tools that may be used at this stage include value chain and need-gap analysis, SWOT and PESTLE analysis, activity mapping, VRIO model and core competency analysis, competitor analysis, benchmarking, process improvement models, such as business process reengineering and Kanban, and innovation practices, such as design thinking, technology brokering and blue ocean strategy.

At Planning node S3, the outsourcing organization undertakes feasibility studies, defines the outsourcing strategy, and formulates the innovation practices. At this stage, the outsourcing organisation develops a corporate strategy to demonstrate how FinTech outsourcing generates value, designs a detailed outsourcing life-cycle program, prepares the life-cycle communications strategy, and prepares the business case rules and the base case scenarios. In addition, the outsourcing organisation may formulate an organizational innovation framework, design proactive and scalable innovation processes where innovation investments are made ahead of customer needs, and design appropriate innovation engagement methods with outsourcing partners, such as the use of agile methods (Babin, 2011) (Oshri and Kotlarsky, 2011) (Oshri, 2014) (Oshri, Kotlarsky, and Willcocks, 2015). The tools that may be used at this stage include feasibility study, ROI analysis, including economic and customer value considerations, and journey mapping.

At Design node S4, the outsourcing organization designs the outsourcing deal configuration. At this stage, the outsourcing organisation prepares the commercial and operating blueprint for the FinTech outsourcing project, develops balanced score metrics (including FinTech innovation measurement), drafts the service agreement and the price and contract framework, and designs the interparty relationship, the retained organization and the contract governance function (Babin, 2011) (Oshri and Kotlarsky, 2011) (Oshri, 2014) (Oshri, Kotlarsky, and Willcocks, 2015). The tools that may be used at this stage include the balanced scorecard, service level agreement (SLA), and the contract and governance framework.

At Engage node S5, the outsourcing organization negotiates and contracts with the selected FinTech service provider. At this stage, the outsourcing relationships are governed by explicit and enforceable written contracts. Such contracts clearly define what activities are going to be outsourced, including appropriate service and performance levels. Contracts should neither prevent nor impede the regulated entity from meeting its respective regulatory obligations, nor the regulator from exercising its regulatory powers. Contracts should include termination clause and minimum periods to execute a termination provision, to allow the outsourced FinTech services to be transferred to another third-party service provider or to be incorporated into the regulated entity. Material issues unique to the outsourcing arrangement should be meaningfully addressed such as choice-of-law or jurisdictional provisions for adjudication of disputes. Contracts should include, where appropriate, conditions of subcontracting by the third-party service provider for all or part of an outsourced activity, with the approval of the regulated entity (BCBS, 2005). The tools that may be used at this stage include market intelligence, and outsourcing agreements, such as SLA and operational level agreement (OLA).

At Monitor node S6, the outsourcing organization undertakes contract management. At this stage, there should be close monitoring of the performance of the outsourcing service providers, including periodic working-level meetings with both the end-user groups and the supplier to review the supplier's performance. The outsourcing organisation should work with the supplier to redefine service levels as appropriate. There should be considerations for transformational outsourcing management, by developing client-provider commitment, investing in and monitoring the relationship, using diligent documentation and administration, information exchange and coordination (GAO, 2001) (FDIC, 2014) (Mani et. al., 2006). In addition, the client-provider leadership should demonstrate the following

behaviour: focusing on the future, transparency, problem solving, outcome-driven, spirit of togetherness, exhibit clout within own organization, swift removal of obstructions, trustworthiness, effective performance and positive chemistry (Willcocks, Lacity, and Craig, 2013). The tool that may be used at this stage includes outsourcing governance framework.

At Feedback node S7, the outsourcing organization undertakes performance measurement. At this stage, the outsourcing organization periodically undertakes studies to assess the supplier's performance, and each metric measured should logically support a requirement that is linked to a strategic goal (FFIEC, 2004) (Oshri, Kotlarsky, and Willcocks, 2015). The tools that may be used at this stage include internal or external audit program, balanced scorecard, management report card, and need-gap analysis.

At Innovation node S8, the outsourcing organization measures value creation through innovation. For incremental innovation, at the operational and strategic level, the outsourcing organisation should have developed clear measurement instruments as reference points to evaluate whether its incremental innovation targets have been met. For radical innovation, the client firm should seek both qualitative and quantitative inputs regarding performance. In terms of qualitative feedback, inputs regarding the quality of radical can include periodical surveys (Oshri and Kotlarsky, 2011) (Oshri, 2014). The tools that may be used at this stage include innovation audit, three horizons model, ROI analysis, benchmarking, and surveys and interviews.

3.3.2 Stages of the Risk Loop

At the risk loop, post Investigate node SR1, at Relationship node R2, the outsourcing organization will need to establish who the key stakeholders are for the candidate outsourcing activities, and the stakeholders' respective aspirations and routines. It is important to understand the relationship dynamics, and figure out if there are any cultural gaps that needs to be bridged (Cullen et. al., 2005) (Oshri, Kotlarsky and Willcocks, 2015). The tools that may be used at this stage include stakeholder mapping and stakeholder interviews.

At Review node R3, the outsourcing organization will be required to conduct the relevant outsourcing due diligence. At this stage, the outsourcing organization ascertains if the FinTech service provider is qualified with the requisite domain knowledge and resources to meet the objectives of the regulated entity in the specified outsourcing activity. It will be essential that the service provider exhibits low risk to fulfil its obligations, in particular to factors including: strength of financial condition, turnover of management and employees, ability to maintain business continuity, ability to provide accurate, relevant, and timely Management Information Systems (MIS), experience with the function outsourced, reliance on subcontractors, location (particularly if cross-border), and redundancy and reliability of communication lines. Moreover, the service provider's intangible strengths, such as their service philosophies, quality initiatives, management style, and values, should fit those of the outsourcing organization (FFIEC, 2004) (BCBS, 2005). The tools that may be used at this stage include Request for Information (RFI), Request for Proposal (RFP), Request for Quotation (RFQ), Statement of Works, service providers' presentations and interviews, and market intelligence and benchmarking reports.

At Systemic Controls node R4, the outsourcing organization looks to control its organizational and industry level risk exposure. At this stage, the outsourcing organization checks if there are appropriate considerations and measures regarding risks impacting the consumers of FinTech products or services, including, data privacy, data security, continuity of financial services and the use of appropriate marketing practices. It is also appropriate to consider risk factors such as strategic and profitability risks, cyber risk, operational risk, compliance risk, money laundering risk, and liquidity risk and funding sources (BCBS, 2018). The tools that may be used at this stage include value chain analysis, scenario planning, and real options analysis.

At Idiosyncratic Controls node R5, the outsourcing organization looks to control its outsourced function and contract level risk. In terms of the outsourced function, it will be useful to understand the sensitivity of data accessed, protected, or controlled by the service provider, the volume of transactions, and its criticality to the outsourcing organization's business. In terms of risks impacting FinTech, it will be useful to understand the reliability and security of the FinTech products or services, the scalability to accommodate FinTech growth, and whether if intellectual property risk can occur. In terms of the contracted outsourcing performance, it will be useful to consider concentration risk – especially prominent if some part of the services provided by FinTech providers were to become dominated by globally active players, and/or the risk of outsourcing multiple activities exist to the same service provider. In addition, solvency risk should be considered. This is prominent if specialised young FinTech companies are service providers (FFIEC, 2004)

(BCBS, 2018). Similarly, the tools that may be used at this stage include value chain analysis, scenario planning, and real options analysis.

At Governance node R6, the outsourcing organization establishes guidelines for outsourcing risk management framework and the outsourcing governance structure. These can include setting appropriate risk appetite and tolerance with effective thresholds to trigger prompt remedial action, identifying and assessing risks at the launch of every product, activity, process and system to ensure the timely and overarching mitigation of risks in the approval, launch and delivery of processes and systems, and appropriate exit strategies, including the maintenance of skills and expertise in-house so that outsourced functions can be taken back by the regulated firm or substituted in an orderly manner, if required (FFIEC, 2004) (BCBS, 2018). The tools that may be used at this stage include risk management framework, SLA, and OLA.

At Monitor node R7, the outsourcing organization establishes guidelines for business continuity planning (BCP), multi-vendor monitoring (if any), and change management. In terms of BCP, the outsourcing organization should regularly review the BCP of the FinTech service provider to ensure any services considered "mission critical" for the outsourcing organization could be restored within an acceptable timeframe, and the service provider's program for contingency plan testing (FFIEC, 2004). In terms of change management, an appropriate strategy should be devised comprising a transition plan, disruption minimisation strategy, communication strategy, staffing arrangement, and mobilised resources, among others (Oshri, Kotlarsky, and Willcocks, 2015). The tools that may be used at this stage include the BCP program, OLA, transition program, and the Kotter change model.

At Feedback node R8, the outsourcing organization performs and assesses risk audit and regulatory compliance. For instance, the outsourcing organisation may measure the FinTech service activity results against defined service levels, and stress test processes and technologies for day-to-day resiliency and efficacy of mission-critical functions (CBI, 2018) (FDIC, 2014). The tools that may be used at this stage include internal and/or external audit programs and compliance programs.

At the end of the first round of the outsourcing contractual relationship, the organisation may cease the outsourcing arrangement. In an event the outsourcing relationship is extended and renewed, we will enter a subsequent pass of the Strategy-Risk model. This will be elaborated in the next section.

3.4 Subsequent Pass of the Strategy-Risk Model

At the renewal phase for the outsourcing relationship, the outsourcing organisation enters a new round of strategy and risk loops for the Strategy-Risk model.

At Investigate node SR1, the outsourcing organisation may ask: what are the insights gleaned from risk audit (risk loop), and/or the insights gleaned from performance measurement and innovation (strategy loop), after the first round of working relationship with the service provider.

In the new round, at the strategy loop, at Opportunity node S2, organisations may be looking into new opportunities for organizational improvement, such as cost reduction, operational flexibility, increased security, operational resilience, strategic growth and innovation. In the subsequent stage, at Planning node S3, organisations may ask: are there appropriate design of the outsourcing policies to capture the outsourcing opportunity identified at Opportunity node S2.

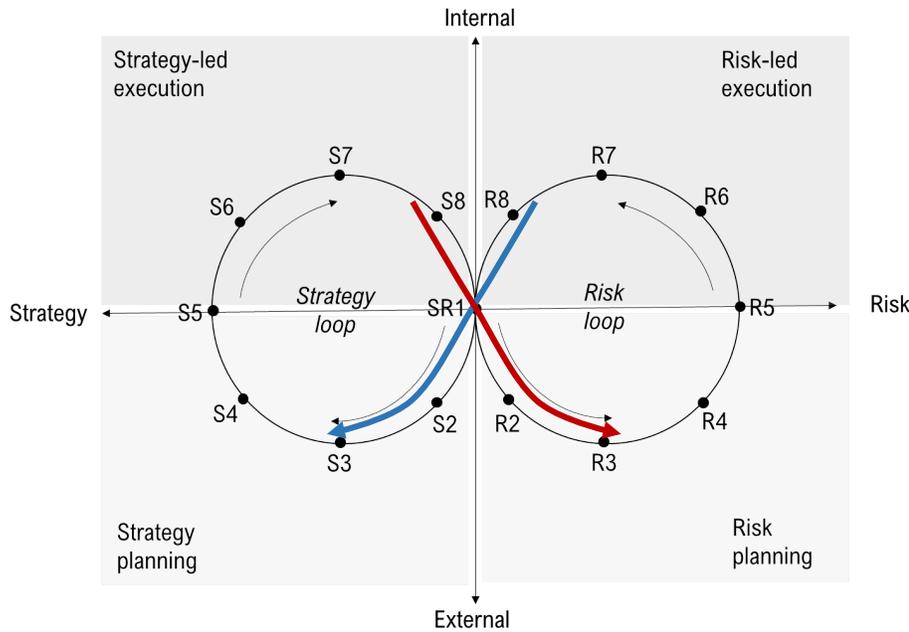
In the new round, at the risk loop, at Relationship node R2, organisations may be looking into client-provider relationship management issues (e.g. when client and/or provider's staffing changes), and the tackling of contract variations and disputes, if any. Consequently, while undertaking risk review and due diligence, at Review node R3 organisations may ask: is the service provider qualified with adequate resources to perform the outsourcing work.

The outsourcing organisation continues to review and monitor the outsourcing relationship in this renewal round, in an iterative sequential manner into the subsequent stages of the strategy and risk loops.

3.5 Cross-looping of the Strategy-Risk Model

In some cases, the loop may cross, such that an organisation at Feedback node R8 of the risk loop can enter the strategic loop at Opportunity node S2, via Investigate node SR1. In addition, organisations at Innovation node S8 in the strategy loop can enter the risk loop at Relationship node R2, via Investigate node SR1.

The progression of stages in the Strategy-Risk model, by exiting a strategy loop and entering a risk loop, or vice versa, is termed as cross-looping. An illustration of cross-looping can be seen in Figure 2.



NODE	STARTING POINT	DESCRIPTION
SR1	Investigate	<ul style="list-style-type: none"> Identify problem statement Understand market

NODE	STRATEGY STAGE	DESCRIPTION
S2	Opportunity	<ul style="list-style-type: none"> Identify opportunity for organizational improvement
S3	Planning	<ul style="list-style-type: none"> Undertake feasibility study Define strategy
S4	Design	<ul style="list-style-type: none"> Design outsourcing deal configuration
S5	Engage	<ul style="list-style-type: none"> Negotiation Contracting
S6	Monitor	<ul style="list-style-type: none"> Undertake contract management
S7	Feedback	<ul style="list-style-type: none"> Undertake performance measurement
S8	Innovation	<ul style="list-style-type: none"> Measure value creation through innovation

NODE	RISK STAGE	DESCRIPTION
R2	Relationship	<ul style="list-style-type: none"> Identify stakeholders Manage relationship dynamics
R3	Review	<ul style="list-style-type: none"> Undertake due diligence
R4	Systemic Controls	<ul style="list-style-type: none"> Control for organizational and industry level risk
R5	Idiosyncratic Controls	<ul style="list-style-type: none"> Control for outsourced function and contract level risk
R6	Governance	<ul style="list-style-type: none"> Establish guidelines for outsourcing risk management framework and governance structure
R7	Monitor	<ul style="list-style-type: none"> Establish guidelines for business continuity planning (BCP) Establish guidelines for multi-vendor monitoring Establish guidelines for change management
R8	Feedback	<ul style="list-style-type: none"> Risk audit Regulatory compliance

Figure 2. Cross-looping in Strategy-Risk Outsourcing Model

For instance, an invoked performance measurement penalty at Feedback node S7 of the strategy loop, may lead to a re-evaluation of the value derived from the outsourcing contract at Investigate node SR1, and trigger downstream reactions in the form of a dispute resolution in Relationship node R2 and contract review in Review node R3 of the risk loop. Less unfavourable resolutions may also lead to tighter risk controls, governance structures, closer monitoring and stringent audit and compliance checks. However, an untenable negative outcome from these node pass-throughs may lead to a termination of the contractual agreement, and consequently terminate the Strategy-Risk outsourcing model process.

In another instance, a risk audit finding at Feedback node R8 of the risk loop may identify a potential business process reengineering opportunity that may be resolved for organizational improvement. This opportunity may be a potential outsourcing target that can be assessed in Opportunity node S2 of the strategy loop. This reengineering opportunity, if ascertained to pass the feasibility and impact analysis in Planning node S3, can kickstart a fresh Strategy-Risk outsourcing model process.

4. Conclusion and Future Work

In the FinTech era in the financial services landscape, staying ahead of the innovation curve and being disciplined at enhancing core service offerings entail careful resource planning. A well-structured outsourcing arrangement can go a long way toward enhancing long term organizational strategic growth.

This study evaluates outsourcing for financial services, specifically in the post-2014 FinTech era. The paper studies comprehensive non-proprietary outsourcing life cycle models that have been described in publicly available academic literature, and regional or international professional organisations, and standard bodies. Publications on outsourcing life cycle models are sparse. Many organizations are careful and reluctant to reveal outsourcing successes and failure drivers, as well as the incremental cost savings and revenue attained (Babin and Quayle, 2016). While the models studied in this paper are relatively comprehensive, factors such as (A) strategic management with innovation focus and (B) emergence of FinTech-associated risks, which are important and critical in financial services outsourcing, are lacking in emphasis.

This paper proposes an elegant and simple-to-use end-to-end model which can be utilized as a guide by the financial services industry for outsourcing decisions. With emphasis on the two aforementioned factors (A) strategic management with innovation focus (Strategy elements) and (B) emergence of FinTech-associated risks (Risk elements), this model, building upon the life cycle model proposed in Cullen et al. (2006), is summarily known as the Strategy-Risk outsourcing life cycle model. This model proposed is a two-loop model. The strategy loop looks at, for instance, evaluating outsourcing innovation opportunities assessing market intelligence, and measuring outsourcing performance. The risk loop involves, for instance, due diligence of service providers, risk governance, and contract monitoring. The model is designed with particular relevance to outsourcing in financial services.

Actual implementation should be undertaken with discretion, fitting to the unique scenarios of the outsourcing situation. The model is sequential, as outsourcing contracts are typically long-term multi-period client-vendor contractual relationships, with the expectation that the contract and relationship may be reviewed and renewed at the end of each term. Further, progression across the outsourcing stages is an iterative process. This means that, if there is a need to review approaches in earlier stages, an organisation can revisit earlier stages to improve the desired outcomes of outsourcing. The paper also describes a cross-looping phenomenon, which allows, for instance, risk review events that arise from the risk loop to have strategic outcomes (e.g. process gap problem leading to a business reengineering opportunity), and strategic review events in the strategy loop to have risk consequences (e.g. poor performance appraisal leading to tightening of governance controls). This phenomenon provides a close mirroring of real-life outsourcing implementations.

This paper analysed the shortcomings of existing models and proposes a generalizable model. Limitations of this paper include the possibility that evolution of this model may be required to contextualize the model to specific industry user groups or to environment changes. Future research may involve the examination of external validity:

- (i) how different sub-industry groups in the financial services landscape, such as banks, hedge funds, insurance companies, and stock exchanges, can leverage on the Strategy-Risk life cycle model to provide value creation and reduce failures, through use cases and surveys.
- (ii) how the model remains viable with passage of time.
- (iii) how the model remains viable to specific cultural settings and regulatory jurisdictions, such as Islamic finance, in view of enhancing outsourcing outcomes.

Further, it may be worthwhile to explore variations of the Strategy-Risk model which may benefit organizations from different industries with critical risk elements and strategic focuses on innovation, such as Healthcare and MedTech.

An outsourcing partnership is successful when both vendors and clients achieve their objectives. How this success can be achieved, if well-coordinated, can lead to highly successful outcomes. FinTech and the associated risks are here to stay. Recognizing how FinTech is changing the financial services landscape and having a clear awareness of the power of outsourcing, can bring about positive giant leaps in organizations leveraging on outsourcing for growth.

References

- Altinkemer, K., Chaturvedi, A., & Gulati, R. Information systems outsourcing: Issues and evidence. *International Journal of Information Management*, vol. 14 no. 4, pp. 252-268, 1994.
- Arner, D. W., Barberis, J., & Buckley, R. P. The evolution of FinTech: A new post-crisis paradigm? *Georgetown Journal of International Law*, vol. 47, no. 4, pp. 1271–1319, 2015.
- Arner, D. W., Barberis, J., & Buckley, R. P. 150 years of Fintech: An evolutionary analysis. *Jassa The Finsia Journal of Applied Finance*, vol. 3, pp. 22, 2016.
- Alt, R., Beck, R., & Smits, M. T. FinTech and the transformation of the financial industry. *Electronic Markets*, vol. 28 pp.3, 2018
- Alt, R., & Puschmann, T. *Digitalisierung der Finanzindustrie–Grundlagen der Fintech-Evolution*. Springer, Berlin/Heidelberg, 2016.
- Arner, D. W., Barberis, J., & Buckley, R. P. FinTech, RegTech and the reconceptualisation of financial regulation. *Northwestern Journal of International Law and Business*, vol. 37 no. 3, pp. 371–413, 2017.
- Austin, J., & Bloggs, J. Big Data Outsourcing and Identity Verification in Fintech Credit Assessment: A Case Study of a Microloans Platform in China. In *Proceedings of Australasian Conference on Information Systems*. Sydney, Australia, 2018.
- Autorité des Marchés Financiers (AMF). *Outsourcing Risk Management Guideline*. Paris, France, 2010.
- Babin, R. *Best Practices in Outsourcing: The Bancolumbia Experience – Grupo Bancolumbia Case Study*. Global Excellence in Outsourcing, International Association of Outsourcing Professionals, 2011.
- Babin, R., & Quayle, A. ISO 37500 – Comparing outsourcing life-cycle models. *Strategic Outsourcing: An International Journal*, vol. 9 no. 3, pp. 271-286, 2016.
- Basel Committee on Banking Supervision (BCBS). *Outsourcing in Financial Services*. February, Basel, 2005.

- Basel Committee on Banking Supervision (BSBC). *Principles for the sound management of operational risk*. Basel, Switzerland, 2011.
- Basel Committee on Banking Supervision (BCBS). *Sound Practices: Implications of Fintech Developments for Banks and Bank Supervisors*. Basel, Switzerland, 2018.
- Beimborn, D. *Cooperative sourcing: Simulation studies and empirical data on outsourcing coalitions in the banking industry*. Springer Science & Business Media, 2008.
- Braun, C., & Winter, R. Classification of outsourcing phenomena in financial services. *ECIS 2005 proceedings*, pp. 2, 2005.
- Brynjolfsson, E., & McAfee, A. *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. WW Norton & Company, 2014.
- Caplan, D., Janvrin, D., & Kurtenbach, J. Internal audit outsourcing: an analysis of self-regulation by the accounting profession. *Research in Accounting Regulation*, vol. 19, pp. 3-34, 2007.
- Cane, A. Information technology and competitive advantage: Lessons from the developed countries. *World Development*, vol.20 no.12, pp. 1721-1736, 1992.
- Central Bank of Ireland (CBI). *Outsourcing - Findings and Issues for Discussion*. Discussion Paper 8. Dublin, Ireland, 2018.
- Chou, D.C. and Chou, A.Y. Information systems outsourcing life cycle and risks analysis, *Computer Standards & Interfaces*, vol. 31 no. 5, pp. 1036-1043, 2009.
- Clark, G. L., & Monk, A. H. The scope of financial institutions: in-sourcing, outsourcing and off-shoring. *Journal of Economic Geography*, vol. 13, no. 2, pp. 279-298, 2013.
- Consumer Financial Protection Bureau (CFPB). *CFPB Bulletin: Service Providers*. Washington D.C., USA, 2016.
- Cox, N., & Pilbauer, J. Outsourcing critical financial system operations. *Journal of business continuity & emergency planning*, vol. 11 no. 3, pp. 202-210, 2018.
- Cristanto, J., Donaldson, C., Ocampo, D. & Prenio, J. *Regulating and supervising the clouds: emerging prudential approaches for insurance companies*. FSI Insights. Basel, Switzerland, 2018.
- Cullen, S., Seddon, P. B., & Willcocks, L. *Managing outsourcing: The lifecycle imperative*. London: London School of Economics and Political Science, 2006.
- Currie, W. L., Michell, V., & Abanisho, O. Knowledge process outsourcing in financial services: The vendor perspective. *European Management Journal*, vol. 26 no. 2, pp. 94-104, 2008.
- Dayasindhu, N. Information technology enabled process outsourcing and reengineering: Case study of a mortgage bank. *AMCIS 2004 Proceedings*, pp. 437, 2004.
- Deloitte. *Traditional outsourcing is dead. Long live disruptive outsourcing*. The Deloitte Global Outsourcing Survey 2018. Deloitte, 2018.
- Duck, T. Why outsource the compliance function? *Journal of Investment Compliance*, vol. 7 no. 3, pp. 67-69, 2006.
- Ehrenfeld, J. Securities market automation from standards to self-learning machines: Current state and future perspectives. *Journal of Securities Operations & Custody*, vol. 9 no. 3, pp. 245-252, 2017.
- Federal Deposit Insurance Corporation (FDIC). *Technology Outsourcing: Informational Tools for Community Bankers*. Washington D.C., USA, 2014.
- Federal Financial Institutions Examination Council (FFIEC). *Outsourcing Technology Services IT Examination Handbook*. Virginia, USA, 2004.
- Federal Reserve. *Guidance on Managing Outsourcing Risk*. Washington D.C., USA, 2013.
- Federal Stability Board (FSB). *Financial stability implications from fintech: Supervisory and regulatory issues that merit authorities' attention*. June, Basel, 2017.
- Financial Conduct Authority (FCA). *TR13/10 - Outsourcing in the asset management industry*. London, UK, 2013.
- Financial Conduct Authority (FCA). *FG 16/5-Guidance for firms outsourcing to the 'cloud' and other third-party IT services*. London, UK, 2016.
- Folwarski, M. Challenges of central banks as regulators to the development of the FinTech sector. *Safe Bank*, vol. 4, no. 77, pp. 50-62, 2019.
- Frost, J., Gambacorta, L., Huang, Y., Shin, H. S., & Zbinden, P. *BigTech and the changing structure of financial intermediation*. BIS Working Papers, 799, 2019.
- Gewald, H., & Dibbern, J. Risks and benefits of business process outsourcing: A study of transaction services in the German banking industry. *Information & Management*, vol. 46 no.4, pp. 249-257, 2009.
- Gewald, H., & Franke, J. The risks of business process outsourcing: a two-fold assessment in the German banking industry. *International Journal of Electronic Finance*, vol. 1 no. 4, pp. 420-441, 2007.

- Gewald, H., Wüllenweber, K., & Weitzel, T. The Influence of Perceived Risks on Banking Managers' Intention to Outsource Business Processes: A study of the German Banking and Finance Industry. *Journal of Electronic Commerce Research*, vol. 7 pp. 2, 2006.
- Glass, G. Outsourcing 3.0: Licensed FinTechs driving growth and efficiency for banks. PwC. Available: <https://www.finleap.com/insights/pwc-and-finleap-whitepaper-outsourcing-3-0-for-banks/>, 16 May 2020.
- Gomber, P., Koch, J.-A., & Siering, M. Digital finance and FinTech: Current research and future research directions. *Journal of Business Economics*, vol. 87 no. 5, pp. 537–580, 2017.
- Gonzalez, R., Llopis, J., & Gasco, J. Information technology outsourcing in financial services. *The Service Industries Journal*, vol. 33 no. 9-10, pp. 909-924, 2013.
- Government Accountability Office (GAO). *Leading commercial practices for outsourcing of services*. Washington D.C., USA, 2001.
- Gozman, D., & Willcocks, L. The emerging Cloud Dilemma: Balancing innovation with cross-border privacy and outsourcing regulations. *Journal of Business Research*, vol. 97, pp. 235-256, 2019.
- Grote, M. H., & Täube, F. A. When outsourcing is not an option: International relocation of investment bank research—Or isn't it? *Journal of International Management*, vol. 13 no. 1, pp. 57-77, 2007.
- Gulla, U., & Gupta, M. P. Impact of information systems outsourcing: a study of Indian banking sector. *International Journal of Business Information Systems*, vol. 10 no. 2, pp. 131-150, 2012.
- Gutierrez, F., & Dyson, L. E. Managing employee expectations of organizational change: A case study of IT outsourcing at an Australian bank. In *Knowledge Management and Innovation in Advancing Economies: Analyses and Solutions - Proceedings of the 13th International Business Information Management Association Conference, IBIMA*, 2009.
- Hideyuki M. Global Business Process/IS Outsourcing to Singapore in the Multinational Investment Banking Industry, *Journal of Information Technology Case and Application Research*, vol. 7, no. 3, pp. 4-24, 2005.
- Hon, W. K., & Millard, C. Banking in the cloud: Part 1—banks' use of cloud services. *Computer law & security review*, vol. 34 no. 1, pp. 4-24, 2018a.
- Hon, W. K., & Millard, C. Banking in the cloud: Part 2—regulation of cloud as 'outsourcing'. *Computer Law & Security Review*, vol. 34 no. 2, pp. 337-357, 2018b.
- Huber, R. L. How Continental Bank outsourced its" crown jewels.". *Harvard Business Review*, vol. 71 no. 1, pp. 121-129, 1993.
- International Association of Outsourcing Professionals (IAOP). *Outsourcing Professional Body of Knowledge*. Version 10, 2010, Van Haren Publishing, 2008.
- International Association of Outsourcing Professionals (IAOP). *Outsourcing Professional Body of Knowledge*. International Association of Outsourcing Professionals, Van Haren Publishing, Zaltbommel, 2014
- International Standards Organisation (ISO). *International Standard 37500 Guidance on Outsourcing*. Geneva, Switzerland, 2014.
- Jennings, D. Outsourcing opportunities for financial services. *Long Range Planning*, vol. 29 no. 3, pp. 393-404, 1996.
- Kaźmierczyk, J. & Macholak, P. Outsourcing in the Banking Sector - The Polish Banking Sector Case. *IAFOR Journal of Politics, Economics and Law*, vol. 1 no. 1, 2014.
- Klepper, R., & Jones, W. O. *Outsourcing information technology, systems and services*. Prentice-Hall, Inc., 1998.
- Klus, M. F., Lohwasser, T. S., Holotiuk, F., & Moormann, J. Strategic alliances between banks and fintechs for digital innovation: Motives to collaborate and types of interaction. *The Journal of Entrepreneurial Finance*, vol. 21 no. 1, pp. 1, 1998.
- Konschalla, T. *Outsourcing: BaFin compares outsourcing by institutions*. BaFinJournal. Bonn, Germany, 2013.
- Lacity, M., & Hirschheim, R. The information systems outsourcing bandwagon. *MIT Sloan Management Review*, vol. 35 no. 1, pp. 73, 1993.
- Lacity, M., Khan, S., & Willcocks, L. A review of the IT outsourcing literature: Insights for practice. *The journal of strategic information systems*, vol. 18 no. 3, pp. 130-146, 2009.
- Lacity, M., Khan, S., Yan, A. and Willcocks, L.P. (2010), A review of the IT outsourcing empirical literature and future research directions, *Journal of Information Technology*, vol. 25 No. 4, pp. 395-433, 2010.
- Lacity, M., & Willcocks, L. Beyond Cost Savings: Outsourcing Business Processes for Innovation. *Sloan Management Review*. vol. 54 no. 3, pp. 63-69, 2013.
- Lacity, M., Willcocks, L., & Feeny, D. Commercializing the back office at Lloyds of London: Outsourcing and strategic partnerships revisited. *European Management Journal*, vol. 22 no. 2, pp. 127-140, 2004.
- Linder, J. Transformational Outsourcing. *MIT Sloan Management Review*, vol. 45 no. 2, pp. 52-58, 2004.
- Lawrence, G. B. Adaptive financial regulation and RegTech – a concept article on realistic protection for victims of bank failures. *Duke Law Journal*, vol. 66 no. 3, pp. 567–604, 2016.

- Mani, D., Barua, A. and Whinston, A.B. Successfully governing business process outsourcing relationships. *MIS Quarterly Executive*, vol. 5 no. 1, pp. 15–29, 2006.
- Mayo, D. *Enterprise Case Study: How N26 achieved rapid expansion utilizing Mambu's cloud banking platform - Enabling a new generation of banks to achieve scale and effect change*. Informa. 2020.
- McCormack, P. The FSA approach to the supervision of outsourcing. *Journal of Financial Regulation & Compliance*, vol. 11 no. 2, pp. 113, 2003.
- McLellan, K., Marcolin, B. L., & Beamish, P. W. Financial and strategic motivations behind IS outsourcing. *Journal of Information Technology*, vol. 10, no. 4, pp. 299-321, 1995.
- Mohapatra, S., & Das, S. Information Technology Outsourcing Risks in Banks: A Study of Perception in the Indian banking industry. *XIMB Journal of Management*, vol. 10, pp.2, 2013.
- Mojsilovic', A., Ray, B., Lawrence, R. and Takriti, S. A logistic regression framework for information technology outsourcing lifecycle management. *Computers & Operations Research*, Vol. 34 No. 12, pp. 3609-3627, 2007.
- National Outsourcing Association (NOA). *Outsourcing Life Cycle*. National Outsourcing Association, London, 2012.
- Němcová, Z., & Dvořák, J. Technology payment cards communication with banking institutions in the field of cashless payment. *Scientific papers of the University of Pardubice. Series D, Faculty of Economics & Administration*, vol. 18 no. 26, pp. 116–128, 2013.
- Ng, T. The Reserve Bank's policy on outsourcing by banks. *Reserve Bank of New Zealand Bulletin*, vol. 70, pp. 2, 2007.
- Oshri, I. *Innovation through outsourcing: Have you got the goods*. National Outsourcing Association Year Book, 2014.
- Oshri, I. & Kotlarsky, J. *Innovation in Outsourcing*. WBS White Paper for Cognizant, 2011.
- Oshri, I., Kotlarsky, J. and Willcocks, L. *The Handbook of Global Outsourcing and Offshoring*. 3rd ed. Basingstoke, Hampshire: Palgrave Macmillan, 2015.
- Ozeke, H. B. Outsourcing of banking activities. *International Financial Law Review*, vol. 27, no. 1, pp. 65-68, 2008.
- Pan, W., Li, Z., Zhang, Y., & Weng, C. The new hardware development trend and the challenges in data management and analysis. *Data Science and Engineering*, vol. 3, no. 3, pp. 263-276, 2018.
- Pei, Z., Zhen-Xiang, Z. and Chun-ping, H. Study on critical success factors for IT outsourcing lifecycle. *IEEE 2007: International Conference on Wireless Communications, Networking and Mobile Computing*, Beijing, pp. 4379-4382, 2007.
- Poustchi, K., & Dehnert, M. Exploring the digitalization impact on consumer decision making in retail banking. *Electronic Markets*, vol. 28, pp. 3, 2018.
- Quinn, J. B. Outsourcing Innovation: The New Engine of Growth. *MIT Sloan Management Review*, vol. 41, no. 4, pp. 13, 2000.
- Ravi, S. P., Jain, R. K., & Sharma, H. P. An analysis of business process outsourcing strategies of public and private sector banks in India. *International Business & Economics Research Journal*, vol. 10, pp. 2, 2011.
- Reynolds, P. ISG Momentum® Market Trends & Insights 2018 Vertical Report. Information Services Group: ISG Research. Available: <https://www.isg-one.fr/research/isg-momentum/articles/isg-momentum-market-trends-insights-2018-vertical-report>, 16 May 2020.
- Scott, H. S., Gulliver, J., & Nadler, H. Cloud Computing in the Financial Sector: A Global Perspective. Program on International Financial Systems, 2019.
- Shim, Y., & Shin, D. Analyzing China's fintech industry from the perspective of actor-network theory. *Telecommunications Policy*, vol. 40 no. 2–3, pp. 168–181, 2016.
- Singh, D. Outsourcing in Financial Services. *Journal of Banking Regulation*, vol. 6, no. 3, pp. 202–204, 2005.
- Smojver, S., & Blažeković, D. Information systems outsourcing in Croatian banks: Developments 2005–2012. *Economic research-Ekonomska istraživanja*, vol. 28, no. 1, pp. 259-270, 2015.
- Sullivan, J. A center of excellence is a key success factor in governing multiple outsourcing contracts, KPMG Shared Services and Outsourcing Institute. Available: www.kpmginstitutes.com/institutes/shared-services-outsourcing-institute/articles/2013/06/governance-centers-excellence.html, 26 May 2020.
- Tas, J., & Sunder, S. Financial services business process outsourcing. *Communications of the ACM*, vol. 47, no. 5, pp. 50-52, 2004.
- Walter, K. ISG Provider Lens FAO Digital Outsourcing Services Quadrant Report. Information Services Group. Available: <https://research.isg-one.com/reportaction/Quadrant-FAO-Digital-Operations-Global-2018/Marketing?SearchTerms=fao>, 16 May 2020.
- Wescott, K. 2020 Telecommunications, Media, and Entertainment Outlook. Deloitte. Available: <https://www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/telecommunications-industry-outlook.html>, 25 May 2020.

Willcocks, L., Cullen, S. and Craig, A. *The Outsourcing Enterprise: From Cost Management to Collaborative Innovation*, Palgrave Macmillan, Basingstoke, Hampshire, 2011.

Willcocks, L., Lacity, M., and Craig, A. Sourcing Leadership. *Professional Outsourcing*, vol. 14 pp. 22-25, 2013.

Zhu, N., Qiu, H., Wang, L., & Foulds, L. Outsourcing of Operations in the Banking Industry: A Case Study from China. *IUP Journal of Supply Chain Management*, vol. 14, no. 3, pp. 7-25, 2017.

Appendix 1

No.	Publication Type	Publication Author and Year	Research Topic
1	Business/ Finance/ Management *	Beimborn, D. (2008)	Outsourcing coalitions in banking
2	Business/ Finance/ Management *	Gonzalez, R., Llopis, J., & Gasco, J. (2013)	IT outsourcing in financial services
3	Business/ Finance/ Management *	Grote, M. H., & Täube, F. A. (2007)	Outsourcing pertaining to investment bank research
4	Business/ Finance/ Management *	Gozman, D., & Willcocks, L. (2019)	Understanding outsourcing risks posed by cloud-based FinTechs
5	Business/ Finance/ Management *	Clark, G. L., & Monk, A. H. (2013)	Insourcing, outsourcing and offshoring in FIs
6	Business/ Finance/ Management *	Klus, M. F., Lohwasser, T. S., Holotiuk, F., & Moormann, J. (2019)	Motivations of outsourcing by banks and FinTechs
7	Business/ Finance/ Management *	Cox, N., & Pilbauer, J. (2018)	Outsourcing critical financial system operations
8	Business/ Finance/ Management *	Currie, W. L., Michell, V., & Abanisho, O. (2008)	Knowledge process outsourcing in financial services
9	Business/ Finance/ Management *	Caplan, D., Janvrin, D., & Kurtenbach, J. (2007)	Outsourcing of internal audit function
10	Business/ Finance/ Management *	Lacity, M., Willcocks, L., & Feeny, D. (2004)	Outsourcing of back office operations
11	Business/ Finance/ Management *	Scott, H. S., Gulliver, J., & Nadler, H. (2019)	Outsourcing of cloud services in financial services
12	Business/ Finance/ Management *	Folwarski, M. (2019)	Challenges of central banks as regulators to the development of the FinTech sector
13	Information Systems/ IT/ Engineering *	Gewald, H., & Dibbern, J. (2009)	Business process outsourcing in financial services
14	Information Systems/ IT/ Engineering *	Gewald, H., & Franke, J. (2007)	Business process outsourcing in financial services
15	Information Systems/ IT/ Engineering *	Zhu, N., Qiu, H., Wang, L., & Foulds, L. (2017)	Outsourcing operations in banking
16	Information Systems/ IT/ Engineering *	Gutierrez, F., & Dyson, L. E. (2009)	Organisational change in IT outsourcing in banking
17	Information Systems/ IT/ Engineering *	Dayasindhu, N. (2004)	IT outsourcing in a mortgage bank
18	Information Systems/ IT/ Engineering *	Smojver, S., & Blažeković, D. (2015)	Country-specific outsourcing of banking activities: Croatia
19	Information Systems/ IT/ Engineering *	Gulla, U., & Gupta, M. P. (2012)	Country-specific outsourcing of banking activities: India
20	Information Systems/ IT/ Engineering *	McCahery, J. A., & de Roode, A. (2018)	Country-specific offshoring of banking activities: Singapore
21	Information Systems/ IT/ Engineering *	Tas, J., & Sunder, S. (2004)	Business process outsourcing in financial services

No.	Publication Type	Publication Author and Year	Research Topic
22	Information Systems/ IT/ Engineering *	Braun, C., & Winter, R. (2005)	Classification of outsourcing phenomena in financial services
23	Information Systems/ IT/ Engineering *	Austin, J., & Bloggs, J. (2018)	Big Data Outsourcing and Identity Verification in FinTech Credit Assessment
24	Legal *	Duck, T. (2006)	Outsourcing pertaining to compliance functions of investment firms
25	Legal *	McCormack, P. (2003)	Regulatory outsourcing policy on FIs
26	Legal *	Ozeke, H. B. (2008)	Country-specific outsourcing of banking activities: Turkey
27	Legal *	Kaźmierczyk, J. & Macholak, P. (2014)	Country-specific outsourcing of banking activities: Poland
28	Legal *	Singh, D. (2005)	Regulatory outsourcing policy on FIs
29	Legal *	Hon, W. K., & Millard, C. (2018a)	Outsourcing of cloud services in financial services
30	Legal *	Hon, W. K., & Millard, C. (2018b)	Outsourcing of cloud services in financial services
31	Regulator Guideline	FCA (2016)	Outsourcing pertaining to ‘cloud’ and other third-party IT services by FIs
32	Regulator Guideline	Federal Reserve (2013)	Managing outsourcing risks by FIs
33	Regulator Guideline	BCBS. (2011)	Managing operational risk in outsourcing in financial services
34	Regulator Guideline	FCA (2013)	Outsourcing pertaining to asset management
35	Regulator Guideline	FFIEC (2003)	Managing outsourcing risks by FIs
36	Regulator Guideline	FDIC (2014)	Managing technology providers’ performance risk by FIs
37	Regulator Guideline	CFPB (2016)	Outsourcing in compliance with federal consumer financial law
38	Regulator Guideline	AMF (2010)	Managing outsourcing risks by FIs
39	Supervisory Body Publication	Konschalla, T. (2013)	Comparative study of banking outsourcing
40	Supervisory Body Publication	Cristanto, J., Donaldson, C., Ocampo, D. & Prenio, J. (2018)	Regulating cloud outsourcing for insurance companies
41	Supervisory Body Publication	Ng, T. (2007)	Regulatory outsourcing policy on FIs
42	Supervisory Body Publication	CBI (2018)	Regulatory outsourcing policy on FIs

* Journal, Conference, Symposium, Book

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
R1, S1	Investigate	1. Identify problem statement 2. Understand market	1. What are the organizational needs for outsourcing? What is the motivation for outsourcing? 2. Is the organization able to clearly define its outsourcing business requirements? 3. What is the market intelligence on related outsourcing, related suppliers, and similar outsourcing decisions in peer organizations? (Cullen et. al., 2005) (Lacity, Khan and Willcocks, 2009) (Oshri, Kotlarsky and Willcocks, 2015)	1. Value chain analysis and deconstruction 2. Stakeholder interviews 3. Market and competitive intelligence
R2	Relationship	1. Identify stakeholders 2. Manage relationship dynamics	1. Who are the key stakeholders? What are their aspirations and routines? 2. What are the relationship dynamics? Are there any cultural gaps that needs to be bridged? (Cullen et. al., 2005) (Oshri, Kotlarsky and Willcocks, 2015)	1. Stakeholder mapping 2. Stakeholder interviews
R3	Review	1. Undertake due diligence	1. Is the FinTech service provider qualified with domain knowledge and experience, with adequate resources to perform the outsourcing work? 2. Does the service provider understand and can meet the objectives of the regulated entity in the specified activity? 3. Does the service provider exhibit low risk to fulfil its obligations, in particular to factors including: strength of financial condition, turnover of management and employees, ability to maintain business continuity, ability to provide accurate, relevant, and timely Management Information Systems (MIS), experience with the function outsourced, reliance on subcontractors, location (particularly if cross-border), and redundancy and reliability of communication lines? 4. For servicing geographically dispersed activities, can the like-service be met by using third parties with similar reach or capability? 5. What is the economic, legal and political conditions that might adversely impact the service provider's ability to perform effectively for the regulated entity. 6. What is the provider's intangible strengths, such as their service philosophies, quality initiatives, management style and values? Do they fit those of the outsourcing organization? 7. Will the outsourcing agreement be an arms-length transaction? (FFIEC, 2004) (BCBS, 2005)	1. Request for information (RFI) 2. Request for proposal (RFP) 3. Request for quote (RFQ) 4. Statement of Works 5. Market intelligence 6. Benchmarking

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
R4	Systemic Controls	1. Control for organizational and industry level risk	<p>1. Are there appropriate considerations and measures regarding risks impacting the consumers of financial products or services, including:</p> <p>A. Data privacy, data security B. Discontinuity of financial service C. Appropriate marketing practices</p> <p>2. Are there appropriate considerations and measures regarding risks impacting the financial services sector, including:</p> <p>A. Strategic and profitability risks B. Cyber risk C. Operational risk - institutional and systemic D. Compliance risk - including consumer and data protection regulation E. Money laundering - terrorism financing risk F. Liquidity risk and funding sources (BCBS, 2018)</p>	<p>1. Value chain analysis 2. Scenario planning 3. Real options analysis</p>
R5	Idiosyncratic Controls	1. Control for outsourced function and contract level risk	<p>1. Are there appropriate considerations and measures regarding risks impacting the outsourced function, including:</p> <p>A. Sensitivity of data accessed, protected, or controlled by the service provider B. Volume of transactions C. Criticality to the outsourcing organization's business.</p> <p>2. Are there appropriate considerations and measures regarding risks impacting financial technology, including:</p> <p>A. Reliability of FinTech products or services B. Security of FinTech products or services C. Scalability to accommodate FinTech growth D. Intellectual property risk</p> <p>2. Are there appropriate considerations and measures regarding risks impacting contracted outsourcing performance, including:</p> <p>A. Concentration risk - prominent if some part of the services provided by FinTech providers were to become dominated by globally active players, and/or outsourcing multiple activities to the same service provider. B. Solvency risk - prominent if specialised young FinTech companies are service providers (FFIEC, 2004) (BCBS, 2018)</p>	<p>1. Value chain analysis 2. Scenario planning 3. Real options analysis</p>

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
R6	Governance	1. Establish guidelines for outsourcing risk management framework and governance structure	<p>1. Is the risk management framework capturing the following aspects:</p> <p>A. Ensuring integrated risk culture shared throughout outsourcing supply chain</p> <p>B. Setting and implementing the policies, processes and systems to control risks to ensure prompt reporting, assessment and early risk mitigation for FinTech-driven risks</p> <p>C. Setting appropriate risk appetite and tolerance with effective thresholds to trigger prompt remedial action using Key Risk Indicators (KRI).</p> <p>D. Identifying/assessing risks in all processes and systems to enhance capacity to identify, assess and mitigate risks arising from extended processes and systems in FinTech migrations</p> <p>E. Assessing risks in the launch of every product, activity, process and system to ensure the timely and overarching identification, assessment of risks in the approval, launch and delivery of FinTech-driven processes and systems</p> <p>F. Appropriate risk monitoring and proactive risk management to update the frequency of monitoring and reporting with appropriate escalation according to the size and nature of the risks</p> <p>G. Setting ‘criticality and importance of service’ methodology that can be applied consistently across all outsourcing decisions and is in line with relevant sectoral regulations and guidance, assessed on an ongoing basis.</p> <p>H. Incorporating business continuity and disaster recovery plan with business disruption scenarios in FinTech-driven processes and systems</p> <p>I. Informing stakeholders of changes in banks’ risk management processes and practices that reflect changes in risk profile driven by fintech developments</p> <p>J. Adequacy of a service provider's internal and security controls, including the practicality of the service provider having an internal auditor, and the auditor's level of training and experience; service providers external auditors' training and background; and internal IT audit techniques of the service provider.</p> <p>K. Appropriate exit strategies, including the maintenance of skills and expertise in-house so that functions can be taken back by the regulated firm or substituted in an orderly manner, if required.</p> <p>2. Is there SLA established to address the following issues:</p> <p>A. Availability and timeliness of services; confidentiality and integrity of data; change control;</p>	<p>1. Risk management framework</p> <p>2. Service level agreement (SLA)</p> <p>3. Operational level agreement (OLA)</p>

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
			<p>security standards compliance, including vulnerability and penetration management; business continuity compliance; and help desk support.</p> <p>B. SLA program and monitoring process; accountability; recourse process for non-performance; escalation process; dispute resolution process; and termination process.</p> <p>(FFIEC, 2004) (BCBS, 2018)</p>	
R7	Monitor	<p>1. Establish guidelines for business continuity planning (BCP)</p> <p>2. Establish guidelines for multi-vendor monitoring</p> <p>3. Establish guidelines for change management</p>	<p>1. Does the outsourcing organisation's BCP comprise:</p> <p>A. Ongoing and effective business continuity and information security monitoring programs;</p> <p>B. Effectively management of multiple service provider relationships; and</p> <p>C. Assessing, monitoring, and effectively controlling cross-border risks when foreign FinTech service providers are used.</p> <p>D. Regularly review the BCP of the FinTech service provider to ensure any services considered "mission critical" for the outsourcing organization could be restored within an acceptable timeframe.</p> <p>E. Review the service provider's program for contingency plan testing. For critical services, annual or more frequent tests of the contingency plan are required.</p> <p>F. Assess service provider/vendor interdependencies for mission critical services and applications.</p> <p>2. In a multiple supplier relationship, is the outsourcing organisation monitoring the control environment through:</p> <p>A. Use of operational agreements between each of the service providers or stand-alone contracts</p> <p>B. Use of lead service provider, who has a contractual obligation to notify the financial institution of any concerns (controls / performance) associated with any of its outsourced activities.</p> <p>3. Does the outsourcing organisation's change management strategy comprise:</p> <p>A. Transition plan, disruption minimisation strategy, communication strategy, staffing arrangement (transfer, redundancy, redeployment), management function (retained organization), mobilised resources (allocated training and responsibilities for transition and operational teams)</p> <p>(FFIEC, 2004) (Oshri, Kotlarsky, and Willcocks, 2015)</p>	<p>1. BCP program</p> <p>2. Operational level agreement (OLA)</p> <p>3. Transition program</p> <p>4. Kotter change model</p>

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
R8	Feedback	1. Risk audit 2. Regulatory compliance	1. Are audit and compliance procedures appropriately executed? A. Measure service activity results against defined service levels; examine measured results to identify problems and determine causes; take appropriate action to correct failed activities, functions, and/or processes; continuously guide service providers through feedback sessions based on objectively measured performance metrics. B. Test, including stress testing, of processes and technologies for day-to-day resiliency and efficacy of mission-critical functions. C. Processes for monitoring and reviewing present and new products, services or delivery channels for compliance with applicable regulatory requirements, including, as appropriate, those related to consumer protection, data protection and anti-money laundering and countering the financing of terrorism (AML/CFT). D. Ensure that for regulated firms that outsource the operational tasks of internal control functions for the monitoring and auditing of outsourcing arrangements, ensure the operational tasks are effectively performed, including receiving appropriate reports, and exercise appropriate oversight and are able to manage the risks that are created by outsourcing arrangements. (CBI, 2018) (FDIC, 2014)	1. Internal/ external audit program 2. Compliance program
S2	Opportunity	1. Identify opportunity for organizational improvement	1. Are there opportunities for organizational improvement through: A. Cost reduction B. Operational flexibility C. Increased security D. Operational resilience E. Strategic growth F. Innovation (BCBS, 2018) (Lacity, Khan and Willcocks, 2009)	1. Value chain and need-gap analysis 2. SWOT and PESTLE analysis 3. Activity map, VRIO model and core competency analysis 4. Competitor analysis, benchmarking 5. Process improvement models, e.g. business process reengineering, Kanban 6. Innovation practices, e.g. design thinking, technology brokering, blue ocean strategy

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
S3	Planning	<p>1. Undertake feasibility study</p> <p>2. Define strategy</p> <p>3. Formulate innovation practices</p>	<p>1. Are there appropriate planning that will enable effective decision-making for the FinTech outsourcing process:</p> <p>A. Develop a corporate strategy to demonstrate how outsourcing as a management tool generates value.</p> <p>B. Design the detailed outsourcing life-cycle program</p> <p>C. Prepare the life-cycle communications strategy</p> <p>D. Prepare the business case rules and the base case</p> <p>E. Assess the feasibility and impact of the outsourcing on the organization</p> <p>F. Strategize and assess suppliers' innovation capability.</p> <p>2. Are there appropriate innovation practices in the organization to prioritize innovation:</p> <p>A. Formulate organizational innovation framework, e.g. bespoke design thinking</p> <p>B. Design proactive and scalable innovation processes where innovation investments are made ahead of customer needs, and there are continuous and streamlined upgrading of digital capabilities.</p> <p>C. Design appropriate innovation engagement methods with outsourcing partners, e.g. agile.</p> <p>(Babin, 2011) (Oshri and Kotlarsky, 2011) (Oshri, 2014) (Oshri, Kotlarsky, and Willcocks, 2015)</p>	<p>1. Feasibility study</p> <p>2. ROI analysis, including economic and customer value considerations</p> <p>3. Journey map</p>
S4	Design	<p>1. Design outsourcing deal configuration</p>	<p>1. Are there appropriate design of the FinTech outsourcing policies:</p> <p>A. Design corporate policies, guidelines and governance model for the use and maintenance of outsourcing as an effective management tool.</p> <p>B. Prepare the commercial and operating blueprint for the outsourcing project</p> <p>C. Draw up innovation methodology: agree on the definition of innovation, defining a scope of the innovation project, deciding on key areas (themes) to focus on, developing an action plan for each innovation project and deciding on the governance process of the innovation program.</p> <p>D. Develop balanced score metrics, including innovation measurement</p> <p>E. Draft the service agreement and the price and contract framework</p> <p>F. Design the interparty relationship (structure, roles, authorities, etc.), the retained organization and the contract governance function</p> <p>(Babin, 2011) (Oshri and Kotlarsky, 2011) (Oshri, 2014) (Oshri, Kotlarsky, and Willcocks, 2015)</p>	<p>1. Balanced scorecard</p> <p>2. Service level agreement (SLA)</p> <p>3. Contract and governance framework</p>

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
S5	Engage	1. Search 2. Negotiation 3. Contracting	<p>1. Is the provider able to provide the necessary outsourced financial services solution, with demonstrated domain knowledge (e.g. programming expertise, knowledge of industry trend), related outsourcing experience, and adequate talent, financial and technology resources.</p> <p>2. Are the outsourcing relationships governed by explicit and enforceable written contract:</p> <p>A. Clearly define what activities are going to be outsourced, including appropriate service and performance levels. The service provider's ability to meet performance requirements in both quantitative and qualitative terms should be assessable in advance.</p> <p>B. Contract should neither prevent nor impede the regulated entity from meeting its respective regulatory obligations, nor the regulator from exercising its regulatory powers.</p> <p>C. Regulated entity must ensure it has the ability to access all books, records and information relevant to the outsourced activity in the service provider.</p> <p>D. Contract should provide for the continuous monitoring and assessment by the regulated entity of the service provider so that any necessary corrective measures can be taken immediately.</p> <p>E. Include termination clause and minimum periods to execute a termination provision to allow the outsourced services to be transferred to another third-party service provider or to be incorporated into the regulated entity. Such a clause should include provisions relating to insolvency or other material changes in the corporate form, and clear delineation of ownership of intellectual property following termination, including transfers of information back to the regulated entity and other duties that continue to have an effect after the termination of the contract.</p> <p>F. Material issues unique to the outsourcing arrangement should be meaningfully addressed. For example, where the service provider is located abroad, the contract should include choice-of-law provisions and agreement covenants and jurisdictional covenants that provide for adjudication of disputes between the parties under the laws of a specific jurisdiction.</p> <p>G. Contract should include, where appropriate, conditions of subcontracting by the third-party service provider for all or part of an outsourced activity. In appropriate cases it should require approval by the regulated entity of the use of subcontractors by the third-party service provider for all or part of a serviced activity or activity being</p>	1. Market intelligence 2. Outsourcing agreement 3. Service level agreement (SLA) 4. Operational level agreement (OLA)

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
			delivered. More generally, the contract should provide the regulated entity with the ability to maintain a similar control over the risks when a service provider outsources to other third parties as in the original direct outsourcing arrangement. (BCBS, 2005)	
S6	Monitor	1. Undertake contract management	<p>1. Are there close monitoring of the performance of the FinTech service providers:</p> <p>A. Schedule periodic working-level meetings with both the end-user groups and the supplier to review the supplier's performance</p> <p>B. Conduct executive-level oversight meetings with the supplier's senior management to review the supplier's performance</p> <p>C. Ensure that the supplier measures and reports on performance</p> <p>D. Work with the supplier to redefine service levels as appropriate</p> <p>E. Consider transformational against transactional outsourcing management - ascertain degree of client-provider commitment, investing in and monitoring the relationship, using diligent documentation and administration, information exchange and coordination.</p> <p>2. Do the client-provider leadership demonstrate the following behaviour:</p> <p>A. Focused on the future</p> <p>B. Transparency</p> <p>C. Problem solving</p> <p>D. Outcome first</p> <p>E. High spirit of togetherness</p> <p>F. High clout within own organization</p> <p>G. Swift removal of obstructions</p> <p>H. Trustworthiness</p> <p>I. Effective performance</p> <p>J. Positive chemistry</p> <p>(GAO, 2001) (FDIC, 2014) (Mani et. al., 2006) (Willcocks, Lacity, and Craig, 2013)</p>	1. Outsourcing governance framework

Appendix 2

Node	Stage (First Pass)	Description	Leading Driving Question(s)	Leading Activities
S7	Feedback	1. Undertake performance measurement	<p>1. Are there adequate performance measurements conducted on the FinTech service providers:</p> <p>A. Sample and audit performance data frequently enough to perform trend analysis and permit extrapolation based on historical data</p> <p>B. Distribute performance data to stakeholders</p> <p>C. Employees, and possibly stakeholders, to rate supplier on a regular basis using, for example, scorecards and quarterly report cards</p> <p>D. Trigger incentives to motivate the supplier to exceed performance requirements; consider penalties to motivate the supplier to meet performance requirements.</p> <p>E. Periodically undertake studies to assess how the supplier's performance compares with the value being delivered to similar clients and the extent to which the supplier's performance is improving over time (e.g., validate cost assumptions for multi-year contracts)</p> <p>F. Metrics should measure the performance the service provider is giving the financial institution and not be based on the performance the vendor is delivering in aggregate to all its customers. Each measurement should logically support a requirement that is linked to a strategic goal. (GAO, 2001) (FDIC, 2014)</p>	<p>1. Internal/ external audit program</p> <p>2. Balanced scorecard, management report card</p> <p>3. Need-gap analysis</p>
S8	Innovation	1. Measure value creation through innovation	<p>1. For incremental or radical FinTech innovation undertaken, are there appropriate measurement tools:</p> <p>A. For incremental innovation, at the operational and strategic level, client firms should have developed clear measurement instruments as reference points to evaluate whether its incremental innovation targets have been met.</p> <p>B. For radical innovation, the client firm should seek both qualitative and quantitative inputs regarding performance. In terms of qualitative feedback, inputs regarding the quality of radical can include periodical surveys. (Oshri and Kotlarsky, 2011) (Oshri, 2014)</p>	<p>1. Innovation audit</p> <p>2. Three horizons model</p> <p>3. ROI analysis</p> <p>4. Benchmarking</p> <p>5. Surveys and interviews</p>

Biographies

Tristan Lim is a researcher and faculty at the School of Business Management of Nanyang Polytechnic, Singapore. His domain areas include Machine Learning and FinTech, among others. Tristan has experience spanning the private and public sector, in the areas of technology advisory, venture capital and finance. Tristan holds postgraduate degrees in the areas of IT, Engineering and Finance from Singapore Management University, National University of Singapore and The University of Sydney. He is a CFA (USA) and CAIA (USA) charter holder, and a member of the Chartered Institute of Securities and Investment (UK).

Patrick Thng is a senior practice faculty at the School of Information Systems of Singapore Management University, Singapore, where he is presently the Director of the Master of IT in Business (Financial Technology & Analytics). His research interests include strategic sourcing and vendor management, digital banking, FinTech and innovation management, among others. Patrick was formerly the Director and Chief Information Officer of the World Bank Treasury and Finance. He also held senior and regional roles in the banking industry, including DBS Bank (MD of Strategic Sourcing), UBS, ANZ Bank and BNP Paribas. Patrick graduated with PhD (Management) from Singapore Management University, Master of Commerce (Hons) in Information System Management from The University of New South Wales and Bachelor of Commerce (Hons, First Class) in Systems, Accounting and Finance from The University of New South Wales. He is also an FCA (Australia) and ISACA (USA) charterholder, and a board member of several Fintechs (Digital Banking, AI and Customer Experience).