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A Cross-national Investigation of Trait Antecedents of Mobile Banking Adoption

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ABSTRACT:

Although there is a near agreement in the literature on the main predictors of consumers' attitudes toward technological innovation, the potential ways through which personal traits and national environmental differences contribute to significant variations in mobile banking adoption has received limited attention. Based on insights from innovation adoption and personality research, this study tested a model of mobile banking adoption using data from a developed and a developing country. Survey data came from a sample of 1,340 participants from the United Kingdom and Ghana. The results indicate that intrinsic traits are stronger in explaining consumers' attitude toward mobile banking in Ghana than in the United Kingdom. However, no significant variance between the two countries was observed with regard to the mediation effect of consumers' attitude on the intention to use mobile banking. The practical and theoretical implications of this study are discussed.

1. Introduction

After nearly three decades of research, there is almost a consensus among scholars regarding the main factors that determine consumers' attitudes toward the adoption of technological innovations. However, a critical review of the literature reveals that limited attention has been dedicated to examining the potential role of personal traits (see Dabholkar & Bagozzi, 2002; Oh et al., 2013) and environmental differences (see Shaikh & Karjaluoto, 2015) in the adoption of self-service technologies (SSTs). As such, this study addresses this gap by examining the importance of intrinsic traits in the adoption of mobile banking within the different environmental contexts of a developed and a developing economy.

To date, the literature suggests that the adoption of innovations, such as mobile banking and other SSTs, is the outcome of a complex interrelationship among key variables relating to product characteristics and personal and environmental/situational factors

(Bhatt, 2016; Dabholkar & Bagozzi, 2002; Gao, Rohm, Sultan, & Huang, 2012; Meuter, Bitner, Ostrom, & Brown, 2005; Thakur & Srivastava, 2014; Wessels & Drennan, 2010).

In particular, a reasonable number of studies have established that product characteristics are essential determinants of consumers' attitudes toward using innovations. These studies (e.g., Akturan & Tezcan, 2012; Papies & Clement, 2008; Park & Chen, 2007; Tobbin, 2012; Vijayasarathy, 2004) indicate that innovation attributes, such as perceived usefulness (PU), perceived ease of use (PEOU), relative advantage, and compatibility, are critical determinants of consumers' adoption of internet and mobile technologies.

Comparatively, even though personal traits are at the core of consumer behavior (Dabholkar & Bagozzi, 2002; Lin & Chang, 2011; Meuter et al., 2005), only a few studies have explored the important role of these factors in the adoption of digital innovations. In the SSTs literature, one personal trait that has been identified as particularly important to consumers' adoption of technology is called *inherent innovativeness* (Dabholkar & Bagozzi, 2002) or *personal innovativeness* (Agarwal & Prasad, 1998; Gao et al., 2012; Thakur & Srivastava, 2014). In addition, a few others (Dabholkar, 1996; Oh et al., 2013) have observed the importance of consumers' *need for interaction* as a vital variable in consumers' choice of a medium for accessing services (Dabholkar, 1996; Oh et al., 2013). However, despite the acknowledged importance of personal traits in innovation adoption, limited attention has been given to a detailed examination of these factors in the adoption of SSTs, such as mobile banking, in different market contexts.

As such, the current research tested a model of mobile banking adoption with respondents from both a developed and a developing country. A cross-national design was purposely adopted to indirectly control for the potential moderating effects of differences in the national environments of the two study countries. Based on insights from the literature on personality theory (see Engel, James, Kollat, & Blackwell, 1969; Hirschman, 1980), we identified and conceptualized two important personal traits—*inherent innovativeness* and the *need for interaction*—as antecedent predictors of innovation adoption (see Dabholkar & Bagozzi, 2002; Lin & Chang, 2011; Thakur & Srivastava, 2014). We purposely focused on these two traits to enable a detailed examination of their hypothesized importance in the adoption of mobile banking. Overall, this paper contributes to the innovation and mobile banking adoption literature in two main ways.

First, the research contributes to the development of the literature by integrating perspectives from personality theories into the attitude–behavior models to test the predictive importance of intrinsic traits in mobile-banking adoption under different environmental contexts. Such an enquiry is warranted because despite the fundamental role of personal traits in consumer behavior, our understanding concerning the relative importance of these factors is limited (Dabholkar & Bagozzi, 2002; Lin & Chang, 2011). Moreover, the focus on personal traits is important because in spite of the pervasive trends in consumer adoption of digital innovations, some segments may not be very comfortable with using these innovations (Laukkanen, Sinkkonen, Kivijärvi, & Laukkanen, 2007; Thakur & Srivastava, 2014). Second, this study extends the SST and mobile banking literature into an international context by validating the research model

with data from respondents in both a developed and a developing country in view of the marked national environmental differences that may explain variations in mobile banking adoption (see Shaikh & Karjaluoto, 2015).

Moreover, the study provides insights and directions for policy makers and international managers for enhancing policies and strategies aimed at encouraging consumer patronage of mobile banking and related SSTs. In this way, the findings can help improve the service experience of disadvantaged and minority segments (see Rosenbaum et al., 2011) in the current digitized global market space.

The remainder of this paper presents an overview of the literature, conceptual perspectives, and hypotheses. This is followed by a description and explanation of the research methods employed. Finally, the findings, discussions, implications, and limitations of the research are presented.

3. Literature Review

Mobile banking has been defined as banking transactions using mobile devices, such as cell phones, personal digital assistants, smartphones, and other devices (excluding laptops), to access financial or banking services (Lee & Chung, 2009). In the current study, we consider mobile banking transactions as involving the use of any of the aforementioned devices by customers to independently carry out financial operations. These transactions include making inquiries, checking one's account history, ordering cards and cheque books, applying for loans, monitoring one's credit and securities portfolio, monitoring exchange rates and stocks exchanges, recharging phone accounts,

paying bills, and conducting account-to-account money transfers at the national and international levels (see Chemingui & lallouna, 2013).

Attitude–Behavior Theories of Innovation Adoption

Since the early 1980s, the broad literature on innovation adoption has evolved from various perspectives, including the very well-known attitude–behavior (Ajzen, 1991; Ajzen & Fishbein, 1980), technology adoption (Davis, 1989), and innovation diffusion (Rogers, 2003) models. *Attitudes* have been broadly defined as the cognitive beliefs, values, and general orientation of consumers toward phenomena such as new technologies or innovations. According to the attitude–behavior theorists (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), consumers' attitudes, along with other personal and situational factors, are immediate determinants of their intentions to perform a behavior. *Intention* refers to an individual's plans to continue to use a service or a product (Ajzen & Fishbein, 1980).

Since the initial work on the *theory of reasoned action* (TRA) (Fishbein & Ajzen, 1975), these theories have evolved to accommodate relevant variables and conceptualizations to explain innovation adoption. Given the extensive discussion of these theories in the literature (see Yousafzai, Foxall, & Pallister, 2010), the next section provides a brief overview of the three most popular attitude–behavior models that have been used to study innovation adoption.

First, the TRA (Fishbein & Ajzen, 1975) holds that *behavioral intentions* are influenced by personal attitudes toward performing a particular behavior (e.g., using

mobile banking), as well as how one perceives social pressures, that is, *social norms*. Subjective norms (normative beliefs) represent the extent to which an individual's behavior is affected by the approval/disapproval of important referent groups in the society. This way, the TRA acknowledges that trends in the socio–cultural milieu are important factors in the adoption of technological innovations. In addition, the theory is premised on the assumption that people's behavior can be predicted by their intentions. These intentions are also shaped by rational (reasoned) and volitional (free will) decisions. Since there are some conditions in which individual behavior may not be volitional or under one's control (see Reinders et al., 2008), the TRA has been criticized as inadequate in explaining various consumer behaviors, such as the adoption of technological innovations.

Second, the *theory of planned behavior* (TPB) (Ajzen, 1991) has been proposed as an improved model to overcome the limitations of the TRA. The TPB suggests that in addition to attitudes and subjective norms, an individual's *perceived behavioral control* (PBC) influences behavioral intentions and actual behavior. PBC (Ajzen, 1991; Ajzen, 2002) refers to the extent to which one believes that he/she has control over things that happen to him/her rather than attributing such happenings to external forces. However, the TPB has also been criticized as being deficient in explaining all forms of consumer behavior. The contention is that the model does not capture other highly predictive factors, such as *personal norms*, *affective evaluations* (evaluation affected by emotions), and *innovation characteristics,* which may account for significant variations in intentions (see Davies, Foxall, & Pallister, 2002; Yousafzai et al., 2010).

Third, the technology acceptance model (TAM) was proposed by Davies (1989) in an attempt to build on the weaknesses of prior models (e.g., TRA). This model holds that an individual's acceptance of a technological product is determined by his/her attitude toward the use of that technology and his/her perceptions regarding the *usefulness of that innovation*. According to TAM, attitudes toward using an innovation are shaped by beliefs relating to the PU and PEOU of such an innovation. This way, the model highlights the importance of the innovation characteristics, in addition to attitudes and intentions, with regard to innovation acceptance.

Arguably, TAM has been the most widely used conceptual framework for explaining the adoption of modern technological innovations, such as computers, emails, and internet and mobile banking (Yousafzai et al., 2010). To date, several empirical findings have established strong support for TAM as a credible model for explaining innovation adoption. For example, studies indicate that innovation attributes, such as *relative advantage*, *ease of use,* and *compatibility* are the most salient factors in explaining consumers' adoption of internet and mobile technologies (Al-Jabri & Sohail, 2012; Koenig-Lewis, Palmer, & Moll, 2010; Papies & Clement, 2008; Park & Chen, 2007; Vijayasarathy, 2004).

Personal Factors and Innovation Adoption

Aside from innovation characteristics, *personal factors* have been identified as important determinants of innovation adoption. Largely, these include research that focuses on surface or superficial personal factors (gender, age, and income levels) (Gao et al., 2012; Laforet & Li, 2005; Laukkanen & Pasanen, 2008; Nilsson, 2007; Onyia & Tagg, 2011). Overall, the results from these studies suggest that early adopters of

mobile banking are relatively young (between the ages of 25 and 34 years), average income earners, and white-collar, urban workers. Instructively, these findings are by no means conclusive (Al-Jabri & Sohail, 2012; Quinn, Dibb, Simkin, Canhoto, & Analogbei, 2016; Thakur & Srivastava, 2014). This is because the need for model parsimony has often led researchers to exclude other relevant underlying personal factors, which may explain consumers' use of innovation.

Consequently, some scholars have called for a need to move beyond the analysis of superficial demographic characteristics to focus on deeper personal factors. These factors include intrinsic motivations, psychographics (see McMellon, Schiffman, & Sherman, 1997; Meuter et al., 2005; Thakur & Srivastava, 2014), and inherent personal traits (Gao et al., 2012). In particular, inherent personal traits have been noted as vital to innovation adoption, as they are considered to be at the heart of consumer behavior (Dabholkar & Bagozzi, 2002; Lin & Chang, 2011).

Intrinsic Traits and Innovation Adoption

Broadly, the trait theorists (Barczak, Scholder–Ellen, & Pilling, 1997; Engel et al., 1969; McMellon et al., 1997; Hirschman, 1980; Ryan & Deci, 2000) hold that inherent traits largely determine human or consumer behavior. The view from this school of thought is that people who are endowed with certain inherent traits tend to perform some activities better because of the intrinsic satisfaction they experience. For example, self-determination theorists hold that strong intrinsic motivations operate in human action (Ryan & Deci, 2000). Ryan and Deci (2000, p. 56) define intrinsic motivation as "the doing of an activity for its inherent satisfaction rather than for some separable consequence." Thus, when intrinsically motivated, a person will perform an act for the

fun or the challenge of it rather than because of external prodding, pressures, or rewards (Oh, Jeong, & Baloglu, 2013).

In addition, other innovation adoption theorists (Dabholkar & Bagozzi, 2002; Hirschman, 1980; Midgley & Dowling, 1978) state that relevant traits, such as *inherent innovativeness*, variously known as consumer innovativeness (Gao et al., 2012; Roehrich, 2004), or *personal innovativeness* (Agarwal & Prasad, 1998; Thakur & Srivastava, 2014), exert a significant effect on attitudes toward innovation adoption. The concept of inherent innovativeness has been defined as "the degree to which an individual is receptive to new ideas and makes innovation decisions independent of the communicated experience of others" (Midgley & Dowling, 1978, cited in Dabholkar & Bagozzi, 2002, p.188).

Dabholkar and Bagozzi (2002) identified that individual variables, such as *inherent innovativeness*, along with other personal factors, such as *self-efficacy* (Bandura, 1997; Wang, Harris, & Patterson, 2013), *self-consciousness,* and the *need for interaction* with employees, moderate attitudes and intentions toward SSTs. Moreover, Gao et al. (2012), who investigated the antecedents of consumer adoption of mobile marketing among the youth population in the United States and China, also identified that consumer innovativeness, personal attachment, and other contextual factors (perceived product usefulness and risk avoidance) significantly affect consumers' attitudes. In a related study, Thakur and Srivastava (2014), who conceptualized personal innovativeness as an endogenous variable, determined that the construct exerts a significant impact on the intention to use mobile banking.

Instructively, despite these plausible logic in viewing personal traits as fundamental determinants in the adoption of technological innovations, most of past research have conceptualized these factors in complementary roles as either moderator or mediators (Dabholkar and Bagozzi 2002; Oh et al., 2013; Thakur & Srivastava, 2014). Consequently, limited attention has been given to examining the importance of relevant traits as key antecedent predictors of the consumers' adoption of mobile technologies under different market contexts.

Environmental and Situational Factors

In addition to innovation characteristics and personal factors, the broad environment and specific contexts of consumers are also key variables in innovation adoption. Consequently, certain previous studies (Chong, Chan, & Ooi, 2012; Gao et al., 2012; Laukkanen & Cruz, 2012; Pavlou & Chai, 2002; Sayar & Wolfe, 2007) have examined some ways in which environmental factors, together with product characteristics and personal factors, determine consumers' attitudes toward various forms of digital technological innovations. For example, at the macro level, Pavlou and Chai (2002) observed that cultural differences (individualism/collectivism, power distance, and long-term orientation) significantly affect consumers' adoption of e-commerce.

Moreover, other studies have considered how specific situations or conditions affect consumers' use of technological innovations. For example, the effect of situations such as "voluntariness"/"forced used" (Agarwal & Prasad, 1997; Brown, Mowen, Donavan, & Licata, 2002; Liu, 2012), "waiting time" (Dabholkar & Bagozzi, 2002; Oh et al., 2013), "forced use" of SSTs **(**Reinders et al., 2008**)**, "past experience" with SSTs (Wang et al., 2012); and complexity of SSTs (Oh et al., 2013), on consumers' use of SSTs have been examined. Overall, the outcomes from these studies suggest that the different

situational contexts of consumers may encourage/discourage them to use various forms of SSTs in service consumption.

To date, a number of studies have broadly investigated some ways in which national environmental differences influence personal factors, such as demographic and intrinsic traits, in the adoption of electronic and internet banking (Chong et al., 2012; Gao et al., 2012; Laukkanen & Cruz, 2012; Pavlou & Chai, 2002; Sayar & Wolfe, 2007). For example, Chong et al. (2012) employed the TAM and diffusion of innovation (DOI) model to investigate e-commerce adoption across China and Malaysia. Their research model tested the effect of variables such as trust, cost, social influence, and personal variables (age, educational level, and gender) as control factors. The results showed that age, trust, cost, and social influence account for significant variations in the users' adoption of e-commerce across the two countries.

It is important to highlight that most of the studies that have tested the effect of national environmental difference on the adoption of technological innovations were based on samples from relatively advanced or emerging economies (Chong et al., 2012—Malaysia vs. China; Gao et al., 2012—China vs. the United States; Laukkanen & Cruz, 2012—Finland vs. Portugal; Pavlou & Chai, 2002—the United States and China; Sayar & Wolfe—Turkey and the United Kingdom). For example, Laukkanen and Cruz (2012), who examined the antecedents of mobile banking adoption within two European nations, found that national cultural dimensions—individualism, long-term orientation, and masculinity—are significant determinants of mobile banking adoption. In addition, the scholars observed that gender, previous mobile service experience, type of mobile device, and country significantly affect mobile banking adoption.

From the above overview, it is apparent that there has been limited focus on developing countries, which are generally characterized by more challenging macro environments, compared with developed and emerging markets. More importantly, it can be argued that these studies failed to address important questions concerning how environmental differences between developed and developing economies may explain variations in mobile banking adoption. Against the background of the preceding review, the next section explains the conceptual perspectives and the resulting hypotheses examined in this research.

Conceptual Perspectives and Hypotheses

Following the preceding review, a conceptual model of mobile banking adoption that considers the need to address the observed gaps in the literature was adopted. This model emphasizes the critical role of relevant personality traits in explaining consumers' attitudes and intentions to use mobile banking. Moreover, it conceptualizes two main personal traits—*inherent innovativeness* and the *need for interaction*—as antecedent predictors. We focused on these two traits based on insights from previous studies (Dabholkar & Bagozzi, 2002; Gao et al., 2012; Lin & Chang, 2011; Thakur & Srivastava, 2014) that underline the importance of these constructs in the adoption of technological innovations. The key elements in our conceptual model and the underlying logic of the proposed relationships are explained as follows.

3.1. Predictors: Inherent Innovativeness and the Need for Interaction

Inherent innovativeness has been defined as "the degree to which an individual is receptive to new ideas and makes innovation decisions independent of the communicated experience of others" (Hirschman, 1980; Midgley & Dowling, 1978, cited in Dabholkar & Bagozzi, 2002, p.188; Roehrich, 2004). Inherent innovativeness is viewed as an important predictor of innovation adoption because intrinsic traits are at the core of consumer behavior (Dabholkar & Bagozzi, 2002). The reasoning is that consumers who are naturally 'wired' with a high amount of this trait are more predisposed to using mobile banking because of the pleasure they derive from using innovation. This perspective is supported by motivation theorists who argue that people who are endowed with certain inherent traits tend to perform some activities better because they derive intrinsic satisfaction from doing so (Ryan & Deci, 2000).

Although a few empirical studies have established support for the importance of inherent innovativeness in the adoption of mobile technologies in cross-national investigations (Gao et al., 2012), the majority (Dabholkar & Bagozzi, 2002; Frimpong, Obaid, Wilson, & Sarpong, 2017; Thakur & Srivastava, 2014) were based on single-country samples, thereby limiting their generalizability. Based on the foregoing insights from trait theorists and empirical research, we anticipated that consumers with certain levels of inherent innovativeness are more inclined to using mobile banking. This led to the development of the first hypothesis as follows.

H1: Inherent innovativeness exerts a positive and significant effect on consumers' attitudes toward mobile banking in both the United Kingdom and Ghana.

The *need for interaction*, the second predictor, has been defined as the importance of human interaction to consumers in service encounters (Dabholkar, 1996). The

reasoning is that the more a consumer needs personal interaction, the greater the chance he/she will avoid self-service options in the consumption of services. Consequently, consumers with a strong need for interaction are usually more inclined to seek the assistance of service employees during service consumption (Meuter, Ostrom, Roundtree, & Bitner, 2000; Meuter et al., 2005) rather than doing this on their own via SSTs.

To date, a few studies have validated the importance of the need for interaction in explaining variations in consumers' adoption of SSTs. For example, a study show that consumers' need for interaction is a significant predictor of technology adoption (Dabholkar & Bagozzi, 2002), while others suggest that such a need mediates the link between innovation characteristics (ease of use) and intention to adopt SSTs (Oh et al., 2013). Drawing from the logic that consumers who have a strong need for interaction tend to prefer human support in the consumption of services, we conjectured that the need for interaction is a significant but negative predictor of consumers' attitude toward using mobile banking. This reasoning and insight led to the second hypothesis as follows.

H2: The need for interaction exerts a negative but significant effect on consumers' attitude toward mobile banking in both the United Kingdom and Ghana.

3.3. Moderating Effect of the National Environment

Although intrinsic factors are key determinants of human behavior and innovation adoption, external environmental factors also play a significant role in human behavior. This is because broad variations in human motivation and behavior are also determined by "more proximal socio–cultural conditions in which actors find themselves" (Dec & Ryan, 2008, p. 14) affect people's actions. Based on this theoretical perspective on the role of the environment in human behavior, we discuss two main aspects of national environmental conditions that influence innovation adoption—Technological and socio–cultural factors.

Differences in Technological Milieu

There is a reasonable support in the innovation adoption literature concerning the important effect of a nation's technological environment on the extent of its people's adoption of technology (Archibugi & Coco, 2004; Bhat, 2016; Cheng, Cheung, & Wang, 2018). According to Archibugi and Coco (2004), a nation's technological capability index (TCI) is an important indicator of the rate of innovation diffusion in its environment. TCI is represented by three broad domains relating to: i) the creation of technology, ii) availability of technological infrastructure, and iii) the development of human skill (Archibugi & Coco, 2004). Moreover, Bhat (2016) noted that technological infrastructure, such as internet connectivity, are important facilitators of consumers' use of online digital technology and mobile banking. This perspective appears logical, especially, given that the availability of facilitative infrastructure and services can make the use of mobile banking easier and attractive, even for consumers who may not be technology enthusiasts.

Differences in the Socio–Cultural Milieu

Culture has been broadly defined as the way of life of a group of people. Arguably, Hofstede's research (2001, 1983, & 1980) provides evidence suggesting that the United Kingdom and Ghana can be broadly categorized into different cultural clusters. For example, some previous studies (Blankson & Strutton, 2011; Darley & Blankson, 2008) indicate that African societies are among the most collectivist societies. This contrasts with the generally more individualistic nations of Western Europe (2001, 1983, & 1980). Although scholars (Blankson & Strutton, 2011; Darley & Blankson, 2008) admit that rapid urbanization appears to be undermining traditional Ghanaian (African) cultural values, the generality of Ghanaian society can be described as collectivist, relative to that of the United Kingdom.

Socio-cultural factors have long being established as important environmental determinants of consumer behavior and innovation adoption. This viewpoint is rooted in the attitude–behavior theories (Ajzen, 1991; Fishbein & Ajzen, 1975), which hold that the adoption of innovation is a function of social norms. This perspective is reasonable because societal values act as important moderators in the acceptance of technology (Srite & Karahanna, 2006). Moreover, it has been observed that the situational (Meuter et al., 2005; Steenkamp, Hofstede, & Wedel, 1999) or cultural context (Baptista & Oliveira, 2015; Laukkanen & Cruz, 2012) of consumers can significantly impact their attitudes toward innovation adoption.

To date, there has been a strong support for the significant role of socio–cultural factors in technology adoption (Ahklaq & Ahmed, 2013; Alsajjan & Dennis, 2010; Baptista & Oliveira, 2015; Im & Soo, 2011; Tobbin, 2012). In addition, other empirical studies show that national cultures have significant influence on the diffusion of consumer

products (Kumar & Pansari, 2016; Venzin, Kumar, & Kleine, 2008) and on electronic commerce (Chong et al., 2012; Pavlou & Chai, 2002). Moreover, Laukkanen et al. (2007) have observed that consumers in countries with a longer history of mobile banking culture face less consumption risk. Therefore, it is reasonable to expect consumers within cultures, where there is a pervasive use of technology, to be more inclined to follow this practice than those with little or no exposure to such practices.

Following on from the preceding viewpoints, we anticipated that differences in the technological and socio–cultural milieu of the two countries in this study may help account for significant variations in the effect of the inherent innovativeness and the need for interaction (predictors) on the consumers' attitude (mediator) toward using mobile banking. This view informed to the development of the third and fourth hypotheses as follows.

H3: Due to environmental differences, a significant difference exists between the United Kingdom and Ghana with regard to the effects of inherent innovativeness on consumers' attitudes toward mobile banking.

H4: Due to environmental differences, a significant difference exists between the United Kingdom and Ghana with regard to the effects of the need for interaction on consumers' attitudes toward mobile banking.

3.4 Mediator and Outcome Variables: Consumers' Attitude and Intention

Attitudes have been generally defined as individuals' orientation to respond to a phenomenon in a consistent way. A reasonable number of studies indicate that consumers' attitudes are immediate and strong determinants of their intention to use innovations in general (Ajzen, 1991; Ajzen and Fishbein, 1980; Davis, 1989; Fishbein and Ajzen, 1975), and digital innovations in particular (Wang et al., 2013; Meuter et

al., 2005; Yousafzai et al., 2010). However, although consumers' attitudes strongly predict their intentions and behavior, this relationship may be subject to the influences of societal norms (e.g., socio–cultural factors), as well as the extent to which individuals have control over their behavior (see above discussion on TPB, Ajzen 1991).

Based on insights from the literature and study's objective, we included consumers' attitude as a mediating variable between the antecedent trait predictors and the intention to use mobile banking. The assumption was that the strength of the relationship between consumers' attitudes and intention to use mobile banking would be stronger in countries with a longer tradition of digital banking and possessing superior and facilitative technological infrastructure. Given that the United Kingdom has a more advanced technological infrastructure and an established culture in digital banking compared with Ghana, we conjectured a significant difference between these countries with regard to the mediating effect of consumers' attitudes on their intention to use mobile banking. Following this logic, we formulated the fifth hypothesis as follows.

H5: Due to environmental differences, a significant difference exists between the United Kingdom and Ghana with regard to the mediating effects of consumers' attitudes on their intention to use mobile banking.

3.5 Control Variables

We included control variables related to the respondents' age, gender, and education. This is because previous studies (see Bhatt, 2016; Laukkanen et al., 2007; Nilsson, 2007; Thakur & Srivastava, 2014; Wang et al., 2013) suggest that these personal factors significantly influence consumers' attitudes toward SSTs in general, and mobile banking in particular. Overall, the results from the data analysis show that the predictor variables account for significant variations in consumers' attitudes and intention to use

mobile banking, even after controlling for the effect of all the demographic factors (Age → Att_MB: t = 3.068, p = 0.02; Gender → Att_MB: t = 0.850, p = 0.396; Education → Att_MB: t = 1.377, p = 0.169). The only exception was the variable age, which had a significant but mild effect.

4. Method

4.1. *Study Context—United Kingdom and Ghana*

The respondents for this study were purposely selected from two countries that represent developed (United Kingdom) and developing (Ghana) nations. These countries were chosen as they were perceived to be different in terms of their national culture and respective stage of technological development (see Blankson & Strutton, 2011; Darley & Blankson, 2008; Hofstede, 1980, 2001). First, the United Kingdom can be described as a highly developed Western country and a leading global economy with a relatively more advanced technological infrastructure. For example, the internet penetration rate as of the end of 2017 was a high 94.7% for the United Kingdom, compared with 34.3% for Ghana (https://www.internetworldstats.com). In addition, the United Kingdom has a longer history of digital banking culture and a relatively more pervasive use of electronic platforms for service delivery in both the public and private sectors (Sayar & Wolfe, 2007). By contrast, Ghana is a developing country with an emerging telecom and banking sector. Although there is a high penetration of mobile telephony (estimated at approximately 137%) (NCA, 2018), a well as an increasing trend in the use of mobile money transactions in Ghana, most of these are performed via third-party human agents. Thus, Ghana can be described as "emerging" on the landscape of digital payments.

4.2 Construct Measurements

All of the measurements used in this study were adopted from previous studies (see Table 2). The predictors (*inherent innovativeness* and the *need for interaction*), mediator (*attitude to mobile banking*), and outcome variable (*intention to use mobile banking*) were all anchored on a 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree. Inherent innovativeness (Dabholkar & Bagozzi, 2002) was measured using three items, whereas the need for interaction (Dabholkar, 1996) was captured using four items. The attitude toward mobile banking (Dabholkar & Bagozzi, 2002) was measured using six items, while intentions to use mobile banking (Ajzen & Fishbein, 1980) were each measured using two items.

4.3 Sampling and Respondents' Profile

A total of 1,340 samples were selected through surveys in the United Kingdom and Ghana based on convenience and purposive sampling. The UK sample (n = 720) was selected via an online panel hosted by Prolific Academic, whereas those from Ghana (n = 620) were obtained from a mall-intercept method. Since we had no access to a reliable online panel in Ghana, we purposely selected a mall (Accra Mall) frequented by a relatively middle-class segment, which is similar to the profile of the respondents in the online UK panel. A preliminary analysis of respondents' profiles suggested that the two samples were comparable on the key variables. For example, more than 80% of the respondents in both countries had higher than a high school education, and more than 80% were aged between 18 and 45 years. However, although female respondents accounted for 53% of the combined sample, the corresponding percentage was lower

for Ghana (45%) than for the United Kingdom (60%). The detailed profiles of the respondents from the two countries are provided in Table 1.

Table 1: Demographic Profile of Respondents

Category	Ghana		UK	
	N	Percentage	N	Percentage
Gender*				
Male	337	55.0	282	40.3
Female	276	45.0	417	59.7
Age				
18-25 years	90	14.5	160	22.2
26-30 years	174	28.1	162	22.5
31-35 years	183	29.5	114	15.8
36-40 years	105	16.9	89	12.4
41-45 years	48	7.7	69	9.6
46-50 years	16	2.6	54	7.5
51-50 years	2	0.3	47	6.5
Over 55 years	2	0.3	25	3.5
Highest Education Level				
SSS / High school	122	19.7	123	17.1
Diploma**	194	31.3	113	15.7
Associate degree***	66	10.6	308	42.8
Bachelor's degree	187	30.2	131	18.2
Master's degree	30	4.8	35	4.9
PhD	0	0	10	1.4
Other	21	3.4	0	0

Notes: * There were 21 (1.6%) respondents who did not indicate their gender.
**A diploma qualification is above a high school certificate but below a first degree qualification.
*** An associate degree refers to a higher diploma. It is above a diploma qualification but below a bachelor's degree.

5. Data Analysis and Results

5.1 Potential Biases, Reliability, and Validity Assessment

The Smart PLS3 software was used to evaluate both the measurement and the structural models of the research. The results from the measurement model are shown in Table 2. The assessment of the measurement model was based on the combined data from the United Kingdom and Ghana. All item loadings were higher than the 0.7 threshold, except for one item—Interact3—which scored 0.538. Moreover, both the Cronbach's alpha and composite reliability values were higher than the 0.70 threshold, thereby suggesting good reliability. The measurement model also demonstrated appropriate

construct (convergent and discriminant) validity since the average variance extracted values were higher than 0.5.

Table 2: Reliability and Convergent Validity

Construct / Indicators	Loading	p-values	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Inherent innovativeness			0.767 ***	0.864***	0.680 ***
Innov1	0.883	0.000			
Innov2	0.813	0.000			
Innov3	0.773	0.000			
(Dabholkar & Bagozzi, 2002)					
Need for interaction			0.759***	0.829***	0.630***
Interact1	0.978	0.000			
Interact2	0.804	0.000			
Interact3	0.538	0.000			
(Dabholkar, 1996)					
Attitude toward mobile banking	0.904	0.000	0.944***	0.956***	0.783***
ATT1	0.890	0.000			
ATT2	0.910	0.000			
ATT3	0.908	0.000			
ATT4	0.868	0.000			
ATT5	0.826	0.000			
ATT6					
(Dabholkar & Bagozzi, 2002)					
Intention to use mobile banking			0.870***	0.939***	0.885***
INT1	0.938	0.000			
INT2	0.943	0.000			
(Ajzen & Fishbein, 1980)					

NB: The detailed statements for measuring the various constructs are in Appendix 1, p. 34.

To evaluate the potential for common method variance (CMV) in the findings, when both the dependent and other exploratory variables are derived from the same respondents, two techniques were used. The first one was Harman's single factor test (Chang, van Witteloostuijn, & Eden, 2010). Accordingly, an exploratory factor analysis was conducted to check whether a single factor accounted for most of the variance among the measured constructs. The applicable guideline is that a single factor should not explain more than 50% of the variance. The results from a factor analysis via SPSS

show that the variance explained by one factor is at an acceptable level of 40%, suggesting that CMV is not a major concern.

Furthermore, the approach suggested by Kock (2015, p. 7) was followed to calculate the variance inflation factor (VIF) using Smart PLS. According to Kock, if all VIFs resulting from a full collinearity test are equal to or less than a threshold of 3.3, the model can be considered free of common method bias. The outcomes from four separate regression analyses, in which all the main constructs in our study were regressed on each other, show that the VIFs are much lower than the threshold (see Table 3). Therefore, based on our triangulated analyses, it is safe to assume that CMV has no substantial effect on the results reported in this study.

Table 3: Collinearity Statistics (Variance Inflation Factors) for Common Method Diagnosis

	Dependent Variables			
Independent Variables	**Inh_Innov**	**Interaction**	**Att_MB**	**Intention**
Inh_Innov	-	1.129	1.238	1.187
Interaction	1.012	-	1.113	1.107
Att_MB	1.765	1.790	-	1.095
Intention	1.752	1.825	1.121	-

The above-stated variables are defined as follows: Inh_Innov—inherent innovativeness, Interaction—need for interaction, Att_MB—attitude toward mobile banking, and Intention—intentions to use mobile banking.

Moreover, the results in Table 4 provide further evidence of the discriminant validity of the measurements because the correlation of items in each construct is stronger than with other items in other constructs, as suggested by Fornell and Larcker (1981).

Table 4: Discriminant Validity Indicators

Construct	Inh_Innov	Interaction	Att_MB	Intention
Inh_Innov	**0.824**			
Interaction	0.319	**0.794**		
Att_MB	0.294	0.140	**0.885**	
Intention	0.329	0.090	0.657	**0.941**

Note: Diagonal values **(bold)** represent the square root of the average variance extracted (AVE) for each construct. Off-diagonal values represent the correlations (shared variance) among the constructs. The diagonal values should be greater than the off-diagonal ones to demonstrate discriminant validity.

Structural Model

First, the research model was assessed using the combined data from the United Kingdom and Ghana. After evaluating the measurement model, the structural model was assessed using a bootstrapping calculation technique with 5,000 resamples to generate the statistics necessary to test the hypothesized relationships in the proposed conceptual model (Henseler, Ringle, & Sinkovics, 2009). The results from the combined data (United Kingdom and Ghana) indicate that the proposed conceptual model has a good fit and is valid since all of the path coefficients (Inh_Innov → Att_MB = 0.277, p =0.000; Interaction → Att_MB = 0.052, p = 0.031; Att_MB → Intention = 0.657, p = 0.000) are significant.

Effect of Trait Predictors on Attitude to Mobile Banking

To examine the effect of the antecedent predictors on the respondents' attitudes toward mobile banking in the two countries, a multi-group analysis procedure was used to evaluate the structural models for the United Kingdom and Ghana. The results (see Figures 1a & 1b) show that the effects of inherent innovativeness on the attitude toward mobile banking are positive and significant in both the United Kingdom (Inh_Innov → Att_MB = 0.203, p = 0.000) and Ghana (Inh_Innov → Att_MB = 0.341, p = 0.000), thereby supporting hypothesis 1. In addition, the effects of the need for interaction on

the attitude toward mobile banking are significant in both the United Kingdom (Interaction → Att_MB = -.179, p = 0.000) and Ghana (Interaction → Att_MB = 0.115, p = 0.011). However, the directions of the relative effects of the need for interaction in the two study contexts are different. Thus, although the effect of the need for interaction is negative in the case of the United Kingdom (as expected), its effect is positive in Ghana. Therefore, these mixed outcomes provide no conclusive evidence to support hypothesis 2, which postulates a negative effect in both the United Kingdom and Ghana.

Figure 1a: Structural Model

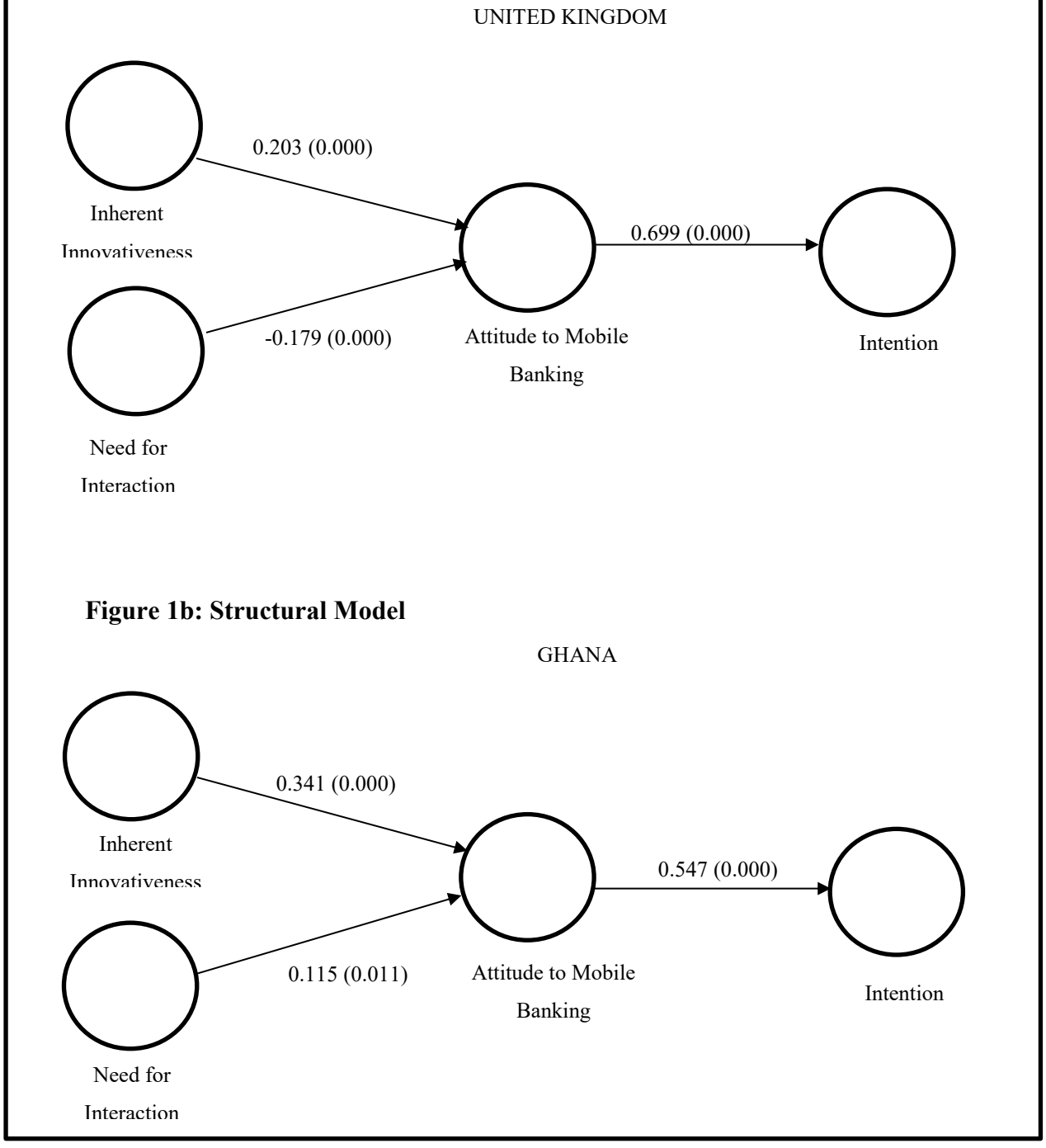

Figure 1b: Structural Model

National Differences in Path Coefficients

To test for the potential moderating effects of the respective national environments in our model, we examined the relative effects of the predictor and moderator variables. Table 5 shows the results of the differences in the path coefficients associated with the responses from the two samples, as well as their p-values. The outcomes support hypotheses 3 and 4, which postulate significant variations between the two countries in this study with regard to the effects (path coefficients) of consumers' inherent innovativeness (0.138, p = 0.013) and the need for interaction (0.294, p = 0.001) on their attitude toward mobile banking. However, although the absolute mediation effects of the consumers' attitude on their intention to use mobile banking is larger in the United Kingdom (0.699; t =27.63, p = 0.00) than in Ghana (0.547; t = 14.31, p = 0.000), the difference in their path coefficients (.153, p = 1.000) is not significant. Thus, hypothesis 5, which suggests a significant difference in the mediation effects, is not supported.

Table 5: Testing the Differences between the United Kingdom and Ghana

Relationship	**Difference in Path Coefficients between Ghana and the United Kingdom**	**p-Value**	**Results**
Inh_Innov → Att_MB	0.138	0.013	H3 is supported
Interaction → Att_MB	0.294	0.001	H4 is supported
Att_MB → Intention	0.153	1.000	H5 is not supported

6. Discussions

Despite the near agreement in the literature on the main predictors of consumers' adoption of technological innovations, there is limited knowledge concerning how differences in personal traits and national environments contribute to significant variations in mobile banking adoption, especially, between developed and developing economies. Consequently, this study tested a model of mobile banking adoption using a dataset on respondents from a developed Western country, the United Kingdom, and a developing sub-Saharan African economy, Ghana. The main results of this study and their implications for theory and practice are discussed as follows.

First, the results show that the inherent innovativeness of consumers exerts a significant positive impact on their attitude toward using mobile banking in both the United Kingdom and Ghana. Second, the respondents' need for interaction also emerged as a significant predictor of the consumers' attitude toward mobile banking for both countries. However, the direction of its effect differed between the two groups of respondents. Specifically, while consumers' need for interaction has a negative impact on their attitude toward mobile banking in the United Kingdom, its effect in Ghana is positive. While the negative effect of the consumers' need for interaction in the UK sample was expected, we did not anticipate that it would have a positive effect in the Ghana sample. The findings from Ghana suggest that consumers with a strong need for human interaction in the consumption of retail banking services also have a more positive attitude toward mobile banking. Although this outcome was not expected, it may be explained by the uniqueness of the Ghanaian national culture. For example, given the general collectivist orientation of the Ghanaian society (Blankson & Strutton, 2011; Darley & Blankson, 2008), it is plausible that consumers in this market value

human interactions in accessing retail banking services, even though they may have strong, positive inclinations toward mobile banking.

Second, the findings indicate that the two antecedent trait predictors are more salient in explaining consumers' use of mobile banking in Ghana than in the United Kingdom. Stated differently, the outcomes suggest that other factors peculiar to the Ghanaian respondents (e.g., technological and socio–cultural milieu as presumed), may have contributed to the stronger predictive effects of trait factors. Even though we did not directly measure these environmental differences, the may be explained by the well-established attitude–behavior theories (Ajzen, 1991; Fishbein & Ajzen, 1975). These theories hold that consumers' adoption of technological products are influenced by a complex interaction of factors, such as social–cultural norms of various societies. Overall, this finding interesting and additional insights. This is because most of previous cross-national investigations (see Chong et al., 2012; Gao et al., 2012; Laukkanen & Cruz, 2012; Pavlou & Chai, 2002; Sayar & Wolfe, 2007) involved mainly developed and emerging economies. In addition, these studies did not consider personal traits as the focal antecedent predictors.

Third, the results reveal that the mediation effect of consumers' attitude on their intention toward mobile banking is larger in the United Kingdom than in Ghana, although the magnitude of the difference is not statistically significant. Interestingly, this finding is contrary to our expectation, as we hypothesized a significant difference between the two countries with regard to the mediation effect of attitude on the intention to use mobile banking. Nonetheless, there are some possible theoretical explanations for this outcome. For example, the outcome may be explained by the view that the

general attitude of consumers toward mobile banking in both countries has exceeded the minimum threshold and are positive, as indicated by the path coefficients (0.699 vs. 0.547, see Fig. 1a & 1b) in the respective structural models.

7. Conclusions

This study mainly examined the relative importance of intrinsic traits in the adoption of mobile banking in the cases of a developed and a developing economy. The results show that pertinent intrinsic traits – inherent innovativeness and the need for interaction – are important antecedent predictors of mobile banking adoption in the context of both a developed and a developing economy. Although a number of previous studies (Gao et al., 2012; Roehrich, 2004; Agarwal & Prasad, 1998; Thakur & Srivastava, 2014) have examined the effects of these constructs (as either mediators or moderators), very little attention has been given to testing their potential significant roles as antecedent predictors in cross-national investigations. Thus, the current conceptualization of these constructs as antecedent predictors, helps extend the literature by emphasizing their critical importance in the adoption of technologies, such as mobile banking. Moreover, a cross-national analysis suggests that these traits may be more salient in explaining consumers' attitudes toward the use of mobile banking in Ghana (a developing economy) than in the United Kingdom (a developed economy). However, no significant variance between the two countries was observed with regard to the mediation effect of consumers' attitude on their intention to use mobile banking.

Overall, this research makes two main theoretical contributions to the literature. First, it adds to the limited research regarding the critical role of personal traits, such as inherent innovativeness and the need for interaction, in the adoption of mobile banking. In this way, the study generally contributes to the literature by supporting the

importance of the trait theory in consumer behavior (Hirschman, 1980; Roehrich, 2004; Ryan & Deci, 2000) and in the adoption of technological innovations (Dabholkar & Bagozzi, 2002; Lin & Chang, 2011; Thakur & Srivastava, 2014). More specifically, it helps extend the mobile-banking-innovation adoption literature (Baptista & Oliveira, 2015; Crabbe, Standing, Standing, & Karjaluoto, 2009; Hele, Scornavacca & Huff, 2012; Tobbin, 2012).

Second, the outcomes from the cross-national analysis confirm the importance of national environmental differences as potential moderators of the trait–innovation adoption hypothesis. We arrived at this conclusion by testing the relative importance of inherent innovativeness and consumers' need for interaction in predicting the consumers' attitude toward adopting mobile banking in both a developing and a developed economy. This is an important contribution to the literature because it further confirms the applicability of the personal traits–innovation adoption theories, which are mainly Western-based, to the context of developing countries, which are generally challenged by difficult economic conditions, have less efficient technological infrastructure, and are perceived to have unique cultural practices. We consider this as a worthy extension of the literature in view of the limited transnational investigations of mobile banking adoption (Shaikh & Karjaluoto, 2015). The managerial implications of these findings are discussed next.

7.1 Managerial Implications

Considering the increasing trend in the use of mobile commerce and digitization of service delivery channels in retail banking, it may be tempting for managers of multinational banks to adopt this medium for the mass-targeting of retail consumers across various national markets. Although such an approach may be largely appropriate

for most global consumer segments that are technologically savvy (see Gao et al., 2012), the findings from this study raise important questions concerning this emerging "orthodoxy" of using self-service digital platforms to serve various customer segments. Consequently, we discuss some directions for managers and policy makers in light of the findings reported above.

First, at the micro and managerial levels, the finding that intrinsic factors (inherent innovativeness and the need for interaction) are critical to customers' attitude toward mobile banking underscores the importance of not ignoring such micro segments. This outcome also underlines the relevance of including these trait measures as additional criteria for market segmentation and channel design. Thus, apart from relying on the traditional broad demographic factors (age, gender, education, and others), managers of multinational banks can employ more fine-grained segmentation criteria, such as consumers' trait orientation, to identify latent, but often ignored segments, which may prefer accessing retail banking services with more human support and interactions., Additional research targeted at this micro-segment, may enable managers to uncover unique preferences that can be integrated into the design of existing mobile banking platforms to make them more user-friendly.

Moreover, bank managers may gradually influence segments, which that need more human support for accessing banking services to migrate to self-service platforms through strategic promotions and education. For example, this may be achieved by assigning dedicated customer service officers in bank branches to guide customers with "special needs" (see Wang et al. 2013). Branch demonstrations can also be augmented

with periodic educational events in public spaces, such as malls, as well as the use of illustrative online videos as part of a grand multichannel strategy.

Finally, at the policy level, the finding suggesting that environmental differences may moderate consumers' attitudes toward mobile banking, implies that creating a supportive and facilitative environment, may be an appropriate approach to changing the attitudes of consumer segments that are intrinsically less inclined to using mobile banking towards. One way to improve consumers' attitudes toward mobile banking, especially in developing economies, is by improving internet connectivity, as well as removing bottlenecks (e.g., erratic supply of electricity/power), which often frustrate the use of mobile banking. Through the resolution of these environmental obstacles, developing country governments can make their technological landscape more favorable and supportive for both local banks and their customers, and thereby increase the usage of mobile technologies in their financial market over the long haul.

7.2 Limitations and Research Implications

A few limitations of this research can serve as bases for future research. First, the findings reported here were based on a cross-national survey rather than a longitudinal study. Therefore, ascribing causality in the examined linkages is difficult or inappropriate. Thus, a longitudinal study that tracks respondents' ratings on the constructs in the model over a longer period (e.g., five years) will be more useful in assessing the extent to which the observed antecedent traits explain consumers' attitude and intention toward using mobile banking.

Second, the unavailability of online consumer panels in Ghana meant that we had to rely on a mall-intercept approach to obtain data. As a result, this approach may have introduced some sampling bias, despite the similarity in the respondents' profiles across the two study countries. Therefore, it is strongly recommended that future researchers address this problem by using similar channels or sampling frames for data collection.

Finally, the moderation analyses were based on the premise of marked environmental differences between the two study contexts. Although the literature provides evidence that support palpable environmental differences between the two study contexts, the measurement of specific environmental variables, would have allowed for a direct assessment of the extent of moderation contributed by the contexts this study. Consequently, future research can improve on our indirect moderation design by obtaining direct measures of specific macro environmental differences and integrating these in the analyses. For example, respondents can be asked to rate the extent to which they perceive their countries' technological and cultural environments as facilitating or inhibiting the use of mobile banking. The resulting composite scores can then be treated as moderators of the hypothesized relationships in the proposed research model.

Appendix 1:

Independent Variables

Inherent Innovativeness. (Adapted from Dabholkar & Bagozzi, 2002)	**Disagree Strongly**						**Agree Strongly**
Innov1: I am always seeking new ideas and experiences	1	2	3	4	5	6	7
Innov2: When things get boring I like to find some new and unfamiliar experiences	1	2	3	4	5	6	7
Innov3: I like to continually change activities	1	2	3	4	5	6	7
Need for Interaction (Dabholkar, 1996)							
Interact1: Human contact with bank staff makes visiting my bank enjoyable to me	1	2	3	4	5	6	7
Interact2: I like interacting with the bank tellers who provides the service in bank branches	1	2	3	4	5	6	7
Interact3: It bothers to me to use a machine to access banking services when I could talk with a person instead	1	2	3	4	5	6	7

Mediator Variable

Attitude to Mobile Banking (Adapted from Dabholkar & Bagozzi, 2002): Range 1(Negative Attitude to 7 (Positive Attitude)
ATT1: Bad ------- God
ATT2: Unpleasant-----Pleasant
ATT3: Harmful -------Beneficial
ATT4: Unfavourable ------- Unfavourable
ATT5: Unsecure ------- Secure
ATT6: Difficult ------- Easy

Dependent Variable

Intentions to use mobile banking (Ajzen and Fishbein, 1980)	**Disagree Strongly**						**Agree Strongly**
INT1: Intend to increase my use of mobile banking in future	1	2	3	4	5	6	7
INT2: For the future I will make efforts to use mobile banking	1	2	3	4	5	6	7

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