Using Humanness and Design Aesthetics to Choose the "Best" Type of Trust: A Study of Mobile Banking in France

Abstract

Purpose –This research addresses the limitations of previous literature regarding choosing the appropriate conceptualisation of trust (i.e., interpersonal trust or system trust) and the role of design aesthetics in generating system trust and intention to adopt mobile banking.

Design/methodology/approach – This research conducts two studies. Study 1 determines the degree of humanness in a mobile banking application. Study 2 tests the research model. Two hundred and sixty-one respondents participate in study 1 and four hundred and ninety-nine in study 2. SPSS (study 1) and SmartPLS (study 2) are used to test the hypotheses.

Findings – Study 1 establishes that the mobile banking application is perceived to have low humanness. Thus, it is expected that system trust is more appropriate to use than interpersonal trust. Study 2 demonstrates that i) system trust is more useful than interpersonal trust in the mobile banking context and ii) design aesthetics positively influences consumer system trust and intention to adopt.

Originality/value - To the best of the authors' knowledge, this research is the first to distinguish empirically between system trust and interpersonal trust and identify the best choice of mobile banking trust type. Specifically, this study determined the choice of system trust for mobile banking through *a priori* humanness measures and validated this choice by measuring both system trust and interpersonal trust, which has not been done before. In addition, retail banking should consider the influence of design aesthetics on consumer trust and incorporate elements that enhance consumers' opinions about the mobile banking application's functionality, reliability, and helpfulness.

Keywords: Mobile banking, system trust, interpersonal trust, technology trust, design aesthetics, SmartPLS.

1. Introduction

Context is found to be important in trust studies (Jarvenpaa et al. 2004). This research examines the effects of two concepts: technology humanness and design aesthetics. Several studies conclude that design aesthetics is associated with positive outcomes. However, when aesthetics is extended to utilitarian services (here mobile banking), it is not clear from the literature whether the attractiveness effect still works.

Some recent literature demonstrates the importance of design appeal in eliciting the adoption and use of innovations in general, and mobile banking, in particular (e.g., Chaouali et al., 2019). However, it is surprising how little is understood about the attractiveness of mobile banking (a utilitarian service). Ironically, to enhance the appeal of mobile banking applications, managers tend to base their strategies on intuitions more than on scientific knowledge (Chaouali et al., 2019), leaving the robustness and generalizability of the mobile banking attractiveness effect an open question. In addition, little is known about design aesthetics' effects on trust, in spite of aesthetics' importance during the pre-adoption stage (Cyr, 2008). One focus of this research is on design aesthetics as the antecedent of both trust and intention to adopt a mobile banking application.

It is well-established that trust is at the heart of customer-firm relationships. However, the majority of previous literature on trust in the domain of human–technology interaction is subject to a critical gap that this study attempts to fill. This research finds that many researchers who study trust in a specific technology use either interpersonal trust[1] (i.e., benevolence, competence, and integrity) or system trust (i.e., helpfulness, functionality, and reliability) (Lankton et al., 2015). However, as Table 1 shows, although many researchers recognize the importance of technology humanness (e.g., Marela et al. 2020), they do not acknowledge, on a

[1] Or human-like trust.

scientific basis, that system trust (in addition to interpersonal trust) can exist (e.g., Meyer-Waarden and Cloarec, 2021). Also, many researchers subjectively choose one trust type without any solid scientific justification (Lin, 2011). For example, previous studies use interpersonal trust to conceptualise trust in mobile banking (e.g., Yu et al., 2015) while system trust is arguably more appropriate. This research argues that, in many cases, the selection of either interpersonal trust or system trust in the domain of human–technology interaction can only be done effectively after i) measuring the degree of the technology's humanness and ii) measuring both trust types, in line with Lankton et al. (2015). It finds no articles besides Lankton et al. (2015) that do this. Table 1 shows neither of these steps is typically being done by previous literature. This research fills this gap by demonstrating and confirming the need for a careful matching process between the degree of a technology's humanness and the type of trust to be used. The results imply that whenever the choice of system and interpersonal trust types is in question, one should measure the humanness of the technology before deciding.

Table 1. Prior Studies of Trust in Technology

Author(s)	Type of technology	Interpersonal trust or system trust	Measures humanness to choose trust type	Measures both types to verify choice
Agag et al. (2020)	Online hotel booking	System and interpersonal	No	No
Balakrishnan and Dwivedi (2021)	Chatbox service	Interpersonal	No	No
Chang et al. (2016)	Online shopping	Interpersonal	No	No
Chaouali et al. (2019)	Mobile banking	Interpersonal	No	No
Chen and Cheng (2020)	Media trust	Interpersonal	No	No
Eastlick and Lotz (2011)	Online shopping	Interpersonal	No	No
Giovanis (2016)	Mobile internet	Interpersonal	No	No

Hong and Cha (2013)	Online shopping	Interpersonal	No	No
Jensen and Wagner (2018)	e-travel website	Interpersonal	No	No
Kaabachi et al. (2017)	Internet-only banks	System and interpersonal	No	No
Kaabachi et al. 2020	Online banks	System and interpersonal	No	No
Lin (2011)	Mobile banking	Interpersonal	No	No
Luo et al. (2010)	Mobile banking	Interpersonal	No	No
Marela et al. (2020)	Bitcoin	System	No	No
Martínez-López et al. (2015)	Online shopping	Interpersonal	No	No
Meyer-Waarden and Cloarec (2021)	Autonomous vehicles	System and interpersonal	No	No
Moussawi et al. (2020)	Siri	Interpersonal	No	No
Nghia et al. (2020)	Online shopping	System	No	No
Schuetz and Venkatesh (2020)	Cognitive tech systems	Interpersonal	No	No
Shareef et al. (2019)	E-commerce	System	No	No
Sung (2020)	M-app ads	Interpersonal	No	No
Tang et al. 2019	M-coupons	Interpersonal	No	No
Thiebes et al. (2020)	AI	Interpersonal	No	No
Tseng and Lee (2016)	Online group shopping	Interpersonal	No	No
Wei at al. (2021)	Genetic testing	System	No	No
Whang and Im (2018)	Recommender system	Interpersonal	No	No
Ye and Kankanhalli (2017)	Crowdsourcing platf.	Interpersonal	No	No
Zhu et al. (2020)	Online shopping	Interpersonal	No	No

Unlike prior work, this research examines what customers infer about the design aesthetics of a mobile banking application while considering the appropriate type of trust. Specifically, this research first finds that design aesthetics of a mobile banking application can

lead to higher trust (specifically *system trust—but not interpersonal trust*) and intentions to adopt. This is supported by environmental psychology, which suggests a halo effect, leading customers to make a correspondence between aesthetics and trust (Chaouali et al., 2019). In other words, that halo effect carries over first impressions regarding the aesthetics cues to other non-observable attributes of products/services/environments (Tractinsky and Lowengart, 2007). This research shows that aesthetics can generate quick and lasting *system* trust (Tuch et al., 2012) that favors adopting the attractive mobile application (Crolic et al., 2019). This implies that researchers and practitioners should not neglect using aesthetics and system trust in their mobile banking studies and practice. This research also shows, by contrast, that mobile banking design aesthetics does not predict interpersonal trust, and interpersonal trust does not predict adoption intention, underscoring how critical the trust type choice is.

To the best of the authors' knowledge, this research is the first attempt to address this combination of gaps in the literature. To achieve this, it provides a deeper comprehension of trust formation through design aesthetics. In addition, it proposes a more accurate conceptualisation of trust by applying guidelines necessary to select the appropriate trust type (interpersonal trust or system trust). In sum, it tries to answer these research questions:

RQ1. How does the perceived humanness of mobile banking[2] affect the choice of the appropriate type of trust?

RQ2. How does mobile banking design aesthetics differentially affect interpersonal and system trust?

RQ3. How does design aesthetics affect the intention to adopt mobile banking?

[2] From here on, we will use the term "mobile banking" to mean a mobile banking application.

To answer these research questions, this research builds on trust theory and the theory of affordances. As such, it provides several theoretical implications. It contributes to the theory of affordances by demonstrating that social affordances help assess the degree of humanness of the technology. It contributes to trust theory by i) proposing design aesthetics as an antecedent of trust in a utilitarian service (here mobile banking), which is rarely addressed in the literature (i.e., previous studies mainly focus on design aesthetics' effects in hedonic services), ii) distinguishing between system trust and interpersonal trust, and iii) proposing guidelines to choose the appropriate type of trust based on the technology's humanness. Furthermore, it has insightful managerial implications. Mobile banking applications should embed vivid, attractive, and captivating illustrations and visuals. The buttons can be labelled with realistic pictures and icons so that they can be used as signifiers (Norman, 2013). The application can include analytics to provide timely and accurate details and feedback on the users' experience and preferences. Also, this research recommends that the degree of humanness should be measured *a priori* so practitioners and academicians can use the appropriate type of trust to get accurate results. Another interesting implication is that designers can increase the humanness of applications or technologies by enhancing their aesthetics to include social affordances (from the theory of affordances).

2. Literature review

In addition to trust theory, this research is based on the theory of affordances (Norman, 2013) to inform the choice of mobile banking system trust over interpersonal trust. That choice is achieved through *a priori* humanness measures, building on the theory of affordances (Lankton et al., 2015).

Trust is a necessary ingredient in people's daily connections with their environments (Zheng et al., 2017). Trust is crucial in the context of digital environments (online and mobile

contexts), in which uncertainties and risks are often high (Gefen et al., 2003). Trust in a specific technology is the focus of many studies, such as cloud services (Vanderwerff et al., 2019) and chatbox service (Balakrishnan and Dwivedi, 2021). Because research finds that people can ascribe human characteristics to technologies (i.e., anthropomorphize them—Nass et al., 1994), most studies, surprisingly, measure trust in a technology using constructs developed to assess interpersonal trust (i.e., ability, benevolence, and integrity).

Technology humanness is an important concept in the marketing and information technology literature. The 1950 Turing Test was created to see if one could distinguish an answer given by a computer versus a human (Moussawi et al., 2020). Now, some technologies can include new human-like aspects such as fluency, politeness, appearance, sociability, name, gender, and sense of humor (Moussawi et al., 2020; Waytz et al., 2014). During any experience with a system, one may attribute human characteristics to it. This attributing process defines what anthropomorphizing means (Waytz et al. 2014). The result of anthropomorphizing is that one makes a system seem more human-like, i.e., to possess more humanness.

Designers are trying to make some systems have more human-like characteristics (e.g., metavoicing) in order to be perceived as humans. As such, literature should distinguish between technologies high on humanness and those low on humanness since they have divergent effects on customers' reactions, including trust in them (Lankton et al., 2015).

2.1 Trust theory

Trust encourages customers to subjectively rule out and manage the "possible" undesirable outcomes that can occur when using e-channels (Gefen et al., 2003). Mobile banking can be perceived by customers as a risky/uncertain channel (Luo et al., 2010). Indeed, its users can be exposed to various uncertainties that are beyond their control. Mobile banking may operate poorly or be dysfunctional or be subject to technical problems, causing losses of

money, time, and privacy (Luo et al., 2010). Previous research supports the effects of trust on customers' perceptions, emotions, use intention, and loyalty (Cyr, 2008). However, trust in technology and trust in mobile banking, particularly, may suffer from an incorrect conceptualisation as suggested by Lankton et al. (2015). That is why Lankton et al. (2015) propose scientific guidelines to select the appropriate conceptualisation.

Researchers use two distinct types of trust with respect to human-technology interaction. They can apply interpersonal trust, composed of the attributes benevolence, competence, and integrity or system trust, composed of helpfulness, functionality, and reliability[3] (Lankton et al., 2015) (see Table 2 for definitions). However, the literature is not clear on the appropriateness of using one typology instead of the other (Lankton et al., 2015). In fact, the majority of researchers, until now, select what trust type to use based on scant scientific justifications. Some argue that since empirical findings suggest people assign human attributes to technologies, one can always apply interpersonal trust constructs to a study where a human trusts a technology. However, this may generate misspecification of the trust concept and thus inaccurate findings (Lankton et al., 2015). Also, "using the wrong trust constructs [dimensions] may be misleading and cause conflict or confusion among respondents because of the mismatch between the construct and the technology being assessed" (Lankton et al., 2015, p. 881). If the technology is more machine-like than human-like, then using system trust prevents respondents from feeling forced to ascribe unwarranted attributes to a technology. Specifically, it keeps respondents from having to imagine that a machine-like technology has human attributes like benevolence (caring) or integrity (ethical reasoning) when these traits are far removed from how they view what that technology can do. Even though people anthropomorphize

[3] System trust's functionality, reliability, and helpfulness~~)~~: i) "reflect what technology [here mobile banking] can realistically do for the human trustor [here the customer], not what another human can do for the trustor" (Lankton et al., 2014, p. 132), all without violating humans' understanding of a technology's capabilities (Lankton et al., 2015), and ii) "represent a remedy for felt risks and uncertainties about whether the technology can do what they want it to do" (Lankton et al., 2014, p. 132).

technologies, respondents may have trouble ascribing caring or ethical reasoning to a machine-like technology (Ho and MacDorman, 2010). To address this, some researchers (e.g., Lankton et al. (2015)) try to put an end to this "anarchy" and establish better guidelines for using one typology instead of the other.

Table 2. Definitions of Interpersonal Trust and System Trust

Interpersonal Trust Constructs	System Trust Constructs
Ability/Competence: "that group of skills, competencies, and characteristics that enable a party to have influence within some specific domain" (Mayer et al., 1995, p. 717).	**Functionality**: "the degree to which an individual believes the technology will have the functions or features needed to accomplish one's task(s)" (Lankton McKnight 2008, p. 34).
Integrity: "the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable" (Mayer et al., 1995, p. 719).	**Reliability**: "the degree to which an individual believes the technology will continually operate properly, or will operate in a consistent, flawless manner" (Lankton McKnight 2008, p. 35).
Benevolence: "the extent to which a trustee is believed to want to do good to the trustor, aside from an egocentric profit motive" (Mayer et al., 1995, p. 718).	**Helpfulness**: "the degree to which an individual believes the technology will provide adequate and responsive help" (Lankton McKnight 2008, pp. 35-36).

Note: Each System Trust construct in the right column was derived from the Interpersonal Trust construct to its left. Each System Trust construct's definition was based on the affordances a relatively low-humanness system would likely provide its users that users can trust in or rely on (i.e., what can this technology provide or do for its user?)

2.2 The theory of affordances

The theory of affordances was first developed by ecological psychology (Gibson, 1979) to study "how animals evolved to perceive their environment in particular ways" (Evans et al., 2017, p. 36). Then it was applied to the contexts of design (Norman, 2013) and information systems (Seidel et al., 2013). Affording refers to allowing people the opportunity to take action (Borghini et al., 2021). An affordance is defined as "a relationship between the properties of an object and the capabilities of the agent that determine just how the object could possibly be used", for example "a chair affords ("is for") support and, therefore, affords sitting. Most chairs can also be carried by a single person (they afford lifting)", "glass affords seeing through and support" (Norman, 2013, p. 11) and "knobs can be turned, pushed and pulled" (Norman, 2013, p. 13). The theory of affordances assumes that people see, utilize, and even accidentally transform the affordances that are offered by their physical, online, and mobile environments (Borghini et al., 2021; Norman, 2013). Consequently, mobile applications can offer several affordances that convey information and meaning and trigger (or hinder—i.e., anti-affordances) the formation and change of beliefs, emotions, and behaviours among users (Borghini et al., 2021). For example, Värlander and Yakhlef (2006) show that customers are more likely to communicate more of their needs and aspirations and develop approach behaviours when they are seated at a round table with the bank tellers instead of being separated by glass counters.

Recently, the theory of affordances was extended to include social affordances. In this vein, technologies can appear and act like humans. With social affordances, a technology's features can influence its level of sociality by enabling quasi-social interactions between people or between people and machines. For example, virtual agents offer social affordances by recognizing, treating, and replying to human voices (two-way interaction) (Lankton et al., 2015). Visibility is another example of digital technologies' (e.g., Facebook) social affordance, which allows users to make their interests, information, behaviours, and preferences visible to

their online network by updating their status and profiles (Lankton et al., 2015). Metavoicing affords users the ability to engage in an ongoing conversation by reacting online to others' presence, profiles, content, and activities by retweeting or voting on a posting (Majchrzak et al., 2013).

Social affordances describe aspects and characteristics of technologies that make users perceive them as more or less human-like (i.e., different levels of "humanness"), which in turn will cause interpersonal trust to have more influence for more human-like technologies but system trust for more system-like technologies (Lankton et al., 2015). For example, Siri, by allowing human voice-based communication, and mobile Facebook, by enabling interpersonal communication, are perceived more human-like (so here researchers should use interpersonal trust). By contrast, Microsoft Access, by not depicting others as psychologically present (lower social presence), or enabling interpersonal communication and dynamism (fewer social affordances) is perceived as system-like (so here researchers should use system trust constructs).

2.3 Mobile banking's degree of humanness

As discussed above, when a technology has more social affordances, people perceive it as more human-like (e.g., mimicking a human—such as talking and looking like humans and offering two-way interaction) (Lankton et al., 2015). Accordingly, systems that are higher in sociality will be considered higher in humanness, while those lower in sociality will be considered lower in humanness (Lankton et al., 2015). Mobile banking is likely to lack social affordances such as social presence (voice and quasi-human appearance), responsiveness, and interpersonal communication. That is why, customers would view it as less human-like. That is why this study expects that mobile banking will be lower on humanness compared to other technologies (e.g., mobile Facebook) that are higher in social affordances. Thus,

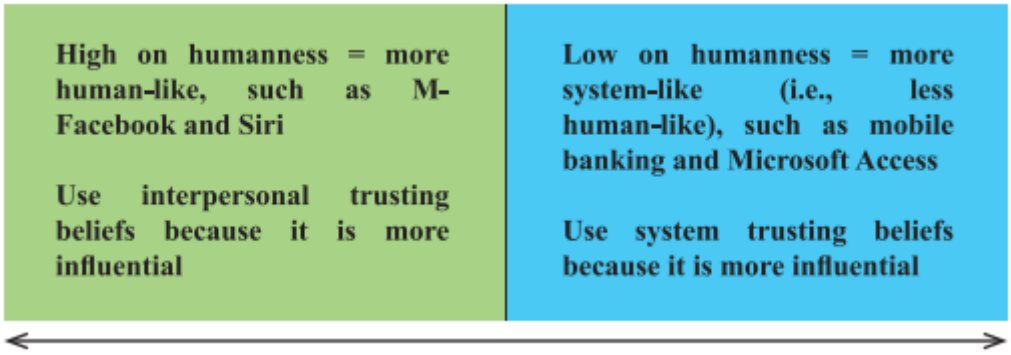
H1. Mobile banking will be perceived lower on humanness than other technologies (here mobile Facebook[4]) that have higher social affordances.

2.4 Trust in mobile banking: More system-like trust than interpersonal-like trust

Trust in mobile banking is defined broadly as the willingness to depend on it because of the belief that it has desirable attributes (Lin, 2011). This paper focuses on trusting beliefs about those desirable attributes, and will treat the terms "trust" and "trusting beliefs" as synonyms. In line with the principle of technologies' degrees of humanness and recent research on trust theory (Lankton et al., 2015), as customers will view a mobile banking application to be less human-like, they cannot fully ascribe desirable human attributes (i.e., integrity, competence, and benevolence) to mobile banking. They tend to think that mobile banking can be functional, reliable, and helpful (system trusting beliefs) instead of being competent, honest, and benevolent (interpersonal trusting beliefs). In addition, a mobile banking application interacts with its users in a limited way through its help function (i.e., email and phone support, accessed several clicks away). Thus, the use of system trusting beliefs will be more appropriate to address trust in mobile banking while the use of interpersonal trusting beliefs will be more appropriate to address trust in social technologies (e.g., mobile Facebook) that embody higher humanness. In sum, customers trust a mobile banking application to provide a certain functionality, to operate reliably, and to be helpful (Lankton et al., 2014). Thus, system trusting beliefs will more strongly impact intention to adopt a mobile banking service than will interpersonal trusting beliefs (see Figure 1).

[4] Mobile Facebook is used and empirically tested in many studies as a benchmark for technologies that are higher in humanness (e.g., Lankton et al., 2015).

Figure 1. Humanness continuum (adapted from Tripp et al. (2011) and Lankton and McKnight (2008))



H2. System trusting beliefs will have a stronger positive effect on intention to adopt mobile banking than will interpersonal trusting beliefs.

2.5 Design aesthetics as an antecedent of trusting beliefs and intention to adopt

"Design aesthetics" refers to the "balance, emotional appeal, aesthetics, and uniformity of the overall graphical look, […] including colors, photographs, shapes, or font" (Cyr, 2008, p. 53). Customers reward the extra effort of banks when they care about their enhanced experience by producing attractive mobile applications (Morales, 2005). They adjust their reliance on mobile banking depending on the level of its attractiveness (Chaouali et al., 2019). In this vein, environmental psychology (e.g., S–O–R model and servicescape[5]) supports the "look" and "feel" effects on trust (Cyr et al., 2006). Similarly, Chaouali et al. (2019) find that design aesthetics is highly correlated with: i) intention to adopt mobile banking (r = 0.75) and ii) trust in mobile banking (r = 0.74). Indeed, when customers do not have prior experience with the system, they mainly rely on observable cues (here design aesthetics) to make their

[5] S–O–R model (Mehrabian and Russell, 1974) and servicescape (Bitner, 1992) provide evidence that environmental stimuli (e.g., overall layout, design, and digital environment) affect the individual's internal processes and then engender behavioural reactions (Tuch et al., 2012)

inferences on other non-observable attributes (here intention to adopt, trust) (Eroglu et al., 2001).

According to environmental psychology, a halo effect is likely to occur leading customers to make a correspondence between aesthetics and adoption/trust (Chaouali et al., 2019). In other words, that halo effect carries over first impressions regarding the aesthetics cues to other non-observable attributes of products/services/environments (Tractinsky and Lowengart, 2007). Aesthetics can generate quick and long-lasting inferences (Tuch et al., 2012) that are in favor of the most attractive item or mobile application (Crolic et al., 2019). According to the "what is beautiful is good" effect (from environmental psychology), attractive stimuli generate trust (for example, people tend to trust attractive persons, stores, and websites [Tractinsky and Lowengart, 2007]). Individuals take less than 50 milliseconds to form their first impressions of a product or service depending on its appearance (Lindgaard et al., 2006). In our context, Chaouali et al. (2019) demonstrate that customers assign high levels of trust in and intention to adopt a visually appealing mobile banking application. Thus,

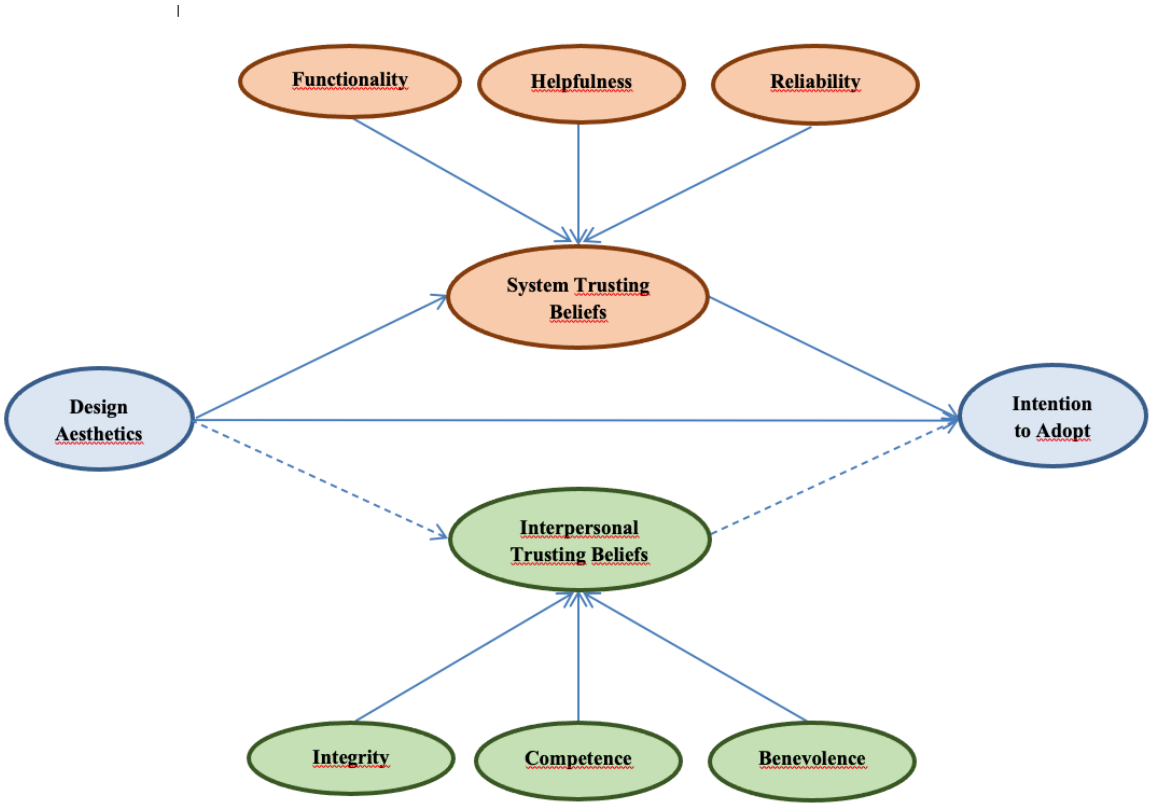
H3a. Design aesthetics will have a positive effect on intention to adopt mobile banking.

It is probable that design aesthetics will more strongly affect system trust first impressions of the service (functionality, helpfulness, and reliability) than interpersonal trust impressions of the service (competence, benevolence, and integrity). This is because design aesthetics is about the technology, and so its halo effect will more likely affect a technology-like or system-like trust than a human-like trust. Also, both aesthetics and trust in a specific technology are easier to relate to system-like constructs rather than to human-like constructs. Thus,

H3b. Design aesthetics will have a stronger positive effect on system trusting beliefs than on interpersonal trusting beliefs.

Figure 2 illustrates the proposed model.

Figure 2. Research model



Note: Dotted lines indicate weaker hypothesized effects.

3. Overview of studies

This research presents two studies. Study 1 tests to see if mobile banking is perceived as less human-like than mobile Facebook~~,~~. Study 2 (see Figure 2) tests the effect of design on trust in and intention to adopt mobile banking. It tests to see if customers use the mobile banking's design aesthetics as proxy cues for trust. It is revealed that trust is established through perceptions of design aesthetics, and thus there will be a positive effect on intent to adopt. Simultaneously, it examines whether it is more appropriate to use system trust in the context of mobile banking, instead of interpersonal trust, since people perceive mobile banking as less human-like.

All constructs (study 1 and study 2) are measured using multi-item scales that have been empirically validated in prior research. Since the original questionnaires are in English. The questionnaires (study 1 and study 2) are rigorously translated to French using the back-translation method (Brislin, 1980). One accredited bilingual translator translates the items from English (their original language) to French. Then, another one translates them back to English. Next, ten experts (marketing, engineers, and business PhD students) compare the original and back-translated English versions. No differences regarding the wordings and meanings are found.

Next, content validity (study 1 and study 2) is verified in three ways, in line with previous literature (e.g., Pandey and Chawla, 2016). First, ten English speaking experts (marketing professors and PhD students and engineers) compare the original and back-translated English versions. No issues regarding the wordings and meanings are found. Second, a focus group composed of other five marketing professors, who are also active users of mobile applications including mobile banking (at least three years of experience), discuss the French version to ensure that the items are easily comprehended by the respondents and are representative for the constructs they are measuring. Third and in line with Giovanis et al. (2019a; 2019b), content validity is guaranteed because this study uses scales validated in prior literature.

For the two studies, this research applies the procedural and statistical remedies that are used and recommended by previous literature to minimise common method bias (Hair et al., 2020; Jordan and Troth, 2020; Podsakoff et al., 2003; 2012). First, this research (study 1 and study 2) uses simple, clear, and concise questions, avoiding unspecified terms or terms with multiple meanings or complex syntax (e.g., double negatives) to minimise ambiguity and uncertainty among the respondents, in line with Jordan and Troth (2020) and as insured by the feedback of the focus group of five marketing professors. Furthermore and following the

recommendations of Hair et al. (2020), this research distributes three versions of the questionnaires (for each study) using different orders of the items.

Prior to distributing the questionnaires (study 1 and study 2), as per Podsakoff et al. (2003, 2012), this research provides the participants with a "good" and motivational cover letter and instructions (motivating participants to respond accurately). The participants are assured that i) their personal data will be kept confidential, ii) they can receive any feedback on the study's results and interpretations upon request (by giving them the email of one of the authors), and iii) the data collected will be used for academic purposes only, so that their participation will contribute to the advancement of science. On this latter point, this research tries to enhance the participants' "desire for self-expression or emotional catharsis" by using phrases like "we value your opinion" and "we need your feedback", as suggested by Podsakoff et al. (2012, p. 562).

Moreover, this research applies psychological separation techniques, aligned with Podsakoff et al. (2012, p. 550), by using "multiple study" cover story, in which participants are told that for reasons of convenience or efficiency several unrelated studies [here two studies: mobile banking and climate change] are being conducted at the same time" to lessen the salience of the link between the independent and dependent variables. In addition, the participants are informed that the dependent variable is tangential (i.e., unimportant) to the main study objective, following the recommendation of Podsakoff et al. (2012).

Also, this research applies proximal separation techniques between the independent and dependent variables by including unrelated (to the main study) activities in the questionnaires (Podsakoff et al., 2012). After answering questions on the independent variables, participants see a 4 minute-video on climate change and answer some questions on it ("What do you think about climate change?", "According to the video, what are the consequences of climate

change?", "Are you concerned by this phenomenon?", and "How can we fight climate change?"). After that, they answer the dependent variable questions.

Additionally, this research labels all the scale points (not just the end points of the scales) and removes common scale properties by varying, whenever possible, the anchor labels of the scales, as a methodological separation (e.g., using anchors "(1) Much more machine-like" to "(7) Much more human-like" and other anchors "(1) Strongly disagree" to "(7) Strongly agree"), in line with Jordan and Troth (2020) and Podsakoff et al. (2012)[6].

In addition and as recommended by Hair et al. (2020) and Podsakoff et al. (2003), the Harman's single-factor test shows that the issue of a common method variance bias is not a critical issue since the majority of the variance is not accounted for by a single factor (in both studies).

3.1 Study 1

3.1.1 Sample and procedure

This study used undergraduate students at a large French university. The selection of the student sample can be a suitable choice because students are familiar, comfortable, and engaged with mobile applications (including mobile Facebook and mobile banking), mobile devices (i.e., smartphones and tablets), and internet-based transactions (Akturan and Tezcan, 2012). Moreover, students are among the most active users of Facebook (Assimakopoulos et al., 2017) and mobile banking (Malaquias and Hwang, 2019), as highlighted by Hoehle and Venkatesh (2015, p. 453): "mobile applications are primarily used by young individuals and these applications are particularly popular among students". Furthermore, they have the skills for conducting various mobile activities (Malaquias and Hwang, 2019). In addition, Lankton et

[6] This research does not opt for temporal separation to reduce the costs as well as the complexity of the data collection (Podsakoff et al., 2012).

al. (2015, p. 893) posit that students "are fairly homogeneous in terms of individual characteristics such as age, education, and experience and they have been used in … trust research". Such homogeneity allows studies to control for the demographic variables and contrast the hypotheses more robustly (San-Martín et al., 2017). That is why using a sample of students is popular in the marketing literature (Aw, 2019; De Cicco et al., 2020). Also and with respect to France (where the study is conducted), forty-one percent of the French population is below thirty-five years old (National Institute of Statistics and Economic Studies, 2021). For all these reasons, a sample of students is acceptable in this study.

The participants are randomly intercepted and recruited on campus to participate in the study. In line with previous literature (e.g., El Hedhli et al., 2013), data are collected using a paper and pencil-based survey. The students are approached at different points of time and in different areas of the campus to minimise sampling bias, non-coverage, and periodicity issues (Khare et al., 2019; Yildirim et al., 2020). The interviewers are from different universities than the university where they intercept the participants to avoid familiarity bias (familiarity with both the university campus and the students).

Next, the participants are randomly assigned to either the mobile banking (one hundred and thirty-six participants) or mobile Facebook (one hundred and twenty-five participants) surveys. The surveys are administered by marketing research assistants and PhD marketing students who are well trained and instructed in interception and interview techniques, in line with previous literature (Giovanis et al., 2019a; 2019b). All respondents have to be experienced users of the mobile application to which they are assigned. Then they are asked to complete the questionnaires. Table 3 shows the participants' demographic details.

Table 3. Demographic details of the participants (study 1)

	Mobile banking group (136 participants)	Mobile Facebook group (125 participants)
Mean age	20.1 years old	19.2 years old
Gender		
- Male	70 (51.5%)	77 (61.6%)
- Female	66 (48.5%)	48 (38.4%)
Level of education		
- Freshman	41 (30.2%)	39 (31.2%)
- Sophomore	52 (38.2%)	42 (33.6%)
- Junior	43 (31.6%)	44 (35.2%)
Experience with mobile Internet		
- More than 3 years	136 (100%)	125 (100%)
Experience with mobile phones		
- More than 3 years	136 (100%)	125 (100%)

All constructs are measured using multi-item scales (see Table 4) that are adapted from Lankton et al. (2015).

Table 4. Measurement items (study 1)

Concept	**Items** (Source: Lankton McKnight Tripp (2015))
Animation	**AN1:** MBA/M-Facebook uses graphics and/or graphic movement to present information. **AN2:** MBA/ M-Facebook has a lot of pictures. **AN3:** There is a lot of animation in MBA/ M-Facebook.
Dynamism	**DY1:** The content on MBA/ M-Facebook often changes between uses. **DY2:** The information that is on MBA/ M-Facebook is not static across uses. **DY3:** The content on MBA/ M-Facebook is not predictable each time I use it.
Interpersonal communication	**IC1:** MBA/ M-Facebook facilitates interpersonal communication. **IC2:** MBA/ M-Facebook enables two-way information sharing. **IC3:** MBA/ M-Facebook allows me to email, blog, chat, or otherwise communicate with other people.

Responsiveness	**RES1:** MBA/ M-Facebook is responsive to my information needs. **RES2:** MBA/ M-Facebook provides timely (or almost timely) answers to my questions. **RES3:** I am able to obtain advice and feedback from MBA/ M-Facebook without delay.
Social presence	**SP1:** There is a sense of sociability with MBA/ M-Facebook. **SP2:** There is a sense of human warmth with MBA/M-Facebook. **SP3:** There is a sense of human contact with MBA/ M-Facebook. **SP4:** There is a sense of personalness in MBA/ M-Facebook.
Technology humanness	**TH1:** For each item below, please rate how technology-like versus human-like MBA/ M-Facebook is: (1) Much more technology-like to (7) Much more human-like **TH2:** For each item below, please rate how machine-like versus person-like MBA/ M-Facebook is: (1) Much more machine-like to (7) Much more human-like **TH3:** For each item below, please rate how technology-oriented versus human-oriented the qualities of MBA/ M-Facebook are: (1) MBA/Facebook has many more techno qualities to (7) MBA/ M-Facebook has many more human qualities.

Note: MBA = mobile banking application.

3.1.2 analysis and results

For both groups (mobile banking and mobile Facebook), the reliability of the scales is demonstrated since all Cronbach's alphas are above 0.7. The results of means comparisons show that compared to mobile banking, mobile Facebook has significantly higher animation ($M_F = 5.39$, $M_{MB} = 2.58$, $p < 0.05$), dynamism ($M_F = 5.56$, $M_{MB} = 4.14$, $p < 0.05$), interpersonal communication ($M_F = 5.59$, $M_{MB} = 2.99$, $p < 0.05$), responsiveness ($M_F = 5.58$, $M_{MB} = 3.81$, $p < 0.05$), social presence ($M_F = 6.05$, $M_{MB} = 2.76$, $p < 0.05$), and humanness ($M_F = 5.67$, $M_{MB} = 1.95$, $p < 0.05$). Therefore, as hypothesized, respondents perceive mobile banking as less human-like because it provides less animation, dynamism, interpersonal communication, responsiveness, social presence, and humanness. The results of study 1 support H1; thus, the *a priori* choice of trust type was system trust. Study 2 tests hypotheses 2, 3a, and 3b, which will validate the choice of system trust and reveal the strength of design aesthetics' influence on both trust and intention to adopt.

3.2 Study 2

3.2.1 Sample and procedure

Real bank customers in the Région Parisienne (Île-de-France or Paris Region) are randomly intercepted and recruited to participate in the study. In line with previous literature (e.g., El Hedhli et al. (2013)), data are collected using a paper and pencil-based survey at different points of time (between bank branch opening and closing hours) and working days and in many different areas of the Région Parisienne to minimise sampling bias, non-coverage, and periodicity issues (Giovanis et al., 2019a; 2019b; Khare et al., 2019; Yildirim et al., 2020) during the winter of 2020. The surveys are administered by marketing research assistants and PhD marketing students who are well trained and instructed in interception and interview techniques, in line with previous literature (Giovanis et al., 2019a; 2019b). The participants are approached using systematic sampling (the interviewers approach each fifth bank customer who left the bank branch or the ATM), in line with Khare et al. (2019) and Khong and Ong (2014). If a bank customer refuses to participate, the subsequent fifth one who left the bank branch (or the ATM) is intercepted (Khare et al., 2019; Khong and Ong, 2014). A filter question at the beginning of the survey is asked to ensure that the participants have no previous experience with mobile banking (since Study 2 focuses on intention to adopt mobile banking, it selects individuals who are non-users of mobile banking).

The sample is composed of four hundred and ninety-nine respondents. In line with previous studies, the participants are asked to manipulate real mobile banking applications[7] (e.g., money transfers, account balance lookups, and help info); and then they answer the questionnaires. Table 5 shows the demographic details of the participants.

[7] The mobile banking applications are owned by the survey administrators.

Table 5. Demographic details of the participants (study 2)

Items	Frequency (percentage)
Gender	
- Male	271 (54.3%)
- Female	228 (45.7%)
Age	
- 18-30 years	129 (25.8%)
- 30-50 years	244 (48.9%)
- More than 50 years	126 (25.3%)
Level of education	
- Secondary school	81 (16.2%)
- Vocational school	259 (51.9%)
- University level	159 (31.9%)
Income	
- Less than 1500 euros	96 (19.2%)
- 1500-2000 euros	215 (43%)
- More than 2000 euros	188 (37.8%)

3.2.2 Measures

All measures are adapted from prior research (see Table 6). They are answered on a 7-point Likert scale ranging from (1) "very strongly disagree" to (7) "very strongly agree". Previous literature evidences the multidimensional operationalization of both interpersonal trust and system trust. These two constructs are conceptualised as second-order constructs. Interpersonal trust is composed of three first-order constructs: i) integrity, ii) competence, and iii) benevolence. System trust is composed of three first-order constructs: i) reliability, ii) functionality, and iii) helpfulness (Lankton et al., 2015).

Table 6. Measurement items (study 2)

Concept	Items	Source
Design Aesthetics	**DA1:** The screen design (i.e. colors, boxes, menus, etc.) is attractive. **DA2:** This MBA looks professionally designed. **DA3:** The graphics are meaningful. **DA4:** The overall look and feel of this MBA is visually appealing.	Cyr et al. (2006)
Interpersonal trust (second-order construct)	**Integrity (first-order construct)** **IN1:** This MBA will be truthful in its dealings with me. **IN2:** This MBA will be honest. **IN3:** This MBA will keep its commitments.	Lankton et al. (2015)
	Competence (first-order construct) **CO1:** This MBA will be competent and effective. **CO2:** This MBA will perform its role very well. **CO3:** This MBA will be a capable and proficient MBA.	Lankton et al. (2015)
	Benevolence (first-order construct) **BE1:** This MBA will act in my best interest. **BE2:** This MBA will do its best to help me if I need help. **BE3:** This MBA will be interested in my well-being, not just its own.	Lankton et al. (2015)
System trust (second-order construct)	**Functionality (first-order construct)** **FU1:** This MBA will have the functionality I need. **FU2:** This MBA will have the features required for my tasks. **FU3:** This MBA will have the ability to do what I want it to do.	Lankton et al. (2015)
	Helpfulness (first-order construct) **HE1:** This MBA will supply my need for help through a help function. **HE2:** This MBA will provide competent guidance. **HE3:** This MBA will provide whatever help I need.	Lankton et al. (2015)
	Reliability (first-order construct) **RE1:** This MBA will be very reliable. **RE2:** This MBA will not fail me. **RE3:** This MBA will be extremely dependable.	Lankton et al. (2015)

Intention to adopt mobile banking	**IA1:** I intend to adopt this MBA in the next few months. **IA2:** I predict that I would adopt this MBA in the next few months. **IA3:** I plan to adopt this MBA in the next few months.	Chaouali et al. (2019)

Note: MBA = mobile banking application.

3.2.3 Model estimation and results

For the model estimation, this study uses SmartPLS 3, which is less restrictive regarding sample size, model complexity, and non-normal data and is more appropriate when using higher-order constructs (Hair et al., 2017), as this study does. The higher-order model estimation follows the disjoint two-stage approach to estimate the measurement models of both interpersonal trust and system trust (Sarstedt et al., 2019).

3.2.3.1 Assessment of the measurement model

As shown in Table 7, all Cronbach's alphas and rho_A (ρA) values are satisfactory (above 0.7). Thus, internal consistency and reliability are adequate (Hair et al., 2017). In addition, all outer loadings have satisfactory levels and are highly significant ($p < 0.001$). Thus, indicator reliability is acceptable (Hair et al., 2017). Moreover, all AVE values are satisfactory (above 0.5), showing high levels of convergent validity. Furthermore, the results show support for discriminant validity (see Table 8) because the heterotrait-monotrait (HTMT) values are satisfactory (lower than 0.90 and statistically different from 1.0). Thus, the reflective measurement models of the first-order components are all satisfactory.

Table 7. Loadings, CA, ρA, and AVE (Study 2)

	Loadings	**CA**	**ρ_A**	**AVE**		**Loadings**	**CA**	**ρ_A**	**AVE**
DA		0.800	0.802	0.627	**IN**		0.725	0.729	0.645

DA1	0.808*				**IN1**	0.820*			
DA2	0.842*				**IN2**	0.810*			
DA3	0.803*				**IN3**	0.780*			
DA4	0.708*				**CO**		0.726	0.737	0.645
FU		0.721	0.730	0.641	**CO1**	0.836*			
FU1	0.823*				**CO2**	0.764*			
FU2	0.824*				**CO3**	0.808*			
FU3	0.754*				**BE**		0.788	0.789	0.702
HE		0.741	0.743	0.658	**BE1**	0.829*			
HE1	0.821*				**BE2**	0.818*			
HE2	0.820*				**BE3**	0.866*			
HE3	0.792*				**IA**		0.725	0.730	0.645
RE		0.736	0.741	0.653	**IA1**	0.821*			
RE1	0.812*				**IA2**	0.811*			
RE2	0.826*				**IA3**	0.777*			
RE3	0.787*								

Note:DA = Design Aesthetics, FU = Functionality, HE = Helpfulness, RE = Reliability, IN = Integrity, CO = Competence, BE = Benevolence, IA = Intention to Adopt, IT = Interpersonal Trust, and ST = System Trust, * = significant ($p < 0.01$), CA = Cronbach's alpha, ρA = rho_A, and AVE = Average variance extracted.

Table 8. Discriminant validity (Study 2)

	DA	**FU**	**HE**	**RE**	**IN**	**CO**	**BE**
FU	0.634*						
HE	0.560*	0.655*					
RE	0.603*	0.675*	0.645*				
IN	0.120*	0.033*	0.081*	0.060*			
CO	0.088*	0.054*	0.053*	0.055*	0.868*		

BE	0.077*	0.061*	0.064*	0.090*	0.860*	0.794*	
IA	0.726*	0.705*	0.687*	0.657*	0.060*	0.037*	0.057*

Note: DA = Design Aesthetics, FU = Functionality, HE = Helpfulness, RE = Reliability, IN = Integrity, CO = Competence, BE = Benevolence, IA = Intention to Adopt; * = significantly different from 1.

Regarding the measurement model parameters for the second-order constructs (interpersonal trust and system trust), collinearity is not an issue among the first-order constructs since VIF values are below 3, as shown in Table 9 (Sarstedt et al., 2019). In addition, integrity, competence, and benevolence have significant weights (w = 0. 361, CI = [0.325; 0.396]; w = 0.380, CI = [0.330; 0.425]; w = 0.395, CI = [0.357; 0.436], respectively), as first-order constructs of interpersonal trust. Functionality, helpfulness, and reliability have significant weights (w = 0.465, CI = [0.310; 0.604]; w = 0.383, CI = [0.218; 0.553]; w = 0.387, CI = [0.225; 0.554], respectively) as first-order constructs of system trust.

Table 9. Weights and VIF

	Weights	**BCa bootstrap confidence intervals**	**VIF**
Interpersonal Trust (second-order construct)			
Integrity (first-order construct)	0.361	[0.325; 0.396]	2.479
Competence (first-order construct)	0.380	[0.330; 0.425]	2.033
Benevolence (first-order construct)	0.395	[0.357; 0.436]	2.055
System Trust (second-order construct)			
Functionality (first-order construct)	0.465	[0.310; 0.604]	1.467
Helpfulness (first-order construct)	0.383	[0.218; 0.553]	1.445
Reliability (first-order construct)	0.387	[0.225; 0.554]	1.451

3.2.3.2 Assessment of the structural model

As shown in Table 10, design aesthetics has a positive effect on intention to adopt mobile banking (β = 0.294; CI = [0.204; 0.384]). Since the structural path effect of design aesthetics on intention to adopt has a bootstrap 95% confidence interval of [0.204;0.384] and this interval is both positive and does not include zero, design aesthetics has a positive and significant direct effect on intention to adopt. Thus, H3a is supported.

For H2 and H3b, this research conducts testing of the differential impact of structural paths using the bootstrap approach, as outlined by Chin et al. (2013), in addition to the traditional assessment of the structural model. First, interpersonal trust has a non-significant effect on intention to adopt mobile banking ($\beta = 0.055$; CI = [-0.028; 0.129]), while system trust has a positive and significant effect on intention to adopt mobile banking ($\beta = 0.451$; CI = [0.334; 0.560]). Second, the differential impact of structural paths of system trust -> intention to adopt and interpersonal trust -> intention to adopt is significant ($\Delta_{paths} = 0.396$, CI = [0.257; 0.541]). In sum, the assessment of the structural model and the differential impact of structural paths converge on the same conclusion with system trust having a stronger impact than interpersonal trust. Thus, H2 is supported.

Moreover, the results show that i) design aesthetics has a positive and significant effect on system trust ($\beta = 0.573$; CI = [0.503; 0.645]) but has a non-significant effect on interpersonal trust ($\beta = 0.063$; CI = [-0.044; 0.154]) and ii) the differential impact of structural paths of design aesthetics -> system trust and design aesthetics -> interpersonal trust is significant ($\Delta_{paths} = 0.510$, CI = [0.368; 0.668]). The assessment of the structural model and the differential impact of structural paths converge on the same conclusion with design aesthetics having a stronger impact on system trust. Thus, H3b is supported.

Based on the R^2 values, results show that the model explains 44.4 percent of the variance in intention to adopt mobile banking and 32.8 percent of the variance in system trust, but almost none (0.3 percent) of the variance in interpersonal trust. The latter prediction result is deemed non-satisfactory.

In addition, Stone–Geisser's Q^2 values are assessed using the cross-validated redundancy approach of the blindfolding procedure (Hair et al., 2017). Since the model yields Q^2 values that are 0.270 and 0.204 (well above 0) for intention to adopt mobile banking and system trust, respectively, and Q^2 value of 0.002 (almost 0) for interpersonal trust, the results

show high predictive relevance for intention to adopt mobile banking and system trust but almost no predictive relevance for interpersonal trust.

This research also examines the effect sizes for design aesthetics, interpersonal trust, and system trust. "The effect size f^2 allows assessing an exogenous construct's contribution to an endogenous latent variable's R^2 value" (Hair et al., 2014, p. 186). Values of 0.02, 0.15, and 0.35 indicate small, medium, or large effect, respectively (Hair et al., 2014). This study finds that design aesthetics has an almost null effect size on interpersonal trust ($f^2 = 0.003$) and a small effect size on intention to adopt mobile banking ($f^2 = 0.103$), but a large effect size on system trust ($f^2 = 0.489$). In addition, system trust has a medium effect size on intention to adopt mobile banking ($f^2 = 0.239$). By contrast, interpersonal trust has an almost null effect size on intention to adopt mobile banking ($f^2 = 0.004$).

Table 10. Structural model results (Study 2)

	Path	**Bca CI**	**f^2**	**Sig?**
Design Aesthetics -> Intention to Adopt	0.294	[0.204; 0.384]	0.104	Yes
Design Aesthetics -> Interpersonal Trust	0.063	[-0.044; 0.154]	0.003	No
Design Aesthetics -> System Trust	0.573	[0.503; 0.645]	0.489	Yes
Interpersonal Trust -> Intention to Adopt	0.055	[-0.028; 0.129]	0.004	No
System Trust -> Intention to Adopt	0.451	[0.334; 0.560]	0.239	Yes
	R^2	**Q^2**		
Interpersonal Trust	0.3%	0.002		
System Trust	32.8%	0.204		
Intention to Adopt	44.4%	0.270		
Differential Impact of Structural Paths				
	Diff. in Estimates	**Bca CI**		**Sig?**
System Trust -> Intention to Adopt vs. Interpersonal Trust -> Intention to Adopt	0.451 – 0.055 = 0.396	[0.257; 0.541]		Yes

Design Aesthetics -> System Trust vs. Design Aesthetics -> Interpersonal Trust	0.573 – 0.063 = 0.510	[0.368; 0.668]	Yes

Note : Bca CI = Bca confidence interval. This research makes no assumption about the distribution of the estimated structural paths and calculates bootstrap confidence intervals, ensuring that zero does not occur within the interval as per Hair et al. (2021).

The study's results are further corroborated by an additional analysis. In line with Rese et al. (2020), this research compares the original model with model A (the original model but without system trust) and model B (the original model but without interpersonal trust) to further test the relevance of system trust or interpersonal trust or both of them. As suggested by Mathieson (1991, p. 187), the comparisons between models is based on three criteria that are i) the "ability to predict intention to use a system", ii) "the value of the information provided by the models", and iii) "the cost of using the models". Accordingly and in line with recent literature (Sharma et al., 2021), this research uses several information criteria that are i) R^2 adjusted[8] , ii) Q^2, iii) Akaike Information Criterion (AIC), and iv) Bayesian Information Criterion (BIC). Altogether, the results show that model B outperforms the original model and model A (as shown Table 11, BIC and BIC weights). Since the difference between scores is so small, BIC weights are calcualted for the three models (Danks et al., 2020). With a likelihood of 87.9% Model B is the correct model.

Table 11. Additional results analysis

	Original model			
	R^2 Adj.	**Q^2**	**AIC**	**BIC (BIC weight)**
Interpersonal Trust	0.3%	0.002		
System Trust	32.8%	0.204		
Intention to Adopt	44.4%	0.270	-285.56	-268.71 (12.1)
	Model A			
	R^2 Adj.	**Q^2**	**AIC**	**BIC (BIC weight)**
Interpersonal Trust	0.3%	0.002		
Intention to Adopt	31.1%	0.188	-180.71	-168.08 (0.)

[8] "Is deemed more suitable than R^2 to compare competitive models" (Souiden et al., 2019, p. 126), because "problems often arise if we use the R^2 value to compare models that are specified differently (but with the same endogenous construct). For example, if we add nonsignificant constructs to a structural model that are slightly correlated with the endogenous latent variable, the R^2 will increase … Thus, if we use the R^2 as the only basis for understanding the model's predictive accuracy, there is an inherent bias toward selecting models with many exogenous constructs, including ones that may be only slightly related to the endogenous constructs" (Hair et al., 2014, p. 175).

	Model B			
	R^2 Adj.	**Q^2**	**AIC**	**BIC (BIC weight)**
System Trust	32.6%	0.204		
Intention to Adopt	43.9%	0.269	-285.32	-272.68 (87.9)

4. Conclusions

4.1 Theoretical implications

The findings demonstrate that the power of aesthetics can effectively shape customer trust and intention, in line with Tuch et al. (2012). This research mentions that the literature is not clear whether aesthetics will positively affect adoption of a risky utilitarian service like mobile banking. It contributes by finding evidence here that it does. It demonstrates that design aesthetics influences both trust and intention to adopt mobile banking. That is, an aesthetically pleasing mobile banking application not only has a large effect size influence on trust, but it even contributes a significant direct effect on intention to adopt—beyond trust's influence on intention to adopt. This suggests that researchers should include aesthetics in their models leading to both trust and intention to adopt mobile banking systems. The study's design aesthetics results provide evidence that the halo effect of environmental psychology applies even in mobile banking, where utilitarian aspects dominate (Chaouali et al., 2019).

In addition, the findings, suggest very convincingly that with such a low humanness technology, intention to adopt mobile banking is determined by system trust (i.e., functionality, reliability, and helpfulness) rather than interpersonal trust (integrity, competence, and benevolence). Measuring both system trust and interpersonal trust demonstrates this clearly. This research contributes to trust theory by overcoming the misspecification of the concept of trust in two ways. First, measuring humanness *a priori* helps propose that system trust will work

better in the model. Second, measuring both system-and interpersonal trust allows to verify that system trust is the appropriate choice. Indeed, using the appropriate type of trust prevents respondents from feeling forced to ascribe unwarranted attributes to a technology. If a technology has relatively low humanness, respondents will feel uncomfortable ascribing human attributes like integrity and benevolence to it. So, this research posits that when the technology possesses more human-like characteristics, the use of interpersonal trust is more appropriate, but when the technology possesses more system-like characteristics, the use of system trust is more appropriate. This research's differential impact of system trust versus interpersonal trust on intention to adopt confirms the need for a match between the degree of a technology's humanness and its trust type.

This research contributes to the theory of affordances (rarely studied in the marketing literature) by demonstrating that the presence of social affordances (i.e., animation, dynamism, interpersonal communication, and social presence) can increase a technology's humanness. In this vein, it recommends that humanness should be measured *a priori* so one can use the appropriate type of trust. The technologies measured here and in Lankton et al. (2015) can serve as benchmarks for the humanness level measured *a priori*. More importantly, the theory of affordances should be extended to the context of artificial intelligence (as they can embody social affordances) to study the customers' reactions to its attributes such as functionality and warmth. The theory of affordances can, for example, uncover misspecification of some constructs (other than trust) related to artificial intelligence.

4.2 Managerial Implications

The results show that i) mobile banking is perceived lower on humanness than other technologies that have higher social affordances (H1), ii) system trust has a stronger positive effect on intention to adopt mobile banking than interpersonal trust (H2), and iii) design

aesthetics has both a positive effect on intention to adopt mobile banking (H3a) and a stronger positive effect on system trust than on interpersonal trust (H3b). Accordingly, this research has several managerial implications.

First, this research provides practical insights into how can banks develop initial trust among customers (and thereby increase system adoption) through design aesthetics. The findings suggest that banks should consider the influence of design on customer trust and incorporate aesthetic elements that can enhance the effects of the favorable inferences users make about the mobile banking application's trust. In other words, trust and mobile banking adoption can be shaped by the attractiveness of the interface. For example, mobile banking applications should embed vivid, attractive, and captivating illustrations and visuals. The buttons can be labelled with realistic pictures and icons so that they can be used as signifiers. Colorful and eye-catching fonts can change to make customers more aware of screen transitions. The content and information should be concise and consistent but easy to read and understand. The application can be more customizable by allowing users to change the configuration, colors, and themes they want.

Second, this study addresses a critical gap in trust literature. Practitioners who survey their own customers about trust and adoption need to know that they will likely get incorrect information back if they specify the wrong type of trust—and therefore their predictive models will not be accurate, just as this research's model subset that used interpersonal trust does not work. That is, this research demonstrates that when the technology possesses less human-like characteristics, system trust (i.e., functionality, helpfulness, and reliability) should be used rather than interpersonal trust (i.e., integrity, competence, and benevolence). Thus, this study recommends that practitioners and researchers use a pilot study measuring humanness in order to select the appropriate type of trust. The application can include analytics to provide timely and accurate details and feedback on the users' experience and preferences. Indeed, banks

should use big data by leveraging the information gathered to offer a personalised mobile banking experience.

Third, another interesting implication is that designers can greatly enhance the humanness of any applications or technologies by enhancing the presence of social affordances. For example, they can achieve this by augmenting its animation (the information is displayed by graphic movement), dynamism (the information can change across uses), interpersonal communication and social presence (facilitating interpersonal communication through emails and chat with human tellers), and responsiveness (artificial intelligence can be used to improve the responsiveness to users' requests for information and questions).

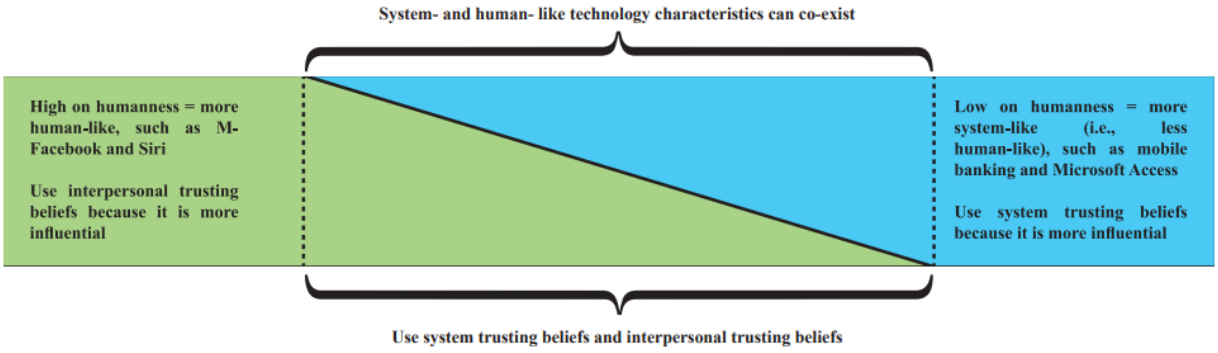
4.3 Limitations and future research avenues

This study is subject to a number of limitations that future studies can address. First, it uses a convenience sampling technique. Future studies should use a more representative sample to generalize the findings. Second, it is applied in France, and results may differ elsewhere. Testing the model in other countries can shed more light on the phenomenon of trust formation through design aesthetics due to cultural differences (Cyr, 2008) or differing adoption rates between countries. Third, the concept of humanness may vary across technologies. A technology can embody both human-like and system-like aspects. So future research should explore the possibility that some technologies can possess both machine-like and human-like aspects, with accompanying hybrid measures of interpersonal and system trust[9]. Virtual assistants and recommendation agents can be interesting examples in which both system- and human-like technology characteristics can co-exist (see Figure 3 below). Fourth, future studies can follow a longitudinal approach to test whether the effects of design aesthetics on trust persist over time, specifically in the post-adoption stage. Trust is likely to be formed by design

[9] We thank the anonymous guest editor for this idea.

aesthetics but can be strengthened by other elements (e.g., positive experience). Indeed, initial trust may be unstable and can change over time (McKnight et al., 2020).

Figure 3. Humanness continuum in which both system- and human-like technology characteristics can co-exist (adapted from Tripp et al. (2011) and Lankton and McKnight (2008))



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