



Systemic risk enacted by emotionally driven client behaviour on South African mobile banking systems: A structured literature review through the theoretical lens of interpersonal behaviour

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Abstract

Systemic risk is considered as one of the greatest, if not the greatest risk faced by retail banks. This paper uses the Theory of Interpersonal Behaviour as theoretical lens to understand systemic risk caused by emotional driven technology enacted client behaviours on mobile banking systems.

A structured literature review was selected as research method through which 34 research papers were selected for the identified research themes, namely mobile banking systems, systemic risk, SA retails banks and theory of interpersonal behaviour. From the identified research papers several sub themes were identified using a thematic analysis. These findings indicate that several factors (both conscious and nonconscious) have an impact on a client's intention to enact systemic risk behaviours via a mobile banking system.

In conclusion the paper proposes a theoretical framework, based on the theory of interpersonal behaviour, for explaining systemic risk enacted by emotionally driven client behaviour on mobile banking systems. From the limitations of the study a number of future research recommendations are also made, including investigating how mobile banking clients can be persuaded to abstain from systemic risk behaviour.

Keywords: Mobile Banking Systems; Systemic Risk; SA Retail Banks; Interpersonal Behaviour; Systematic Literature Review

1 Introduction

At the forefront of the rapid IT growth in the banking industry, is the emergence of mobile banking. This form of IT-enabled banking allows clients to perform typical banking transactions, such as making payments or transferring funds, via a mobile device (Hassan & Wood, 2020). Thusi and Maduku (2020) consider mobile banking to be a promising new delivery channel for banking services in emerging markets like South Africa, where it is difficult to obtain physical access to banking services. The increased growth in internet access and mobile device penetration within SA has made mobile banking event more enticing (Slazus, 2022).

The rapid growth of Information Technology in the financial system has allowed for greater cross-integration between banks and global financial markets, resulting in increased inter-connectedness between these entities (Klaassen, 2020). This in turn has also increased the potential of systemic risk.

According to Cerra et al.(2017), the greatest risk faced by retail banks is systemic risk*. The South African financial market is exposed to increased systemic risk, given that it is integrated with the global economy (C. F. J. Beyers, De Freitas, Essel-Mensah, Seymore, & Tsomocos, 2020). Bostandzic and Weiß (2018) consider the main sources of systemic risk for banks to be their size and their inter-connectedness. The inter-connectedness between large banks have a further danger that a systemic risk event may result in interbank contagion where the default from one bank would cause losses and further defaults from other connected banks (C. F. J. Beyers et al., 2020).

To complicate the matter, not much consideration has been given to model or measure human behavioural aspects that may cause or increase systemic risk (Hochrainer-Stigler et al., 2020). Hochrainer-Stigler et al. (2020), argue that: “the current technical view on systemic risks must be broadened to include the special nature of human agency”. At this point we argue that the behaviour of mobile banking clients needs to be considered as part of systemic risk measurement by SA retail banks, as their behaviours may result in a systemic risk event that may cause retail banks to fail. In other words, SA retail banks face increased systemic risk due to the wide adoption of mobile banking and how clients may behave using a mobile banking application. A bank’s mobile banking client base can engage directly with core banking systems through a mobile device, at any time from almost anywhere in the world.

The problem is described as follows: An event in the financial market causes mobile banking clients to enact emotional driven behaviours[†] (user interactions) on mobile banking systems (via various interfaces). This results in a possible systemic risk event that can cause the failure of a retail bank, which in turn could cause the failure of multiple other banks (due to interbank contagion). The multiple bank failures have a systemic impact (local or even global) on the financial market, resulting in hampered economic growth and possible economic damage. This scenario is depicted in Figure 1 below.

* probability that a bank will default due to a shock to the financial system.

[†] such as transferring large sums of money to another bank in another country.

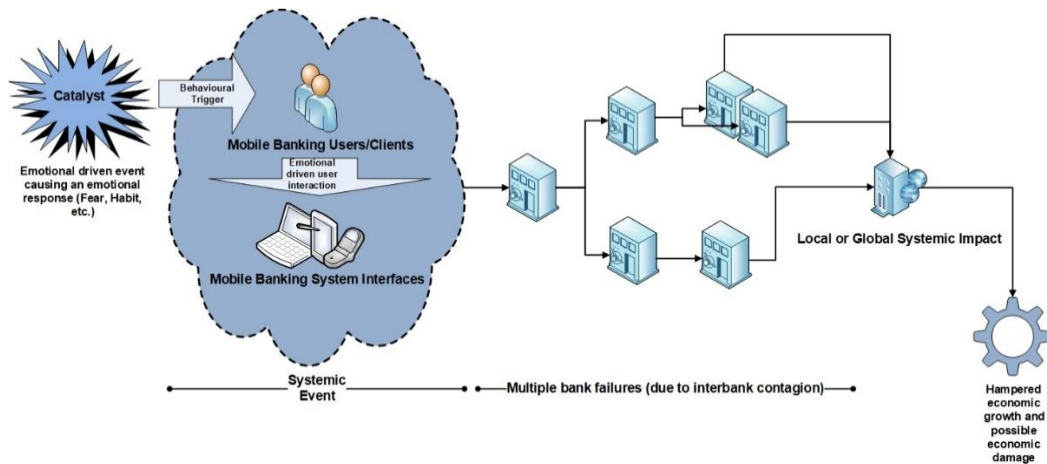


Figure 1: The Problem Statement

To better understand the phenomenon of systemic risk caused by such emotional driven technology enacted client behaviours, Triandis (1977)'s Theory of Interpersonal Behaviour will be applied as theoretical lens to the research problem. TIB is an integrated model that states that behaviour is a function of intention that also considers the key role that emotions, habit and facilitating conditions play when forming the intention to perform the behaviour. This paper aims to answer the following research question:

“How can systemic risk be understood, caused by emotional driven technology enacted client behaviours on mobile banking systems, by applying the theoretical lens of Theory of Interpersonal Behaviour?”

The rest of the paper consists of the following sections:

- Section 2: Introduces the literature themes that were investigated.
- Section 3: Outlines the research method that was followed.
- Section 4: Details the findings of the research as it relates to each literature theme.
- Section 5: Describes the proposed theoretical framework to address the research problem.
- Section 6: Concludes the paper with recommendations for future research.

2 Background

The background section of this study was organized into the main literature themes of mobile banking systems, systemic risk, SA retail banks and the theory of interpersonal behaviour.

2.1 Mobile Banking Systems

Mobile Banking can be defined as a service offered by banks that enables clients to use financial products and execute financial transactions via a mobile device at any time and without having to physically go to the bank (Lan & Giang, 2021). For emerging markets such as South Africa, mobile banking offers great promise as both an innovative and low-cost service channel to reach new clients (Van Deventer, 2021). This includes a previously untouched population to banking and financial services, where access to traditional banking has historically been limited (Thusi & Maduku, 2020). Yet, despite its benefits, the number of clients that make use of mobile banking services has been

limited. This also holds true for SA, where in 2018 only 43% of the population with a mobile device actually performed a mobile banking activity on their device(s) (Thusi & Maduku, 2020).

2.2 Systemic Risk

Ellis, Sharma, and Brzeszczyński (2021) considers systemic risk as the risk that causes a significant loss of economic value and confidence in a sufficient portion of the financial market. Systemic risk may be triggered by an unexpected event that has a negative impact on the economy. The likelihood of systemic risk materialising has increased along with the increase in complexity and interconnectedness of global financial systems (Klaassen, 2020).

Since the global financial crisis of 2007-09, systemic risk has remained one of the most feared risks when evaluating the vulnerability of banks in light of unforeseen future events (Badarau & Lapteacru, 2020). While South Africa was able to avoid a banking crisis in the past (C. F. J. Beyers et al., 2020), its financial sector was not totally unaffected by systemic risk, which serves to highlight the global effect that a systemic risk event has (Klaassen, 2020). The negative indirect impact of the 2007-09 crisis did result in job losses in the South African economy, emphasizing the need for South African banks to remain pro-active in minimizing systemic risk (Eita, Ngobese, & Muteba Mwamba, 2020).

2.3 SA Retail Banks

South Africa's financial sector is considered to be well governed and well regulated, with its banks regarded as some of the soundest in the world (Coetzee, 2019). However, the sector is also highly concentrated, with only five banks making out 90+% of South Africa's total banking assets in July 2018 (Coetzee, 2019). These banks are also heavily interconnected and account for most of the systemic risk consideration within the SA financial sector (Badarau & Lapteacru, 2020; Klaassen, 2020). Given how highly concentrated and integrated the South African financial and banking sector is, the South African Reserve Bank (SARB) is determined that unscrupulous behaviour[‡] is not allowed by any bank in order to ensure that systemic risk is contained (Coetzee, 2019). This was demonstrated in 2014 when the SARB intervened to prevent a potential systemic risk event from materialising during the failure of African Bank (Klaassen, 2020).

2.4 Theory of Interpersonal Behaviour

The Theory of Interpersonal Behaviour (TIB) as developed by Triandis (1977) is a psychosocial theory for understanding and explaining human behaviour (Gagnon et al., 2003). TIB extends similar behavioural theories, such as the Theory of Reason Action (TRA) or Theory of Planned Behaviour (TPB), by considering the impact of habit and affect (emotion) on behaviour (Moody, Siponen, & Pahnla, 2018; Pinder, Vermeulen, Cowan, & Beale, 2018). A common criticism of TIB is that it tends to be used less when compared to other behavioural models, often due to researchers preferring less complex theories compared to TIB (Robinson, 2010). Robinson (2010) further argues that despite this criticism, the value of this theory's ability to predict behaviour needs to be valued. It is TIB's consideration both conscious and nonconscious factors on behaviour that makes it ideal for this study. The same motivation has resulted in TIB being used to investigate diverse human behaviours across multiple fields of study, such as hand hygiene behaviour (Kupfer et al., 2019) and food waste reduction behaviour (Mumtaz, Chu, Attiq, Shah, & Wong, 2022).

[‡] behaviour(s) that can be considered dishonest or unfair for a bank to achieve its own goals.

In this study, TIB is applied in the field of information systems research to study emotionally driven client behaviour on mobile devices that may cause a systemic risk event in SA retail banks.

3 Research Method

A Systematic Literature Review (SLR) was chosen as research method to conduct the research. As stated earlier, the purpose of the study is to apply the theoretical lens of interpersonal behaviour to study systemic risk in the context of SA retail banks, enacted by emotionally driven client behaviour through mobile banking systems. A SLR research paper answers one or more formulated research questions by extracting and summarising the key findings from other research papers (Bhandari, 2020; Khan, Kunz, Kleijnen, & Antes, 2003), to add new knowledge to a specific body of knowledge. This research method is well suited for not only providing an overview of and insight and critique on a research problem but also identifying potential future research directions (Dumay, Bernardi, Guthrie, & Demartini, 2016; Snyder, 2019).

The SLR was executed in the following steps:

1. Academic papers were obtained using multiple databases, namely:
 - Google Scholar
 - ScienceDirect
 - EBSCOHost
 - ProQuest
 - Sabinet African Journals
 - ResearchGate
 - Directory of Open Access Journals
2. The following search terms were used to search for potential papers for the study using the database indicated in step 1:
 - (“mobile banking” OR “mobile banking systems”) AND “South Africa”
 - (“mobile banking” OR “mobile banking systems”) AND “behaviour”
 - “systemic risk” AND “South Africa”
 - “systemic risk” AND “behaviour”
 - (“retail banks” OR “retail banking”) AND “South Africa”
 - (“theory of interpersonal behaviour” OR TIB)
 - (“theory of interpersonal behaviour” AND “IS research”
3. Search results were filtered to papers published within the past 5 years, but increased where the results were for not satisfactory.

4. Papers that were deemed unsuitable sources were excluded. This could have been due to one or more reasons, including the full text not being available or the paper not being available (or written) in English.
5. Potential papers would be evaluating against the following criteria (in steps 5 and 6):
 - a. The paper is relatable one of the main literature themes (as described in Section 2).
 - b. The paper is focused on or at least applicable to the South African context.
6. Papers irrelevant for this research were excluded by scanning the abstracts of the remaining papers.
7. Lastly, we studied the full text of the remaining papers considered to be relevant to the research. After further exclusions, a total of 34 papers remained.

The remaining papers were organized within the main literature themes described in Section 2. It should be noted that several papers could be organized within multiple of the main research themes mentioned in Section 2. By using a thematic analysis, sub themes were identified (see Table 1) from the collection of literature sources, with the aim to address the research question (Braun & Clarke, 2006, 2012) and further contribute to the exiting body of knowledge.

Table 1 illustrates the main literature themes with the sub-themes that were identified through the thematic analysis.

Main Theme	Sub Theme	References
Mobile Banking Systems	Adoption	Van Deventer (2019), Hammouri, Al-Gasawneh, Abu-Shanab, Nusairat, and Akhorshaideh (2021), Slazus (2022)
	Continued Use	Van Deventer (2019), Hammouri et al. (2021), Koenait, Maziriri, and Chuchu (2021), Lan and Giang (2021)
	Perceived Risk	Van Deventer (2019), Slazus (2022)
	Perceived Usefulness	Van Deventer (2019), Van Deventer (2021)
	Technology Acceptance Model (TAM)	Hassan and Wood (2020), Slazus (2022)
	User Behaviour	Abdullah, Ahmed, and Ameen (2018)
	Infrastructure /Architecture	Abdullah et al. (2018), Thusi and Maduku (2020)
	Culture	Hassan and Wood (2020)
New Risks and Orientation	Mogos and Jamail (2021)	

Main Theme	Sub Theme	References
Systemic Risk	Systemic Event	Guerra, Silva, Tabak, de Souza Penaloza, and de Castro Miranda (2016), F. J. C. Beyers, Van Zyl, Walters, and Van den Heever (2018)
	Bank Size	Bostandzic and Weiß (2018), Klaassen (2020)
	Interconnectedness	F. J. C. Beyers et al. (2018), Bostandzic and Weiß (2018), Badarau and Lapteacru (2020), Klaassen (2020)
	Interbank Contagion	Foggitt, Heymans, Pretorius, and van Vuuren (2017), C. F. J. Beyers et al. (2020), Klaassen (2020)
	No Universal Definition	Benoit, Colliard, Perignon, and Hurlin (2017), Foggitt et al. (2017), Klaassen (2020)
	Inadequate Measures	Oordt and Zhou (2019), Hochrainer-Stigler et al. (2020), Ellis et al. (2021)
	Technology Adoption	Chaudhry, Ahmed, Huynh, and Benjasak (2022)
	Culture	Andries and Balutel (2022)
	COVID-19	Rizwan, Ahmad, and Ashraf (2020), Ellis et al. (2021)
SA Retail Banks	Competitive Environment	Coetzee (2016), Badarau and Lapteacru (2020)
	Systemic Exposure	C. F. J. Beyers et al. (2020)
	South African Reserve Bank (SARB)	Coetzee (2019), C. F. J. Beyers et al. (2020), Coetzee and Genukile (2020), Klaassen (2020)
	Well Regulated	Coetzee (2019), Eita et al. (2020)
	Highly Concentrated	Coetzee (2019), Klaassen (2020)
	Risk Averse	Coetzee (2019)
	Technology Adoption	Coetzee (2019)
Theory of Interpersonal Behaviour	Affect (Emotion)	Pee, Woon, and Kankanhalli (2008), Moody et al. (2018), Kupfer et al. (2019), Mumtaz et al. (2022)

Main Theme	Sub Theme	References
	Habit	Pee et al. (2008), Turel (2015), Moody et al. (2018), Kupfer et al. (2019), Mumtaz et al. (2022)
	Social Factors	Moody et al. (2018),
	Intention	Pee et al. (2008), Pinder et al. (2018)
	Perceived Consequences	Moody et al. (2018)
	Facilitating Conditions	Moody et al. (2018)

Table 1: Thematic Analysis - Main research themes with sub-themes

The results of the thematic analysis as depicted in Table 1 is discussed in the sections that follow.

4 Discussion

4.1 Mobile Banking Systems

SA retail banks have been keen to encourage the adoption of mobile banking systems, given the benefits it provides to both banks and their clients (Thusi & Maduku, 2020).

A mobile banking system architecture provides a communication channel with a bank's core banking systems via mobile communication systems, the internet, and mobile banking servers (Abdullah et al., 2018). The architecture in turn allows clients to perform banking transactions through a mobile interface.

Contemporary research on mobile banking, especially in the SA context, has been focussed on clients' adoption (Hammouri et al., 2021; Slazus, 2022; Van Deventer, 2019) and continued use of mobile banking applications (Hammouri et al., 2021; Koenaitte et al., 2021; Lan & Giang, 2021; Van Deventer, 2019). The dominant theory used in the studies mentioned is the Technology Acceptance Model (TAM) (Hassan & Wood, 2020; Slazus, 2022). TAM is used in the mentioned studies to investigate and explain the factors that influence a customer's perceived risk and usefulness with regards to the adoption and continued use of mobile banking. Hassan and Wood (2020) add that cultural factors also impact customer perceptions toward the use of technological services, such as in the case of mobile banking. Abdullah et al. (2018) further highlights that many client behaviours can also create vulnerability and threats to the mobile banking system.

4.2 Systemic Risk

Systemic risk can be defined as the risk that an unexpected event, known as a systemic event, could result in considerable loss and damage to the financial market, including the banking system (Ellis et al., 2021). A systemic event is typically caused by either an internal or external shock to the financial market (F. J. C. Beyers et al., 2018; Guerra et al., 2016). Main sources of systemic risk for banks, which could cause such a systemic event, are bank size and interconnectedness. A large bank would cause a much bigger loss to the financial market in the event of a default than a smaller bank (Bostandzic & Weiß, 2018; Klaassen, 2020). The bigger the bank, the more interconnected or linked (via interbank loans) it is likely to be with other banks (Badarau & Lapteacru, 2020; F. J. C. Beyers et al., 2018; Bostandzic & Weiß, 2018). From this perspective the SA banking system is susceptible to

systemic risk, given that it is concentrated around a small number of big and interconnected banks (Klaassen, 2020).

Despite systemic risk being considered as one of the greatest, if not the greatest risk faced by retail banks, there is still no universally agreed upon definition for systemic risk (Benoit et al., 2017; Foggitt et al., 2017; Klaassen, 2020). The lack of agreement on the definition of systemic risk has also resulted in a lack of agreement on how systemic risk should be measured (Ellis et al., 2021; Hochrainer-Stigler et al., 2020). Oordt and Zhou (2019) go so far as to consider conventional systemic risk measures incapable of thoroughly measuring and reporting on systemic risk.

Various factors can increase the probability of a systemic risk event. Chaudhry et al. (2022) state that the rapid growth of IT is resulting in increased risk to the financial market. Research by Andries and Balutel (2022) revealed that country-specific cultural values, particularly individualism and masculinity, can be considerable contributors to systemic risk. The recent COVID-19 pandemic resulted in renewed interest in the effectiveness of systemic risk measures (Ellis et al., 2021). Rizwan et al. (2020) showed that during COVID-19 systemic risk was successfully mitigated through effective policy interventions, yet the pandemic still resulted in a significant increase in systemic risk in some countries.

It should also be noted that it is Europe and the U.S. that seem to be the main origins of systemic risk and not the emerging market (Bostandzic & Weiß, 2018). Moreover, an average European bank contributes more to global systemic risk than an average U.S. bank. Bostandzic and Weiß (2018) explain by indicating differences in the regulatory regime of the U.S and Europe compared to other markets, the higher interconnectedness of European banks with the global financial system, as well as the relative size of European banks compared to U.S. banks.

4.3 SA Retail Banks

South African banks have a reputation for being conservative and risk averse (Coetzee, 2019), despite having to operate in a highly competitive environment (Badarau & Lapteacru, 2020; Coetzee, 2016). SA banks have consistently enjoyed being regarded as sound and well regulated by the global financial market (Coetzee, 2019; Eita et al., 2020). South Africa's central bank the SARB itself has maintained a conservative and strict regulatory approach to ensure banks remain sound and well regulated (C. F. J. Beyers et al., 2020; Coetzee & Genukile, 2020; Klaassen, 2020). A primary motivation for the SARB's approach is to ensure that systemic risk is mitigated (Coetzee, 2019).

Despite its soundness, the SA retail banking sector remains highly concentrated and interconnected, with a handful of banks making up the bulk of SA's retail banking sector (Coetzee, 2019; Klaassen, 2020). Despite the SARB's efforts, SA retail banks are not immune from systemic risk exposure, given that SA is well integrated into the global financial sector (C. F. J. Beyers et al., 2020). Indeed, as previously indicated, in past the SARB has needed to intervene in order to prevent a systemic event from materialising. It is also expected that the SA banking sector will continue to see an increase in IT growth, with 3 new digitally focused retail banks entering the market in recent years (Coetzee, 2019).

4.4 Theory of Interpersonal Behaviour

The Theory of Interpersonal Behaviour (TIB) consists of several related constructs that explain and determine behaviour, as described, and depicted in Figure 2. The constructs are:

- **Affect (Emotion):** This a person's overall positive or negative feeling regarding a behaviour (Moody et al., 2018). Affect is essentially a person's emotional response to a behaviour, which helps explain the psychological cause of the behaviour (Mumtaz et al., 2022).
- **Habit:** Behaviours that have been learned to be enacted automatically in a given situation are known as habits (Kupfer et al., 2019). Within the Information Systems (IS) context, habits are learned through the repetitive use of IS systems (Turel, 2015).
- **Social Factors:** A person's intention to perform or abstain from a behaviour can be significantly influenced by additional pressures resulting from a subjective social norm (Mumtaz et al., 2022), and/or the person's position with a given social group (Moody et al., 2018)
- **Intention:** The intent to enact a behaviour is itself the result of affect, habit, and social factors. Forming the intent or decision to enact a behaviour requires the input of both conscious (habit and social factors) and nonconscious (affect) constructs (Pinder et al., 2018).
- **Perceived Consequences:** Behaviours that are perceived to be safer and/or more rewarding are preferred over behaviours that are perceived to carry a high risk and/or pose a threat to the person (Moody et al., 2018).
- **Facilitating Conditions:** The ability of a person to enact an intended behaviour within an environment is known as facilitating conditions (Moody et al., 2018). Depending on these conditions a person's ability to enact a behaviour could either be enabled or impeded (Kupfer et al., 2019) regardless of his/her intention (Pee et al., 2008) or habits (Mumtaz et al., 2022).

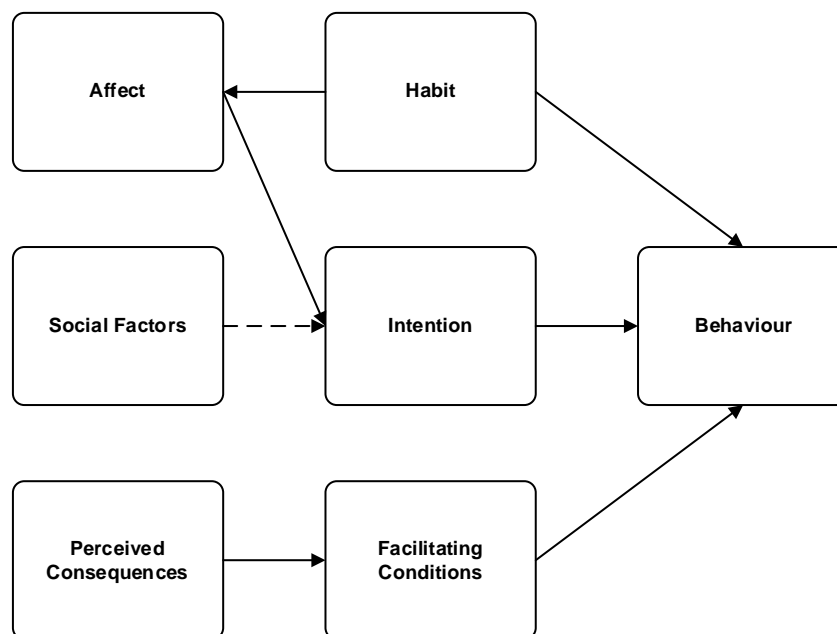


Figure 2: Theory of Interpersonal Behaviour (Triandis, 1977)

While all constructs have an impact on behaviour, TIB emphasizes the nonconscious, automatic, and impulsive constructs of emotion and habit (Kupfer et al., 2019; Mumtaz et al., 2022)

5 A framework for emotionally driven mobile technology enacted systemic risk behaviour

This section proposes a new theoretical framework that explains systemic risk enacted by emotionally driven client behaviour on mobile banking systems. The new theoretical framework uses Triandis's Theory of Interpersonal Behaviour as its foundation and applies the findings from this study.

The new theoretical framework that explains systemic risk enacted by emotionally driven client behaviour on mobile banking systems, consists of the following constructs, depicted in Figure 3. Each construct is inherited from TIB but is described and applied within the problem context of this study.

- 1. Affect (Shock to the Financial Market):** An unexpected shock to the financial market (such as the failure one or more banks) triggers an emotional response (typically fear) from mobile banking clients. A good example of such a shock within the SA financial market is the 2014 failure of African Bank (Section 4.3). The client's fear response in turn results in the client forming the intention to enact a systemic risk behaviour.
- 2. Habit (Repetitive Mobile Banking Use):** The repetitive use of mobile banking systems (Section 4.4) results in clients forming habits that may result in ongoing systemic risk behaviour. This habit could also serve to strengthen a customer's affect during an unexpected shock to the financial system.
- 3. Social Factors (Cultural Values):** The set of cultural values specific to South Africa could make the client more susceptible to forming the intention to enact a systemic risk behaviour (Section 4.2).
- 4. Intention (Mobile Banking Adoption / Continued Use):** Within this context the intention to enact a systemic risk behaviour is coupled with the client either having to adopt mobile banking systems use or having to continue mobile banking systems use (Section 4.1). This is due to the client enacting a systemic behaviour through using a mobile banking system.
- 5. Perceived Consequences (Risk vs. Usefulness):** A client could be further encouraged to enact a systemic risk behaviour via a mobile banking system if he/she perceives the usefulness or benefit of using the system to outweigh the risk of using the system (Section 4.1).
- 6. Facilitating Conditions (Mobile Banking System Interfaces):** Access to one or more mobile banking system interfaces (Section 4.3) is the primary facilitating condition that enables clients to enact systemic risk behaviour.

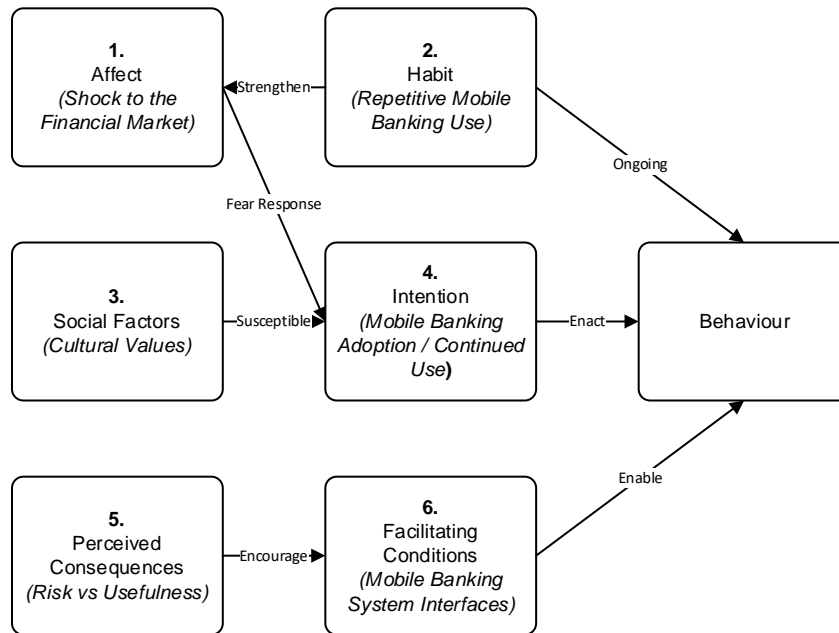


Figure 3: A Theoretical Framework for Systemic Risk Enacted by Emotionally Driven Client Behaviour on Mobile Banking Systems

The theoretical framework above illustrates the factors (through the lens of TIB) that impact the enactment of emotional driven systemic risk behaviours through client interactions on mobile banking systems. It should be noted that clients will typically be unaware of the systemic risk impact of the behaviour(s) they enact via the various mobile banking systems interfaces. Instead, clients will be directly concerned with the direct impact these behaviour(s) will have on themselves.

6 Conclusion and recommended future research

In order to address the identified research problem a SLR was conducted from which a total of 34 applicable research papers was identified. These papers were then organized within the 4 main literature themes from which several sub themes were identified for each theme using thematic analysis. The results of the thematic analysis were then used to construct a theoretical framework (See Figure 3) based on the theory of interpersonal behaviour. The framework answers the research question by describing the factors that impact emotional driven technology enacted client behaviours on mobile banking systems that may result in increased systemic risk.

Upon conclusion of his paper, the researchers identified several shortcomings in our research from which the following recommendations are made for future research:

- How can clients be persuaded to abstain in behaviours that increase systemic risk, or even be motivated to enact behaviours the reduce systemic risk?
- What are the specific client behaviours that impact systemic risk?
- Apart from being a facilitating condition, can a mobile banking system be applied as mitigation tool/condition for systemic risk?

- How can technologies such Big Data or Artificial Intelligence (AI) complement mobile banking systems to predict when client systemic risk behaviours will be enacted?

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