INFORMATION COMMUNICATION TECHNOLOGY AT HOTELS: EXPLORING CONSUMERS ECONOMIC AND ENVIRONMENTAL VALUES AS SUSTAINABILITY PILLARS

by

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Abstract

Achieving sustainability in the tourism business necessitates using relevant tools to make decisions and evaluations based on clear and accurate facts. This study employs a quantitative research approach to investigate the cultural acceptance and adoption of digital technology by tourists in Canadian hotels. The research focuses on two key aspects: consumers' willingness to embrace technologically advanced hotel services and their sensitivity to sustainability issues, Specifically, economic and environmental sustainability.

The research initially proposed a conceptual model including Digital Trust (DT) as a mediator, along with Cultural Acceptance (CADT), Environmental Value (EV), Social Value (SV), Economic Value (ECV), and Consumer Attitudes (AttS) as independent variables, and Intention to adopt Smart Technology (IAST) as a dependent variable. However, after conducting the survey, the precursor to Structural Equation Modeling (SEM), the Confirmatory Factor Analysis (CFA) model was revised due to significant discriminant validity issues, particularly the high correlation between Digital Trust and Social Value together with IAST. The final model retained CADT as the independent variable, with EV and ECV as mediators, and IAST as the dependent variable.

Findings revealed that CADT had significant direct effects on EV, ECV, and IAST. ECV also significantly influenced IAST and partially mediated the relationship between CADT and IAST. In contrast, EV did not have a significant effect on IAST. The model explained 47.3% of the variance in adoption intention, confirming the central role of cultural acceptance and perceived economic value in technology adoption behavior.

This study addressed a critical gap by contextualizing cultural and sustainability-related factors within the Canadian hospitality sector, a domain underexplored in prior adoption models. The results suggest that hotel managers should emphasize the economic benefits of smart technologies, such as cost savings, efficiency, and resource optimization, when designing communication strategies. While environmental messaging remains relevant, it may require more tangible framing to impact consumer behavior effectively.

The refined model contributes theoretically by clarifying the mediating mechanisms through which cultural acceptance drives tourists' intention to adopt smart hotel technologies and offers a more parsimonious structure with strong empirical support.

Keywords: Tourism, Sustainable Development, Information Communication Technology (ICT), Cultural Acceptance.

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List of Abbreviations

ICT: Information and Communications Technology

4IR: Fourth Industrial Revolution

AI: Artificial intelligence

VR: Virtual Reality

RFID: Radio-Frequency-Identification

SST: Self-Service Technology

AmI: Ambient Intelligence

IOT: Internet of Things

IOE: Internet of Everything

SEM: Structural Equation Modeling

UNWTO: United Nations World Tourism Organization

eWOM; Electronic Word-of-Mouth

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Chapter 1: Introduction

Information Communication Technology (ICT) has been revolutionizing business. Worldwide the tourism sector has been growing astronomically with the advent of the Internet and the rapid introduction of other forms of Information Communication Technology (Aramendia Muneta & Ollo López, 2013).

Travel and leisure form a highly information-intensive sector, and so its evolution is closely connected to the advancement of new information technologies (Velázquez et al., 2015). Additionally, greater competition for international tourism has forced related organizations to adopt the latest ICTs to achieve a competitive edge as well as satisfactory growth (Abrhám, 2017). This sector has broadly applied ICTs to cut costs, save on labor, increase operational efficiency, and most critically improve service quality and customer experience (Law et al., 2009).

The increased use of ICTs has been predominant in the distribution systems used by tourism service providers such as airlines and tour operators, but there has been significantly lower integration in hotels' day-to-day operations (Budd, 2016). ICTs and eBusiness can be defined as the use of digital tools for business functions and processes (Cooper et al., 2005, p. 704). As predicted by Poon (1993) a whole system of ICTs is being diffused throughout the tourism industry, and no player will escape ICTs impacts. The convenience technology offers has lured consumers' participation as evident in many sectors including retail (Thomas-Francois & Somogyi, 2023).

Statista's (2024)'s Report indicated that digital commerce, facilitated by ICT and embraced by some key tourism stakeholders, has a transaction value projected to reach US$955.90bn in 2025. The transaction value is expected to show an annual growth rate of 3.90% by 2029

(Statista's, 2024). While hotels in Canada are involved in the digital commerce ICTs revolution related to clients' distribution activities, there is significant room for greater integration of technology in the hotels' operations. This transition will be useful to address challenges such as labour shortages, which have been flagged as necessary to strengthen the foundation of growth in the tourism sector (*Tourism HR Canada.*, 2022). Also, the integration of ICTs in business processes and day-to-day operations will serve to enhance guests' and tourists' experiences in a manner that also contributes to sustainability in the sector. One international hotel chain has been progressive in establishing smart rooms;, using technology to provide comfort and convenience (Internet of Things), in hotel rooms aimed at improving guest experience and transforming operations (Mavridis., 2024).

One potential upside of adopting smart ICTs in hotels is that they may have knock-on environmental benefits, such as energy efficiency and reduced resource use (Fraj et al., 2015; Graci & Dodds, 2011). However, these outcomes are not automatic, and ICT adoption does not inherently guarantee sustainability. What remains less understood in the Canadian context is why hotels have been relatively slow to integrate such technologies into their day-to-day operations, and whether consumers are willing to accept and adopt technologically advanced hotel services. Numerous studies have examined ICT's impact on hotel efficiency and sustainability practices (Bethapudi, 2013; Eugenia Ruiz-Molina et al., 2013; Jaremen, 2016). However, because much of the existing literature emphasizes supply-side sustainability efforts in hotels (e.g., energy management systems, green operations, and environmental commitment; (Graci & Dodds, 2011), these studies ultimately miss the fact that some of these initiatives will fail without proper consumer engagement. This study, therefore, investigates tourists' cultural acceptance of smart ICTs in

Canadian hotels, as well as their sensitivity to sustainability issues and how these values influence their intention to adopt such technologies.

1.1 Literature Review

1.2 Phase 1: Emergence of e-tourism in the Hotel Sector and Tourism Industry

The revolutionary emergence of the Internet ignited an evolution in tourism, resulting in people's attraction to e-Tourism services (Raisi et al., 2018). This period spanned from 1990 to 2005 and allowed organizations to establish their Web 1.0 presence through websites (Buhalis, 2003; Buhalis & Law, 2008; Law et al., 2010).

As a result of this revolution, many tourists used the Internet to search for their destinations and organize their trips (Raisi et al., 2018; Xiang et al., 2008). By noticing customers' demands, tourism organizations started to explore different factors to improve their websites and made them more feasible for customers to find important information about their destinations (Raisi et al., 2018). On the one hand, websites, by utilizing aesthetic features such as images, colors, and graphic layouts, had succeeded in sparking customers' enthusiasm for choosing tourist destinations (Han & Mills, 2006) leading to better visibility (Raisi et al., 2018). On the other hand, ranking hyperlinks using the search engine, was an external factor that made a website easily findable for customers (Raisi et al., 2018). A website needs to improve its ranking algorithm to become findable for customers and to adapt to the algorithm of the search engines (Raisi et al., 2018; Romero-Frías, 2011). Hence, due to the influence of an increasing number of websites and website visitors (Raisi et al., 2018), the tourism industry greatly depended on search engines (Konidaris & Koustoumpardi, 2018). Significant factors like page load speed, content quality and quantity, mobile responsiveness, inbound links, and the technologies employed dramatically impacted the ranking of search engines and consequently online bookings (Konidaris & Koustoumpardi, 2018).

Tourism organizations during the emergence of the internet used websites to improve visibility and findability (Raisi et al., 2018), they also became increasingly dependent on communicating with customers using emails, especially post-stay emails to enhance the rate of revisiting and customers' outlook towards the brand and to reach their expected potential and current customers at every stage (Yang et al., 2019). Indeed, these types of emails individualized, developed emotional communications by being thankful , and may include rewards for their stay (Yang et al., 2019).

In addition to the fact that with the advent of the Internet, websites, emails, and search engines have been used in the tourism industry, customers' adoption of online travel agencies (OTAs) became a global Trend (Talwar et al., 2020), and "price advantage, efficiency, and system quality" became factors that attracted tourists to OTAs (Jedin & Annathurai, 2020; Ozturk et al., 2016). Indeed, tourists are usually attracted to OTAs because of their transparency, being easily accessible, and convenient (Zhu et al., 2022, p. 842). Later on, in phases two and three, with technological development, these online agencies expanded their business from web-based services to smartphone apps, since mobile apps are easy to download and operate (Dwikesumasari & Ervianty, 2017).

Therefore, in this first period, the emergence of the Internet revolutionized the tourism industry, fostering the adoption of e-Tourism services transforming the way customers engaged with tourism organizations, and attracting new tourists to tourism (Raisi et al., 2018) and stimulated demand for online booking (Konidaris & Koustoumpardi, 2018). These advancements underlined the pivotal role of the Internet in shaping the e-Tourism sector (Buhalis, 2019).

1.3 Phase Two and Three: Technological Development in the Tourism Industry

The Web 2.0 period (2005-2015) was marked by the emergence of blogs and social media platforms, which enabled customer interaction and many-to-many engagement (Buhalis, 2019). Communication strategies have evolved following technology advancements, particularly the Internet. Social media has fostered virtual communities and networks that enable the development and dissemination of information, ideas, interests, and many kinds of expression (Tran & Rudolf, 2022). Furthermore, it plays an important part in the communication strategies of many stakeholders in the tourism industry (Tran & Rudolf, 2022).

In this era, the widespread adoption of mobile applications has revolutionized the way customers interact with the World Wide Web, thereby transforming their purchasing behavior (Hoehle & Venkatesh, 2015). In this period, the geographical location of a product or service is no longer a limiting factor, as customers can easily access and purchase products or services remotely. This shift in consumer behavior presents opportunities for the tourism industry, promotes mobile applications (m-apps) as the preferred medium to purchasing online, and when formulating appropriate strategies (Tan et al., 2017).

Online reviews and ratings posted by customers on websites such as TripAdvisor and Yelp, which constitute electronic word-of-mouth (eWOM), have a profound impact on a company's reputation, branding, and business performance. These online reviews can significantly influence potential customers' purchasing decisions, thereby affecting a company's bottom line (Buhalis, 2019, p. 268).

Therefore, in the second and third phases of technological advancement in tourism, as advances in technology continue to impact business strategy, many traditional interpersonal encounters (i.e. “High-touch and low-tech”) have been supplemented or replaced by technological interfaces (i.e. “High-tech and low-touch) (Kim & Qu, 2014, p. 226). Key developments included the introduction of self-check-in kiosks and mobile applications that allowed customers to manage their travel arrangements independently (Kim & Qu, 2014). This expansion from traditional websites to self-service technology provided tourists with greater control over their experience and minimized the need for face-to-face interactions. As a result, based on previous research, technology became more embedded in the tourism industry, enhancing convenience and flexibility while reducing waiting times and improving overall satisfaction with the service (Kim & Qu, 2014). This phase marked a significant step toward a more personalized and seamless travel experience.

1.4 Phase Four: The Fourth Revolution of Technologies in the Hospitality Sector and Other Current Trends

The most recent and sophisticated development is the use of service robots in hotels and the tourism industry (Patrycja Brylska, 2022) which spanned from 2015 to present) (Buhalis, 2019). The applications of service robots range from basic artificial intelligence talking robots (chatbots) to complicated robot assistants to improve the tourist experience (Patrycja Brylska, 2022). As the number of organizations adopting service robots increases, it is critical to determine what benefits they will offer to the company and its consumers (Belanche et al., 2021).

Ambient Intelligence (AmI) Tourism (2020-future) is fueled by innovative technologies such as the Internet of Things (IoT), Internet of Everything (IOE), Fifth Generation mobile networks 5G, Radio Frequency Identification (RFID), mobile devices, wearables, 3D printing, apps, cryptocurrency and blockchain, sensor and beacon networks, pervasive computing, gamification, and enhanced analytics (Buhalis et al., 2019; Tuo et al., 2025; Tussyadiah et al., 2018). All these technologies contribute to the infrastructure and smart digital grid, which enables smooth interoperability among all stakeholders in the tourism industry (Buhalis, 2019). Interconnecting stakeholders promotes fluidity between physical and digital interactions, enables dynamic networks, and disrupts the traditional tourist business (Buhalis, 2019).

Smartness and AmI provide real-time service, allowing stakeholders to co-create value across many platforms. Interactions occur in real-time, at the precise moment when customers are ready to connect with brands (Buhalis, 2019). According to Buhalis (2019, p. 269) "Nowness" refers to a brand's ability to create real-time, data-driven, consumer-centric experiences through collaboration. Re-engineering is necessary to shape goods, activities, processes, and services in real-time while involving many stakeholders . Buhalis and Sinarta (2019) suggest that optimizing collective performance and competitiveness can lead to innovative solutions and increased value for all ecosystem stakeholders.

1.5 Green Innovations and Sustainability Development in the Hospitality Industry

Sustainability is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Report, 1987, p. 15).

The hotel industry contributes to 8% of global carbon emissions, produces 9% of the world’s waste (approximately 290,000 tons annually) uses 5% of the planet’s available water, generates 79,000 tons of food waste (Voukkali et al., 2023), and contributes to 8% of worldwide greenhouse gas emissions (Sustainable Travel International, 2024). These factors significantly affect the three core pillars of global sustainability: economic, social, and environmental values. For that reason, green innovation is gaining increasing importance among consumers, governments, and society due to concerns about natural resource depletion and pollution, with hotels contributing significantly to tourism-related environmental pollution and playing a key role in achieving sustainable development (Asadi et al., 2020).

Therefore, the contemporary hospitality industry introduced the concept of sustainable interior design, which has evolved as a pivotal approach that aligns the aesthetic appeal and luxury of their designs with environmental responsibility (Designs tomorrow, 2024, p. 1). For example, they utilize self-check-in/out automation in hotels, preventing long queues at the front desk, allowing guests to bypass traditional check-in/out counters and use digital cards and access codes, streamlining the process, thereby enhancing guest satisfaction and operational efficiency (Designs tomorrow, 2024). Green innovation is increasingly recognized as a key marketing advantage, fueled by a growing base of well-informed consumers whose purchasing decisions are significantly shaped by sustainability considerations (Calisto et al., 2021). According to Foris et al. (2020) hotel customers are becoming more attentive to sustainability issues, prompting a rising number of hotels to communicate their eco-friendly practices, particularly through social media platforms. Research by Verma and Chandra (2018) indicates that sustainability is a key factor in hotel selection, ranking higher than price, location, value for money, brand awareness, and food and service quality. Furthermore, customers strongly associate sustainability with energy conservation, followed by recycling and greenscaping within the hotel environment (Verma & Chandra, 2018).

Some benefits reported by hotels that have integrated sustainable practices include: cost reduction, an increase in market share, and customer loyalty (Popsa, 2023). According to Popsa, integrating sustainable practices encourages guests' active involvement in hotel maintenance activities such as reusing towels or switching off lights. Most of the literature on sustainable practices in the tourism and hotel industry points to a bleak picture of the challenges of the situation (Bisht et al., 2025). However, recent research and updated systematic analysis indicate that there is a notable improvement in the way that the hotel industry handles issues such as climate action, conservation, and creating social awareness of the best practices (Adeel et al., 2024a; Rahman et al., 2015). Cost savings remain a key driver of these initiatives, as Graci and Dodds (2011) note that cost reductions significantly influence sustainability practices. In fact, hotels can reduce their energy consumption by 20–40% without compromising performance, demonstrating the feasibility and benefits of environmental strategies (Graci & Dodds, 2011). A prime example in the same paper by (Graci & Dodds, 2011) is the Holiday Inn in North Vancouver, British Columbia, which reduced its energy consumption by 28% and saved approximately $16,000 annually after installing an in-room energy management system. This system, which uses occupancy sensors to adjust room temperatures automatically, proved to be a worthwhile investment, achieving full payback within 14 months.

However, hotels were found to face many challenges while adopting sustainability practices (Chan et al., 2018; Chan et al., 2020) including: financial constraints (McNamara & Gibson, 2008), lack of adequately qualified human resources (Kaur, 2021), inadequate public awareness (Acampora et al., 2022), insufficient government support (Oriade et al., 2021), lack of knowledge (Çelik & Çevirgen, 2021), and a lack of support from management (Kaur, 2021). For hotels to adopt sustainable practices, it is essential for management teams to fully understand the benefits these measures bring to both the business and its guests, but many shareholders still lack the necessary skills, knowledge, and tools to implement such efforts effectively (Sharma & Mathur, 2020). Although an increasing number of hotels are gradually incorporating sustainability initiatives into their operations, and with the rising demand in Canada due to the impacts of climate change, it has become even more urgent for businesses to explore ways to reduce their carbon emissions and move towards becoming more environmentally friendly, like eco-conscious hotels.

In summary, sustainable practices are crucial for enhancing operational efficiency, conserving resources, and fostering guest loyalty (Baljeu, 2024). By prioritizing sustainability and embracing innovative technological solutions, hotels can effectively meet contemporary traveler expectations, manage energy-related costs, and contribute to planetary health (Baljeu, 2024).

1.6 Research and Literature Gaps

Much of the existing literature emphasizes supply-side sustainability efforts, such as energy management systems, waste reduction programs, or green building design (Graci & Dodds, 2011; Chan et al., 2018). However, sustainability initiatives ultimately depend on consumer behavior: even the most advanced technologies can fail if guests are unwilling to use them (Verma & Chandra, 2018). Thus, a demand-side perspective is critical. This study focuses on tourists' acceptance of smart ICTs in Canadian hotels, highlighting the role of consumer attitudes and cultural acceptance in complementing supply-side measures.

Addressing this demand-side perspective not only complements supply-side measures but also ensures that sustainability initiatives in hotels achieve their intended impact.

Moreover, most prior studies on sustainability in tourism have predominantly followed a supply-based perspective, while the demand-side dimension, particularly tourists' environmental values and their role in technology adoption, remains underexplored (Aydın & Alvarez, 2020). This represents a key gap, as it is unclear whether environmental concerns translate into actual adoption behaviour, or whether they remain secondary to economic or experiential motivations.

Despite the significant contribution made by the aforementioned review of the literature on ICTs at hotels (Buhalis, 2019), there is a notable gap in the existing literature regarding the relationship between Information and Communication Technology (ICT) and Sustainable Development in the hotel industry. While many studies have focused on the impact of ICT on operational efficiency (Aramendia Muneta & Ollo López, 2013; Eugenia Ruiz-Molina et al., 2013) and sustainability initiatives within hotels (Zhu et al., 2021), very few have explored how ICT directly contributes to sustainable development and its influence on customer satisfaction (Stankov et al., 2019). Specifically, there is a lack of research addressing the adoption, usage, and consumer acceptance of interactive digital technologies in Canadian hotels. Understanding these factors is essential to bridging the gap between technological advancements and the overall experience of hotel clientele. With this aim in mind, the study investigated the following research questions:

1. What is the level of cultural acceptance of interactive digital technologies in Canadian hotels?
2. What is the effect of consumers' cultural acceptance and sustainability values as a mediator to consumers' adoption of Smart ICTs?

In short, it is our intention to improve the knowledge about this important study area where ICT, hotels, and sustainability are intertwined.

1.7 Research Problem Statement/Issue

ICT has revolutionized the ways of business, however, much of the ICT used is for the distribution of tourism products and services. In 2024, online booking, especially Booking Holdings (the leading online travel agency; OTA) recorded the highest market cap among the selected online travel companies worldwide and estimated $166.7 billion USD. By comparison in that same year, Airbnb and Trip.com Group had a market cap of around 83 and 46 billion USD, respectively (Statista's, 2024). Recent industry data highlights the continued expansion of online hotel bookings, reflecting a broader shift toward digital consumer behavior in the hospitality sector. For example, in the United States, the online hotel booking market was valued at $51.8 billion in 2024, marking a 6.5% year-over-year increase (Markets, 2024). Furthermore, as of 2023, over 65% of all global travel bookings were completed online, and 35% of these were made via mobile devices (*Travelperk*, 2024).These statistics underscore the increasingly central role of digital platforms in shaping consumer choices and service delivery in the tourism and hotel sectors. This growth can be attributed to the benefits online booking offers, such as better pricing, access to detailed information, and no additional booking fees for the consumer (Lien et al., 2015). As a result, the hospitality industry has witnessed a significant shift towards online bookings over the years, with online platforms becoming increasingly popular for hotel reservations. Factors such as online reviews, trust, service quality, and the availability of multiple booking channels have played pivotal roles in shaping consumer behavior toward online hotel bookings (Abashidze, 2024; Teng et al., 2020).

Furthermore, the Western market has seen a shift towards digital transformation in hotel operations, leading to increased brand awareness, improved guest experiences, and enhanced operational efficiencies (Sadek, 2022). This digitalization trend underscores the importance of technology in driving guest loyalty and operational effectiveness within the U.S. hotel sector (Adekuajo et al., 2023). In addition, an important question is whether Canadian tourist consumers will accept these new technologies, trust them to provide services that are traditionally provided with a human touch, and be willing to adopt digital technologies.

This study, therefore, investigated the impact of consumer acceptance of this emerging interactive technology, determined the constructs that may lead to adoption, and assessed the potential additional benefits it could bring to the business in Canada based on the perspective of tourist consumers. To analyze the future and possible evolution of technological integration in the hospitality sector in Canada, this study initially aimed to investigate several factors believed to influence the adoption of smart technologies by hotel guests, including Cultural Acceptance (CADT), Consumer Attitudes (AttS), Digital Trust (DT), and sustainability values such as Environmental, Social, and Economic Value (EV, SV, ECV). However, due to methodological constraints, particularly challenges in establishing discriminant validity, the final model was revised. As a result, the study investigated the effects of CADT, EV, and ECV on the Intention to Adopt Smart Technology (IAST). Further details regarding this transition and the final constructs included are provided in the Methodology chapter.

Chapter 2: Theoretical Background (Evolution of Hypothesis)

Note on the Evolution of the Conceptual Model

This chapter outlines the theoretical background, and the development of the initial conceptual framework proposed for the study. Originally, the model incorporated constructs such as Digital Trust (DT) as a mediating variable; Cultural Acceptance (CADT), Consumer Attitudes (AttS), Environmental Value (EV), Social Value (SV), and Economic Value (ECV) as independent variables; and Intention to Adopt Smart Technology (IAST) as the dependent variable. However, due to methodological challenges encountered during confirmatory factor analysis, particularly issues related to discriminant validity, constructs such as DT, AttS, and SV were removed from the final tested model. The original constructs and associated hypotheses are presented here to provide theoretical context and transparency. The revised model and the rationale for these changes are discussed in Chapters 3 and 4.

2.1 Measurement of variables

2.1.1.1 Operationalization of Constructs

Each latent construct was operationalized using multiple indicators based on established scales from the literature. Table 3.1 summarizes the operationalization of each construct and the source of the measurement scales.

Table 2.1. Construct's definition

Construct	Definition
Cultural Acceptance	Is the approval of a phenomenon measured by the sum of the conscious or unconscious behaviour by society that determines new ways of life through norms, values, knowledge, and codes of conduct in the context of a cultural framework and time (Thomas-Francois et al., 2023).
Consumer Attitudes*	Evaluative dispositions toward smart ICT implementation in hotels (Ajzen, 2018).
Environmental Value	Perceived environmental benefits of smart ICT adoption, such as improving energy efficiency, reducing waste, and lowering carbon emissions, contribute to sustainability. (Adeel et al., 2024a; Zhu et al., 2021).
Social Value*	Perceived social benefits and status enhancement from smart ICT adoption (Popov et al., 2021).
Economic Value	Perceived economic benefits and cost savings from smart ICT adoption (Dimoska & Trimcev, 2012)
Digital Trust*	Is consumer's confidence in a digital partner's, business' or institution's commitment (written/unwritten) to prevent all sources of harm that may arise in transacting business between the two parties (consumer and partner/business/ institution) (Levine, 2019).
Intention to Adopt Smart Technology	Behavioral intention to implement or use smart Technology solutions in hotels (Ayanwale & Ndlovu, 2024).

*Note: Constructs marked with an asterisk (*) were omitted from the final analysis due to discriminant validity issues, as discussed in Chapters 3 and 4.

The initial proposed conceptual framework (not the final one presented in the findings) for the current study as shown in Figure 1 seeks to investigate whether consumers' attitudes, cultural acceptance, and sustainability constructs such as consumers' economical value, environmental value, and social value of the hotel sector are antecedent to their intention to adopt smart and digital technologies at hotel mediated by their digital trust.

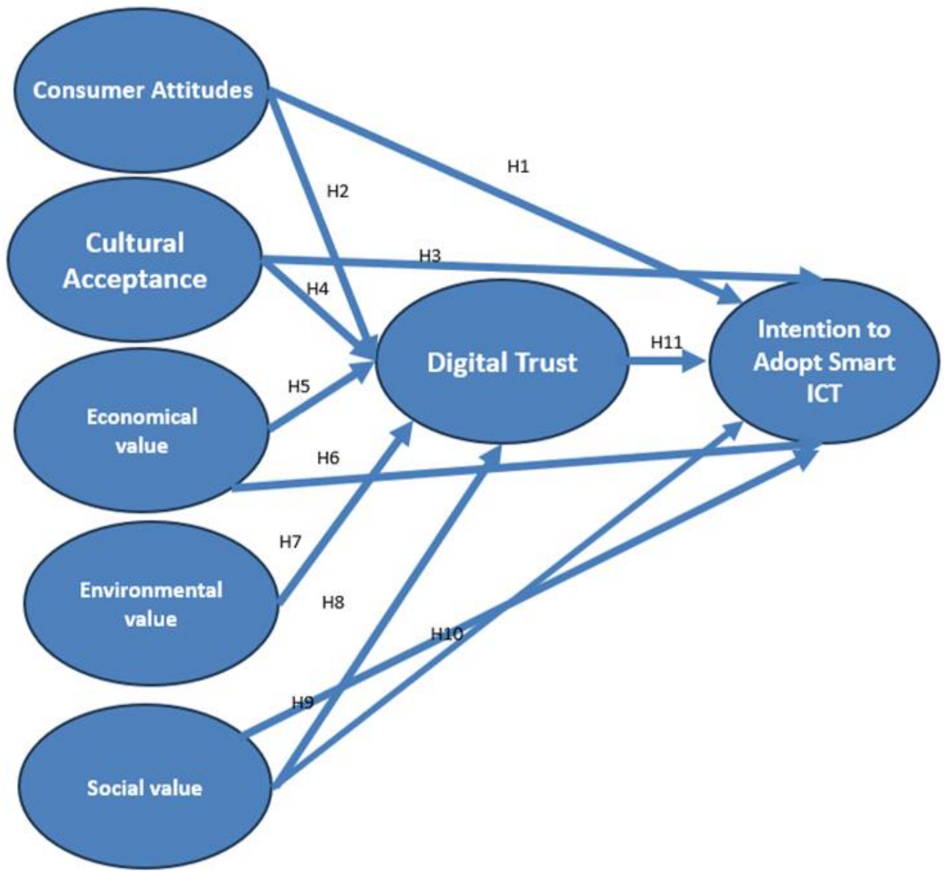

Figure 2.1. An initial conceptual model was proposed at the outset of the study. The final revised model is presented in Chapter 4

2.2 Consumer Attitudes

Attitude refers to "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen, 1991, p. 188). The theory of planned behavior posits that consumer attitudes influence the intention to adopt a product or service as they mirror the individual's comprehensive assessment of the action, influenced by convictions regarding the outcomes, social influences, perceived authority, and compatibility with individual principles (Ajzen, 2018). Favorable attitudes result in stronger intentions to adopt, whereas unfavorable perceptions may hinder adoption intentions (Ajzen, 2018). Consumers' attitudes toward technology acceptance significantly influence their adoption or behavioral intention (Davis et al., 1989). This has led to the proposition of Hypothesis 1 and Hypothesis 2 as follows:

H^1: Consumers' attitudes towards (AttS) smart ICT have a positive effect on consumers' intention to adopt (IASI)

H^2: Consumers' attitudes towards (AttS) smart ICT have a positive effect on consumers' Digital Trust (DT)

2.3 Cultural Acceptance

The rapid development of technology has changed the operational structure of hotels and has improved their operational efficiency considerably (Buhalis & Leung, 2018). It is important to determine what factors would contribute to adoption. While a person is likely to choose a system that is easy to use (Marangunić & Granić, 2015), the impact of cultural values on technology in hospitality cannot be ignored. To a great extent, there is a connection between cultural values and technology adoption (Sun et al., 2020). For example, Baptista and Oliveira (2015) confirmed the moderating effect of the long-term orientation of cultural value on users' acceptance of mobile technology. Similarly, Thomas-Francois et al. (2023) found cultural acceptance to play a primary role in the adoption of digital food retailing. Thus, considering the effects of cultural value, the following hypotheses are proposed based on previous studies regarding the acceptance of hotel technology adoption from the perspective of hotel employees (Sun et al., 2020);

H^3: Culture Acceptance of Digital Technology (CADT) by customers has a positive and direct effect on Intentions for consumers to adopt smart technology at Hotels (IASI).

H^4: Cultural Acceptance (CADT) has a positive effect on Digital Trust (DT).

2.4 Economical Value

Destination social responsibility (DSR) necessitates the active engagement of all stakeholders, encompassing residents, businesses, and tourists, implying universal participation in economic responsibility (Byrd & Gustke, 2004). A destination's economic prosperity is contingent upon the adoption of optimal competitive strategies concerning technology, pricing, and overall atmosphere (Dimoska & Trimcev, 2012). Consequently, technological innovation within businesses can generate potential financial gains, thereby facilitating the fulfillment of their economic responsibilities and values (Cegarra-Navarro et al., 2016). Furthermore, enhanced economic well-being contributes to the overall prosperity of the destination's community, fostering a more receptive disposition toward tourism (Mata, 2019). In contrast, a negative destination reputation exacerbates customer dissatisfaction and impedes the adoption of environmentally responsible behavior (ERB) (Chirieleison et al., 2020; Su et al., 2020; Zhu et al., 2021). Resource conservation, augmented income sharing, and effective taxation represent benefits accruing from economic value, contributing to destination prosperity (Baptista, 1999; Lee et al., 2021). Hence, in this study, it was assumed that ICT generates economic rewards that lead to specific sustainable behaviors; tourists tend to emulate these sustainable behaviors when they witness this stability. Based on the discussion above, it was posited:

H^5: Economic Value (EV) has a positive effect on consumers' Digital Trust (DT).

H^6: Economic Value (EV) has a positive effect on consumers' intention to adopt smart technology at hotels (IASI).

2.5 Environmental Value

A comparison between individuals who participate in environmentally responsible actions and those who do not reveals that the former tend to have a stronger connection with nature (Cheng & Wu, 2015; Palmberg & Kuru, 2000; Yang et al., 2021). Through extended interaction with and dedication to their local surroundings, individuals cultivate a sense of place attachment that reinforces environmentally responsible behavior (ERB) in their daily routines (Hines et al., 1987). Destination hosts must cultivate environmental responsibility by ensuring authenticity in their operations. In reciprocation, social interaction may foster sustainable intelligence and pro-environmental behavior (Li et al., 2021). Tourism activities frequently compromise environmental integrity on a broader scale (Adeel et al., 2024a). Destinations that demonstrate environmental concerns can act as drivers for positive shifts in consumer attitudes. However, technologies targeted at lowering carbon emissions are often costly and not widely adopted by most locations. At times, leadership exerts tremendous pressure to incorporate sustainable practices (Ahmed et al., 2018). When destinations follow regulations, they frequently receive positive feedback from stakeholders concerned (Sun et al., 2021). Hotels that prioritize sustainability are more likely to raise awareness among tourists (Batson et al., 1983; Gao et al., 2021; Schwartz & Howard, 1984), thereby fostering trust. Based on the discussion above, we posit:

H^7: Environmental Value (EV) has a positive effect on consumers' Digital Trust (DT).

H^8: Environmental Value (EV) has a positive effect on consumers' intention to adopt smart technology at hotels (IASI).

2.6 Social Value

The sociocultural responsibility has three components. The decision-making process affects the local economy, the equitable distribution of advantages and obligations among the participating groups, and, ultimately, the sustainability of the culture (Heikkinen et al., 2007; Puhakka et al., 2009; Rannikko, 1999). Tourists may feel profoundly connected with a destination when it practices socio-cultural responsibility since it reflects the conduct they receive at the hands of employees and locals (Puhakka et al., 2009). Management decision-making on the environment's preservation and upkeep is influenced by the comprehension of social value relevance (Popov et al., 2021). However, social responsibility is reflected in the satisfaction of employees and locals which is obviously a result of management decisions but empirically has not been proven for tourists (Throsby, 2016). If technology is being used to improve that social value, we expect that there is likely to be a positive effect on trust by consumers (Xiong, 2013). We hypothesize the following based on these ideas:

H^9: Social Value (SV) has a positive effect on consumers' Digital Trust (DT).

H^{10}: Social Value (SV) has a positive effect on consumers' intention to adopt smart technology at hotels (IASI).

2.7 Digital Trust

In the past decade, there has been a rapid increase in online commercial activities enabled by the Internet. This revolution in the business world is due primarily to an explosion in information technology (IT) development and the resulting emergence of electronic commerce (Shaw et al., 1997; Tsukanova, 2024). Electronic commerce is a new form of online exchange in which most transactions occur among entities that have never met. As in traditional exchanges, trust has been considered crucial in the online transaction process (Ba et al., 1999; Soleimani, 2022), perhaps more so given the impersonal nature of the online environment. The rise of digital consumers, the growth of artificial intelligence (AI) techniques, and the heterogeneity of digital platforms are defining a new dimension for trust and security. Considered to be “the key building block of society”, trust plays an essential role in the formation and consolidation of business interactions and relationships (Hawlitschek et al., 2018; Mazzella et al., 2016, p. 27). For instance, leasing a property on Airbnb necessitates various tiers of trust. On the host's end, there exists the necessity of having trust in prospective visitors (e.g., respect towards both the host and the property). From the guest side, it is essential to trust the host and the offered unit or service (e.g., to be adequate to their expectations). Both parties must trust Airbnb’s ability, integrity, and benevolence regarding booking and payment processes.

With the advancement and prevalence of digital technologies, the hospitality industry is evolving into a smarter era (Pencarelli, 2020). The easiest way to communicate with hotel guests effectively is via mobile apps which provide a variety of opportunities to enhance the guest experience, such as: booking rooms, communications, a guest loyalty program (Car et al., 2019). Based on the discussion above, we posit:

H[11]: Digital Trust (DT) has a positive and direct effect on consumers' intention to adopt smart technology at hotels (IASI).

2.8 Summary Note on Hypotheses Included in Final Model

While eleven hypotheses were initially proposed based on the full conceptual model, only those related to Cultural Acceptance, Economic Value, and Environmental Value were tested in the final analysis. The rationale for excluding certain constructs is discussed in Chapters 3 and 4.

Chapter 3: Research Methodology

3.1 Methodology

3.1.1 Introduction

This chapter outlines the methodology employed to investigate the conceptual framework originally proposed in this study, which included Digital Trust (DT), Consumer Attitudes (AttS), Social Value (SV), Cultural Acceptance (CADT), Economic Value (ECV), and Environmental Value (EV) as predictors of consumers' Intention to Adopt Smart Technology (IAST) in Canadian hotels.

However, during data analysis, specifically in the confirmatory factor analysis phase in chapter 4, significant discriminant validity issues were identified among some constructs. As a result, the final tested model was refined to include only CADT, ECV, EV, and IAST. This chapter details methods to address the research questions and test the hypothesized relationships, ethical considerations, limitations, and results, then explains the analytical process that led to the revised model, which is presented in detail in Chapter 4.

3.1.2 Research Philosophy

Positivism is an area in the philosophy of science that emphasises the significance of observation for the development of knowledge, and therefore contemplates the measurement of phenomena as central to the advance of understanding (Given, 2008). This philosophy often involves using quantitative data collection methods and statistical analysis techniques, which can lead to precise and quantifiable results (William, 2024, p. 11). Popper (2005) argues that positivist theories must be tested against data with the intention of their fabrication and subsequent replacement with improved theoretical models. Thus, positivism has been extensively applied in the natural sciences, where empirical observation is used to generate theories and models that can be generalised (Given, 2008). Positivism depends on the hypothetic-deductive method to confirm a priori hypotheses that are usually specified quantitatively, where functional relationships can be derived between causal and explanatory factors (independent variables) and outcomes (dependent variables) (Park et al., 2020).

In this study, the independent variables included Cultural Acceptance (CADT), Economic Value (ECV), and Environmental Value (EV), while the dependent variable was the Intention to Adopt Smart Technology (IAST). Given the structured nature of this research and the application of quantitative techniques, a positivist approach was well-suited for examining the constructs that influence the intention to adopt smart technology and thus was adopted by this study.

3.1.3 Research Design & Approach

This study adopted a quantitative research approach, defined as "a means for testing objective theories by examining the relationship among variables" (Creswell, 2009, p. 22).
This approach aligns with the principles of positivism, which emphasizes objectivity, measurable variables, and systematic procedures (Bryman, 2016). Researchers employing this methodology typically use deductive reasoning, aim to minimize bias, and seek results that are generalizable and reproducible (De-Sousa & Aguiar, 2022; Park et al., 2020).

To gather empirical data, a survey design was used, which is particularly well-suited to positivist research because it allows for the systematic collection of standardized responses from a large population (Lau, 2017). The survey was constructed using previously validated measurement scales drawn from existing literature to ensure the reliability and validity of the instrument (Boateng et al., 2018).

This quantitative research has been conducted using multivariate analysis, in particular structural equation modeling (SEM) using Amos IBM version 29 Software (Byrne, 2013).

In this study, the structural equation model originally investigated whether any of the antecedents' cultural acceptance, consumer attitudes, environmental value, economic value, and social value (Sustainability indicators) mediate digital trust to affect tourist consumers' intention to adopt smart technology. The model would also investigate whether these antecedents have a direct effect on consumers' intention to adopt smart technology.

Structural Equation Modeling (SEM) is usually used to explain multiple statistical relationships simultaneously through visualization and model validation (Dash & Paul, 2021, p. 1). Complex models can be discussed simply through this technique (Dash & Paul, 2021, p. 1). Structural Equation Modeling (SEM) represents an extension of conventional linear modeling techniques, such as multiple regression analysis and Analysis of Variance (ANOVA), which serve as foundational prerequisites for its comprehension. Concisely, SEM can be characterized as the simultaneous integration of factor analysis and multiple regression analysis (Hair Jr et al., 2017; Sarstedt et al., 2021).

Structural Equation Modeling (SEM) is a powerful multivariate statistical technique that combines aspects of factor analysis and multiple regression to analyze complex relationships between observed and latent variables (Hair Jr et al., 2021). According to Verma and Verma (2023), observed variables are those that can be directly measured, such as responses to questionnaire items or physical measurements, however, latent variables are hypothetical constructs that cannot be directly observed but are instead inferred from other variables that can be directly measured.

The collected data were analyzed using Structural Equation Modeling (SEM), a multivariate statistical technique that enables the simultaneous examination of multiple relationships among observed and latent variables (Hair Jr et al., 2017). SEM allows researchers to test complex models that include mediating variables and multiple dependent relationships (Hair, 2014a). This method was chosen for its ability to assess the measurement model (construct validity and reliability) as well as the structural model (hypothesized paths between constructs).

In the context of this study, the final tested model included Cultural Acceptance (CADT), Environmental Value (EV), and Economic Value (ECV) as independent or mediating variables, and Intention to Adopt Smart Technology (IAST) as the dependent variable. Although the initial conceptual model also included Digital Trust (DT), Consumer Attitudes (AttS), and Social Value (SV), these constructs were excluded from the final model due to discriminant validity issues identified during confirmatory factor analysis. Structural Equation Modeling provided a rigorous framework for testing these hypothesized relationships and validating the revised conceptual model.

3.1.4 Data Collection

Before the full-scale data collection, a pilot test involving 50 respondents was conducted to assess the clarity, structure, and internal consistency of the questionnaire. The feedback from the pilot study was used to make minor refinements to the questionnaire. Statistical diagnostics, including Cronbach's alpha *(see Table 9.1 and 9.2 appendix C*), were employed to assess the reliability of multi-item scales. All reliability coefficients met or exceeded recommended thresholds, confirming the robustness of the instrument (Hair, 2014b; Janssens, 2008).
Although the initial questionnaire included constructs such as Digital Trust (DT), Social Value

(SV), and Consumer Attitudes (AttS), as part of the original conceptual framework, these were later excluded from the final model due to issues identified during confirmatory factor analysis *(see Chapter 4)*. However, they remained part of the initial pilot and main survey instrument to maintain theoretical consistency with the original model.

The finalized version of the self-administered online questionnaire was hosted on the Qualtrics XM platform. Qualtrics also managed participant recruitment through its panel services, providing access to a broad, diverse, and randomized sample. The survey was administered in English over one month, from December 1st to December 31st, 2024. A random sampling strategy was employed to ensure equal selection probability across the population, enhancing representativeness and minimizing sampling bias (Noor et al., 2022).

A total of 619 responses were collected from Canadian tourists, of which 438 were deemed valid and included in the final analysis. An additional 149 responses were received from international tourists, but this group was excluded due to its small sample size even before the data cleaning process. According to methodological standards, a minimum of 300 cleaned responses was required for valid SEM analysis (Hair, 2014a).

The questionnaire consisted primarily of closed-ended questions, organized into seven thematic sections covering areas such as cultural acceptance, digital trust, intention to adopt smart technologies at hotels, environmental, social, and economic sustainability values, and attitudes toward smart technologies. Most items used a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree), while demographic and contextual questions used multiple-choice and short answer formats.

To improve clarity, particularly in sections involving abstract concepts, the survey incorporated visual aids such as conceptual illustrations and collaged images. These enhancements aimed to support cognitive processing and reduce misinterpretation, thus improving data quality. Eligibility criteria included being 18 years or older and having stayed in a hotel within the previous 12 months to ensure relevance and contextual accuracy. Demographic details of the final sample are presented in Chapter 4.

3.1.5 Ethical Considerations

Ethical integrity was central to the design and implementation of this study, which was reviewed and approved by the Thompson Rivers University's Research Ethics Board (REB#103549) prior to data collection. All research activities involving human participants were conducted in accordance with institutional ethical guidelines and federal standards for human subjects research. Data were collected via an online survey hosted on the Qualtrics platform, which maintains high standards for data security and participant anonymity. At the outset of the survey, participants were presented with a detailed consent letter outlining the purpose of the study, the nature of participation, and potential risks and discomforts. Participation was entirely voluntary, and respondents were informed of their right to withdraw at any time without penalty by simply closing their browser window. They were also informed that incomplete surveys would not be included in the analysis.

Informed consent was obtained electronically. By clicking "Agree," participants acknowledged that they were 18 years of age or older and had read and understood the information provided. No personally identifying information such as name, IP address, or contact details, was collected unless the participant opted to receive a copy of the results by voluntarily providing an email address at the end of the survey. All response data were stored anonymously on a securely encrypted USB device housed in a locked office accessible only to the primary investigators. These measures ensured both physical and digital security. Data will be retained securely in accordance with institutional policy and will be permanently deleted after the required storage period.

3.1.6 Reliability and Validity

3.1.7 Data Screening and Cleaning

Before proceeding with the main statistical analyses, a comprehensive data screening and cleaning process was carried out using SPSS version 29 software to ensure the integrity, accuracy, and analytical readiness of the dataset. Initially, 619 responses were collected through the Qualtrics panel. However, not all these cases met the required quality standards for inclusion in the final analysis. Therefore, a series of cleaning procedures was implemented to remove cases that could potentially compromise the reliability of the results. Data cleaning involved the removal of incomplete responses, straight-lining patterns, and other quality issues to ensure the reliability and integrity of the dataset.

First, the dataset was examined for incomplete responses. Participants who had failed to respond to more than 50 percent of the questionnaire, particularly in sections containing key constructs, were excluded from the dataset. These cases lacked the essential data needed for valid interpretation and would have significantly reduced the robustness of the confirmatory factor analysis.

Next, the responses were carefully reviewed for inconsistencies and patterns indicative of careless or non-engaged participation. Entries displaying straight-lining behavior, where a respondent selects the same answer repeatedly across multiple Likert-scale items, or those containing contradictory demographic information were flagged as invalid and removed.

Following this, the dataset was checked for missing data. Upon inspection, no significant patterns of missingness were observed in the cleaned dataset. Therefore, missing values were deleted during preliminary analysis. Since the remaining data were complete for all key variables, there was no need for data imputation techniques such as mean substitution or multiple imputation.

Finally, the dataset was assessed for the presence of outliers, both univariate and multivariate. Descriptive statistics and standardized z-scores were used to screen for univariate outliers, while Mahalanobis distance was considered for identifying multivariate outliers. The analysis did not reveal any cases that posed threats to normality, linearity, or the overall stability of the model. Consequently, all 438 valid cases were retained for confirmatory factor analysis (CFA) and subsequent structural modeling procedures.

After data cleaning and screening, the retained responses were evaluated through a series of statistical procedures. Reliability was assessed using Cronbach's alpha to ensure internal consistency across constructs. Additionally, validity checks, including assessments of construct and content validity, were conducted to confirm that the survey items accurately measured the intended theoretical concepts. Descriptive statistics and normality tests were also performed to evaluate data distribution and ensure assumptions for subsequent analyses were met. In conclusion, this rigorous cleaning and validation process ensured that the final dataset was statistically sound, representative of the target population, and suitable for use in the advanced analytical techniques applied in this study, such as confirmatory factor analysis (CFA) and structural equation modeling (SEM).

3.1.8 Reliability Analysis of Data in SPSS

The study of the components and characteristics of measurement scales is known as reliability analysis. According to (Hair, 2014a; Janssens, 2008) Cronbach's alpha, which is obtained from the average correlation of standardized test items, is used when assessing a test. If the items are not standardized, the average covariance between them is used. Cronbach's alpha is a correlation coefficient with a range of values from 0 to 1. This investigation employs Cronbach's alpha for multipoint-scaled items. A more accurate dependability measurement tool has coefficients that are nearly equal to 1. The lower the coefficients (i.e., closer to 0), the less effective the instrument is (Hair, 2014a; Janssens, 2008) . To evaluate the internal consistency of the measurement instrument prior to conducting confirmatory factor analysis (CFA), a reliability analysis was performed using Cronbach's Alpha for each of the latent constructs under investigation. The analysis was conducted using SPSS, and the results are presented in Table 3.1.

It is important to note that the reliability analysis was initially conducted for all constructs proposed in the original conceptual model, including Digital Trust (DT), Social Value (SV), and Consumer Attitudes (AttS). However, due to issues identified during confirmatory factor analysis, these constructs were later excluded from the final tested model *(see Chapter 4)*. Despite their exclusion, their reliability results are reported here for transparency and completeness.

All seven constructs demonstrated high levels of internal reliability, with Cronbach's Alpha values exceeding the widely accepted threshold of 0.70 (Nunnally & Bernstein, 1994), indicating strong internal consistency across items within each scale. These constructs were Cultural Acceptance (CADT), Digital Trust (DT), Intention to Adopt Smart Technology (IASI), Environmental Value (EV), Social Value (SV), and Economic Value (ECV). The constructs CADT and IAST each yielded alpha coefficients above 0.90, reflecting excellent reliability. Similarly, DT, SV, and ECV produced alpha scores between 0.89 and 0.90, signifying very good consistency. Environmental Value (EV) showed a slightly lower but still robust reliability of 0.85. All the instruments' Cronbach's alpha ratings were close to one, indicating that they were reliable for further study. None of the constructs required item deletion to improve their alpha scores, as all values were already within acceptable or desirable ranges. These results provided confidence in the internal stability of the measurement scales and justified proceeding to subsequent CFA and validity testing.

Table 3.1. Cronbach's Alpha Test

Construct	Cronbach's Alpha
CADT	0.900177
DT	0.894855
IAST	0.924458
EV	0.854508
SV	0.895535
ECV	0.901408

3.1.9 Descriptive Statistics and Distributional Analysis

Descriptive statistics are brief informational coefficients that summarize a given data set which can be either a representation of the entire population or a sample (Hayes, 2024) . Descriptive analysis examines the respondents' demographic profile using frequency or percentage tables, cross-tabulations, and charts. We used frequency distribution analysis to examine the demographic profile of the respondents. In this study, to examine the characteristics of the dataset and the initial trends in participants' perceptions, a descriptive statistical analysis was conducted for all observed variables. This included the calculation of means, standard deviations, and the assessment of skewness and kurtosis for each item within the seven key constructs of the study.

It is important to note that although all seven constructs, Cultural Acceptance (CADT), Digital Trust (DT), Intention to Adopt Smart Technology (IAST), Environmental Value (EV), Social Value (SV), Economic Value (ECV), and Consumer Attitudes (AttS), were analyzed at this stage, some were excluded from the final model due to issues identified during confirmatory factor analysis. Their descriptive statistics are reported here for transparency and to reflect the initial scope of the conceptual framework.

For the construct of CADT and the observed items showed mean values ranging from approximately 4.94 to 5.41. This indicates a moderately positive perception among respondents toward the general acceptability of digital technology in the hospitality sector. The standard deviations for CADT items were around 1.38 to 1.46, suggesting a fair level of agreement with some diversity of opinions. Skewness values were negative and ranged from approximately -0.66 to -0.91, indicating that the majority of participants leaned toward agreeing with the importance of digital adoption in hotels. The kurtosis values for these items, generally falling between 0.19 and 0.93, reflected a distribution close to normal, with neither excessive peakedness nor flatness.

The construct of DT demonstrated slightly higher mean values than CADT, with most items ranging between 5.12 and 5.54. These scores suggest that respondents generally trusted hotel digital platforms and systems, particularly in terms of data protection and service reliability. The standard deviations for DT items were relatively consistent, falling between 1.34 and 1.44, which indicates moderate dispersion. Skewness values were close to -1.0, reaffirming a general tendency toward agreement, while kurtosis values remained within acceptable limits, further supporting the distributional suitability of the data.

Items associated with Intention to Adopt Smart Technology (IAST) displayed the highest mean scores among all constructs, ranging from 5.36 to 5.62. This reflects a strong intention among respondents to use smart technology in future hotel experiences. These items also had slightly lower standard deviations, between 1.27 and 1.39, indicating higher consensus. Skewness values ranged from -0.94 to -1.01, which reinforces the notion of widespread support for technology adoption. The kurtosis values for IAST remained moderate and well within acceptable statistical thresholds, confirming the normality of distribution.

For Environmental Value (EV), the mean scores were again positive, falling between 5.14 and 5.35. This suggests that participants recognized the environmental benefits associated with smart ICT in hotels, such as energy efficiency and waste reduction. The standard deviations for EV items ranged from 1.29 to 1.40, and the skewness values were between -0.74 and -0.98, indicating a moderate lean toward agreement. Kurtosis values for this construct, between -0.26 and 0.48, indicated a distribution close to normality with no irregular peaking.

Social Value (SV) items showed comparable results, with mean values ranging from 5.03 to 5.42. These scores imply that respondents acknowledged the social implications of smart ICT, including inclusivity and ease of access. The standard deviations of these items were between 1.30 and 1.42. The skewness values were similarly negative, approximately between -0.76 and -0.88, showing that most participants agreed with the positive social impacts of digital technologies. The kurtosis values for SV were well within acceptable ranges, suggesting a statistically appropriate distribution.

Finally, the Economic Value (ECV) construct demonstrated mean scores ranging from 5.06 to 5.33, reflecting a perception that smart ICT can contribute to cost savings, operational efficiency, and long-term profitability. These items had standard deviations ranging from 1.35 to 1.42, showing moderate spread in responses. Skewness values ranged from -0.74 to -0.91, and kurtosis remained moderate, indicating suitable distributional characteristics for inclusion in parametric modeling.

Overall, the data for all constructs showed negative skewness, suggesting that respondents generally leaned toward agreement with the items presented. Kurtosis values remained within acceptable limits across all variables. According to Kline (2023), skewness within ±3 and kurtosis within ±10 is acceptable for the application of parametric techniques such as Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). The results of this descriptive analysis confirm that the dataset was statistically sound and sufficiently normal for advanced multivariate analysis (See *the Appendix A*).

3.1.10 Normality Test

The test of normality is used to investigate whether the dependent variables are normally distributed or not. This is because all parametric tests require the variables analyzed to be normally distributed. If the absolute values of kurtosis and skewness are 2.0 or less, the data is considered normally distributed (Hair, 2014a).

Alternatively, non-parametric analysis needs to be employed in the analysis if the variables are not normal.

This test included numerical and graphical methods. The normality tests were initially conducted on all observed variables from the original conceptual model, including Digital Trust (DT), Social Value (SV), and Consumer Attitudes (AttS). While these constructs were excluded in the final model due to discriminant validity issues, their data were still assessed for distributional assumptions to ensure full transparency.

The numerical methods consist of skewness and kurtosis, Shapiro-Wilk and Kolmogorov-Smirnov, while the graphical methods consist of histogram and Q-Q plot. As it shown in the tests of normality table for the dependent variable IAST-1, according to the SPSS output, the skewness of IAST-1 was -0.488 and kurtosis was -0.071. Both values fall well within the commonly accepted thresholds of ±1 Hair (2014b), suggesting mild negative skewness and an approximately normal peak of the distribution. These results indicate that the data are reasonably symmetric and not sharply peaked or flat, and thus acceptable for parametric analysis. The Shapiro-Wilk test reported a significant result ($p < .001$), as did the Kolmogorov–Smirnov test. These results technically suggest that the distribution deviates from a normal distribution. However, given the large sample size ($N = 438$), these tests are known to be overly sensitive, often flagging minor deviations as statistically significant (Paramasivam et al., 2024). Therefore, these results should be interpreted in combination with visual evidence and skewness/kurtosis values. The histogram of IAST-1 displayed a roughly bell-shaped curve with a slight leftward (negative) skew. The bars clustered symmetrically around the center, and no major outliers or gaps were observed. The overall shape visually approximated a normal distribution, reinforcing the interpretation from the descriptive statistics. As an example, the Q–Q plot (quantile–quantile plot) for IAST-1 showed points that closely followed the diagonal reference line, particularly in the central portion of the distribution. Slight deviations were observed at the tails, which is common in large samples and not necessarily indicative of problematic non-normality. The plot supports the conclusion that IAST-1 is approximately normally distributed. Although the formal tests of normality returned significant p-values, the skewness, kurtosis, histogram, and Q–Q plot all support the assumption of approximate normality for IAST-1. Therefore, this item meets the normality assumption required for further CFA and SEM procedures. Similar patterns of acceptable normality were observed across all other constructs included in this study. Therefore, all items meet the normality assumption required for further CFA and SEM procedures. The respective histogram of IAST-1 has been provided in Appendix B for reference.

Chapter 4: Data Analysis

4.1 Demographic Results extracted from SPSS

As of 2024, Canada's total population is estimated at 39,826,185 (*World Population Review. 2024*). Approximately 49.5% of the population is male, and almost 50.5% of the population is female. This means that for every 100 people in a sample, there should be approximately 50 males and 51 females to accurately represent the Canadian population (*World Population Review. 2024*). However, surprisingly, in this research, the sample consisted of 226 (51.5%) males and 211 (48.1%) females, with one respondent not reporting their gender. Respondents' age groups ranged from 18–24 (8.9%), 25–34 (20.3%), 35–44 (19.1%), 45–54 (14.1%), 55–64 (18.2%), and 65 and over (19.4%). Respondents resided in the urban core of large cities (41.5%), suburbs (34.6%), small towns or rural areas (23.2%), and the remaining 1.4% preferred not to respond. In reporting marital status, 37.8% of respondents were single, 50.8% were married or in common-law relationships, and 9.6% were divorced or separated (See further details on demographics in Table 4.1).

Table 4.1. Sample population demographics

Sample Population – Demographics		
	Number of Persons	Percentage
Total	438	100%
Gender		
Males	226	51.5%
Females	211	48.1%
Gender Unreported	1	0.4%
Age Groups		
18–24	39	8.9%
25–34	89	20.3%
35–44	84	19.1%
45–54	62	14.1%
55–64	80	18.2%
65–Over	85	19.4%
Missing	2	0.40%
Residence		
Urban core large city	182	41.5%
Suburban	152	34.6%
Small town or rural	102	23.2%
Unreported (preferred not to answer)	2	1.40%
Marital Status		
Single	166	37.8%
Married or Common Law	223	50.8%
Divorce or Separated	42	9.6%
Unreported (preferred not to answer)	7	1.7%

4.2 CFA

Before the SEM is performed on the digital data set, a CFA was conducted to ensure all items accurately represent the latent constructs they are within (Ziegler & Hagemann, 2015). The first criterion that must be satisfied within CFA is uni-dimensionality. Uni-dimensionality is achieved when the variance of all items can be attributed to the variance in each latent construct (Ziegler & Hagemann, 2015). In other words, all measurement items are converging on one dimension (the latent construct they represent). To test uni-dimensionality, it is advisable to ensure factor loadings of all constructs are greater than 0.5 and also a critical ratio that is higher than 1.96 (Schreiber et al., 2006). Next, all standardized factor loadings should be above 0.5. Next, the model fit needs to be examined. The first indication is the chi-square (CMIN value), which is recommended to be below 2 (Schreiber et al., 2006). In the final, CFA output was recommended to be 0.8 and RMSEA was recommended to be < 0.06 (Schreiber et al., 2006). The next step involves examining the standardized residual covariances to identify any factors that may be loading onto other terms/constructs; any standardized residual covariances that have values above 2.58 are not acceptable and should be managed accordingly (Byrne, 2009, 2013). Modification indices can be used to indicate which variables may be contributing to poor model fit and how the model may change as a result of the removal of those items (Byrne, 2009, 2013). By looking for high modification constructs, it is possible to identify these items. The removal process consisted of removing one item at a time and then investigating the model fit to ensure it was improving.

Once uni-dimensionality has been confirmed, convergent validity must be addressed. All regression weights are significant, and C.R values are above the recommended 1.96 (Ziegler & Hagemann, 2015). Both composite reliability and AVE values are recommended to be above 0.7, and with small rounding, this condition must be satisfied. Finally, discriminant validity must be considered. This suggests that all the constructs are different from one another to move forward with the analysis. After the criteria for the model for the CFA are satisfied, the SEM can be conducted to determine the path relationship.

4.2.1 Measurement Model and CFA Revision

While the original conceptual model was grounded in established theoretical frameworks, the empirical results from CFA challenged the model's factorial integrity, necessitating a flexible and iterative refinement process. As suggested by Hair (2014b) , model specification is acceptable as long as it is both theoretically justified and statistically supported.

In this research, initial model fit indices indicated a poor model fit, with values of χ^2/df = 2.915, GFI = 0.814, and AGFI = 0.731, all falling below accepted thresholds (GFI and AGFI > 0.90). Although the RMSEA = 0.066 was within the acceptable limit (Hair et al., 2010), the overall model needed improvement.

The first step toward achieving uni-dimensionality involved examining the standardized factor loadings of all observed variables. Items SV3 and EV5 were removed due to low factor loadings (< 0.5), and as no further items met this criterion, the focus shifted to analyzing the Standardized Residual Covariances table.

Residual covariances exceeding ±2.58 indicate potential sources of model misfit. Item DT1 showed problematic residuals with SV4 (3.559), SV6 (3.003), and SV7 (3.323), leading to its removal. Subsequent review revealed residual issues between EV3 and IASI4 (3.244), as well as SV2 and ECV3 (3.190); therefore, both EV3 and SV2 were removed. Additional misfit was found between SV7 and ECV3 (2.623), prompting the removal of SV7, followed by ECV3, which further improved the model fit to χ^2/df = 2.55. Removing DT2 brought the value down to 2.492.

Further analysis indicated residual covariance of 2.695 between SV1 and IASI4, justifying the removal of SV1, which improved the model to χ^2/df = 2.424. Continuing this refinement, IASI4 was excluded due to its residual of 2.85 with SV5. In the final step, AttS3 was removed, resulting in the most optimized version of the model, where all values in the Standardized Residual

Covariances table were within ±2.58. By doing this, the final fit indices were significantly improved: $\chi^2/df = 2.286$, GFI = 0.907, and AGFI = 0.879, indicating an acceptable fit.

4.2.2 Construct Validity and Reliability

Upon establishing an acceptable model fit and confirming uni-dimensionality, the construct validity of the measurement model was assessed through multiple criteria:

- Composite Reliability (CR) was calculated for each latent variable, with all constructs exceeding the recommended threshold of 0.70, indicating high internal consistency (Hair et al., 2010).
- Convergent Validity was examined using Average Variance Extracted (AVE). All constructs demonstrated AVE values above 0.50, confirming that more than half of the variance was captured by the construct rather than by measurement error.
- Discriminant Validity was evaluated using the Fornell-Larcker criterion, whereby the square root of each construct's AVE exceeded its inter-construct correlations. This should confirm that each construct was distinct from others in the model (Fornell & Larcker, 1981).

In this stage, unfortunately, according to Appendix C, the measuring model has strong composite reliability and convergent validity but not discriminant validity. The results showed that the measured model did not satisfy the CFA's validity and reliability requirements: Although every item's factor loading exceeds 0.6, indicating significance and relevance to the corresponding structures, and All constructs have average variance extracted (AVE) values greater than 0.5, meeting the required level, and the constructs exhibiting a composite reliability (CR) over 0.7

prove the dependability and internal consistency of each construct's elements still have problem with discriminant validity *(See the Appendix C).*

4.3 New Model

A revised conceptual model was developed based on empirical analysis and theoretical refinement. This refinement was not solely the result of discriminant validity issues identified in the CFA process but was also guided by theoretical considerations grounded in established frameworks. Drawing on the Theory of Planned Behavior (Ajzen, 1991) and the Technology Acceptance Model (Davis et al., 1989) the retention of Cultural Acceptance (CADT), Economic Value (ECV), and Environmental Value (EV) reflects their conceptual importance in predicting consumers' behavioral intentions.

Cultural Acceptance (CADT) represents the socio-cultural influences on consumers' openness toward adopting smart digital technologies. Prior studies (Baptista & Oliveira, 2015; Sun et al., 2020; Thomas-Francois et al., 2023) highlight that cultural norms significantly shape the perception of digital trust, particularly in tourism and hospitality contexts. Thus, CADT plays a foundational role in shaping trust and behavioral intent in the digital domain.

Similarly, the inclusion of ECV and EV as mediators aligns with value-based theoretical frameworks, particularly the Value-Belief-Norm (VBN) theory (Stern, 2000), which posits that individuals' pro-environmental behavioral intentions are shaped by their core values, awareness of environmental consequences, and sense of personal responsibility. In this context, economic and environmental concerns can activate personal norms that guide intention and behavior.

Economic value, specifically, was found to significantly mediate the relationship between CADT and intention to adopt smart technology, indicating that financial benefits such as cost efficiency and resource optimization are key drivers in the hospitality sector. Although Environmental Value (EV) did not show a significant mediating effect, its inclusion is theoretically justified given the growing emphasis on sustainability in consumer decision-making within tourism.

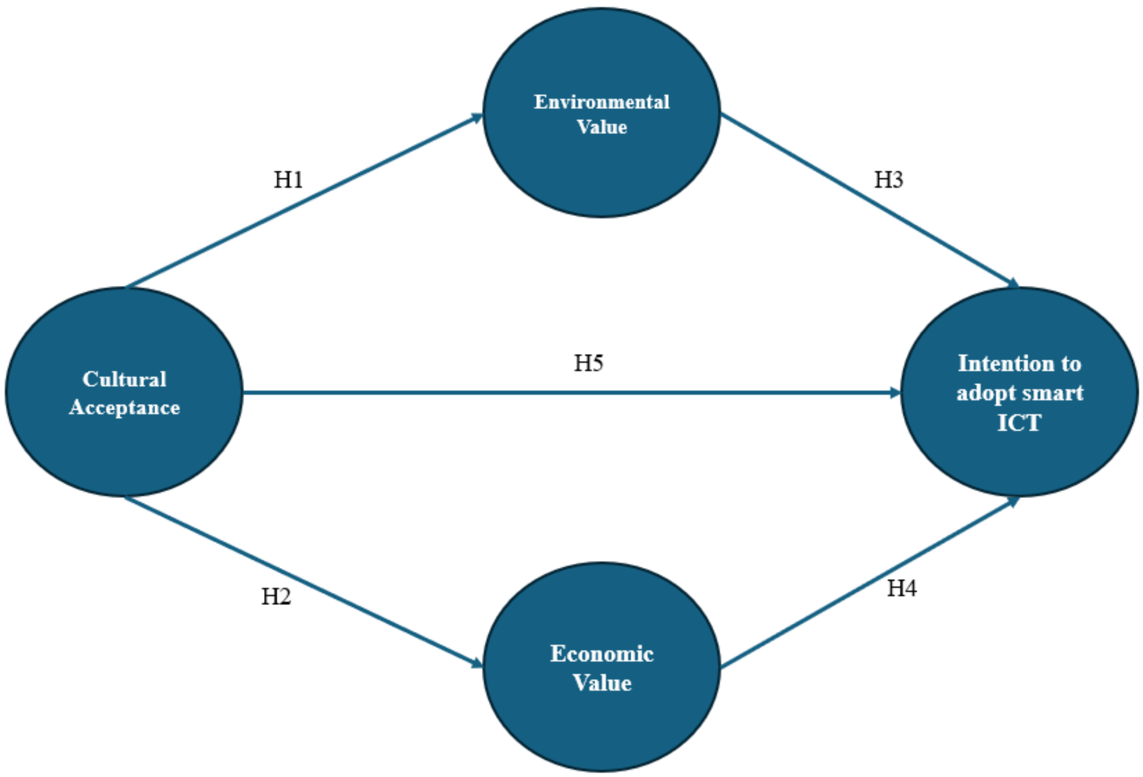

Figure 4.1. The final conceptual model

Based on the refined conceptual model and in light of the theoretical and empirical considerations discussed above, the following research questions were formulated to guide the investigation:

1. What is the level of consumer acceptance of interactive digital technologies in Canadian hotels?
2. What is the effect of cultural acceptance of digital technologies on sustainability sensitivity (economic and environmental) as mediators towards consumers' adoption of Smart ICTs?

To empirically test these research questions, the following hypotheses were developed.

- H1: Cultural Acceptance (CADT) has a positive effect on Environmental Value (EV).
- H2: Cultural Acceptance (CADT) has a positive effect on Economic Value (ECV).
- H3: Environmental value (EV) has an effect on Intention to adopt smart technology (IAST).
- Cultural acceptance (CADT) has a positive direct effect on Intention to adopt smart technology (IAST).
- H4: Economic value (ECV) has a positive effect on Intention to adopt smart Technology (IAST).
- H5: Cultural acceptance (CADT) has a positive effect on Intention to adopt smart Technology (IAST).

These hypotheses reflect the study's revised focus on cultural acceptance as the key predictor and the mediating influence of sustainability values (environmental and economic) in shaping consumer intention. which were theoretically justified along with other constructs in Chapter 2 (Sections 1.2–1.7) as part of the initial conceptual framework. Although only a subset of these constructs (CADT, EV, ECV, and IAST) were retained in the final model due to validity constraints, all constructs were initially justified and presented in the literature review for transparency.

Despite several model revisions based on the Standardized Residual Covariances, discriminant validity issues could not be resolved. Although incremental improvements in model fit were observed, excessively high correlations between certain latent constructs continued to be detected. To explore the underlying factor structure more deeply, Exploratory Factor Analysis (EFA) was conducted. Through EFA, two distinct constructs were identified, lending initial support to their theoretical separation. However, when the items confirmed through EFA were reintroduced into the Confirmatory Factor Analysis (CFA), the problems with discriminant validity were still present, although the correlations were slightly reduced. An additional EFA was conducted specifically for Digital Trust (DT) and Intention to Adopt Smart Technologies (IAST), the pair that had been consistently flagged due to high correlation. Surprisingly, both constructs were identified by EFA as a single underlying factor, casting doubt on their theoretical independence (*see the Appendix D).*

As these repeated attempts at CFA continued to fail, a reconsideration of the original theoretical model was deemed necessary, while still preserving the three sustainability constructs. Even after Digital Trust (DT) was removed from the model, discriminant validity issues were still encountered, particularly between Environmental Value (EV) and Social Value (SV), despite their distinction being supported through EFA.

Consequently, a revised theoretical model was developed, in which both Environmental Sustainability and Economic Sustainability were positioned as mediators in the relationship with smart technology adoption. This model was designed to be more consistent with both theoretical logic and empirical findings. Furthermore, Cultural Acceptance (CADT) was retained as a strong exogenous predictor (Thomas-Francois et al., 2023), as its role was consistently supported across all analyses. This time, according to Morin et al. (2016, p. 117), a confirmatory approach to psychometric measurement allows comparison of an alternative a priori factor structure based on fit assessment procedures and estimation of the relationships between latent constructs corrected for measurement errors. We used the application of maximum likelihood estimation (ML) to estimate the parameters of the model (Arbuckle, 2016), and adhered to the CFA procedures, satisfying all requirements of uni-dimensionality, convergent validity, reliability, and discriminant validity after a few modifications (Janssens, 2008). To further confirm discriminant validity, the Heterotrait Monotrait Ratio test was conducted Table 4.2. All constructs were found to be distinct with scores <0.90 (Henseler et al., 2015). CFA Reliability and Validity Measures and Cronbach Alpha for the new model developed were achieved *(See final scales Appendix C)*. Uni-dimensionality was attained; all latent variables gauged factor loadings >0.05 and critical ratio t-value >1.96, yielding a goodness-of-fit statistic χ25703.9 (2.335 degrees of freedom that is χ2/df 5 2.335 < 3 indicating a good fit (Hair, 2014a). The p-value was <0.001. The comparative fit index of 0.979 > 0.90 cut off, suggesting good fit, along with the Tucker–Lewis Index of 0.975 (Hu & Bentler, 1999). The root mean square error of approximation of 0.047 at the threshold of 0.05, standardised root mean square residual at 0.0311 (less than 0.08 cut-off) and incremental fit measures such as the normal fit index had a good fit at 0.965 (Forza & Filippini, 1998) and goodness-of-fit index and adjusted goodness of fit (with a 0.90 threshold) of 0.919 and 0.879/0.90, respectively. thereby validating the fit assessment of the theoretical representation in the dataset. The indicators of the Confirmatory Factor Analysis (CFA) model quality are as follows: χ2/df 5 2.35; p < 0.001; Tucker-Lewis Index (TLI) 5 0.975; Comparative Fit Index (CFI) 5 0.979; Root Mean Square Error Approximation RMSEA) 5 0.047, Standardized Root Mean Square Residual

(SRMR) 5 0.031, Normed Fit Index (NFI)50.965; The Goodness of Fit Index (GFI)50.919 and Adjusted Goodness of Fit Index (AGFI) 5 0.90/(0.897).

Table 4.2. Heterotrait–Monotrait Ratio (HTMT) of Constructs

Constructs	HTMT Value
CADT – EV	0.709
CADT – ECV	0.681
CADT – IAST	0.745
EV – ECV	0.667
EV – IAST	0.712
ECV – IAST	0.739

Once the CFA was successfully fitted and the validity and reliability tests were properly conducted this time, the structural model was evaluated using several fit indices to assess its adequacy. These include χ^2/df, RMSEA, SRMR, GFI, AGFI, TLI, CFI, and NFI, as recommended by (Hair, 2014a; Hu & Bentler, 1999). The model demonstrated an acceptable fit to the data: χ^2 / (df = 63) = 2.478, p = 0. Additional fit indices included CFI =0.976, TLI =0.966, RMSEA = 0.058, and SRMR = 0.031, GFI = 0.919, AGFI = 0.90 and NFI = 0.965. All indices met or exceeded commonly accepted thresholds (e.g., RMSEA < 0.08, CFI > 0.90), suggesting that the hypothesized model fits the data well.

The final model, shown in Figure 4.1, includes CADT as the independent variable, EV and ECV as mediators, and IAST as the dependent variable. This revised model forms the basis for the hypotheses tested in this study. To enhance clarity regarding the CFA refinement process, Table 4.3 below summarizes the changes made to the measurement model, specifying which items were removed, how many remained, and the reasons for their exclusion:

Table 4.3. Construct revision summary

Construct	No. of Items (Before)	No. of Items (After Revision)	Items Removed	Justification
Cultural Acceptance (CADT)	4	4	None	All items had strong loadings and no residual issues
Digital Trust (DT)	5	(Removed Entirely)	All	High residuals, strong cross-loading with IAST, failed discriminant validity even after EFA
Intention to Adopt Smart ICT (IAST)	4	3	IAST4	Residual issues and high correlation with SV and DT
Environmental Value (EV)	6	3	EV1, EV5	Low factor loadings and residuals with IAST and SV
Social Value (SV)	7	(Removed Entirely)	All	Overlapping with EV and ECV; repeated discriminant validity failure
Economic Value (ECV)	5	4	ECV3	Residual covariance with multiple constructs
Customer Attitude (AttS)	4	(Removed Entirely)	All	High residuals, strong cross-loading with IAST, failed discriminant validity even after EFA

Figure 4.1 illustrates the final conceptual model derived after CFA refinements. It shows CADT as the exogenous predictor, EV and ECV as mediators, and IAST as the dependent variable, with all final standardized path coefficients and statistically supported relationships.

Path Coefficients

Standardized path coefficients (β) were examined to test the proposed hypotheses. CADT had a significant positive effect on EV ($\beta = 0.39$, $p < 0.001$). Similarly, CADT significantly influenced ECV ($\beta = 0.386$, $p < 0.001$, supporting hypotheses H1 and H2. However, the path from EV to IAST was not statistically significant ($\beta = -0.17$, $p > 0.01$), thus, hypothesis H3 was not supported. Both direct and indirect effects were assessed. The indirect effect of CADT on IAST through ECV was found to be significant (β = 0.386 × 0.286 ≈ 0.11, $p < 0.001$), suggesting the presence of a partial effect. The direct effect remained significant/non-significant (β = 0.654, p = 0.001), indicating partial mediation. Table 4.4 presents the results of the structural model, including the standardized path coefficients, statistical significance, and support status for each hypothesis.

Table 4.4. Summary of Hypothesis Testing Based on the Final Structural Model

Hypothesis	Path	β (Standardized)	p-value	Result
H1	CADT → EV	0.39	< 0.001	Supported
H2	CADT → ECV	0.386	< 0.001	Supported
H3	EV → IAST	-0.17	> 0.01	Not Supported
H4	ECV → IAST	0.286	< 0.001	Supported
H5	CADT → IAST (Direct)	0.654	=0.001	Supported

The findings confirm that while CADT significantly affects EV and ECV, only ECV significantly impacts IAST. EV did not have a significant effect on IAST. Additionally, the significant indirect effect of CADT on IAST via ECV confirms partial mediation.

Variance Explained

The model accounted for 47.3% of the variance in IAST, 26.6% in EV, and 18.8% in ECV, as indicated by the R^2 values.

This finding highlights a possible construct overlap or redundancy, which is a common issue in behavioral research when latent constructs are conceptually close. Such results reinforce the importance of using both theory-driven and data-driven approaches in validating structural models (Byrne, 2013). Moreover, HTMT was favored over traditional Fornell-Larcker because of its higher sensitivity in detecting discriminant validity issues (Henseler et al., 2015), especially when constructs are conceptually related or derived from similar theoretical domains. Thus, the revised model is not only better aligned with the data but also reflects a more parsimonious and theoretically coherent structure, enhancing both statistical validity and interpretability. Overall, the final CFA results and model structure demonstrated empirical robustness and theoretical clarity, thus providing a strong foundation for testing the structural model and interpreting the hypothesized relationships among constructs.

To summarize the refinement process, despite multiple CFA model adjustments and theoretical consistency, persistent discriminant validity issues between some constructs (especially DT and IAST) required revisiting the original model structure. Based on EFA findings and empirical misfit, Digital Trust (DT) and Social Value (SV) were excluded. The final model retained Cultural Acceptance (CADT) as the independent variable, with Environmental Value (EV) and Economic Value (ECV) serving as mediators, and Intention to Adopt Smart Technology (IAST) as the dependent variable. The final CFA confirmed uni-dimensionality, convergent validity, and reliability. Discriminant validity was verified through both the Fornell–Larcker criterion and HTMT ratios. The final model demonstrated excellent fit indices: $\chi^2/df = 2.35$, RMSEA = 0.047, SRMR = 0.031, CFI = 0.979, TLI = 0.975. This refined model forms a theoretically and statistically valid foundation for testing the research hypotheses.

Chapter 5: Discussion

This study demonstrated how (CADT) influences consumers' intention to adopt smart technologies (IAST) in the Canadian hotel sector, particularly through the mediating roles of (EV) and (ECV). The final structural model provided strong empirical support for several hypothesized relationships, while also revealing nuanced findings that depart from theoretical expectations.

Model refinements

Although this study initially aimed to explore the mediating role of digital trust, the final model, revised due to methodological constraints, focused on cultural acceptance, economic value, and environmental value as key predictors of smart ICT adoption. Within this refined framework, several limitations must still be acknowledged. During the confirmatory factor analysis (CFA), constructs such as (SV), (DT), and (AttS) were excluded from the final model due to discriminant validity concerns and weak factor loadings. While their removal enhanced the methodological rigor of the model, it also narrowed the theoretical scope of the study and indicated a possible conceptual overlap between these constructs and intention, or with each other, in the context of technology adoption. Future research could revisit these constructs with refined items or alternative methodological approaches to capture their potential influence.

Path: CADT to EV and ECV

After revising our model to include only CADT, EV, ECV, and IAST, we found a positive effect of CADT on both EV and ECV. This supports the idea that individuals who culturally accept digital technology are more likely to perceive both environmental and economic benefits from their use (Adeel et al., 2024a). This result aligns with prior research suggesting that cultural openness enhances sustainable service perceptions and digital engagement (Sun et al., 2020). The strong direct effect of CADT on IAST further confirms the centrality of cultural acceptance in influencing adoption behavior in hospitality settings. Descriptive statistics also indicated a mean score of approximately 5.0 on a 7-point scale for CADT items, reflecting a moderately high level of cultural acceptance among Canadian hotel consumers. This finding directly addresses Research Question 1 (“What is the level of consumer acceptance of interactive digital technologies in Canadian hotels?”), showing that the overall level of acceptance is relatively high.

Path: EV to IAST

Interestingly, the path from Environmental Value (EV) to Intention to Adopt Smart Technology (IAST) was negative, contradicting several prior studies where environmental sustainability perceptions typically enhance user acceptance. For example, Sahabuddin et al. (2024) found that environmental value significantly influenced tourist satisfaction and pro-environmental behavior, while (Adeel et al., 2024b) reported that pro-environmental hotel practices positively shaped consumers’ perceived value and adoption intentions. One possible interpretation is that environmental concerns could be perceived as abstract or secondary in hotel decision-making, especially when economic practicality dominates (Peng & Chen, 2019). Another explanation could be measurement-related: in this study, the EV construct was operationalized through items assessing whether smart ICT reduces waste, saves energy, and lowers carbon emissions. These items may not have fully captured broader dimensions of environmental consciousness, such as long-term ecological responsibility or climate change attitudes. Descriptive analysis also showed a moderately high mean score for EV ($M = 5.0$ on a 7-point scale), indicating that participants generally valued environmental benefits, but this awareness did not manifest in stronger adoption intentions.

In addition, several contextual explanations could be considered. Environmental benefits could be perceived as too abstract or long-term compared to immediate priorities such as convenience, service quality, and cost. Canadian tourists may not fully associate ICT adoption with concrete environmental outcomes, as such technologies could be seen more as efficiency tools than sustainability measures. Leisure travel patterns could also be more oriented toward comfort and enjoyment, which may overshadow pro-environmental considerations.

The finding that environmental value did not significantly predict intention to adopt smart hotel technologies resonates with the broader literature on sustainable hospitality, which highlights the unique intention-behaviour gap in this field and was consistent with the discrepancy between our preliminary analysis and results from SEM. This does not imply that the result was entirely expected; rather, it suggests that the outcome can be understood both in terms of contextual factors (economic practicality, abstract nature of environmental concerns) and in light of the well-documented gap between pro-environmental attitudes and actual behaviour. As a recent review demonstrated, many studies rely on intention-based measures while neglecting actual consumer behaviour, leading to inconsistent and sometimes contradictory findings (Khan et al., 2024). This suggests that although Canadian tourists may express pro-environmental attitudes, these values alone do not translate into concrete adoption decisions for ICT in hotels. At the same time, it would be misleading to conclude that the thesis is not about sustainability. Sustainability in hospitality is inherently multidimensional, encompassing not only environmental but also economic and cultural dimensions. This outcome does not diminish the relevance of sustainability; rather, it illustrates that pathways to sustainable hospitality can emerge through different dimensions, with economic efficiency and cultural acceptance playing particularly influential roles alongside environmental considerations.

Path: ECV to IAST

The mediation analysis demonstrated partial mediation through ECV, indicating that economic evaluations partially explain how CADT translates into adoption behavior. This finding highlights that, in the Canadian hotel context, economic rationality may play a stronger role than environmental value in shaping consumer decisions. From a theoretical perspective, this model contributes to the literature by validating the predictive power of cultural acceptance within the technology adoption context and extending understanding of how sustainability value perceptions function as mediators. These results align with sustainability-aware adoption frameworks but suggest that economic and environmental value function as distinct analytical pathways.

From a managerial perspective, these findings suggest that promotional strategies should place explicit emphasis on the economic benefits of smart technologies, such as cost savings, operational efficiency, and resource optimization. Environmental sustainability messages, while still relevant, may need to be paired with these more concrete and self-oriented benefits in order to resonate effectively with consumers. It should be noted, however, that these managerial implications are grounded primarily in the significance of economic value, not environmental value, given the limitations observed in capturing the latter construct.

4.4 Theoretical and Practical Implications

To answer the first research question, the findings suggest that cultural acceptance of digital technologies among Canadian hotel consumers is generally high, with descriptive statistics indicating positive attitudes toward ICT adoption and a strong inclination to use smart technologies during hotel stays. The average scores for CADT ranged between 4.94 and 5.41, reflecting a favorable cultural openness to digital transformation in hospitality.

Regarding the second research question, the study confirmed that consumers' cultural acceptance directly influences their intention to adopt smart technology, and this relationship is partially mediated by perceived sustainability values. Economic value played a significant mediating role, with respondents showing strong appreciation for efficiency, affordability, and long-term benefits (mean scores between 5.06 and 5.33, as reported directly from the Likert-scale survey responses). In contrast, while environmental value was perceived positively (means around 5.14 to 5.35 from the same survey data), it did not significantly impact behavioral intention in the final model. This suggests that in the hotel context, environmental ideals may be acknowledged but remain secondary to more self-oriented economic motivations.

This study contributes to an emerging yet still underdeveloped body of literature examining how sustainability perceptions influence consumer behavior in hospitality, particularly in the Canadian context, which remains largely underexplored. Theoretically, the findings extend value-based adoption frameworks by confirming that cultural acceptance (CADT) is not only a significant direct predictor of intention to adopt smart technology (IAST) but also an antecedent to perceived environmental and economic value. These results reinforce the idea that sociocultural context plays a pivotal role in shaping how consumers evaluate digital innovations, particularly in service environments like hotels, where tradition and technology often coexist.

By testing environmental value (EV) and economic value (ECV) as separate mediators, the model demonstrates that the economic dimension plays the decisive role in shaping adoption decisions, while environmental value, although positively perceived, did not significantly predict intention. This highlights that, in the Canadian hotel context, economic considerations tend to outweigh environmental ideals in driving smart technology adoption. The significant mediation effect of ECV, but not EV, suggests that in practical hospitality settings, consumers are more motivated by tangible, self-interested benefits such as efficiency, convenience, and long-term affordability rather than abstract environmental concerns. This contrasts with earlier models that assumed environmental concern consistently translates into behavioral intention, highlighting the need to differentiate value types in sustainability research (Han et al., 2010).

Furthermore, since cultural acceptance is a foundational driver, campaigns should be culturally sensitive and aligned with the local norms and values of the target audience. Promoting success stories of early adopters, providing demonstrations in familiar settings, or leveraging trusted community figures may strengthen the perceived cultural compatibility of digital innovations. Beyond economic and environmental considerations, cultural acceptance plays a foundational role in shaping adoption behavior. Since cultural norms strongly influence perceptions of trust, familiarity, and compatibility, strategies to encourage ICT adoption in hotels should be designed with cultural sensitivity in mind. Prior studies have emphasized that technology adoption is not value-neutral but deeply embedded within local cultural frameworks (Baptista & Oliveira, 2015; Thomas-Francois et al., 2023). For instance, showcasing success stories of early adopters, offering demonstrations in culturally familiar settings, or involving trusted community figures can increase perceptions of cultural fit and reduce resistance. This perspective highlights the importance of tailoring adoption campaigns to specific socio-cultural environments, ensuring that digital innovations are framed not only as efficient or sustainable but also as culturally compatible.

Finally, this research suggests that technology development in hospitality should not only focus on functionality, but also on aligning innovation with the environmental and economic values that matter most to consumers. Future studies could explore how these relationships evolve over time and across different cultural or demographic groups to enhance the generalizability of the model.

In conclusion, this study demonstrates that consumers' economic and environmental values, as shaped by their cultural acceptance, are key factors influencing the adoption of smart technologies in hospitality. However, economic value emerged as the dominant sustainability pillar driving consumer behavior.

Overall, the study offers both theoretical enrichment and practical relevance by linking cultural acceptance and sustainability values to technology adoption, providing actionable insights for researchers and practitioners in the hospitality industry.

4.5 Limitations of the Study

The first limitation of this study may have been the methodology used to conduct it. The study utilized a cross-sectional design, which captures perceptions at a single point in time. This approach limits the ability to draw causal inferences or observe changes in consumer attitudes and trust over time. Furthermore, the study employed quantitative methods and structured constructs using established scales. While this ensured analytical rigor and model validity, it inherently limits the exploration of contextual subtleties. Future positivist research might consider expanding the range of measured variables or incorporating repeated surveys across diverse settings to better capture variations in consumer behavior and perceptions of digital value. Data were collected through an online survey administered via the Qualtrics panel, which, while efficient and standardized, may be subject to certain self-selection and nonresponse biases. Participants who are more comfortable with technology may have been more likely to complete the survey, potentially skewing results toward a more digitally inclined population. The research relied exclusively on self-reported survey data, which may introduce social desirability bias, memory recall limitations, and subjective interpretation of items. Secondly, the strong effect of culture (CADT) on the dependent constructs may have also been limitation. Because the study was focused on hotel users in the Canadian context, this may have limited it's transferability to other regions, cultures, or types of hospitality services. This limitation is particularly noteworthy because of the strength of the effect of CADT on ECV, EV, and IAST.

Lastly, the limited use of images or visual illustrations to elucidate the concept of ICT in the hospitality context may have also inhibited our ability to detect the effect of EV on IAST. While textual descriptions and survey items were employed to operationalize the construct, the lack of supporting visual examples may have constrained respondents' understanding of how ICT manifests in hotels.

Future research could benefit from incorporating lessons from the shortcomings of our study. For example, future researchers could examine the variation of the influence the influence of environmental value on smart technology adoption across different contexts, such as cultural settings, market conditions, or stages of technological maturity. Furthermore, longitudinal or qualitative studies could explore whether this is a context-specific effect or reflects broader sustainability fatigue. Comparative studies across regions or industries would also help assess the generalizability of the findings. Another possible area of exploration could be the effect of differing images, diagrams, or case examples of ICT applications in hospitality on constructs such as EV or IAST.

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Appendix A: Descriptive Statistics for each construction

Table 7.1. Descriptive Statistics for Cultural Acceptance (CADT)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
CADT_1	438	1	7	4.95	1.47	-0.652	0.117	0.159	0.233
CADT_2	438	1	7	5.26	1.388	-0.901	0.117	0.891	0.233
CADT_3	438	1	7	5.11	1.426	-0.813	0.117	0.594	0.233
CADT_4	438	1	7	5.21	1.388	-0.912	0.117	0.796	0.233
Valid(N) (listwise)	438								

Table 7.2. Descriptive Statistics for Digital Trust (DT)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
DT_1	438	1	7	4.7	1.459	-0.47	0.117	-0.287	0.233
DT_2	438	1	7	4.88	1.339	-0.655	0.117	0.399	0.233
DT_3	438	1	7	4.91	1.39	-0.496	0.117	-0.027	0.233
DT_4	438	1	7	4.9	1.373	-0.508	0.117	0.087	0.233
DT_5	438	1	7	5	1.21	-0.451	0.117	0.475	0.233
Valid N (listwise)	438								

Table 7.3. Descriptive statistics for Environmental Value (EV)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EV_1	438	1	7	5.62	1.173	-0.868	0.117	0.845	0.233
EV_2	438	2	7	5.67	1.096	-0.725	0.117	0.329	0.233

EV_3	438	1	7	5.58	1.333	-1.042	0.117	1.076	0.233
EV_4	438	1	7	5.76	1.173	-0.991	0.117	0.994	0.233
EV_5	438	1	7	5.4	1.311	-0.918	0.117	0.977	0.233
EV_6	438	1	7	5.93	1.137	-1.023	0.117	0.718	0.233
Valid N (listwise)	438								

Table 7.4. Descriptive statistics for Social Value (SV)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SV_1	438	1	7	5.74	1.209	-1.099	0.117	1.398	0.233
SV_2	438	1	7	5.71	1.062	-0.756	0.117	0.763	0.233
SV_3	438	1	7	5.57	1.13	-0.677	0.117	0.573	0.233
SV_4	438	2	7	5.94	1.084	-0.882	0.117	0.301	0.233
SV_5	438	1	7	5.82	1.185	-1.132	0.117	1.454	0.233
SV_6	438	1	7	5.95	1.119	-1.044	0.117	0.896	0.233
SV_7	438	2	7	6.03	1.064	-1.031	0.117	0.7	0.233
Valid N (listwise)	438								

Table 7.5. Descriptive statistics for Economic Value (ECV)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ECV_1	438	1	7	5.09	1.267	-0.55	0.117	0.46	0.233
ECV_2	438	1	7	5.1	1.15	-0.388	0.117	0.345	0.233
ECV_3	438	1	7	5.38	1.117	-0.591	0.117	0.601	0.233
ECV_4	438	1	7	5.27	1.152	-0.508	0.117	0.446	0.233
ECV_5	438	1	7	5.34	1.125	-0.418	0.117	0.053	0.233
Valid N (listwise)	438								

Table 7.6. Descriptive statistics for Intention to adopt Smart Technology (IAST)

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
IAST_1	438	1	7	4.77	1.398	-0.488	0.117	-0.071	0.233
IAST_2	438	1	7	4.89	1.381	-0.762	0.117	0.409	0.233
IAST_3	438	1	7	4.87	1.445	-0.648	0.117	0.08	0.233
IAST_4	438	1	7	5.07	1.355	-0.829	0.117	0.803	0.233
Valid N (listwise)	438								

Table 7.7. Descriptive statistics for Customer Attitude (AttS)

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
AttS_1	438	1	7	5.08	1.323	-0.569	0.117	0.023	0.233
AttS_2	438	1	7	5.09	1.259	-0.391	0.117	-0.004	0.233
AttS_3	438	1	7	5.16	1.285	-0.565	0.117	0.225	0.233
AttS_4	438	1	7	4.88	1.463	-0.455	0.117	-0.116	0.233
Valid N (listwise)	438								

Appendix B: Normality Test

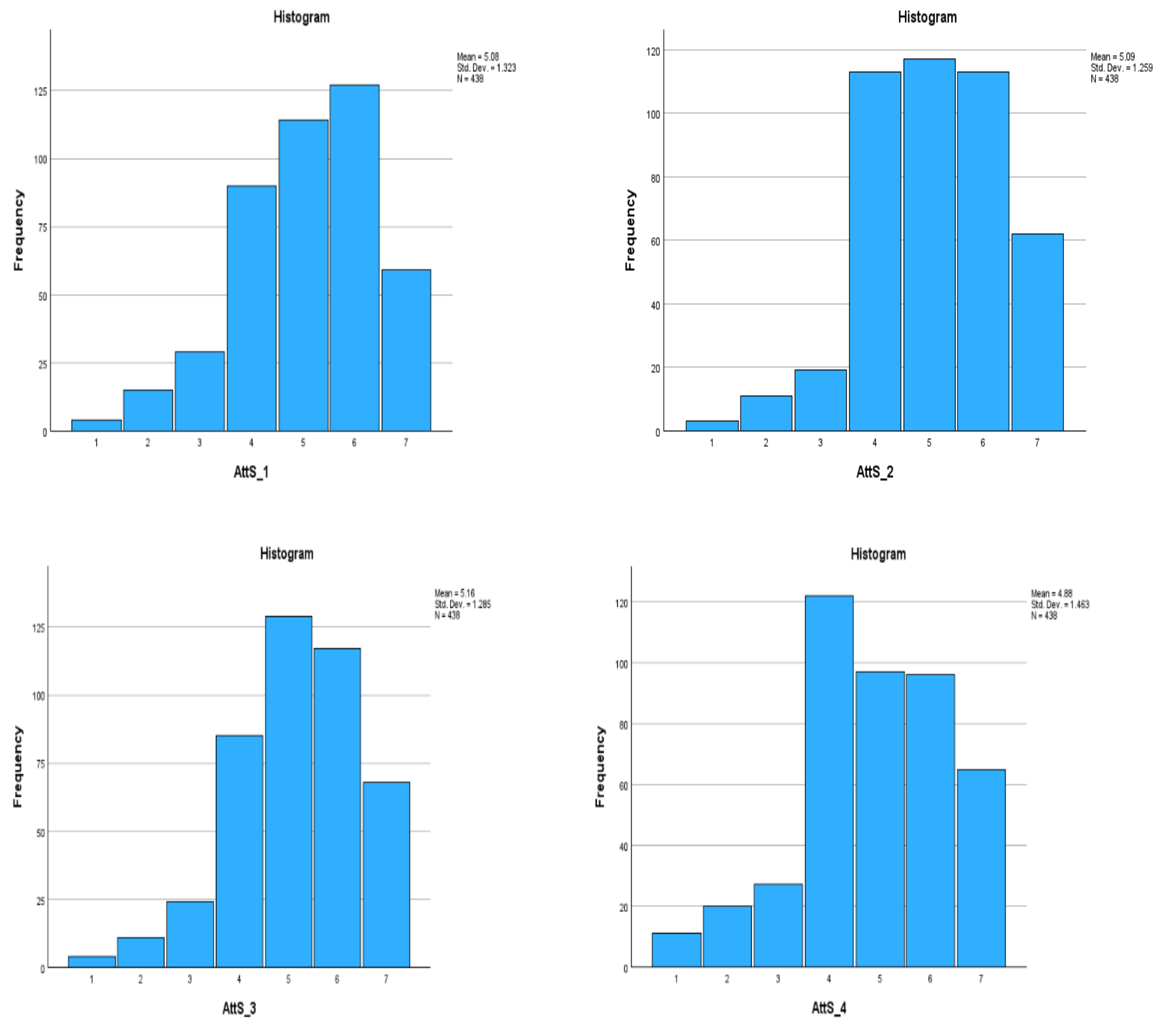


Figure 8.1. Histogram of Customer Attitude (AttS)

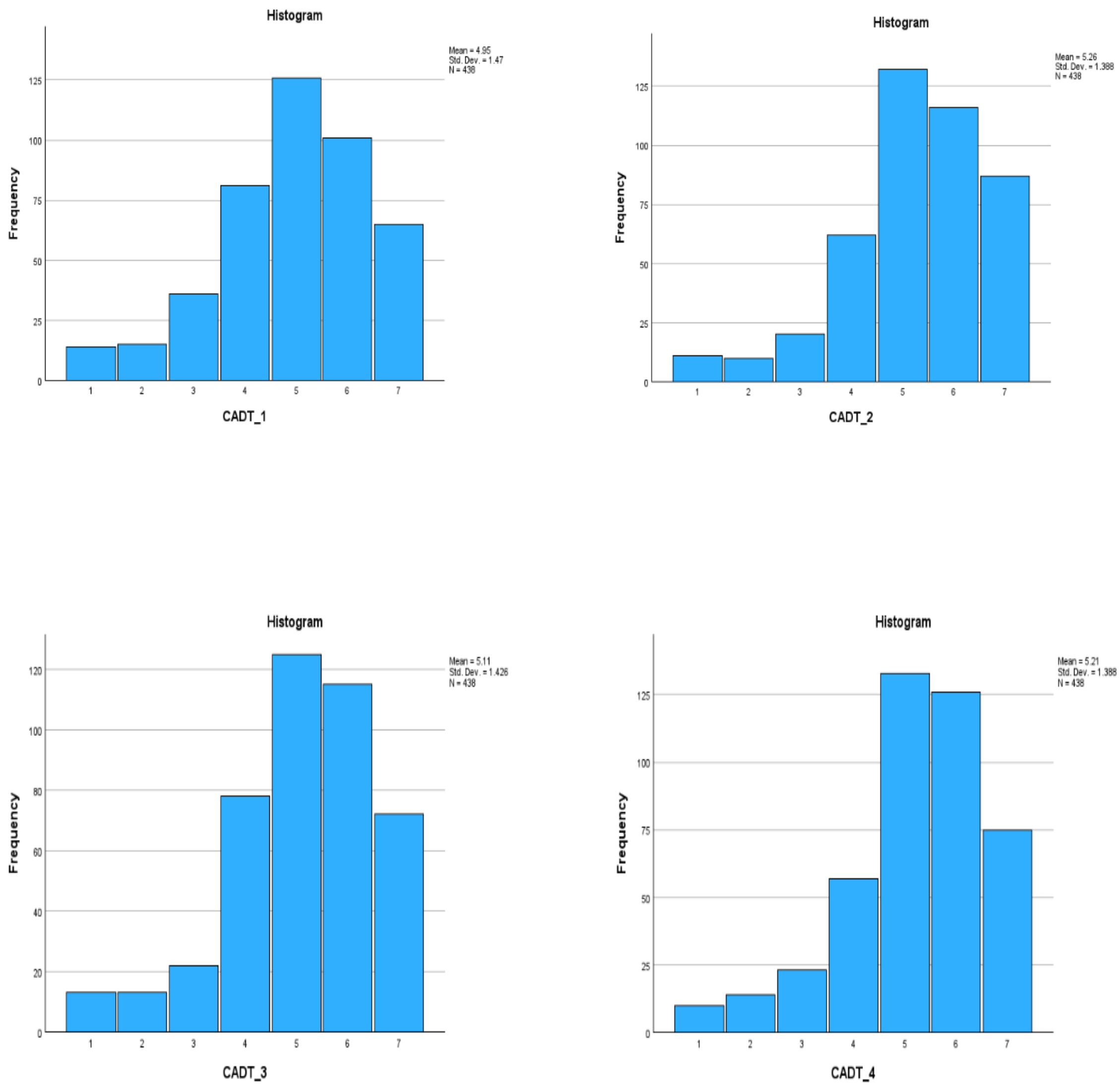


Figure 8.2. Histogram of Cultural Acceptance (CADT)

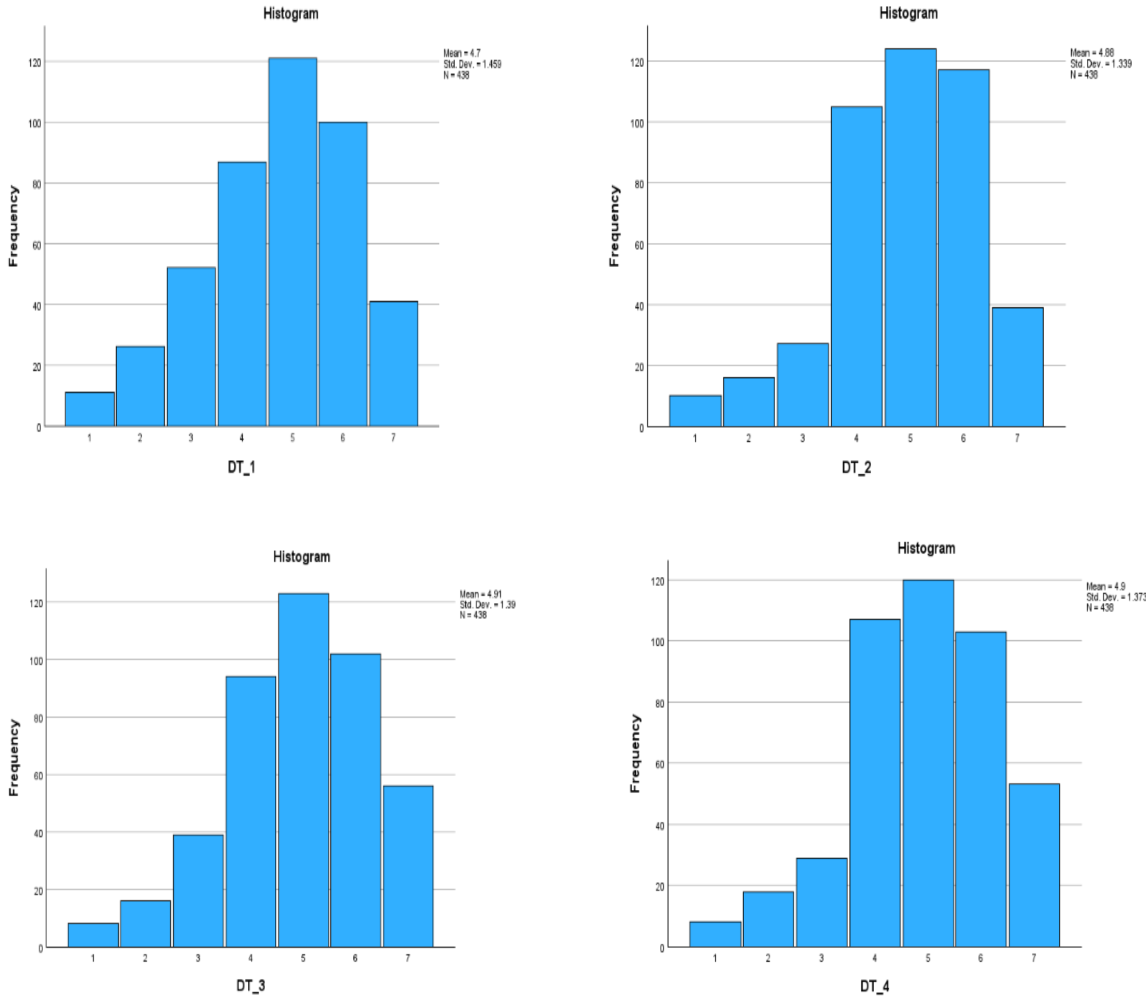
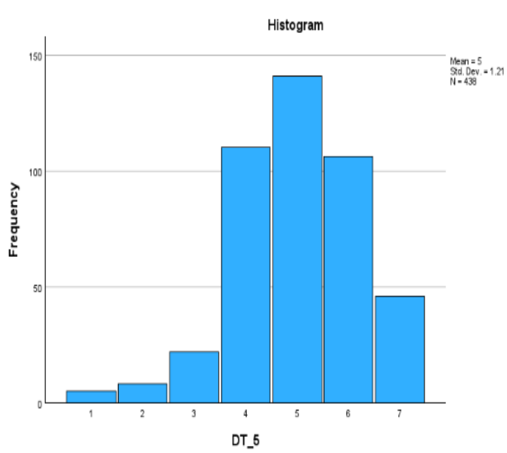
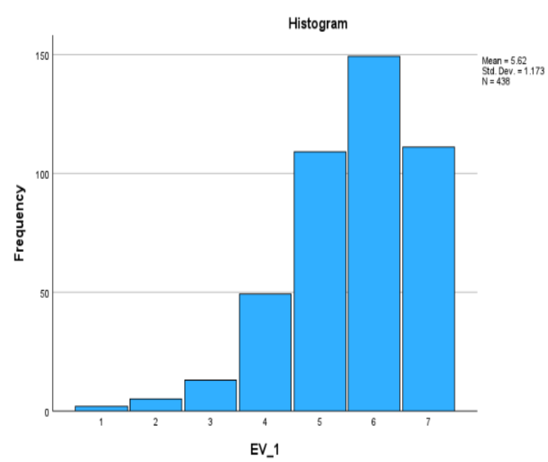


Figure 8.3. Histogram of Digital Trust (DT)





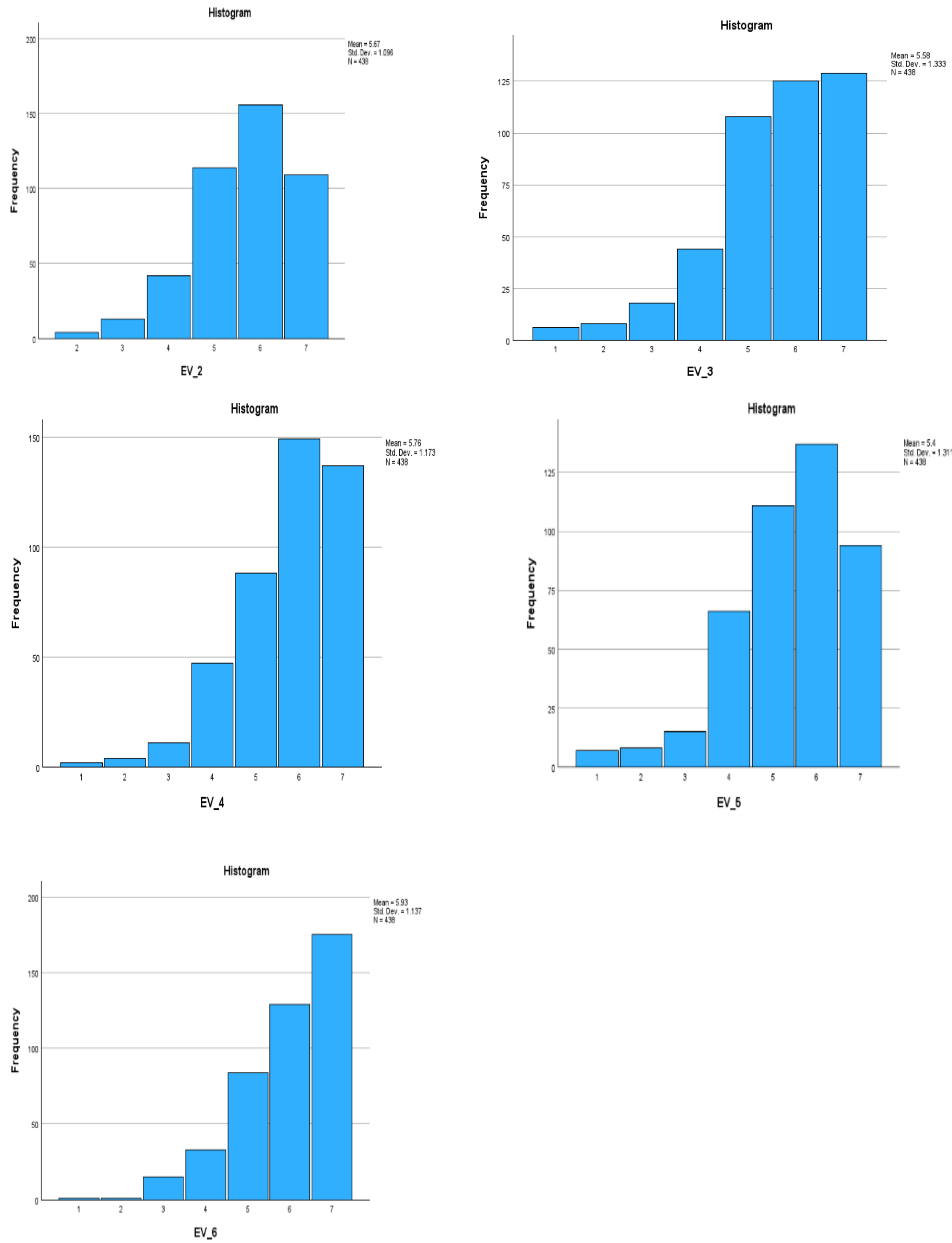
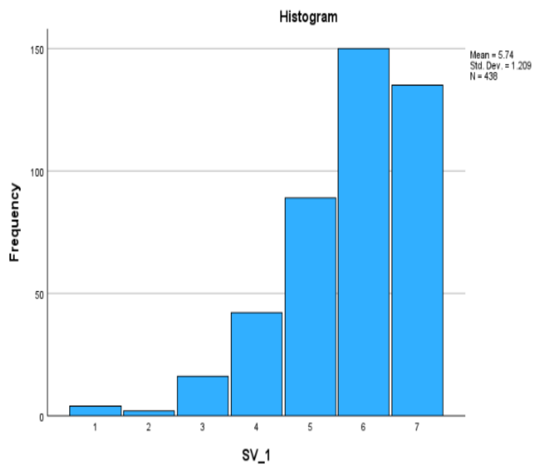
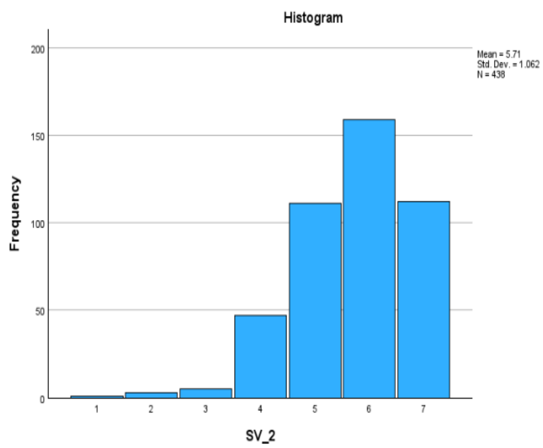
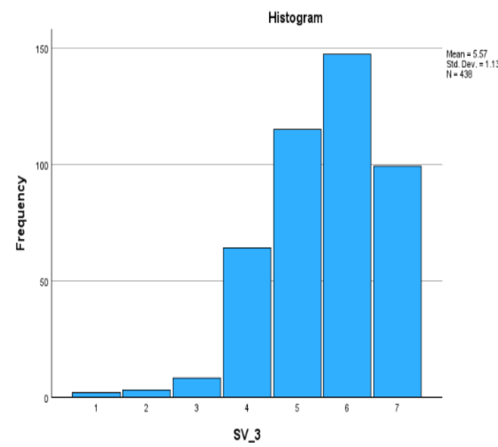
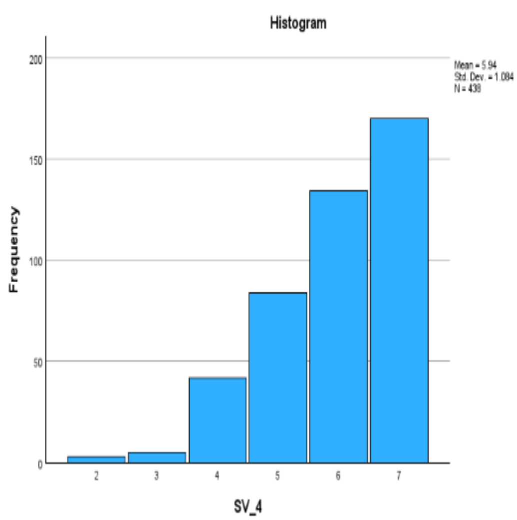


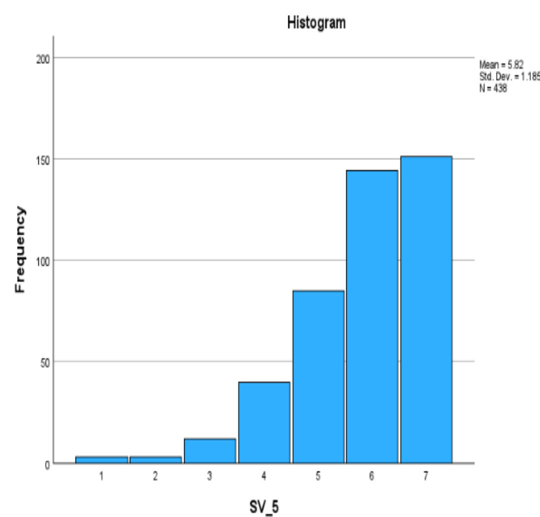
Figure 8.4. Histogram of Environmental Value (EV)


Histogram
Mean = 5.74
Std. Dev. = 1.209
N = 438
Frequency
SV_1


Histogram
Mean = 5.71
Std. Dev. = 1.062
N = 438
Frequency
SV_2


Histogram
Mean = 5.57
Std. Dev. = 1.13
N = 438
Frequency
SV_3


Histogram
Mean = 5.94
Std. Dev. = 1.084
N = 438
Frequency
SV_4


Histogram
Mean = 5.82
Std. Dev. = 1.185
N = 438
Frequency
SV_5

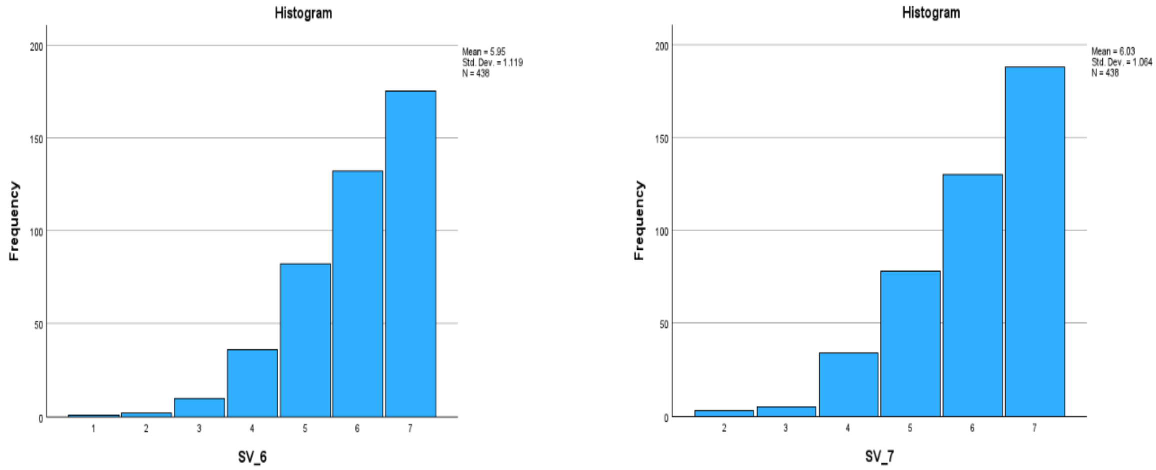
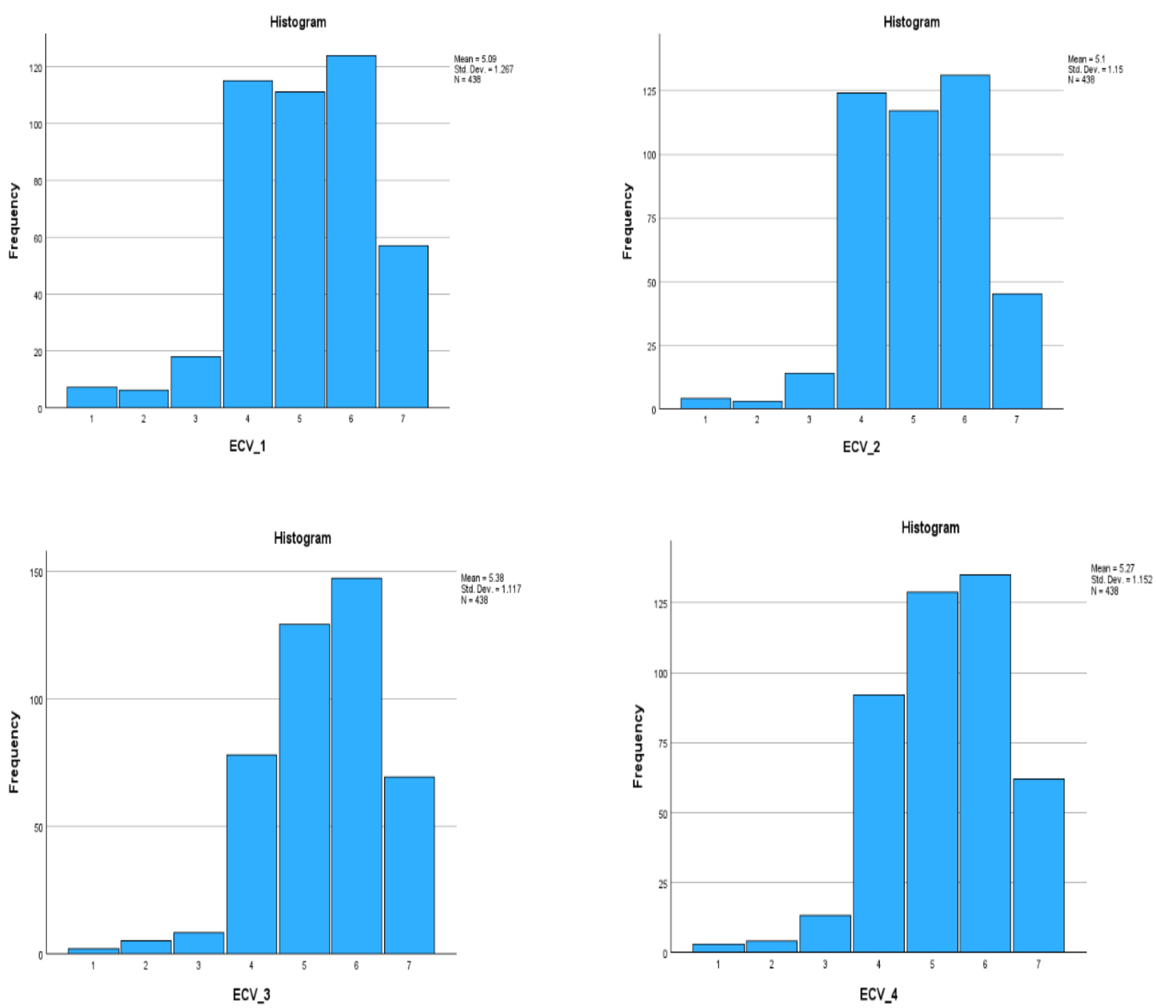


Figure 8.5. Histogram of Social Value (SV)



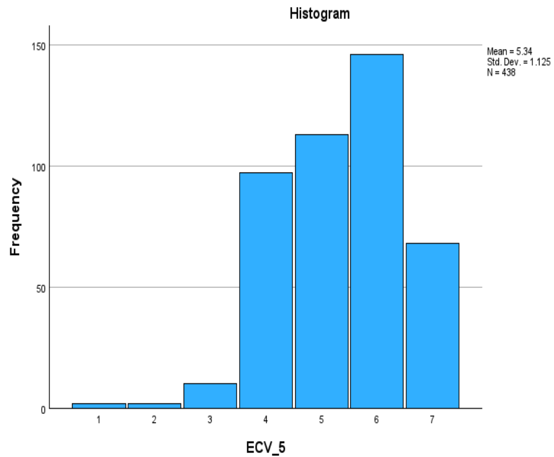


Figure 8.6.Histogram of Economic Value (ECV)

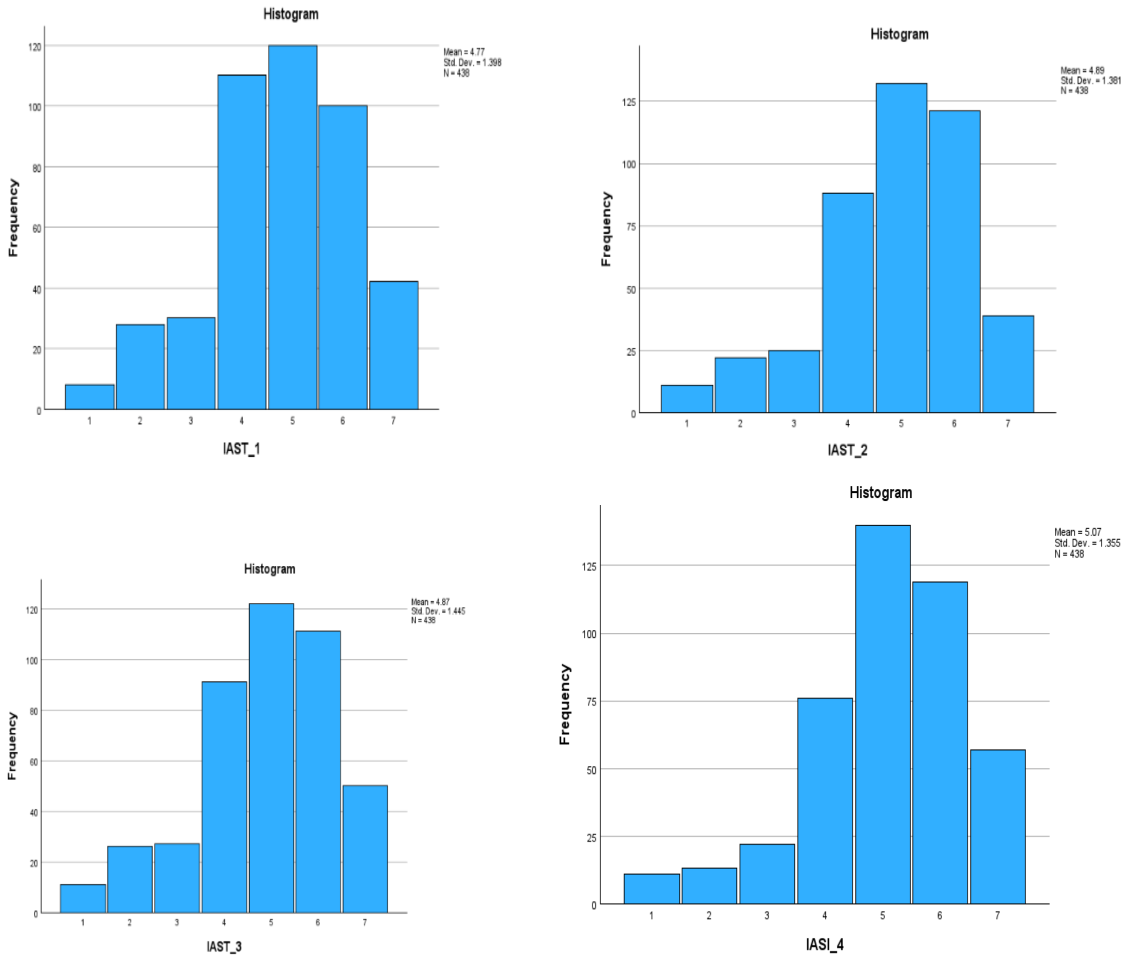


Figure 8.7. Histogram of Intention to adopt smart technology (IAST)

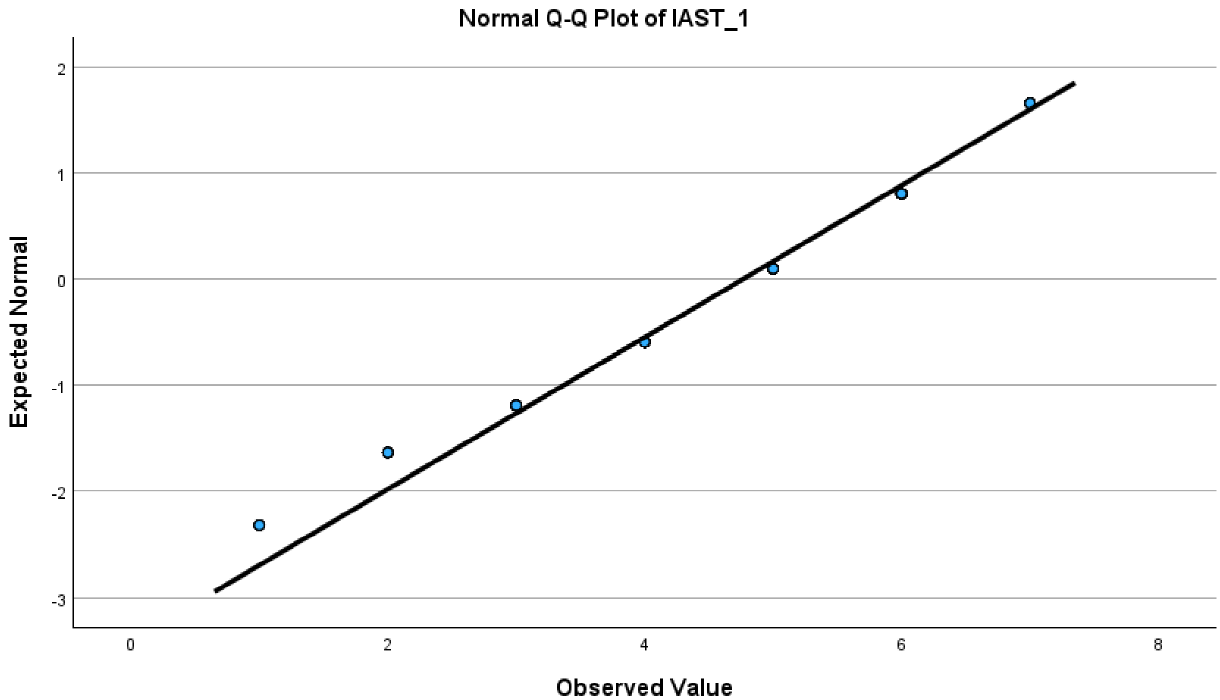


Figure 8.8. Normal Q-Q plot of IAST-1

Appendix C: CFA Reliability and Validity Measures and Cronbach's Alpha for first Model and New Model

Table 9.1. CFA Reliability and Validity Measures and Cronbach's Alpha for first Model

	Composite Reliability (>.50)			Construct Reliability (AVE) (>.60)	
CADT	0.9			0.7	
DT	0.85			0.66	
IAST	0.91			0.78	
EV	0.83			0.56	
SV	0.84			0.64	
ECV	0.88			0.66	
AttS	0.87			0.72	
Discriminate Validity*					
	CADT	DT	IASI	EV	SV	ECV
CADT	**0.49**					
DT	0.41	**0.43**				
IAST	0.38	0.58	**0.61**			
EV	0.24	0.12	0.06	**0.31**		
SV	0.19	0.09	0.02	0.68	**0.41**	
AttS	0.37	0.72	0.79	0.05	0.02	**0.24**
ECV	0.21	0.28	0.2	0.22	0.33	0.43
* method adapted from: (Fornell & Larcker, 1981)						
Cronbach's Alpha Value for Summated Dimensions						
Cronbach's alpha				(>0.70)		
CADT				0.9		
DT				0.89		
IASI				0.92		
EV				0.85		
AttS				0.87		
SV				0.89		
ECV				0.9		

Table 9.2.CFA Reliability and Validity Measures and Cronbach's Alpha for the New Model

	Composite Reliability (>.50)	Construct Reliability (AVE) (>.60)
CADT	0.9	0.76
IAST	0.91	0.87
EV	0.81	0.59
ECV	0.89	0.73

Discriminate Validity*

	EV	CADT	ECV	IAST
EV	**0.59**			
CADT	0.27	**0.76**		
ECV	0.2	0.18	**0.73**	
IAST	0.07	0.38	0.2	**0.87**

* method adapted from: (Fornell & Larcker, 1981)

Cronbach's Alpha Value for Summated Dimensions

Cronbach's alpha	(>0.70)
CADT	0.9
IASI	0.92
EV	0.85
ECV	0.9

Appendix D: Exploratory Factor Analysis (EFA) of Digital Trust (DT), Social Value (SV), and Intention to Adopt Smart Technologies (IAST)

Table 10.1. Component Matrix for Digital Trust (DT) and Intention to Adopt Smart Technologies (IAST)

Component Matrix	Component
	1
I will most likely adopt online/self-service technologies at hotels	0.87
I think it's better for me to adopt online/self-service technologies at hotels	0.857
I believe that digital spaces are reliable when booking and conducting transactions at hotels.	0.853
I plan to adopt online/self-service technologies at hotels	0.828
I believe that digital technology for hotel booking and stays has established norms and procedures to make my transactions secure.	0.81
Over time I will use online/self-service technology at hotels	0.798
I am certain of protection when using digital technology for hotel booking and transactions.	0.784
I believe that the digital technologies used for the hotels transactions have integrity.	0.781
I believe that should a problem occurs with my transactions through digital booking and other transactions with a hotel, the hotel will not exploit me	0.734
Extraction Method: Principal Component Analysis.	
a 1 component extracted.	

Table 10.2. Rotated Component Matrix for Social and Environmental Values

Rotated Component Matrix	Component	
	1	2
SV 2 Improve product and service quality and enhance added value	0.785	0.204
SV 5 Provide all employees with proper and fair wages that reward them for their work	0.772	0.322
SV 4 Be customer-oriented	0.733	0.306
SV 1 Create a safe and healthy work environment	0.721	0.375
SV 6 Provide all customers with high quality services and products	0.719	0.344
SV 7 Treat all customers and community members fairly	0.703	0.359
SV3 Support all employees who want to pursue further education	0.647	0.15
EV 5 One of the most important reasons to conserve is to ensure a continued high standard of living	0.107	0.774
EV 3 Nature is important because of what it can contribute to the pleasure and welfare of humans	0.265	0.766
EV 4 We need to preserve resources to maintain a high quality of life	0.4	0.751

EV 2 One of the most important reasons to conserve is to preserve wild areas	0.386	0.685
EV 1 Nature is valuable for its own sake	0.425	0.553
EV 6 It makes me sad to see natural environments destroyed	0.524	0.536
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
a Rotation converged in 3 iterations.		

Table 10.3. Rotated Component Matrix for Social and Environmental Values (Refined Version)

Rotated Component Matrix	Component	
	1	2
SV 4 Be customer-oriented	0.781	0.232
SV 7 Treat all customers and community members fairly	0.776	0.246
SV 2 Improve product and service quality and enhance added value	0.772	0.207
SV 6 Provide all customers with high quality services and products	0.771	0.305
SV 5 Provide all employees with proper and fair wages that reward them for their work	0.768	0.317
SV 1 Create a safe and healthy work environment	0.724	0.341
EV 5 One of the most important reasons to conserve is to ensure a continued high standard of living	0.105	0.852
EV 3 Nature is important because of what it can contribute to the pleasure and welfare of humans	0.316	0.766
EV 4 We need to preserve resources to maintain a high quality of life	0.453	0.719
EV 2 One of the most important reasons to conserve is to preserve wild areas	0.453	0.612
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
a Rotation converged in 3 iterations.		

Table 10.4. Final Rotated Component Matrix for Social and Environmental Value

Rotated Component Matrix	Component	
	1	2
SV 4 Be customer-oriented	0.813	0.212
SV 7 Treat all customers and community members fairly	0.795	0.208
SV 6 Provide all customers with high quality services and products	0.793	0.296
SV 5 Provide all employees with proper and fair wages that reward them for their work	0.777	0.315
SV 2 Improve product and service quality and enhance added value	0.744	0.222
EV 5 One of the most important reasons to conserve is to ensure a continued high standard of living	0.114	0.882

EV 3 Nature is important because of what it can contribute to the pleasure and welfare of humans	0.338	0.772
EV 4 We need to preserve resources to maintain a high quality of life	0.478	0.693

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 3 iterations.