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CULTURE-DESIGN COMPATIBILITY: IMPLICATIONS OF DISSONANCE BETWEEN COMPULSORY INFORMATION SYSTEMS AND INTERNATIONAL WORKFORCES

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To: Dean William G. Hardin
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This dissertation, written by Michael Alexander Danvers, and entitled Culture-Design Compatibility: Implications of Dissonance between Compulsory Information Systems and International Workforces, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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ABSTRACT OF THE DISSERTATION

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This proof-of-concept study investigates how Culture-Design Compatibility, the alignment between users' culturally informed preferences and the design features of compulsory information systems, influences perceptions of information system quality within multinational enterprises (MNEs). Although the Delone and McLean Information Systems Success (ISS) Model emphasizes System, Service, and Information Quality as key metrics, it does not explicitly account for cultural factors that shape user perceptions. To address this gap, this research integrates Interaction Theory with Hall's and Hofstede's cultural frameworks, positing that cultural dimension (Context, Time Perception, and Uncertainty Avoidance) function as antecedents to Perceived Quality.

Data was collected from a sample predominantly located in Latin America and the Caribbean, thereby reflecting a geographically constrained, but contextually rich, user base. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the study validates newly developed measures of Culture-Design Compatibility and demonstrates a significant, positive relationship with Perceived Quality ($\beta = 0.74$, $p < 0.001$), explaining

55% of the variance in user perceptions. Post-hoc analyses using alternative modeling approaches further support the robustness of these findings.

While these results suggest that cultural misalignment can lead to user resistance in the form of diminished system quality perceptions, the study's scope remains preliminary due to its geographically limited sample and single-time-point design. As a proof of concept, this work encourages broader investigations with more diverse samples, longitudinal designs, and additional control variables. In doing so, it aims to inspire future research to refine, generalize, and operationalize Culture-Design Compatibility as a means to optimize system adoption, reduce resistance, and promote more effective global IT strategies within MNEs.
Keywords: Culture-Design Compatibility, Interaction Theory, Information Systems Success Model, Multinational Enterprises, Cultural Dimensions, Information System Perceived Quality, PLS-SEM

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Introduction

The globalized business landscape has seen Multinational Enterprises (MNEs) invest heavily in information technology (IT) solutions and information systems, with estimated global spending projected to reach $5.1 trillion in 2024 (Gartner, 2023). However, despite these investments, a 31% failure rate for IT projects remain high (Standish Group, 2020). To gauge the health of the system, MNEs commonly use a variety of key performance indicators (KPI) in conjunction with psychometric instruments populated with survey data focused on different dimensions of an information system. An example of an empirically tested instrument that is widely accepted by academia and commonly applied by industry is the Delone and McLean Information Success Model (ISS). The ISS model emphasizes the importance of perceived *System Quality, Service Quality,* and *Information Quality* as foundational exogenous constructs. However, recent research suggests that current approaches to gauging system success using this model might be incomplete (Ibrahim et al, 2021).

Cultural factors, critical in shaping user perceptions, remain underexplored in this context (Rulinawaty et al, 2024). Culture influences how users interpret *System Quality, Service Quality,* and *Information Quality*; yet the original ISS model, and the updated model released in 2003, doesn't account for the potential effect these factors can impose as culturally heterogenous workforces interact with compulsory homogenous information systems. Consider the fact US-based MNEs, valued at $9.2 trillion in 2023 (BEA, 2023), employed an estimated 43 million employees around the globe (BEA, 2023). Operating under the assumption MNEs apply Rational Theory of Management during the information system's development strategy, the system's purpose is to "…rationalize work, to enhance managerial decision-making and planning, to control and motivate the performance of employees toward agreed-upon goals, and to improve communication and coordination among people in the organization or between the organization and aspects of its environment" (Markus, 1980). As MNEs continue to expand the use of compulsory information systems' to facilitate collaboration towards operational objectives (Markus, 1980), understanding the phenomenological relationship between culturally heterogeneous users and their perceptions of the homogenous information systems becomes critical in pursuit of mitigating additional investments addressing cognitive, affective, and/or behavioral resistance (Piderit, 2000). Cognitive resistance describes the cognitive load put forth by the user and their subsequent appraisal of the information system (Cieslak et al, 2024), whereas affective resistance refers to their emotion; both sub-dimensions would psychometrically be documented as the user perceiving the information system to be cognitively demanding and subsequently of poor quality (Brief & Weiss, 2002). Behaviorally, resistance could lead to general underutilization (Al-Abdallah et al., 2023) and/or total abandonment of an information system. Global IT spending reached $4.72 trillion in 2023 (Gartner), with costs of poor software quality and failed IT projects exceeding $1.56 trillion and $260 billion, respectively (Krasner, 2021). Understanding this subject now could prevent future significant operational inefficiencies, given the massive financial stakes.

Accounting for evidence that supports the argument cultural dimensions play a crucial role in shaping these expectations (Hofstede, 1980), this dissertation investigates how *Culture-Design Compatibility* between users and the information systems they are compelled to use can impact their perception of the core quality dimensions in the ISS model. Interaction Theory suggests that system resistance emerges from the dynamic between *User Preferences* and *System Designs*, not solely from system inadequacies or user deficiencies. Yet, little research has focused on how cultural misalignment can distort user perceptions of the quality dimensions, leading to resistance. Dissonance in this study functions as a proxy for resistance between the system design and user expectations. In this context – cognitive and affective – resistance in the ISS model would be empirically observed as an exogenous influence on the model's foundational quality dimensions and be phenomenologically captured through psychometric instruments that measure cultural dimensions in these co-existing conditions, *User Preferences* and *System Designs*. When there exists a misalignment *User Preferences* and *System Designs*, early stages of cognitive and affective resistance may begin to be observed as negative perceptions of the ISS quality dimensions. While performance metrics (e.g., KPIs) offer insights into the user's immediate performance, they fall short in predicting how users perceive and interact with the information system, which could have long-term implications (i.e., cognitive and affective resistance budding into behavioral resistance).

Numerous studies have highlighted the profound impact national and organizational cultural traits exert on the ways users perceive and engage with information systems (Hiller, 2003; Klein, 2004). These cultural anchors significantly shape users' attitudes towards an information system, influencing both their willingness to continue using the system and the manner in which it is utilized (Lee et al., 2007). Although the research has explored cultural influences as mediating and/or moderating factors on similar models (e.g., ISS Model and Unified Theory of Acceptance and Use of

Technology Model/UTAUT), no existing studies have integrated Interaction Theory and cultural dimensions as precursors to understanding user perceptions. This is a critical omission, as these user's perception is fundamental to the psychometric instruments. How does *Culture-Design Compatibility* impact the user perception of quality dimensions of the ISS model?

This research proposes a new framework by testing Interaction Theory within the context of cultural dimensions, empirically assessing how *User Preferences* and *System Designs* – through the lens of cultural dimensions – shape an information system's *Perceived Quality*. This work extends both Interaction Theory and the quality dimensions of the ISS Model, offering a novel approach to measuring a phenomenon that is theorized to precede exogenous factors used by existing models and potentially influences user perceptions of foundational quality dimensions. By integrating Interaction Theory and cultural dimensions, this study offers a proof of concept by introducing *Culture-Design Compatibility* as a direct antecedent to *Perceived Quality* (both concepts later explored). Misalignment between *User Preferences* and *System Designs* creates friction points that cognitively increase intrinsic, extraneous, and germane loads.

Intrinsic load – referring to the inherent difficulty in processing information, regardless of how it is presented – is theorized to be at a constant level; whereas extraneous load – the way information is presented – could be influenced by the system design. Germane load describes the effort needed to process information into cultural schemas (MCW, n.d). Higher cognitive load negatively impacts user satisfaction and task performance, contributing to cognitive resistance (e.g., judgments that the system is too complex or unsuitable). Affective Events Theory explains how workplace events influence employees emotions and, consequently, their job performance and satisfaction (Weiss et al, 1996). What can be synonymized with emotional impact, the users' emotional reactions to system interactions and cognitive challenges shape their attitudes toward the system. Positive emotional triggers (e.g., engaging systems with culturally aligned design) improve perceptions of system quality, whereas negative emotional triggers (e.g., frustration with confusing interfaces) lead to affective resistance.

If there is misalignment between *User Preferences* and *System Designs,* Interaction Theory describes the misalignment as increasing resistance; using Cognitive Load Theory, the resistance increases cognitive load requirements which amplifies negative affective/emotional reactions. Repeated negative experiences (Affective Events) reinforce cognitive resistance, creating a perception that the system's quality dimensions are poor or inadequate. Over time, cognitive resistance exacerbates emotional resistance, forming a cycle of disengagement. If unchecked, such conditions pose a substantial risk, potentially undermining the information system's governance over essential business processes and, by extension, diminishing the MNE's competitive edge fostered through strategic information system implementations. The consequences of this cultural-design misfit may emerge as miscommunications in tasking, expensive system overhauls, shadow IT, organizational disruptions, or system abandonment. Insights from the findings could be leveraged for strategic decision-making, system framework refinement, and policy design enhancement, potentially saving billions of dollars mitigating system redesigns or system abandonment.

Background Literature Review and Theory

The ISS Model: An Established Framework with Emerging Gaps

The ISS model, initially introduced in 1992 and refined in 2003, remains a pivotal framework for assessing system success. The model evaluates an information system's effectiveness by focusing on key quality dimensions: *System Quality, Service Quality,* and *Information Quality* (DeLone et al., 1992; 2003). These dimensions are seen as critical factors that shape user satisfaction and, ultimately, the overall success of the system (Urbach, 2009). DeLone and McLean's rationale for focusing on these three quality dimensions as foundational elements is the result of an extensive review and synthesis of existing research, revealing a consensus around the paramount importance of these aspects in capturing the essence of an information system. The logical underpinning of their argument is that these dimensions encapsulate the essential elements necessary for an information system to be effective, addressing both the technical excellence of the system and its alignment with user needs and expectations.

Information Quality, characterized by the accuracy, timeliness, and relevance of the data provided by the information system, is of paramount importance in the MNE setting. Given the collaborative nature of projects spanning various countries, the demand for precise and accessible information is non-negotiable. The quality of information not only facilitates effective decision-making but also enhances user satisfaction. Studies by Rai et al. (2002) and Seddon (1997) have established a significant correlation between *Information Quality* and its perceived usefulness and satisfaction among users, thereby underscoring its criticality in the successful deployment and utilization of information systems in a global business environment. *Service Quality*, marked by parameters like reliability, responsiveness, and timely support, pertains to the user's interaction with information system support services. In MNE contexts, where diverse global teams rely on constant system support, the quality of service directly influences user satisfaction and system utilization. Empirical evidence from studies by Wang et al. (2008), Ozkan et al. (2009), and Roca et al. (2008) corroborates the profound impact of *Service Quality* on an information system's effectiveness, highlighting its essential role in fostering a positive user experience and, by extension, ensuring sustained engagement with the information system. *System Quality* is defined by attributes such as performance efficiency, technical robustness, and intuitiveness. Within the context of MNEs, this dimension is crucial as it reflects the ease with which users across different jurisdictions can navigate and utilize the information system for their daily operations. The linkage between *System Quality* and both user satisfaction and utilization are foundational to the discourse on information system's success, asserting that a technically superior system lays the groundwork for enhanced user engagement.

Renowned for its robustness in various contexts, including e-commerce (Wang, 2008; Brown, 2015), e-government (Wang, 2008; Van Cauter et al., 2017), and knowledge management systems (Wu, 2006), the ISS Model has been extensively validated through empirical studies. However, as previously stated, its scope has been critiqued for not adequately accounting for cultural influences as a distinct variable. This oversight signals a significant gap, given the pivotal role culture plays in shaping user interactions with technology. To address this limitation, there is a growing consensus on the need to integrate cultural constructs into the ISS framework, a stance reinforced by Tam et al. (2017) in their field study on mobile banking performance. This study builds on the foundational work by Garfield et al. (1997), who argued that a user's cultural background fundamentally influences their perceptions and interactions with a system's functionalities and usage. This notion is further supported by Overby et al. (2004), who found that users with specific cultural profiles might prioritize certain types of information over others, demonstrating how cultural predispositions can shape information processing and decision-making practices. Furthermore, research by Leidner et al. (2006) underscores the dual-edged influence of culture on IT implementation, positing that culture can function as both a facilitator and a barrier to the successful deployment of information technologies. These insights collectively emphasize the intricate ways in which culture intersects with technology adoption and utilization, highlighting the necessity for a more culturally responsive ISS model.

Interaction Theory: A Dynamic Perspective on Resistance

Interaction theory, as conceptualized by Markus (1980), offers a comprehensive view of information system resistance, underlining the dynamic interaction between user characteristics and system features. Incorporating Interaction Theory into the ISS model creates the opportunity to evaluate the concept of *Culture-Design Compatibility*. Seminal work by Markus provided a case study investigating the implications of three separate theories used to explain resistance towards an organization's use of a financial information system. The first two theories would have suggested the source of the resistance as either explicitly people-determined or system-determined, neither of which would have been accurate. The third theory, Interaction Theory, concluded resistance was a product of "settings, users, and designers" interacting with each other (Markus, 1980). Unlike people-determined or system-determined theories, Interaction Theory argues that resistance emerges from the interaction between users, systems, and their contexts (Markus, 1980). According to this theory, even when an information system proficiently meets technical and organizational needs, a cultural mismatch between *System Features* and *User Preferences* can lead to resistance and eventual failure (Bostrom, 1977; Markus, 1980). This case study provided evidence to support the paradigm shift away from the constrained scope of either people or system-determined theories, towards a more useful theory when analyzing information system resistance.

Extending Markus's Interaction Theory with Hall and Hofstede’s cultural lens, this study hypothesizes that cultural dimensions, later identified and explored as *Context*, *Time Perception*, and *Uncertainty Avoidance*, affect how users perceive the quality of the information system. Resistance could be empirically observed as misalignment between *User Preferences* and *System Design*, which would result in lower perceptions of measured quality dimensions. Unlike previous work that treats culture as a moderator, this study conceptualizes cultural dimensions as pre-existing conditions between *User Preference* and *System Design*, whereby misalignment as an exogenous causal factor directly affect perceptions of quality. This study extends Interaction Theory contextually into the realm of MNE-compulsory information systems by focusing on how culture-design misalignment impacts key ISS quality metrics.

Cultural Dimensions in Information Systems Research

Cultural differences have long been shown to influence user interactions with information (Hall, 1959; Hofstede, 1980). Research by Straub et al. (2002) highlights the multi-layered nature of culture, including national, organizational, and individual levels, and suggests that cultural factors profoundly shape user behavior in information system environments. Previous information system research has analyzed cultural constructs at the national level, making the broad generalization that a nation's cultural preferences uniformly extend to all individuals residing within it. This approach, however, often fails to capture the nuanced realities of individual cultural preferences, as pointed out by McCoy (2005). Straub et al.'s virtual-onion model offers a more refined perspective, suggesting that an individual's cultural preferences are shaped by multiple layers of culture, including but not limited to national culture (2002). This model implies that individual cultural preferences can significantly differ from the collective cultural traits attributed to the larger societal or national group to which the individual belongs (Straub et al., 2002). This notion is supported by empirical evidence, as demonstrated in studies by Baskerville (2003) and Smith et al. (2003), where nations categorized under Hofstede’s "highly collectivist" category still displayed substantial variation in cultural preferences at the individual level. These findings highlight that intra-country cultural diversity can, at times, surpass inter-country differences, challenging the adequacy of using national culture as the sole determinant of individual behavior within information system research (Lee, 2007).

Furthermore, while the concept of national cultural preferences provides valuable insights into macro-level behavioral trends, its applicability falters when attempting to explain the behaviors of individuals within the same country (Straub, 2002). To address this gap, Ford et al. (2015) advocated for the identification of individual-level cultural characteristics. This approach acknowledges that, although influenced by their nation's overarching cultural traits, individuals’ cultural preferences are also informed by their connections to various other cultural layers, including ethnic, religious, professional, and organizational affiliations. This complex interplay suggests that individuals from the same nation may exhibit distinct cultural preferences, shaped by their unique affiliations to distinct cultural groups beyond just the national context (Erez, 2004). Such diversity underscores the limitation of assuming a direct, unmodified transfer of national cultural traits to individuals. Models that consider the multifaceted nature of culture—encompassing national, professional, organizational, and individual cultural characteristics—are crucial for a more accurate understanding of how culture influences user interactions with and attitudes toward compulsory information system (Karahanna et al., 2005; McCoy et al., 2005). This multi-layered approach is essential not only for grasping the broader scope of organizational technology use but also for delving into the individual-specific nuances that affect how users perceive and engage with information system.

The phenomena between individual cultural preferences and information processing is conceptualized as a nuanced aspect of human-computer interaction, whereby cultural profiles function as filters through which information is perceived and interpreted. Hiller (2003), Overby (2004), and Martinsons (1997) highlight how these preferences shape individuals' "internalized perceptions of meaning and relative importance of salient information," underlining the subjectivity inherent in engaging with information system. This subjectivity is further evidenced in the work of Evers et al. (1999), who observed that users with diverse cultural backgrounds assigned different meanings and levels of importance to the same visual aids presented within an information system. This phenomenon underscores a critical point: the user's cultural backdrop not only influences their receptivity to certain types of information but also structures their overall interaction with the information systems. Consequently, what one individual deems crucial within an information system might be overlooked or undervalued by another, based solely on their cultural predispositions (Hiller, 2003; Klein, 2004). This diversity in perception and interpretation leads to wide variance by which information is filtered and understood. Such findings not only validate the theory that individual cultural preferences significantly influence information system engagement, but they underscore the necessity for information system owners to consider the cultural heterogeneity of their user base, understanding dissonance between *User Preference* and *Design* can inflate resistance in the form of negative perception towards quality dimensions.

In the field of social science research, culture has been conceptualized, observed, and empirically documented in a variety of forms. Significant contributions have been made by both individuals (Gallivan, Karahanna, Hall, Hampden-Turner, Hofstede, Schwartz, Srite, Trompenaars) and groups (Global Leadership and Organizational Behavior Effectiveness) in expanding the scientific understanding of culture as a phenomenon. The definitions found in academia have a central tendency to share core elements while differentiating by their particular emphasis on characteristics, adoption, teaching, and utility. Early descriptions offered by Hall and Hofstede provide foundational definitions which have been adopted and adapted over time to include contextually significant additions when describing culture. In Hall’s seminal work “The Silent Language”, he describes culture as "the way of life of a people, the sum of their learned behavior patterns, attitudes, and material things" (1959), while Hofstede explains culture as "the collective programming of the mind that distinguishes the members of one group or category of people from others" (1984). Hall underscores culture as a complex and dynamic system of learned behaviors that include not only explicit practices and artifacts but also implicit beliefs, values, and assumptions that influence how people perceive and interact with their environment. Similarly, Hofstede emphasizes culture consists of shared values, beliefs, and behaviors that are learned and passed down through generations, shaping how individuals in a society perceive and interact with the world. It is important to note the preliminary definitions frame Hall's description of interaction as being between individual and environment, while Hofstede's description as an interaction between an individual, amongst a group/society, and their environment.

Hall conceptualized three primary dimensions – *Context*, *Time Perception*, and *Proxemics* – of culture that focus on how people communicate and interact with one another. The *Context* dimension, deduced to *High-Context* vs. *Low-Context*, describes how much information is communicated through explicit verbal messages versus through implicit, non-verbal cues, context, and shared understandings. In *High-Context* cultures, much of the communication is indirect and relies heavily on the surrounding context, while in *Low-Context* cultures, communication is direct, explicit, and relies on clear, detailed verbal information. The efficacy of incorporating Hall's *Context* and *Time Perception* dimensions was illustrated through the successful application in analyzing customer behavior in e-commerce adoption (Gong, 2009) and strategizing mobile service development (Lee et al., 2007). Hall (1976) articulated *Context* as "the amount of information that is in a given communication as a function of the context in which it occurs," thereby indicating that in high-context cultures, communication leans heavily on implicit cues and non-verbal information. Such cultures often exhibit a pronounced preference for face-to-face interactions, where the subtleties of communication are derived from contextual cues rather than the verbal content alone. Evidence gathered by Tam et al. (2017) further elucidates this by noting that in *High-Context* settings, the verbal component of a message is less informative, and individuals are adept at interpreting rules and meanings from the situational context. Conversely, *Low-Context* cultures prioritize directness, with a preference for explicit and quantifiable information. In stark contrast to *High-Context* cultures, where much of the communication is implicit and reliant on contextual cues, *Low-Context* cultures prioritize clear, explicit messages, with the verbal content carrying the bulk of the information. This dichotomy between *High* and *Low-Context* communication styles is pivotal in understanding user interactions with information systems. Lee et al. (2007) provide evidence that users from *High-Context* cultures often show a preference for symbolic and indirect expressions, impacting how they interpret and interact with digital platforms.

Time Perception, as conceptualized by Hall, serves as a critical cultural axis differentiating two cultural subgroups – monochronic and polychronic – with implications for task management and scheduling preferences. Both monochronic and polychronic orientations describe how cultures perceive and manage time. Monochronic cultures see time as linear and segmented, focusing on punctuality, schedules, and completing one task at a time. Conversely, Hall identifies polychronic cultures as those where multitasking is prevalent; individuals in these cultures are comfortable engaging in multiple activities simultaneously, viewing time as more fluid and less segmented. Cultures with polychronic traits are also described as prioritizing relationships over strict adherence to schedules. Research by Alkhaldi et al. (2016) and Holtbrügge et al. (2013)

applied *Time Perception* constructs to examine variances in e-mail communication styles and the use of video conferencing for knowledge sharing. These studies provide empirical evidence supporting the logic that *Time Perception* can influence the adoption and effective use of technology in communicating and disseminating knowledge. The implications for monochronic and polychronic cultures extends beyond mere scheduling preferences, impacting broader behavioral patterns, including the approach to task execution and the subjective perception of time itself (Hall, 1959; Nonis, 2005). Studies by Rose et al. (2003) and Holtbrügge et al. (2013) exploring communication style themes examined how time perception influences e-mail communication practices, revealing that these underlying cultural values shape not only the content and structure of communication but also expectations around responsiveness and engagement in digital environments.

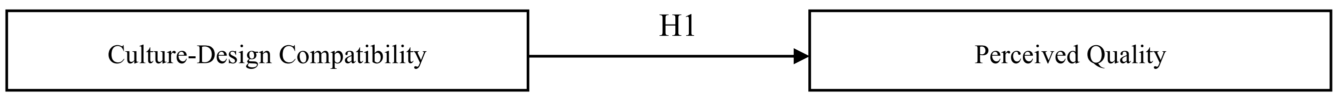
Hofstede conceptualized six dimensions of culture – *Power Distance*, *Individualism* vs. *Collectivism*, *Masculinity Vs. Femininity*, *Long-Term Vs. Short-Term*, *Indulgence Vs. Restraint*, and *Uncertainty Avoidance* – which are used to describe and compare the cultural values of different societies. Hofstede's *Uncertainty Avoidance* provides a pivotal framework for understanding cultural variances in risk perception and management. Defined as "the extent to which the members of a culture feel threatened by uncertain or unknown situations" (Hofstede, 1980), this dimension illuminates the psychological comfort levels of individuals when confronted with ambiguity and uncertainty. Those with high uncertainty avoidance are characterized by a propensity to avoid unfamiliar and novel information, striving to reduce the potential for risk through avoidance of ambiguous situations. This predisposition towards risk aversion is also manifested in a preference for structured environments, formalized rules, and clear expectations, reflecting a broader cultural inclination towards stability and predictability. For example, one study focusing on new technology adoption had evidential support that high uncertainty-avoidance cultures demonstrate resistance to adopting new technologies, favoring tried-and-tested methods to maintain control over potential risks (Erumban et al., 2006). In distributed groups, members from high-uncertainty-avoidance societies reported greater satisfaction with structured, IT-supported decision-making processes, indicating a stronger preference for predictable and organized approaches in collaborative settings (Perez-Alvarez, 2008).

Conversely, individuals who display low uncertainty avoidance demonstrate a markedly different approach to uncertainty and risk. These individuals are more accepting of, and even stimulated by, change and unpredictability, often embracing deviations from the norm and situational anomalies without significant distress. They are considered more adaptable and are seen as risk-takers, willing to explore unknown territories without the same level of anxiety or need for control exhibited by their high uncertainty avoidance counterparts. Studies on e-commerce adoption have demonstrated this flexibility; low-uncertainty-avoidance cultures tend to adopt online platforms more readily, viewing technological change as an opportunity rather than a source of anxiety (Belkhamza et al, 2014). This delineation between high and low uncertainty avoidance not only sheds light on individual and collective behaviors in the face of uncertainty but also offers valuable insights for managing cross-cultural interactions and designing systems or policies in diverse cultural settings. Understanding where a culture falls on this spectrum can inform strategies for communication, decision-making, and innovation.

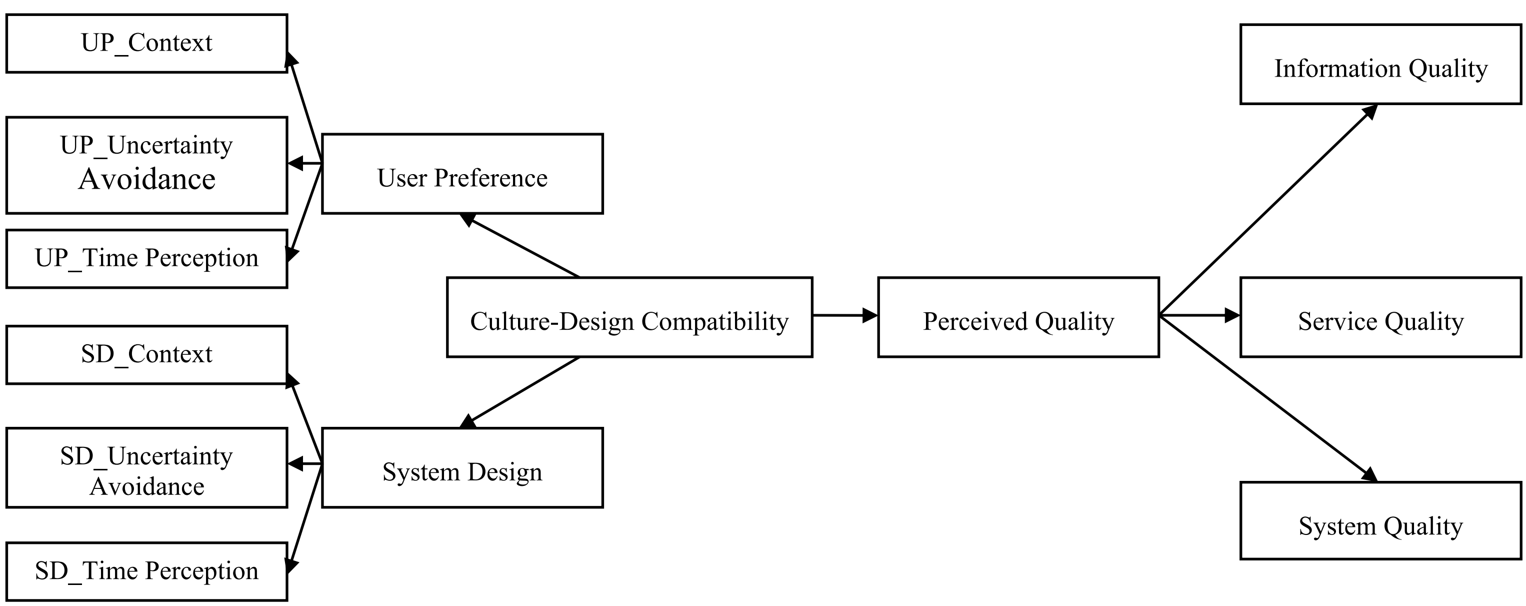
For instance, when developing IT products, high-uncertainty-avoidance societies may benefit from stable, highly reliable solutions that align with their need for control, while low-uncertainty-avoidance societies might embrace more flexible and iterative designs (Bagchi et al., 2004). Tailoring approaches to align with, or gently challenge, prevailing cultural norms regarding risk and uncertainty allows organizations to better meet the expectations of different cultural groups. To understand the intricate relationship between cultural dimensions and information system design this study integrates seminal theories from Hall on *Context* and *Time Perception* (Hall, 1959; Hall, 1976; Hall, 1983) with Hofstede's *Uncertainty Avoidance* (Hofstede, 1980). These dimensions were chosen due to their direct relevance to information system design and empirically documented application in cultural studies (Baumgartner et al., 2004; Honold, 2000; Smith et al., 2004; de Mooij, 2004; Hoft, 1996).

Conceptual and Structural Model Design

Concept Model



Structural Model



Design Basis
Culture Theory (Hall, 1969; Hofstede, 1980)
Information System Success Model (DeLone et al., 2003)
Interaction Theory (Markus, 1980)

Hypotheses

H1:*Culture-Design Compatibility* will have a positive and significant effect on *Perceived Quality*.

The hypothesis is grounded using Interaction Theory (Markus, 1980), whereby congruence of cultural dimensions between *User Preferences* and *System Design*, abstracted as *Culture-Design Compatibility*, will have a strong positive relationship with ISS's foundational quality dimensions, conceptualized as *Perceived Quality*. In this hypothesis both *Culture-Design Compatibility* and *Perceived Quality* are conceptualized at a similar level of abstraction as high order constructs that are defined by sub-dimensions (Edwards 2001; Jarvis et al., 2003; Law and Wong, 1999; Law et al., 1998; MacKenzie et al., 2005; Netemeyer et al., 2003; Petter et al., 2007*).* Conceptualizing the multidimensional latent variables as high order constructs has been argued as more efficient in achieving theoretical parsimony, reducing model complexity, enhancing generalizability (Edwards 2001; Law et al. 1998; MacKenzie et al. 2005; Gorsuch; 1983). While MNE's information system aim to offer a consistent and standard experience to end-users, the foundational qualities of *Information*, *Service,* and *System Quality* may be effected by a misalignment between *User Preference* and *System Design*. Any degree of misalignment between *Cultural Preferences* and *System Design* leads to some form of resistance, as theorized by Markus (1980). The degree of user dissatisfaction and resistance is theorized to be proportional to the severity of misalignment. Small misalignments might result in minor dissatisfaction, while severe misalignments could lead to complete system abandonment or use of shadow IT.

Culture-design compatibility is conceptualized as a third order construct reflected by the interaction between second order constructs *User Preference* and *System Design.* Alignment, or dissonance, between the two sub-dimensions are hypothesized to impact the user's perception of the ISS's quality dimensions. Both of the second order constructs individually represent distinguishable but interacting components theorized by Markus to explain the presence of resistance as a product of misalignment between the two sub-dimensions in the context of information systems. The second order constructs are reflected using *Context*, *Time Perception*, and *Uncertainty Avoidance* as first order cultural dimension constructs. These latent variables attempt to reflect the cultural dimensions from the perspective of both the individual user and the system they are obligated to use. As previously established, it is understood that cultural dimensions can significantly shape users' attitudes towards an information system, impacting their behavior towards willingness and the manner in which they operate the information system (Lee et al., 2007). *Perceived Quality* is also conceptualized as a high order construct representing *Information Quality, Service Quality,* and *System Quality*. These dimensions encompass the essential components required for an information system to be effective, addressing both the system's technical quality and its ability to meet user needs and expectations.

Methodology

Data Collection and Scale Development

Developing a psychometrically rigorous instrument to measure *Culture-Design Compatibility* and *Perceived Quality* was central to this study. Grounded in Interaction Theory - which posits that resistance emerges from the interplay between user characteristics and system features - this study operationalized *Culture-Design Compatibility* as the degree of alignment or misalignment between *User Preferences* and *System Design* features across the three previously discussed cultural dimensions: *Context, Time Perception,* and *Uncertainty Avoidance*. The survey design was robust enough to assess alignment or dissonance, even in cases where features of either *User Preference*, *System Design*, or both diverged. The *Context* dimension captured whether users preferred a low-context communication style, which emphasizes explicit, detailed, and unambiguous information, and whether the system design provided features consistent with this preference, such as clear navigation and detailed documentation. For users who preferred *High-Context* communication, the survey items were designed to measure whether their preference matched system features emphasizing implicit cues or reliance on shared understanding. This allowed the model to capture both positive alignment (e.g., *Low-Context* preferences matched by *Low-Context* design) and negative alignment (e.g., *High-Context* preferences paired with *Low-Context* design).

Similarly, the *Time Perception* dimension evaluated whether users identified as *Monochronic*—favoring structured, sequential task execution—or *Polychronic*, which prioritizes multitasking and flexible schedules. The *System Design* questions assessed whether the information system was perceived to support *Monochronic* or *Polychronic* workflows, such as through structured task prioritization or the ability to manage multiple simultaneous tasks. The survey design ensured that even if a user preferred a *Polychronic* environment, but the system adhered strictly to *Monochronic* principles (or vice versa), the misalignment could be quantified and its impact on *Perceived Quality* measured. The *Uncertainty Avoidance* dimension assessed *User Preferences* for structured, predictable environments with clear rules and whether the system offered corresponding features, such as consistent error handling, robust documentation, and predictable workflows. Users who thrived in *Low-Uncertainty Environments*, favoring flexibility and adaptability, were also able to indicate whether the system supported their preferences, even if the design leaned toward structured, *High-Uncertainty-Avoidance* principles. This dual design allowed for the detection of both alignment (e.g., *High-Uncertainty-Avoidance* preferences matched by structured design) and dissonance (e.g., *Low-Uncertainty-Avoidance* preferences mismatched by rigid, rule-heavy systems).

The strength of this design lies in its ability to evaluate *Culture-Design Compatibility* regardless of whether users and systems have aligned or opposing preferences. For example, a user with *Low-Context, Monochronic,* and *High-Uncertainty-Avoidance Preferences* could still report high *Culture-Design Compatibility* if the system design aligns with these preferences. Conversely, a user with opposite preferences—*High-Context, Polychronic, And Low-Uncertainty-Avoidance*—would also report high *Culture-Design Compatibility* if the system aligns with their unique needs. The design also captures cases of misalignment, such as a *Low-Context User* encountering a *High-Context System*, allowing the study to empirically test whether such dissonance negatively affects *Perceived Quality*. By framing *Culture-Design Compatibility* as the interaction between *User Preferences* and *System Design*, this model operationalized alignment and misalignment as critical factors driving resistance or satisfaction, consistent with Interaction Theory.

We followed MacKenzie et al.'s (2011) recommended scale development procedure, executing two sequential studies identified in this study as Study I (Pilot Study) and Study II. This approach provided a framework for refining and validating constructs (George et al.,2023), ensuring their robustness and generalizability across MNE contexts. We sourced online candidates from Connect CloudResearch to voluntarily participate in the survey hosted on Qualtrics. The online questionnaire was administered exclusively in English and consisted of previously published multi-item scales with favorable psychometric properties (Hair et al, 2010). The cultural dimension scales (*Context*, *Time Perception, and Uncertainty Avoidance*) were adapted from Lee et al.'s study on mobile internet users (2007). The three cultural dimensions were also adapted to represent the two co-existing conditions proposed by interaction theory (*User Preference* and *System Design)*, resulting in six scales represented by 30 reflective items. The three quality dimension scales (*Information Quality, Service Quality,* and *System Quality*) were adapted from Urbach et al.'s study on employee portal success (2010) and are represented by 16 reflective items (See appendix for a table of the construct definitions).

All of the items were measured on a seven-point Likert-type scale, ranging from "strongly disagree" to "strongly agree". In addition, 15 different demographic dimensions were collected, seven during the actual survey and eight provided by Connect CloudResearch. Before the actual research was conducted, four doctoral students pretested the questionnaire, providing feedback on the item's clarity, relevance, validity, focus, neutrality, bias, simplicity, precision, and ease. Minor adjustments to the questionnaire were made based on the feedback from the pretest.

Study I

An English-only pilot survey was used to assess the psychometric properties of the items. To increase response rate, we offered qualifying candidates $1, which resulted in 413 respondents. As a screening question, the pilot survey used two qualifier questions to first identify employees of MNEs, and then MNE employees who are required to use an information system provided by their employer. The pilot survey also used an "attention-check" question to identify participants who may not have been fully engaged in the survey. On the basis of the screening and "attention-check" responses, 116 were allowed to proceed with the survey.

To assess the psychometric properties of the measures, we initially specified a null model for the first-order latent variables. Indicators with outer loadings below 0.7 were removed. To evaluate the reliability of the constructs, we calculated composite scale reliability (CR/ρa), average variance extracted (AVE), and Cronbach's alpha (Chin, 1998; Fornell & Larcker, 1981; Werts, Linn, & Joreskog, 1974). All constructs exceeded the recommended thresholds – ρa > 0.7, AVE > 0.5, and Cronbach's alpha > 0.6 – with the exception of *System Design-Context* (ρa 0.5, AVE 0.3), *System Design-Time Perception (*Cronbach Alpha 0.6), *User Perception-Context* (ρa 0.2, AVE 0.3), and *User Perception-Uncertainty Avoidance* (ρa 0.6, AVE 0.4). Discriminant validity was assessed using Fornell and Larcker's criterion (1981), whereby the square root of a construct's AVE was greater than its correlation with other constructs. Additionally, we employed the Heterotrait-monotrait ratio (HTMT) criterion (Hensler, Ringle, & Sinkovics, 2009). All constructs exhibited HTMT values below 0.85, except for *System Quality* (0.91), which was deemed acceptable given their eventual aggregation into a higher-order construct.

We re-evaluated the adapted items from the constructs that experienced the departure from the recommended acceptance criteria. After additional adaptations were made to the items, the survey was re-introduced to four doctoral students who again reconfirmed each item’s clarity, relevance, validity, focus, neutrality, bias, simplicity, precision, and ease.

Study II

After the pilot study, a new English-only survey with the refined item inventory was hosted on Qualtrics and distributed to participants on Connect CloudResearch. A $2 incentive was offered to qualifying participants, resulting in 425 responses. After screening and attention checks, 207 surveys were retained for analysis. No participants from the pilot study were found in this dataset. The respondent pool was predominantly from Latin America/Caribbean, which should be explicitly noted as it limits cross-cultural generalizability. Thus, the survey results should be interpreted as a proof-of-concept demonstration rather than a final statement on global applicability. Psychometric properties were reassessed at the initial item and subsequent construct levels.

At the item level. all indicators had outer loadings above 0.7, except for *INQ3* (0.6) and *UPCT5* (0.6). Following Hair et al.'s protocol, these items were removed individually and found to negatively impact the construct's internal validity, discriminant validity, and AVE. Therefore, the decision was made to retain these items. At the first order construct level, all constructs exceeded the recommended internal reliability thresholds previously used in the pilot survey. The same criterion was used to assess discriminant validity. *Information Quality* and *System Quality* exhibited an HTMT value of 0.91, which was accepted given their planned aggregation into a higher-order construct. Tables 04-07 found in the appendix provide details of each criteria’s measurement completed at the first-order.

Hierarchical Model Analysis

The repeated indicator approach, a method commonly used in PLS-SEM (Gupta, 2016; Henseler, Ringle, & Sarstedt, 2016), involves using the same set of indicators to measure both the first-order and higher-order constructs after the construct have establish internal reliability and discriminant validity, ensuring consistency and reducing measurement error. The hierarchical model was evaluated using the following higher-order constructs:

1. *System Design***:** This construct was formed by aggregating the first-order constructs of *System Design-Context*, *System Design-Time Perception*, and *System Design-Uncertainty Avoidance*. The indicator weights for these constructs on *System Design* were significant ($\beta = 0.47$, 0.78, and 0.79, respectively, $p < .001$).
2. *User Preference***:** This construct was formed by aggregating the first-order constructs of *User Preference-Context*, *User Preference-Time Perception*, and *User Preference-Uncertainty Avoidance*. The indicator weights for these constructs on *User Preference* were significant ($\beta = 0.28$, 0.98, and -0.22, respectively, $p < .001$).
3. *Perceived Quality***:** This construct was formed by aggregating the first-order constructs of *Information Quality*, *Service Quality*, and *System Quality*. The indicator weights for these constructs on *Perceived Quality* were significant ($\beta = 0.49$, 0.77, and 0.92, respectively, $p < .001$).

The higher-order constructs of *User Preference* and *System Design* were further aggregated to form the *Culture-Design Compatibility* construct. The indicator weights for *User Preference* and *System Design* on *Culture-Design Compatibility* were significant ($\beta = 0.68$ and 0.91, respectively, $p < .001$). As shown in Figure 01, a significant, positive relationship was found between *Culture-Design Compatibility* and *Perceived Quality* ($\beta = 0.74$, $p < .001$), accounting for 55% of the variance in *Perceived Quality*.

Nomological Validity

To assess the nomological validity of the proposed model, we examined the hypothesized relationships between *Culture-Design Compatibility* and *Perceived Quality*. As predicted by Interaction Theory (Markus, 1980), a significant positive relationship was found between *Culture-Design Compatibility* and *Perceived Quality* ($\beta = 0.74$, $p < .001$), accounting for 55% of the variance in *Perceived Quality*. This finding provides strong empirical support for the notion that a strong alignment between *User Preferences* and *System Design* leads to increased *Perceived Quality*.

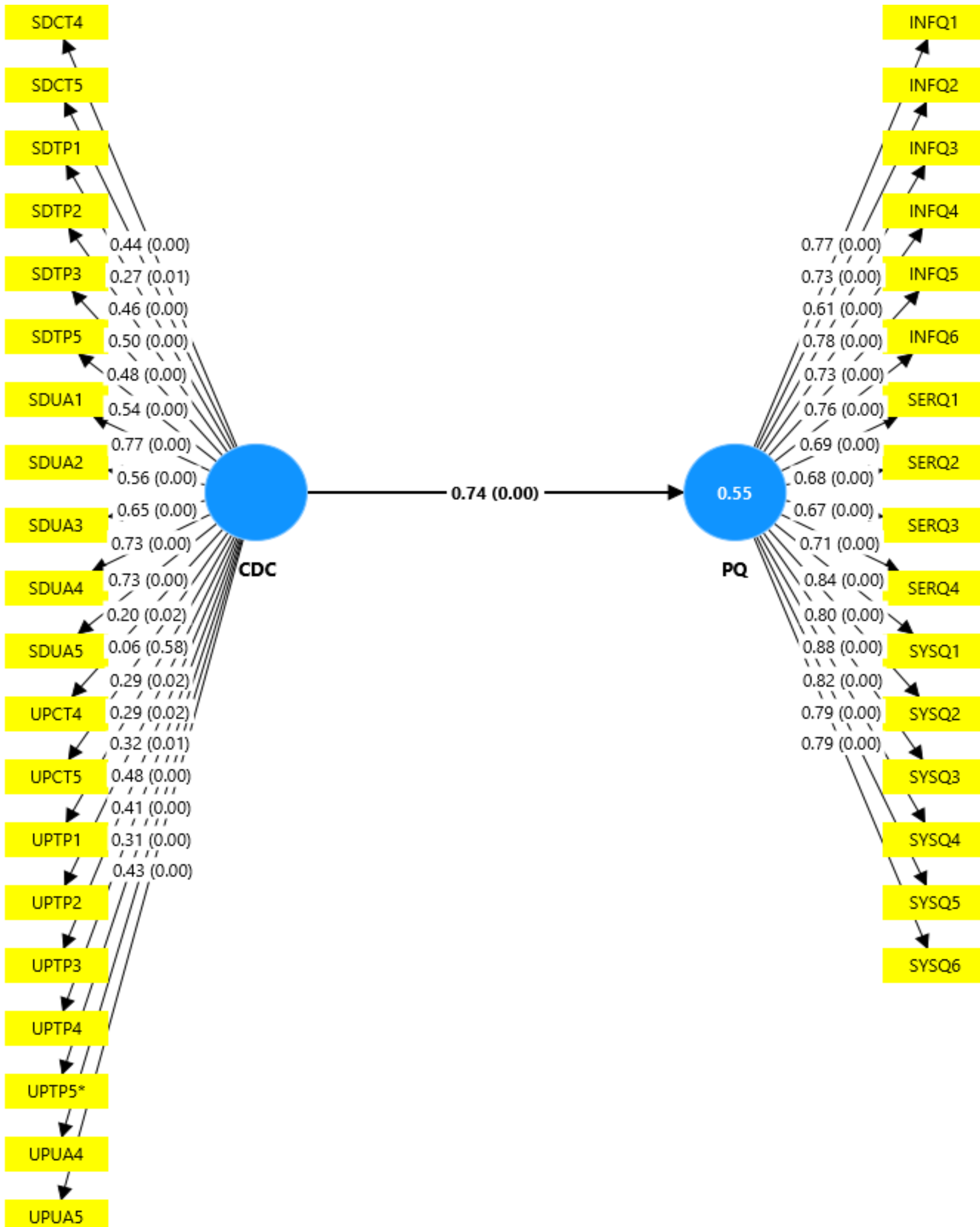


Figure 1 Repeated Indicator High Order Construct Model Configuration

Post-Hoc Analyses

To further validate the robustness of the proposed model, two post-hoc analyses were conducted: (1) an alternative approach to building the higher-order construct using the disjointed two-step approach, and (2) an alternate configuration of the latent variables, grouping cultural dimensions together rather than separating them by *User Preference* and *System Design*. These analyses aimed to explore methodological alternatives and assess whether the original model configuration offered the strongest theoretical and empirical support.

Model Robustness

Disjointed Two-Step Approach to High-Order Construct Development

The development of higher-order constructs in PLS-SEM can be conducted through two main approaches: the previously tested repeated indicator approach or the disjointed two-step approach. The disjointed two-step approach was applied to compare against the evidence supporting the robustness of the relationship between *Culture-Design Compatibility* and *Perceived Quality*. This methodologically distinct approach is typically selected as a technique to mitigate potential multicollinearity issues inherent in the repeated indicator approach and to validate the latent variable structure by leveraging latent variable scores as input for the higher-order construct (Sarstedt et al., 2019; Wold, 1985). Unlike the repeated indicator approach, which uses the same set of indicators to define both the first-order and subsequent higher-order constructs, the disjointed two-step approach aggregates the latent variable scores of the lower-order constructs into the higher-order construct (Becker et al., 2012). This difference offers potential advantages, such as reducing model complexity and ensuring a more parsimonious representation of higher-order constructs.

The relationship between *Culture-Design Compatibility* and *Perceived Quality* was statistically significant ($\beta = 0.71$, $p < .001$), with a standard error of 0.04 and a t-value of 19.19. The model explained 50% of the variance in *Perceived Quality* ($R^2 = 0.50$, $p < .001$). When compared to the repeated indicator approach, the disjointed two-step approach yielded a slightly lower path coefficient ($\beta = 0.71$ vs. $\beta = 0.74$) and variance explained ($R^2 = 0.50$ vs. $R^2 = 0.54$). However, both approaches demonstrated high reliability and significant predictive power. These findings provide additional empirical support for the relationship between *Culture-Design Compatibility* and *Perceived Quality*. While the repeated indicator approach demonstrated marginally stronger fit statistics, the disjointed two-step approach reinforced the robustness of the higher-order construct. This consistency across methodological approaches strengthens confidence in the validity of the hypothesized relationships and supports the decision to model *Culture-Design Compatibility* and *Perceived Quality* as higher-order constructs.

Alternate Configuration of Latent Variables

To explore additional interpretations of the founding theory, the second post-hoc analysis tested an alternate configuration of latent variables, wherein the cultural dimensions—*Context, Time Perception,* and *Uncertainty Avoidance*—were grouped together as a higher-order construct. This approach deviates from the original model, which separated these dimensions into *User Preference* and *System Design*. The rationale for this reconfiguration was to consider an interpretation rooted in cultural dimensions as the primary antecedent to *Perceived Quality*, in alignment with Interaction Theory's emphasis on context as a precursor to information system resistance (Markus, 1980).

The direct effect of *Culture-Design Compatibility* on *Perceived Quality* was statistically significant ($\beta = 0.66$, $p < .001$). Significant relationships were also observed between *Culture-Design Compatibility* and the cultural dimensions (e.g., *Culture-Design Compatibility* → *Context*: $\beta = 0.79$, $p < .001$; *Culture-Design Compatibility* → *Time Perception*: $\beta = 0.48$, $p < .001$; *Culture-Design Compatibility* → *Uncertainty Avoidance*: $\beta = 0.74$, $p < .001$). *Perceived Quality* had 44% of the variance was explained ($R^2 = 0.44$, $p < .001$), slightly lower than the original model ($R^2 = 0.54$). *Context* had 62% of the variance was explained ($R^2 = 0.62$, $p < .001$), indicating strong predictive power for this construct. *Time Perception* and *Uncertainty Avoidance* had moderately lower variance explained ($R^2 = 0.22$ and 0.54, respectively).

The alternate configuration provided insights into the distinct contributions of each cultural dimension to *Culture-Design Compatibility* and *Perceived Quality*. While the variance explained in *Perceived Quality* ($R^2 = 0.44$) was lower than in the original model, the alternate configuration highlighted the individual roles of *Context*, *Time Perception,* and *Uncertainty Avoidance* in shaping *Culture-Design Compatibility*. For instance, the significant path coefficient for *Culture-Design Compatibility* → *Context* ($\beta = 0.79$, $p < .001$) underscores the critical role of contextual alignment in information system perceptions. This reconfiguration offers an alternate lens for interpreting the role of cultural dimensions in information system perceptions. While it did not outperform the original configuration in terms of overall model fit or predictive power, it provided nuanced insights into the direct relationships between cultural dimensions and *Perceived*

Quality. These findings suggest that grouping cultural dimensions together as a unified construct may oversimplify the interactions between cultural preferences and information system design.

Subgroup Analysis

In addition to the alternate processes building high-order constructs and model configurations, we sought to further ensure the robustness and generalizability of the model by performing subgroup analysis. The subgroups were identified based on the categorical responses recorded on the survey's demographic fields. At the time the analysis was performed, SmartPLS requires that each subgroup have a minimum of 10 records to questions; as such, not all potential subgroups met the minimum criteria and were disqualified from potential testing. After the subgroups were established, we proceeded to check for intragroup invariance using Measurement Invariance of Composite Models (MICOM). After identifying the subgroups that met -at minimum- partial invariance, we proceeded to compare the relationship between *Culture-Design Compatibility* and *Perceived Quality* amongst subgroups in search of statistically significant differences using Permutation Multigroup Analysis (PMGA).

Measurement Invariance of Composite Models (MICOM)

As previously stated, MICOM assesses measurement invariance by evaluating whether the constructs are comparable across subgroups. Although the dataset captured a variety of demographics, not all subgroups met the minimum requirement and were therefor not eligible for assessment. For the subgroups meeting the minimum, MICOM procedures evaluated for configural invariance, compositional invariance, and equality of composite mean and variance. During analysis, several permutations failed to process and returned with a “Singular Matrix” error message. Further investigation revealed the system provides the message when either the constructs have a variable of zero, there is extreme collinearity, or the sample size is too small. We confirmed variability of the constructs via manual inspection, re-assessed VIF scores for collinearity, and assessed sample sizes for any disparity. Based on the lack of evidence, we deduced it was a combination of violations at varying severities. An exhausted list for subgroup permutations not examined are listed in the annex.

Achieving compositional invariance meant the composite scores of the constructs are invariant between groups. Achieving equality of composite mean and variance implied there is a similarity of the mean and variance amongst the constructs across subgroups. The subgroups are considered to achieve partial invariance if the MICOM analysis could only establish compositional invariance. The subgroups are considered to achieve full measurement invariance if the MICOM analysis established compositional invariance, equality of composite mean and variance. The majority of the permutations (not explicitly outlined in the singular matrix table) achieved full measurement invariance, while all achieved partial measurement invariance. The results were sufficient to proceed with permutation multigroup analysis, as partial invariance allows the comparison of path coefficients.

Permutation Multigroup Analysis (PMGA)

Permutation MGA was employed to evaluate whether statistically significant differences exist in the structural model across subgroups. The analysis focused on *Culture-Design Compatibility* and *Perceived Quality* relationships and their consistency between groups. The majority of subgroup comparisons revealed no statistically significant differences (*p <0.05)*. A notable exception is the "Type of Information System" comparison between "Business Intelligence Systems" and "Human Resource Management Systems," which exhibited a significant difference ($p = 0.022$), with a negative *Culture-Design Compatibility* and *Perceived Quality* difference of -0.191. This suggests minor variability in how *Culture-Design Compatibility* influences *Perceived Quality* between these system types.

Additional inter-subgroup testing was conducted on demographics in which the user provided individual responses describing their system's design and their user preference using established cultural definitions. SD-HCT vs. UP-LCT, SD-MONO vs. UP-POLY showed largely insignificant differences, supporting the model's applicability across diverse cultural contexts. The lack of significant differences in most subgroup comparisons suggests that the relationship between *Culture-Design Compatibility* and *Perceived Quality* is broadly applicable across various demographics, usage patterns, and system types. The results are interpreted as support for the proof-of-concept nature of this study, indicating that the model can reliably capture the dynamics of *Culture-Design Compatibility* and *Perceived Quality* across diverse organizational contexts and user groups.

The post-hoc analyses served to validate and extend the findings of the original model by exploring alternative methodological, theoretical configurations, intragroup comparisons. The disjointed two-step approach reinforced the robustness of *Culture-Design Compatibility* and *Perceived Quality* as higher-order constructs, offering a complementary perspective to the repeated indicator approach. Meanwhile, the alternate configuration of latent variables illuminated the individual contributions of cultural dimensions, albeit at the cost of reduced explanatory power. An exhausted intragroup analysis provided insight into the statistically insignificant differences shared amongst the majority of categories, most importantly for industry and system type. These analyses underscore the robustness of the original model while providing additional theoretical and methodological insights.

Discussion

Theoretical Implications

The evidence from this design should be interpreted as a proof of concept by introducing the *Culture-Design Compatibility* as a direct antecedent to *Perceived Quality*. While the research utilizes a robust methodological approach, the findings should be viewed as an initial test rather than a definitive, globally generalizable model. Our research underscores the critical role of cultural dimensions in shaping perceptions, providing both theoretical advancements and practical solutions. For researchers, the findings validate and extend existing theories, paving the way for future exploration of *Culture-Design Compatibility* in diverse contexts.

Central to the research is Markus's Interaction Theory, which provides a lens to understand how misalignments between *User Preferences* and *System Design* foster resistance. This foundational theory is complemented by Piderit’s Multidimensional View of Resistance, which conceptualizes resistance as a multifaceted construct encompassing cognitive, affective, and behavioral dimensions. Together, these frameworks offer a nuanced perspective on the interaction between *User Perceptions* and *System Design*. Building on these theories, Sweller’s Cognitive Load Theory (1980) provides insights into the cognitive demands imposed by system design, emphasizing the significance of intrinsic, extraneous, and germane loads. These cognitive factors directly influence user satisfaction and performance, serving as precursors to resistance. Weiss et al.'s Affective Event Theory (1996) further enriches this understanding by highlighting how emotional responses to system interactions shape user attitudes and perceptions, adding a critical affective dimension to the study. To contextualize these cognitive and affective dynamics, we incorporated Hofstede's Cultural Dimensions, Hall's High/Low Context Theory, and Hall's Monochronic/Polychronic Theory. These cultural frameworks clarify how cultural values and communication styles influence user preferences and expectations, offering a comprehensive view of the cultural factors at play. Finally, the research integrates these theoretical insights into the Delone and McLean ISS Model, extending its dimensions of *System Quality*, *Service Quality*, and *Information Quality* to include *Cultural-Design Compatibility* as a direct antecedent.

The empirical findings provide support for the theoretical constructs and their interconnections. The results affirm the central tenet of Interaction Theory, demonstrating that resistance arises from misalignments between *User Preferences* and *System Design*. By operationalizing cultural dimensions as antecedents to resistance, the research extends Interaction Theory to encompass cultural influences as critical factors in shaping *Perceived Quality*. The findings also validate the logic derived from Cognitive Load Theory. Higher levels of extraneous and germane cognitive loads were observed in scenarios of cultural misalignment, reinforcing the theory's relevance in understanding cognitive resistance. These cognitive challenges were shown to amplify affective resistance, as predicted by Affective Event Theory. Negative emotional triggers, such as frustration with culturally incongruent interfaces, were empirically linked to perceptions of poor system quality, highlighting the affective dimensions of resistance. The integration of Hofstede's and Hall's cultural theories into the research model was instrumental in capturing the nuances of *Cultural-Design Compatibility*. The findings confirmed that cultural dimensions, such as *Context* and *Time Perception*, significantly influence *User Preferences* and *System Design*, validating their role as independent antecedents in information system research. The constructs demonstrated strong convergent and discriminant validity, with *Cultural-Design Compatibility* emerging as a higher-order construct that explains 55% of the variance in perceived quality. This novel framework addressed a critical gap in the ISS model extending the ISS model by incorporating *Cultural-Design Compatibility* as a direct antecedent to *System Quality*, *Service Quality*, and *Information Quality*.

The findings have significant implications for the theories underpinning the research. For Interaction Theory, the inclusion of cultural dimensions as antecedents to resistance represents a meaningful extension, broadening its applicability to contexts characterized by cultural heterogeneity. The research underscores the importance of aligning *User Preferences* and *System Design* to mitigate resistance and enhance *Perceived Quality*. Piderit's Multidimensional View of Resistance is enriched by the empirical evidence linking cognitive and affective dimensions of resistance to cultural misalignment. The study highlights the interconnected nature of these dimensions, providing a more nuanced understanding of how resistance manifests in information system contexts. Cognitive Load Theory is advanced through the study's demonstration of how *Cultural-Design Compatibility* influences cognitive loads. The findings suggest that system designers must consider cultural factors to minimize extraneous cognitive loads and optimize germane loads, thereby enhancing user's perception and mitigating resistance. Affective Event Theory is similarly expanded, with the research illustrating how cultural incongruence triggers negative emotional responses that shape user perceptions of the system's quality dimensions.

The incorporation of Hofstede's and Hall's cultural theories into the ISS model offers new avenues for exploring the role of cultural dimensions in information system research. By demonstrating that cultural factors can function as independent antecedents rather than mere moderators or mediators, the study challenges existing paradigms and calls for a reevaluation of how cultural influences are conceptualized in information system models. Finally, the extension of the ISS model to include *Cultural-Design Compatibility* as a direct antecedent represents a significant theoretical advancement. This integration provides a more holistic framework for evaluating information system success, emphasizing the critical role of cultural alignment in shaping user perceptions and system adoption. By bridging the gap between cultural and quality dimensions, this study lays the groundwork for future research exploring the intersection of culture, design, and information system quality.

Managerial Implications

Despite significant IT spending, projected to exceed $5 trillion globally in 2024, failure rates for IT projects remain alarmingly high, often due to issues stemming from cultural misalignment between users and the homogenous systems they are required to use. The core problem addressed by this research is how *Culture-Design Compatibility* impacts users' perceptions of the system's quality and, by extension, the success of the information system. This study sought to address this problem by integrating Interaction

Theory, cultural dimensions, and the ISS model to explore how misalignment between *User Preference* and *System Design* can increase resistance, both cognitively and affectively, ultimately leading to reduced system perception and effectiveness. The proposed framework introduces *Culture-Design Compatibility* as a critical antecedent to *System Quality*, *Service Quality*, and *Information Quality*. From a managerial perspective, this framework offers actionable insights for improving governance, reducing resistance, and optimizing IT investments to achieve measurable performance outcomes.

This research provides compelling evidence that cultural dimensions—such as communication styles (*High/Low Context*), time management preferences (*Monochronic/Polychronic*), and tolerance for uncertainty (*High/Low Uncertainty Avoidance*)—influence users' perceptions of the system's quality. Addressing cultural misalignment reduces the likelihood of cognitive and affective resistance budding into behavioral resistance akin to shadow IT, system abandonment, and costly redesigns. For example, a system overhaul can cost an MNE millions, whereas proactive design interventions addressing cultural preferences can mitigate such expenses.

Misalignment between these cultural dimensions and the system design leads to increased cognitive load, heightened emotional resistance, and eventual disengagement, all of which undermine the effectiveness of the information system. Systems designed with a one-size-fits-all approach will fail to meet the diverse needs of culturally heterogeneous workforces. For example, users in High-Context cultures may benefit from interfaces that incorporate rich contextual cues, while users in Low-Context cultures may prefer interfaces with explicit instructions and linear workflows. CIOs and CPOs should prioritize pre-implementation assessments to identify cultural preferences and potential misalignment risks. Tailored training programs addressing cultural diversity can reduce cognitive and emotional resistance. For MNEs leveraging AI/ML tools, dynamic training content can be personalized based on real-time analysis of user behavior and preferences. CDOs can implement user training that is informed by cultural assessments, fostering better alignment between system expectations and user capabilities. Flexible policies that adapt to cultural dimensions can enhance system usability. For instance, structured workflows may resonate with High-Uncertainty-Avoidance cultures, while iterative and adaptive approaches may suit Low-Uncertainty-Avoidance cultures. Behavioral Scientists can use these insights to design organizational policies that align with employee preferences, reducing friction and resistance to system adoption.

Resistance stems from cognitive and affective dissonance. Behavioral Scientists can leverage these findings to design interventions that promote positive emotional engagement with systems, such as gamification elements, culturally aligned user experiences, and feedback loops that reinforce satisfaction. Organizations that incorporate cultural dimensions into their information system strategy are better positioned to leverage the full potential of their global workforce. By reducing resistance and fostering alignment, these organizations can enhance collaboration, decision-making, and overall performance, creating a sustainable competitive advantage.

Beyond addressing the immediate challenges of system resistance and adoption, this research also introduces forward-looking implications for MNEs navigating the complexities of global IT environments. MNEs can achieve long-term operational efficiency by integrating cultural considerations into their information system strategy. This involves moving beyond traditional performance metrics (e.g., KPIs) to include psychometric evaluations of user perceptions, enabling a more nuanced understanding of information system success. MNEs with AI/ML-infused systems, scalable tools can analyze cultural preferences across global user bases, enabling real-time customization of system interfaces. CIOs and CDOs can invest in developing data-driven personalization through adaptive systems that dynamically respond to user behavior and preferences, fostering higher engagement and satisfaction. The findings highlight the value of R&D investments in flexible system architectures. These systems could accommodate diverse user preference profiles, promoting higher adoption rates and reducing resistance. For example, modular system designs that allow users to customize interfaces and workflows can improve cultural compatibility while maintaining organizational standards.

Directions for Future Research

The significant relationship between *Culture-Design Compatibility* and *Perceived Quality* confirms the theoretical soundness of this integrated framework. However, these findings serve as a preliminary demonstration (a proof of concept) highlighting the need for broader, more diverse samples and longitudinal research before drawing universal conclusions. Although the sample achieved industry and system-type diversity, the limited geographic diversity of the sample and the single time-point measurement constrain our ability to generalize findings beyond the individual user as the unit of measure. Acknowledging previous research has identified evidence to support cultural behaviors/patterns at both national-level (Gupta et al., 2019; Gupta et al., 2025) and organizational-level (Ghafoori et al., 2024; Gupta et al., 2022), it is a moral imperative for future studies to prioritize more balanced samples and longitudinal designs as a means to validate and extend these preliminary insights.

This research lays the groundwork for future studies by encouraging researchers to include *Culture-Design Compatibility* as a preceding factor to commonly used information system assessment models like ISS, TAM, TTF, and UTAUT. Although the sample used in this paper provided insight into the phenomenon in the Americas, continued examination of *Culture-Design Compatibility* whereby both the information system-types and the end users are arguably more heterogenous could provide additional insight into *Culture-Design Compatibility'*s predictive capability. Specifically, a comparative study focused on a MNE with a footprint that breaches several observable cultural dimensions and uses multiple information systems could strengthen the generalizability of these findings with different demographic and regional samples.

As MNEs continue to integrate AI/ML systems into their IT portfolio, a longitudinal study could reveal whether cultural misalignment diminishes as users adapt with improving AI/ML models, or whether initial cultural misfits persist and lead to long-term dissatisfaction. The risk of developing these types of tools in isolation without considering the cultural context of their users may inadvertently perpetuate biases or fail to meet the specific needs of diverse populations. A public area of interest for OpenAI, the creators of ChatGPT categorically ask "How do we increase the extent to which AI's objectives are aligned with human preferences?" (OpenAI, 2025). A study by Stanford HAI highlights how cultural factors shape user expectations from AI, emphasizing the necessity for culturally aware AI development (Itoi et al, 2024). Using a longitudinal approach, a study could potentially measure perceptions pre-implementation, shortly after rollout, and then several months later. The study could also integrate objective performance metrics influenced by the AI/ML tool (e.g., task completion times, error rates, frequency of shadow IT usage) to complement the perceptual data. This could robustly validate the claim that cultural misalignment leads to resistance and measurable performance impacts.

The integration of AI/ML technology presents in interesting addition to user perception as the technology generally uses the interactions with the users and available data to create it's model/output. As a result large MNEs like Google and IBM's participate in the Partnership for Global Inclusivity on AI for generative products (Kulesz, 2024), while others, like Microsoft, study training data and the decision-making products in Azure OpenAI Service leverage by US Federal Agencies (U.S. Government, 2024). This cornerstone theme of Human-AI interaction serves as a large area of interest for OpenAI who proposed questions like "How can we create AI explanations that are interpretable to non-expert users?", "How can humans and AI collaborate effectively in decision-making processes?", and "How can we enhance the ways humans interact with AI models to improve usability and accessibility?" in their Researcher Access Program (OpenAI, 2025). By incorporating *Culture-Design Compatibility* (contextually as a theoretical lens or literally as a measurable factor), AI/ML providers can mitigate resistance and enhance perceived quality.

Conclusion

The problem area addressed in this study revolves around the significant challenge of designing information systems that align with user's cultural preferences. In the context of MNEs, these organizations often face the difficulty of creating systems that are universally accepted and effective across diverse cultural settings. Information systems are crucial in facilitating organizational operations, but their success heavily depends on how well they accommodate users' cultural backgrounds and preferences. This challenge becomes even more complex as cultural differences can impact the effectiveness of system design and users’ perceptions of system quality. The central research question of this study focuses on understanding how cultural dimensions, such as *Context*, *Time Perception*, And *Uncertainty Avoidance*, shape users' preferences and, in turn, how these preferences should be integrated into the design of information systems. This question is directly linked to the problem area of achieving cultural compatibility in system design, which is an expensive essential for MNEs. The study aimed to empirically test how the alignment between cultural preferences and system design, termed *Culture-Design Compatibility,* influences *Perceived Quality* of the system.

The motivation behind researching this area stems from the increasing globalization of businesses and the need for systems that support diverse user groups. With organizations becoming more international, there is a heightened demand for understanding how culture impacts users' interactions with technology. While existing research has acknowledged cultural differences in information system use, less attention has been paid to how these differences can be explicitly integrated into system design to optimize perceived quality and user experience. This gap is critical, as organizations continue to invest in information systems that fail to address the cultural context of their users, potentially leading to inefficiencies, resistance, and dissatisfaction.

Existing research in the field has explored the relationship between culture and system design, often highlighting the role of cultural dimensions like individualism vs. collectivism, high vs. low-context communication, and time orientation. However, most studies have focused on either the user’s cultural characteristics or the system's technical aspects in isolation, rather than examining the interaction between the two. Interaction Theory, which proposes that users' perceptions are shaped by the alignment between cultural preferences and system design, offers a promising framework that has been underutilized in information system research. While the concept of cultural fit in information system design has gained attention, empirical testing of this interaction is sparse, particularly in the context of MNEs, where systems must cater to a diverse range of cultural preferences. This gap in literature provided the impetus for this study. The goal was to develop and test a model of *Culture-Design Compatibility* that could empirically demonstrate how the alignment between users' *Cultural Preferences* and the *Information Systems Design* affects their perceptions of system quality. The study integrated three cultural dimensions—*Context*, *Time Perception*, and *Uncertainty Avoidance*—into the design framework and tested their effects on *Perceived Quality*.

The results of the research supported the hypothesis that *Culture-Design Compatibility* has a significant, positive effect on *Perceived Quality*. The findings demonstrated that a stronger alignment between users' *Cultural Preferences* and the *System Design* leads to improved perceptions of system quality, accounting for over half of the variance in *Perceived Quality*. Additionally, the study's robustness was validated through post-hoc analyses, including an alternative methodological approach (disjointed two-step) and a reconfiguration of latent variables. Both approaches reinforced the original model's validity and highlighted the importance of cultural dimensions in shaping user perceptions of system quality. Furthermore, the subgroup analysis revealed that, while there were no major differences in most demographics, the relationship between *Culture-Design Compatibility* and *Perceived Quality* did vary slightly depending on the type of information system, such as Business Intelligence vs. Human Resource Management Systems. This finding suggests that certain system types may require different considerations when aligning system design with cultural preferences.

In conclusion, this research makes a valuable contribution to literature by providing empirical evidence supporting the interaction between cultural dimensions and information system design. The study highlights the critical importance of considering cultural preferences when developing information systems, especially for multinational organizations. It also paves the way for further research to explore how specific system types or additional cultural dimensions might impact the perceived quality of information systems across diverse user groups. The findings emphasize that *Culture-Design Compatibility* is a key factor in improving user satisfaction and ensuring the success of information systems in globalized work environments.

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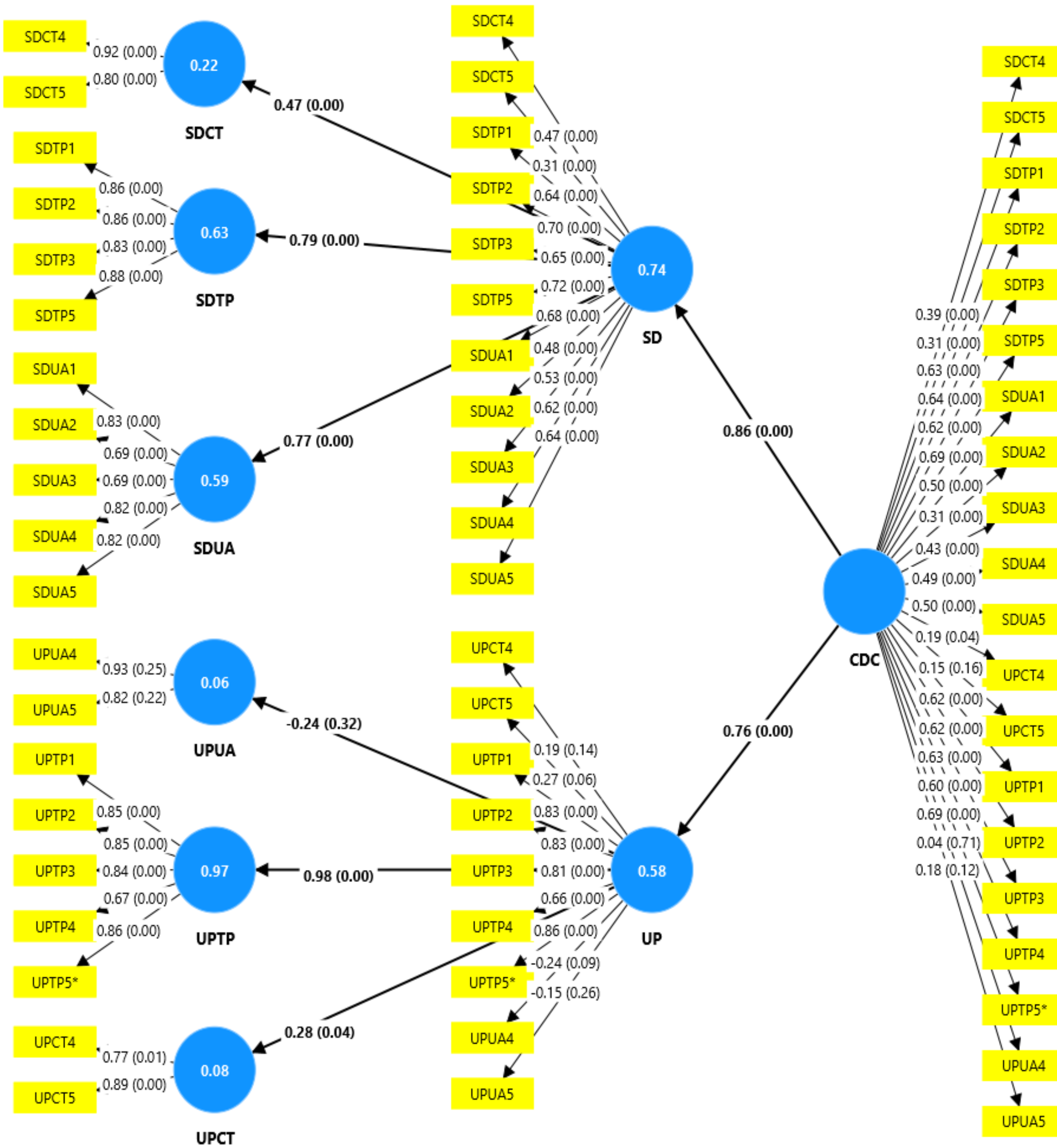

Figure 2 Repeated Indicator High Order Construct Configuration Culture-Design Compatibility

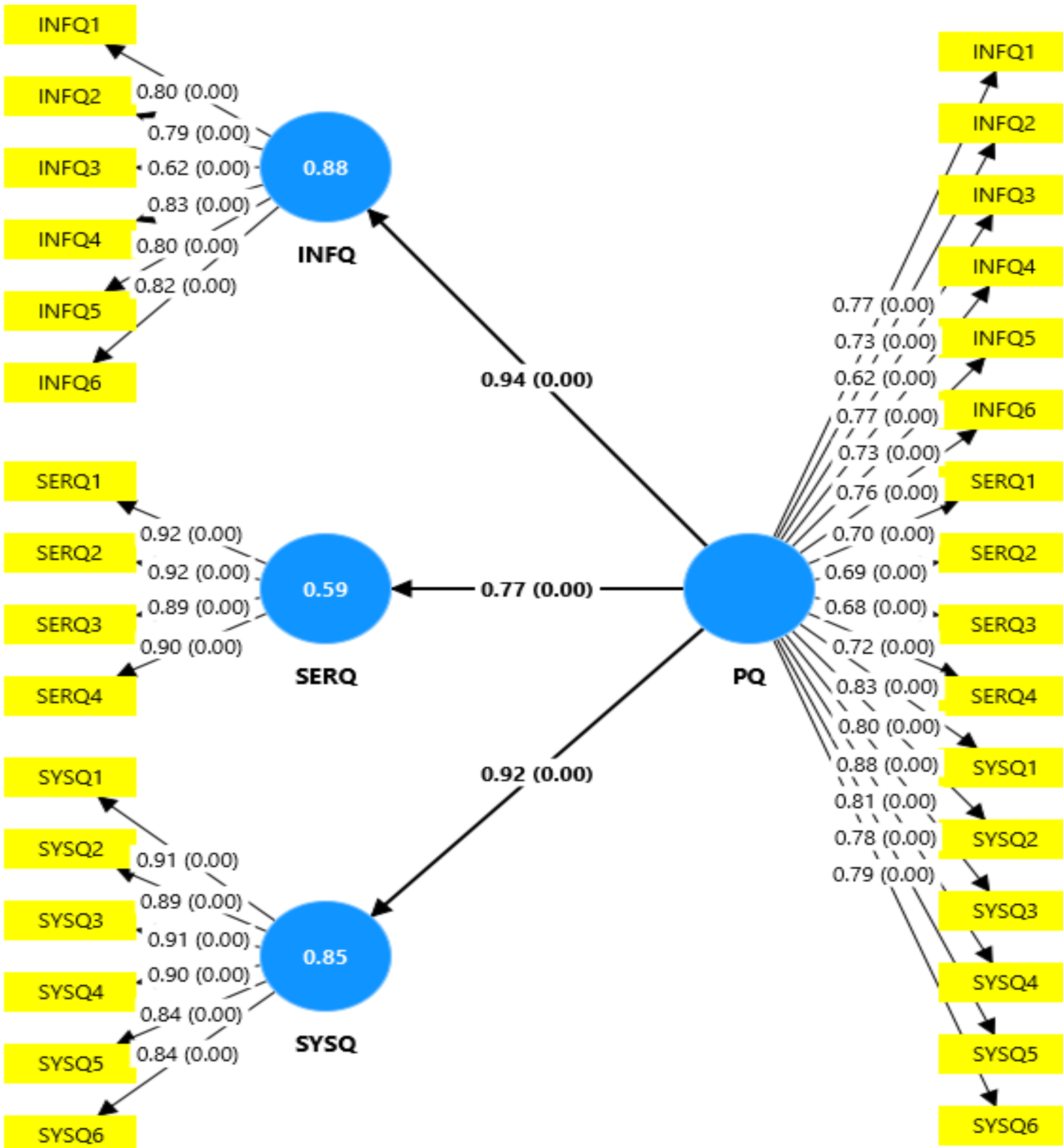

Figure 3 Repeated Indicator High Order Construct Configuration Perceived Quality

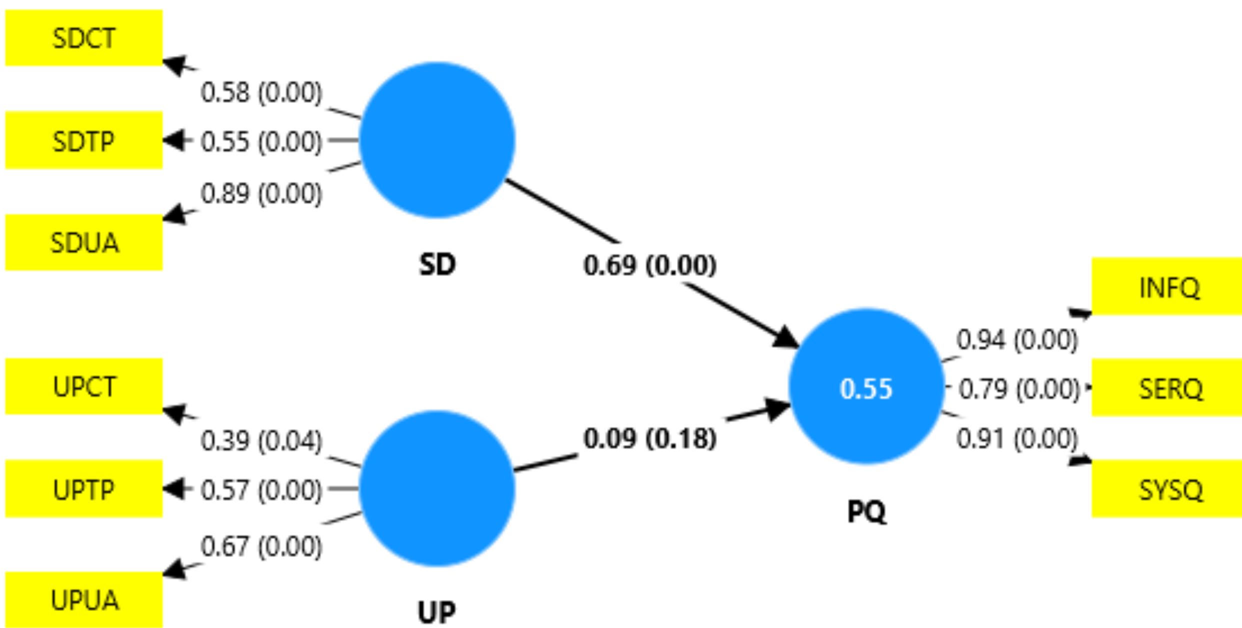

Figure 4 Disjointed Two-Step High Order Construct Configuration

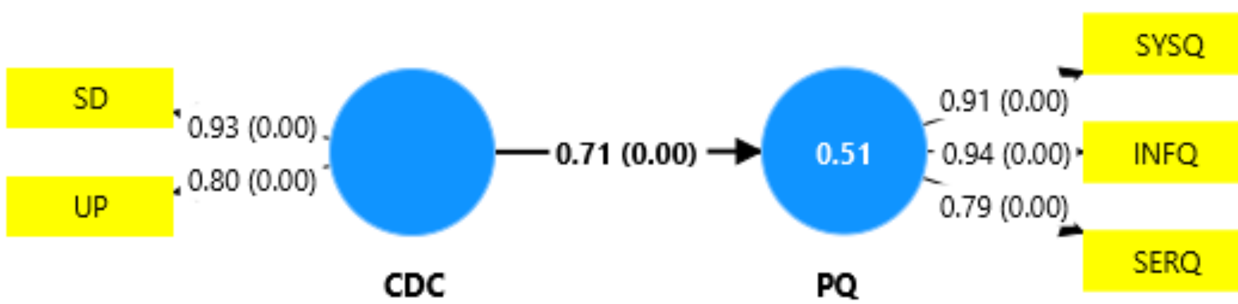

Figure 5 Disjointed Two-Step High Order

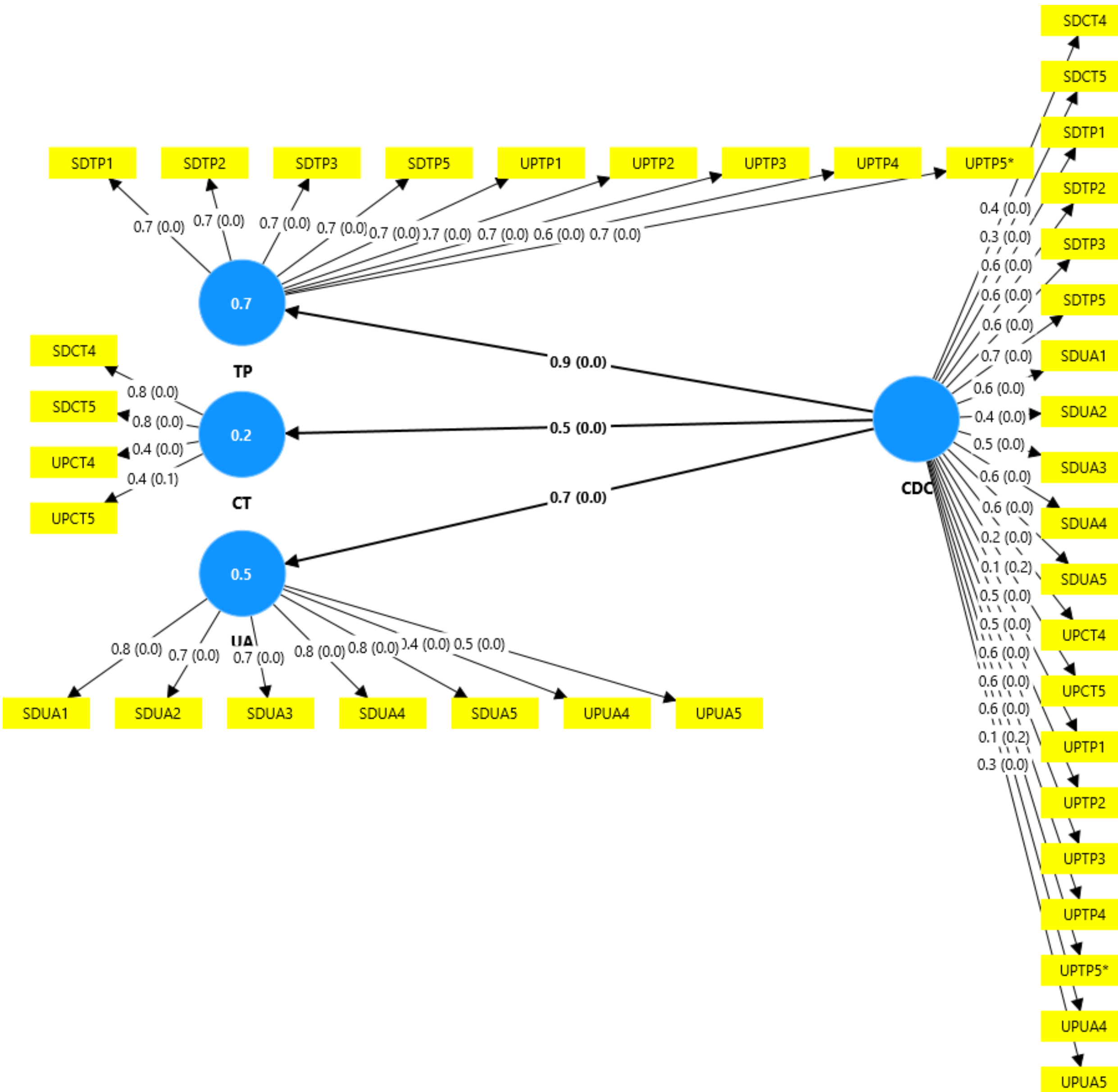

Figure 6 Alternate Configuration Alternate Configuration Repeated Indicator High Order Construct Culture- Design Compatibility

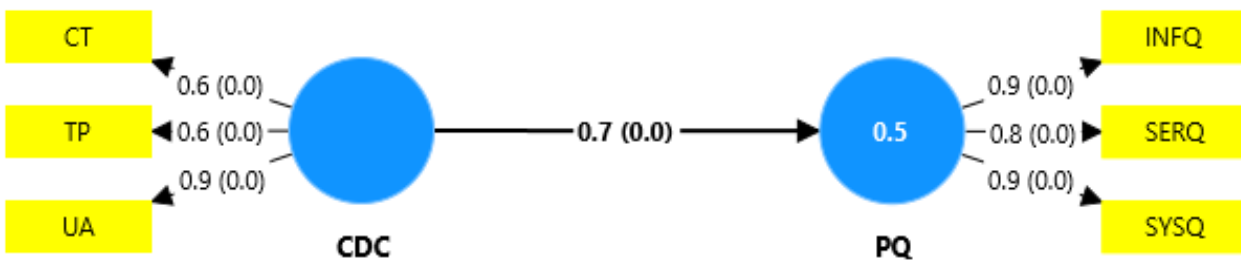

Figure 7 Alternate Repeated Indicator High Order Construct Configuration

Table 1 . Self-Identified Cultural Demographics (User Preference and System Design)

Demographic	Frequency	Percent of Sample
Self-Identified Context Preference		
Low Context	159	77%
High Context	47	23%
Self-Identified Time Perception Preference		
Polychronic	88	43%
Monochronic	119	57%
Self-Identified Uncertainty Avoidance Preference		
Low UA – Confident	93	45%
High UA – Unconfident	114	55%
System Design Context Described		
Low Context	158	76%
High Context	49	24%
System Design Time Perception Described		
Polychronic	119	57%
Monochronic	87	42%
System Design Uncertainty Avoidance Described		
Low UA – Confident	199	96%
High UA – Unconfident	6	3%

Table 2 Personal Demographics

Demographic	Frequency	Percent of Sample
Gender		
Female	102	49%
Male	105	51%
Age		
18-35	74	36%
36-55	87	42%
56-72	46	22%
Office Location		
East Asia or Pacific	1	0.5%
Europe or Central Asia	14	6.8%
Latin America or the Caribbean	192	92.8%
MNE Headquarter Location		
East Asia or Pacific	6	2.9%
Europe or Central Asia	26	12.6%
Latin America or the Caribbean	1	0.5%
North America	174	84.1%
Education		
Less than a high school diploma	1	0.5%
High School Graduate	21	10%
Some College	37	18%
Associate degree	17	8%
Bachelor's Degree	98	47%
Master's Degree	20	10%
Doctorate Degree	5	2%
Professional Degree	8	4%
Annual Income		
Under $10k	3	1%
$10k-$59K	78	38%
$60-$89K	43	21%
$100-$150k	25	12%
$175-$225k	7	3%
Over $250	6	3%
Prefer not to say	4	2%

Table 3 Professional Demographics

Demographic	Frequency	Percent of Sample
Frequency of Use		
Daily	146	71%
Weekly	48	23%
Monthly	12	6%
Quarterly	1	0.5%
Type of MNE Provided IS		
Customer Relationship Management (CRM) System	52	25%
Project Management System	35	17%
Collaboration and Communication Platform	31	15%
Content Management System	24	12%
Business Intelligence (BI) System	21	10%
Human Resource Management System (HRMS)	21	10%
Supply Chain Management (SCM) System	14	7%
Enterprise Resource Planning (ERP) System	9	4%
Position with MNE		
Entry-Level	52	25%
Mid-Level	111	54%
Senior-Level	39	19%
Executive-Level	5	2%
Industry		
Agriculture	3	1%
Architecture and Construction	4	2%
Arts	10	5%
Business Management & Administration	14	7%
Education & Training	8	4%
Finance	15	7%
Government & Public Administration	8	4%
Hospitality & Tourism	6	3%
Information Technology	44	21%
Legal	4	2%
Manufacturing	8	4%
Marketing and Sales	5	2%
Medicine	6	3%
Other	29	15%
Retail	16	8%
Retired	4	2%
STEM	15	7%
Transportation	5	2%
Social Sciences	3	1%

Table 4 Item Loadings

	Outer Loading								
	INFQ	**SDCT**	**SDTP**	**SDUA**	**SERQ**	**SYSQ**	**UPCT**	**UPTP**	**UPUA**
INFQ1	0.8								
INFQ2	0.8								
INFQ3	0.6								
INFQ4	0.8								
INFQ5	0.8								
INFQ6	0.8								
SDCT4		0.9							
SDCT5		0.8							
SDTP1			0.8						
SDTP2			0.9						
SDTP3			0.8						
SDTP5			0.9						
SDUA1				0.8					
SDUA2				0.7					
SDUA3				0.7					
SDUA4				0.8					
SDUA5				0.8					
SERQ1					0.9				
SERQ2					0.9				
SERQ3					0.9				
SERQ4					0.9				
SYSQ1						0.9			
SYSQ2						0.9			
SYSQ3						0.9			
SYSQ4						0.9			
SYSQ5						0.8			
SYSQ6						0.8			
UPCT4							1		
UPCT5							0.6		
UPTP1								0.8	
UPTP2								0.8	
UPTP3								0.8	
UPTP4								0.8	
UPTP5*								0.9	
UPUA4									0.8
UPUA5									0.9

Table 5 Internal Reliability Criteria

First Order Construct				
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
INFQ	0.9	0.9	0.9	0.6
SDCT	0.7	0.9	0.8	0.7
SDTP	0.9	0.9	0.9	0.7
SDUA	0.8	0.8	0.9	0.6
SERQ	0.9	0.9	0.9	0.8
SYSQ	0.9	0.9	1	0.8
UPCT	0.6	1.7	0.8	0.6
UPTP	0.9	0.9	0.9	0.6
UPUA	0.7	0.9	0.9	0.8

Table 6 Hetero-Trait Mono-Trait Table

First Order Construct									
	INFQ	SDCT	SDTP	SDUA	SERQ	SYSQ	UPCT	UPTP	UPUA
INFQ									
SDCT	0.3								
SDTP	0.3	0.3							
SDUA	0.8	0.3	0.3						
SERQ	0.7	0.4	0.2	0.6					
SYSQ	0.9	0.3	0.3	0.8	0.6				
UPCT	0.2	0.2	0.1	0.2	0.1	0.1			
UPTP	0.2	0.3	0.4	0.2	0.3	0.2	0.2		
UPUA	0.4	0.1	0.1	0.5	0.2	0.3	0.2	0.2	

Table 7 Fornell-Larcker Table

First Order Construct									
	INFQ	SDCT	SDTP	SDUA	SERQ	SYSQ	UPCT	UPTP	UPUA
INFQ	0.8								
SDCT	0.3	0.9							
SDTP	0.2	0.2	0.9						
SDUA	0.7	0.3	0.3	0.8					
SERQ	0.6	0.3	0.2	0.5	0.9				
SYSQ	0.8	0.3	0.3	0.7	0.5	0.9			
UPCT	0.2	0.1	0.1	0.1	0.1	0.1	0.8		
UPTP	0.2	0.2	0.4	0.2	0.3	0.2	0.1	0.8	
UPUA	0.3	0.1	0.1	0.4	0.2	0.3	0	-0.1	0.9

Table 8 Survey Items

Latent Variable	ID	Questionnaire Items
System Design-Context (SDCT)	SDCT1	In my employer's system, information is presented through symbols or icons rather than detailed text.
	SDCT2	My employer's system uses emojis/emoticons or symbols to express emotions instead of typing them out in words.
	SDCT3	Symbols and icons in my employer's system are used more frequently than detailed text for conveying information.
	SDCT4	Messages in my employer's system are brief and to the point, avoiding excessive details.
	SDCT5	Instructions provided in my employer's system are presented as simple overviews rather than detailed explanations.
System Design-Time Perception (SDTP)	SDTP1	My employer's system allows the use of multiple services or tools simultaneously.
	SDTP2	The design of my employer's system enables frequent switching between different services or tasks.
	SDTP3	When searching for information, my employer's system supports viewing multiple sources or pieces at the same time rather than focusing on one at a time.
	SDTP4	My employer's system is designed to facilitate managing more than one activity at the same time.
	SDTP5	My employer's system allows the use of multiple services or tools simultaneously.
System Design-Uncertainty Avoidance (SDUA)	SDUA1	My employer’s system is designed to provide high-quality content, ensuring users are confident in the information they use.
	SDUA2	The behavior of my employer’s system is predictable, minimizing unexpected actions or responses.
	SDUA3	The system developed by my employer maintains strong security features to prevent any risk to its operations.
	SDUA4	My employer’s system provides detailed instructions, making it clear what users are expected to do.
	SDUA5	The system emphasizes clear instructions and procedures to help users closely follow set guidelines.

Table 9 Survey Items (Continued 2/3)

Latent Variable	ID	Questionnaire Items
User Preference-Context (UPCT)	UPCT1	I prefer information to be presented through symbols or icons rather than detailed text.
	UPCT2	I prefer using emojis/emoticons or symbols to express my emotions instead of typing them out in words.
	UPCT3	I find symbols and icons to be more helpful than reading through detailed text.
	UPCT4	I prefer messages to be brief and to the point, avoiding excessive details.
	UPCT5	When receiving instructions, I prefer a simple overview rather than a detailed explanation.
User Preference -Time Perception (UPTP)	UPTP1	When completing a task, I prefer to use multiple services or tools at once.
	UPTP2	I enjoy frequently switching between different services or tasks.
	UPTP3	When searching for information, I prefer to look at multiple sources or pieces simultaneously rather than focusing on one at a time.
	UPTP4	I am comfortable managing more than one activity at the same time.
	UPTP5	I like to juggle two or more activities at the same time.
User Preference - Uncertainty Avoidance (UPUA)	UPUA1	I avoid using content or information when I am unsure of its quality.
	UPUA2	I feel uncomfortable when a something behaves in an unexpected way.
	UPUA3	I am hesitant to use a system if my risk exposure is unknown.
	UPUA4	I prefer to have detailed instructions to clearly understand what I am expected to do.
	UPUA5	I like to closely follow set instructions and procedures.

Table 10 Survey Items (Continued 3/3)

Latent Variable	ID	Questionnaire Items
System Quality (SYSQ)	SYSQ1	My employer's system is easy to navigate.
	SYSQ2	My employer's system allows me to easily find the information I am looking for.
	SYSQ3	My employer's system is well structured.
	SYSQ4	My employer's system is easy to use.
	SYSQ5	My employer's system offers appropriate functionality.
	SYSQ6	My employer's system offers comfortable access to all the business applications I need.
Information Quality (INFQ)	INFQ1	The information provided by my employer's system is useful.
	INFQ2	The information provided by my employer's system is understandable.
	INFQ3	The information provided by my employer's system is interesting.
	INFQ4	The information provided by my employer's system is dependable.
	INFQ5	The information provided by my employer's system is complete.
	INFQ6	The information provided by my employer's system is up-to-date.
Service Quality (SERQ)	SERQ1	The responsible service personnel are always highly willing to help whenever I need support with my employer's system.
	SERQ2	The responsible service personnel provide personal attention when I experience problems with my employer's system.
	SERQ3	The responsible service personnel provide services related to my employer's system at the promised time.
	SERQ4	The responsible service personnel have sufficient knowledge to answer my questions in respect of my employer's system.

Table 11 Definitions

Measurement Scale Definitions (Higher-Order Components)		
Variable	**Definition**	**Literature**
Culture-Design Compatibility (CDC)	Abstract conceptualization of the interaction between a user's preference and a compulsory system's design in the context of the following cultural dimensions: context, time perception, uncertainty avoidance.	Hall, E.T. (1976). Beyond culture. Anchor Books. Hofstede, G. (1980). Culture's Consequences: International Differences in Work-Related Values. Markus, M. L. (1980). Power, politics, and MIS implementation. Communications of the ACM. Schaupp, L.C., Fan, W., & Belanger, F. (2006). Determining success for different website goals. Proceedings of the 39th Annual Hawaii International Conference on System Sciences. Wang, R.Y., & Strong, D.M. (1996). Beyond accuracy: What data quality means to data consumers. Journal of Management Information Systems.
Perceived Quality (PQ)	User's perception of an information system's quality using the following dimensions from the Information System Success Model: information quality, service quality, system quality.	DeLone, W.H., & McLean, E. (2003). The DeLone and McLean model of information systems success: A ten-year update. Journal of Enterprise Resource Planning Systems. Markus, M. L. (1980). Power, politics, and MIS implementation. Communications of the ACM. Schaupp, L.C., Fan, W., & Belanger, F. (2006). Determining success for different website goals. Proceedings of the 39th Annual Hawaii International Conference on System Sciences. Wang, R.Y., & Strong, D.M. (1996). Beyond accuracy: What data quality means to data consumers. Journal of Management Information Systems.

Table 12 Definitions (Continued 2/2)

Measurement Scale Definitions (Low-Order Components)		
Latent Variables	**Definition**	**Literature/Scale Adoption**
User Preference Context (UPCT)	Users preference towards the amount of information that is in a given communication as a function of the context in which it occurs.	Lee, I., Choi, B., Kim, J., & Hong, S.-J. (2007). Culture-technology fit: Effects of cultural characteristics on the post-adoption beliefs of mobile internet users. International Journal of Electronic Commerce, 11(4), 11-51.
User Preference Time Perception (UPTP)	Users preference towards the manner in which they engage in activities through the system as being monochronic or polychronic.	
User Preference Uncertainty Avoidance (UPUA)	Users preference towards the extent in which the members of a culture feel threatened by uncertain or unknown situations.	
System Design Context (SDCT)	Users perception towards the design of the system in regard to the amount of information that is in a given communication as a function of the context in which it occurs.	
System Design Time Perception (SDTP)	Users perception towards the design of the IS in regard to the manner in which they engage in activities through the IS as being monochronic or polychronic.	
System Design Uncertainty Avoidance (SDUA)	Users perception towards the design of the system in regard to the expectancy when operating in uncertain or unknown situations.	
Information Quality (INFQ)	Accuracy, timeliness, and relevance of the data provided by the system.	Urbach, N., Smolnik, S., & Riempp, G. (2010). An empirical investigation of employee portal success. The Journal of Strategic Information Systems, 19(3), 184-206.
Service Quality (SERQ)	Reliability, responsiveness, and timely support, pertains to the user's interaction with system support services.	
System Quality (SYSQ)	Reflects the ease with which users across different jurisdictions can navigate and utilize the system for their daily operations.	

Table 13 MICOM and PGMA

Demographic	Group A	Group B	MICOM Status	PMGA P-Value	PMGA Difference CDC-PQ (Group A - Group B)
Type of Information System	Business Intelligence (BI) System	Human Resource Management System (HRMS)	Full Measurement Invariance	0.022	-0.191
Where is your employer's headquartering office located?	Europe or Central Asia	North America	Full Measurement Invariance	0.500	N/A
How often do you interact with the required information system	Daily	Weekly	Full Measurement Invariance	0.5	N/A
Education	Bachelor	Some College	Full Measurement Invariance	0.5	N/A
SDCT	HCT	LCT	Partial Measurement Invariance	0.057	N/A
SDTP	Poly	Mono	Partial Measurement Invariance	0.119	N/A
Sex	Male	Female	Partial Measurement Invariance	0.276	N/A
UPCT	LCT	HCT	Full Measurement Invariance	0.356	N/A
UPTP	Mono	Poly	Partial Measurement Invariance	0.827	N/A
UPUA	High	Low	Partial Measurement Invariance	0.716	N/A
Level In Org	Entry	Mid	Partial Measurement Invariance	0.571	N/A
Level In Org	Entry	Senior	Partial Measurement Invariance	0.429	N/A
Level In Org	Mid	Senior	Full Measurement Invariance	0.724	N/A
Type of Information System	Business Intelligence (BI) System	Collaboration and Communication Platform	Full Measurement Invariance	0.34	N/A
Type of Information System	Business Intelligence (BI) System	Content Management System	Full Measurement Invariance	0.207	N/A
Type of Information System	Business Intelligence (BI) System	Customer Relationship Management (CRM) System	Full Measurement Invariance	0.467	N/A
Type of Information System	Business Intelligence (BI) System	Project Management System	Partial Measurement Invariance	0.919	N/A

Table 14 MICOM and PGMA (Continued 2/2)

Demographic	Group A	Group B	MICOM Status	PMGA P-Value	PMGA Difference CDC-PQ (Group A - Group B)
Type of Information System	Collaboration and Communication Platform	Content Management System	Full Measurement Invariance	0.959	N/A
Type of Information System	Collaboration and Communication Platform	Customer Relationship Management (CRM) System	Full Measurement Invariance	0.971	N/A
Type of Information System	Collaboration and Communication Platform	Human Resource Management System (HRMS)	Full Measurement Invariance	0.24	N/A
Type of Information System	Collaboration and Communication Platform	Project Management System	Full Measurement Invariance	0.558	N/A
Type of Information System	Content Management System	Customer Relationship Management (CRM) System	Full Measurement Invariance	0.99	N/A
Type of Information System	Content Management System	Human Resource Management System (HRMS)	Full Measurement Invariance	0.099	N/A
Type of Information System	Content Management System	Project Management System	Full Measurement Invariance	0.478	N/A
Type of Information System	Customer Relationship Management (CRM) System	Human Resource Management System (HRMS)	Full Measurement Invariance	0.309	N/A
Type of Information System	Customer Relationship Management (CRM) System	Project Management System	Partial Measurement Invariance	0.574	N/A
Culture Dimension - SD v. UP	SD-HCT	UP-LCT	Full Measurement Invariance	0.201	N/A
Culture Dimension - SD v. UP	SD-LCT	UP-HCT	Full Measurement Invariance	0.143	N/A
Culture Dimension - SD v. UP	SD-MONO	UP-POLY	Partial Measurement Invariance	0.41	N/A
Culture Dimension - SD v. UP	SD-POLY	UP-MONO	Partial Measurement Invariance	0.272	N/A
Occupation	Business Management	Information Technology	Partial Measurement Invariance	0.979	N/A

Table 15 Singularity Matrix- No MICOM/PGA

Demographic	Group A	Group B
Where is your job located?	Europe or Central Asia	Latin America or the Caribbean
How often do you interact with the required information system	Daily	Monthly
How often do you interact with the required information system	Weekly	Monthly
Education	HS	Associate
Education	HS	Bachelor
Education	HS	Some College
Education	HS	Bachelor
Education	HS	Master
Education	Associate	Bachelor
Education	Associate	Master
Education	Bachelor	Master
Education	Some College	Master
Type of Information System	Business Intelligence (BI) System	Supply Chain Management (SCM) System
Type of Information System	Collaboration and Communication Platform	Supply Chain Management (SCM) System
Type of Information System	Content Management System	Supply Chain Management (SCM) System
Type of Information System	Customer Relationship Management (CRM) System	Supply Chain Management (SCM) System
Type of Information System	Human Resource Management System (HRMS)	Project Management System
Type of Information System	Human Resource Management System (HRMS)	Supply Chain Management (SCM) System
Type of Information System	Project Management System	Supply Chain Management (SCM) System
Occupation	Arts	Business Management
Occupation	Arts	Finance
Occupation	Arts	Information Technology
Occupation	Arts	Other

Table 16 Singular Matrix- No MICOM/PGA (Continued 2/2)

Demographic	Group A	Group B
Occupation	Arts	Retail
Occupation	Arts	Science, Technology, Engineering, & Mathematics
Occupation	Business Management	Finance
Occupation	Business Management	Other
Occupation	Business Management	Retail
Occupation	Business Management	Science, Technology, Engineering, & Mathematics
Occupation	Finance	Information Technology
Occupation	Finance	Other
Occupation	Finance	Retail
Occupation	Finance	Science, Technology, Engineering, & Mathematics
Occupation	Information Technology	Other
Occupation	Information Technology	Retail
Occupation	Information Technology	Science, Technology, Engineering, & Mathematics
Occupation	Other	Retail
Occupation	Other	Science, Technology, Engineering, & Mathematics
Occupation	Retail	Science, Technology, Engineering, & Mathematics

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2019	Master of Science in Applied Business Analytics American Military University
2024	Millennium Challenge Corporation Performance Award
2021	Chapman Graduate Business School Exceptional Graduate Award
2021	Chapman Graduate Business School Outstanding Performance Award
2021	Veteran and Military Affairs Leadership Award
2017	Coast Guardsman of the Year
2016	Enlisted Person of the Year
2016	Coast Guard Achievement Medal
2015	Coast Guard Achievement Medal
2013	Coast Guard Achievement Medal