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# Factors Influencing System Integrators' Adoption Intentions of Wireless Smart Home Systems in Australia

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**Abstract**
This study focuses on the adoption intentions of wireless home automation systems (WHASs) by system Integrators (SIs) in Australia in the context of business-to-business practices. The research applies the Theory of Planned Behaviour, derived behavioural models, such as the Technology Acceptance Model, the Unified Theory of Acceptance, and Use of Technology, and several more recent extensions for exploring the motivations of SIs in adopting WHASs. It uses a mixed-methodology approach, starting with an extensive literature review, for a full identification of factors favourable to the adoption of a WHAS, followed by a series of face-to-face interviews with SIs, and concluded by an online survey involving 850 SIs operating in Australia. The data thus collected were subjected to statistical analysis to fully explore the factors and their impact on the behavioural intention to adopt a WHAS. In an industry dominated by males and small businesses, the online survey indicated a strong consensus on all the proposed variables: Brand, Product Reliability, Product Interoperability, Product Maintainability, (dedicated) Contact Point, Seamless Purchase Experience, Aftersales Services, Technology Transfer, Cost Support, and Relationship and Cocreation. Qualitative interviews revealed preferences and concerns regarding product features, brand preferences, and services. The statistical analysis confirmed the existence of a linear relationship between the variables and adoption intentions, underlining the significance of brand, technology transfer and the SI and WHAS manufacturer relationship.

**Keywords:** Behavioural Intention; Smart Home Technology; System Integrators; Unified Theory of Acceptance and Use of Technology.

## 1. Introduction

Wireless Home Automation Systems (WHASs) are systems designed to control, monitor, and automate functions in our homes. Thanks to major advancements in technology and the popularity of mobile devices, these systems have evolved over the years from traditional wired smart home systems to smart home systems managing lighting, temperature, audio video distribution and contributing to the security and energy management of our residences and buildings (Rajarajeswari et al., 2021). Smart Home Technology (SHT) is not a modern technology though. Engineers and scientists started harnessing with homes equipped with systems and appliances able to operate autonomously and remotely more than a century ago (Aiello, & Santoni, 2005). However, it is only with the introduction of wireless systems capable of overcoming portability problems, and adoption costs that smart home systems reached the attention of the mass market (Balta-Ozkan, Boteler, & Amerighi, 2014; Saad Al-Sumaiti, Ahmed, & Salama, 2014). Although automation systems are available through a variety of

channels, purchasing and obtaining professional installation services through the professional channel is generally considered the safest and most reliable option (Von Kienlin & Perry, 2016).

While the SHT concept lacks a standardized definition in the relevant literature, it generally refers to a network of interconnected devices that automates various household tasks and enables centralized control, remote monitoring, and optimization of energy usage (Solaimani, Keijzer-Broers, & Bouwman, 2015). Although conventional hardwired systems offer reliability and seamless integration they require careful planning during construction. In contrast, WHASs operate wirelessly, providing flexibility and scalability without the need for extensive pre-planning. Wireless systems, however, face reliability and security concerns and both wired and wireless systems struggle with interoperability issues among devices from different manufacturers (Solaimani et al., 2015).

Despite these challenges, the smart home market continues to grow, driven by factors such as convenience, energy efficiency, and increased connectivity. However, the adoption of new technology depends on perceived advantages rather than objective benefits (Davis, 1989). The global smart home market is projected to reach $380 billion by 2028 (McKinsey & Company, 2022). In Australia, it is predicted to include 9.22 million users by 2027. Comfort and lighting applications are leading (55.2%), followed by controls & connectivity (48%), energy management (45%), security (45%) and home entertainment systems (26.6%) (Granwal, 2022). Historically, the smart home market was driven by wealthy homeowners seeking to elevate their comfort and social status and by the advent of electricity (Aiello & Santoni, 2005). Thomas Edison patented an automated coloured lighting system in 1910 (Sovacool & Del Rio, 2020). Today, consumer interest in home automation solutions is fuelled by the widespread adoption of connectivity technologies and the digitalization of lifestyle (Backman, 2022). SHT is far more accessible and widespread and driven by a shift towards energy efficiency, security and a greater emphasis on post-Covid-19 home investments.

Smart home systems are available through two primary channels: retail and professional (Von Kienlin & Perry, 2016). While retail channels offer cost-effective solutions and minimal installation efforts, homeowners often face technical challenges during setup and maintenance. Conversely, professional installations guarantee maintenance services and a smoother experience. Professionals possess the expertise to manage complexities associated with device integration, configuration, and troubleshooting, minimizing downtime and enhancing user satisfaction (James, 2014). These professionals, referred to as ‘System Integrators’ (SIs), are vital in guiding homeowners through the selection process and ensuring that the systems align with their needs. Thus, a SI is a specialized entity responsible for bringing together component subsystems into a cohesive whole, ensuring their seamless functioning (Davies, Brady, & Hobday, 2007). SIs focus on creating value for customers by reducing costs, improving operational performance, and facilitating system growth. In its purest form, an SI acts as the prime contractor, coordinating the integration of externally sourced products and services into a system tailored to individual customer requirements (Galbraith, 2002; Schwartz, 2004). As shown in Figure 1, SIs play a significant role in guiding and influencing homeowners' choices in selecting suitable smart home systems (James, 2014). While SIs provide integrated systems aimed at addressing homeowners' needs, smart home manufacturers offer individual components and strategic advice to support SIs in developing their businesses (Davies et al., 2007). Formalized relationships between manufacturers and SIs ensure stable demand and technological compatibility across multiple solutions.

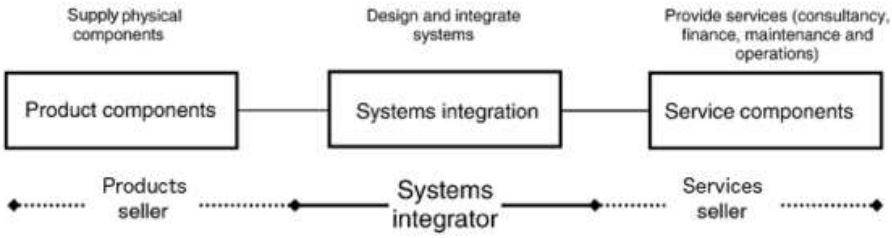



**Figure 1:** System Integrator Ideal Domain of Work (Adapted from Davies et al., 2007, Organizing for Solutions: Systems Seller vs. Systems Integrator)

The main objective of this research is to identify a list of business factors, both technical and non-technical, that influence SIs' behavioural intention to incorporate a particular WHASs into their solutions and assess their magnitude. Furthermore, it aims to provide useful information to manufacturers in the SHT industry. The monetization of value propositions in the home automation ecosystem constitutes a strong motivation for companies. Achieving mass commercialization of WHASs requires a higher level of maturity. This can be achieved by examining the factors that drive the adoption of WHASs by key business players such as SIs who act as value-added resellers.

Solaimani et al.'s (2015) extensive literature review on SHT existing knowledge reveals a notable gap as research predominantly focuses on technological aspects and consumer acceptance, neglecting strategic considerations and the impact of a proper route to market. Moreover, the bulk of the research on technology and user acceptance often overlooks corporate purchasing practices and value-added resellers, with much of the available literature dating from before 2000. This limited focus on organizational and business-oriented considerations can be attributed to the historical dominance of engineers in the SHT field, leading to a greater emphasis on technical issues in the literature (Sovacool & Del Rio, 2020). The same goes for more recent research conducted on SHTs in Australia, the focus of which has been on acceptance of use and technology (Mulcahy et al., 2019; Dahlgren et al., 2021; Sorwar et al., 2023). Thus, this research aims to help bridge this gap by investigating WHAS adoption intention from a strategic perspective, examining factors that foster cooperation between manufacturers and smart home professionals.

## 2. Conceptual Background

### *- Behavioural Intention*

Behavioural intention is a crucial concept driving human behaviour, which is influenced by attitudes, subjective norms, and perceived control (Fishbein & Ajzen, 1975; Ajzen, 1991, 2012). The Theory of Planned Behaviour (TPB) and its various adaptations, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), provide frameworks for understanding Behavioural Intentions, extensively applied in various domains, including technology adoption (Venkatesh et al., 2003; Venkatesh, Davis & Morris, 2007). In a nutshell, the TPB posits that attitudes, subjective norms, and perceived control predict intentions, which, in turn, determine behaviour. Knowledge is deemed irrelevant; instead, beliefs shape behaviour, indicating that people's intentions and behaviours reasonably flow from their beliefs (Ajzen, 2020). Ultimately, favourable attitudes and perceived control strengthen behavioural intentions (Schiffman, Kanuk, & Das, 2006).

- ***Adoption Intention***

Adoption intention can be defined as the willingness to start using new products or technologies (Rees, Briggs, & Oakey, 1984). It plays a vital role in predicting market success (Rogers, 2003; Kotler & Keller, 2006). It reflects people's readiness to accept innovations, guiding resource allocation and marketing strategies. Understanding adoption intention helps identify barriers, refine products, and gain a competitive edge (Davila & Foster, 2005; Turban, Bolloju, & Liang, 2011; Langley et al., 2012; Raguseo, 2018; Reinhardt, Hietschold, & Gurtner, 2019; Liu & Han 2020; Adu-Gyamfi, et al., 2022). Moreover, widespread adoption fosters economic growth and societal transformation. As a crucial predictor of actual adoption, adoption intention has been extensively studied in psychological research (Marikyan, & Papagiannidis, 2023).

Due to the complexity of B2B buying, SIs adopt WHASs differently from consumers. They prefer comprehensive solutions over separate services from multiple suppliers (Davies et al., 2007; Kotler & Keller, 2012). Specifically, adoption intention in business is influenced by task-technology fit, ease of learning, ease of maintaining, reliability, and consumer expectations (Nicholson et al., 2005). Both internal and external factors shape these decisions, including economic conditions, organizational factors, interpersonal relationships, and individual characteristics. Recognizing the human aspect of business buyers is ultimately crucial in understanding their adoption intention (Marín, Nicolás, & Rubio, 2019). SIs' adoption intentions of WHASs will be the dependent variable in this study.

- ***Influential Factors***

The relevant literature indicates that SIs expect quality, comprehensive services, the latest technology, and competitive pricing from suppliers, all tools needed to meet homeowner expectations (e.g. Lee & Benbasat 2003; Loch, Straub, & Kamel, 2003; Solomon et al. 2014). Moreover, consumer adoption factors influence SIs' decisions as resellers (Wang & Benbasat, 2007; Michler, Decker, & Stummer, 2020). The factors influencing SIs' decisions regarding WHAS adoption can therefore be inferred from walking through the TPB, then through the UTAUT and TAM, and then through the fields of business buyer behaviour, general technology adoption intention, consumer SHT adoption, and marketing mix categories. The use and acceptance of SHT is the extent to which people believe that the technology provides a relative advantage over the traditional one (Venkatesh et al., 2003; Ajzen, 2010). The theories presented in Figure 2 offer a framework for identifying the factors that can serve as independent variables influencing adoption intentions.

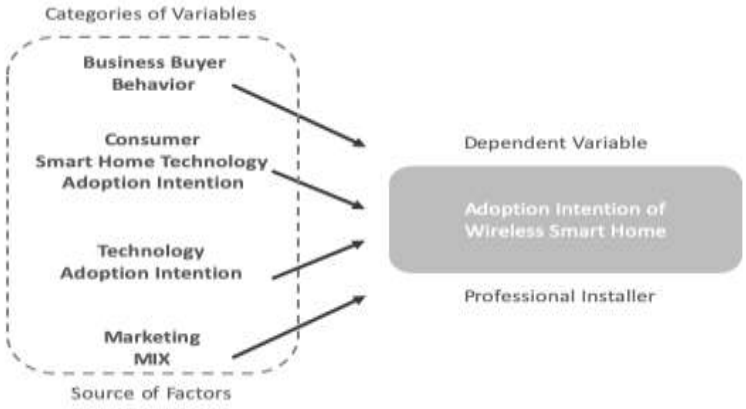



**Figure 2:** Theoretical Background for the Conceptual Framework
(Compiled by Authors for this Study)

Systematic reviews by Solaimani et al. in 2015, then later by Marikyan, Papagiannidis, and Alamanos (2019) and Sovacool and Del Rio (2020) provide insights into consumer adoption factors. Key dimensions influencing adoption include the abundance of solutions, app proliferation, setup challenges, and interoperability issues. Intrinsic product characteristics, are also highlighted as crucial for differentiation and SI profitability. In this study, the proposed influential factors for SIs' adoption intentions toward WHAS thus include: (i) brand, (ii) product features, (iii) services, (iv) relationships, and (v) cocreation. They will be the independent variables in this study.

*(i) Brand* – The concept of brand incorporates multiple components and serves as proxy for quality, reputation, trust, and risk mitigation, simplifying decision-making and reducing cognitive burden (Kotler, & Pfoertsch, 2007; Kelley, & Dwelley, 2018; Keller & Vanitha, 2020). Reputable brands offer trust, loyalty, and resource advantages. Brand affection boosts consumer trust and reduces risk (Goode et al., 2014). Recent studies affirm the influence of SHT brands on adoption, technology anxiety mitigation, technology difficulty domestication, technological uncertainty, and service intangibility (Aldossari & Sidorova, 2020; Mashal, Shuhaiber, & Daoud, 2020). Brands ultimately enhance SIs' image, the industry reputation, and internal performance expectations (Sorwar et al., 2023).

*(ii) Product Features* – The intrinsic characteristics of a product play a vital role in shaping adoption intention (Balta-Ozkan et al., 2014). Key factors include reliability, interoperability, and maintainability (Woo & Lim, 2015; Abdallah, Xu, & Shi, 2017). But while reliability and interoperability are critical to both professionals and consumers, SIs prioritize WHAS ease of maintenance (Hwang & Honey, 2012). Literature, however, tends to overlook maintainability's significance in professional adoption (Sovacool & Del Rio, 2020).

*(iii) Services* – Supplementary services are pivotal for SIs' adoption of WHAS. Spanning pre-, during, and post-transaction phases as they ease the adoption process by reducing SIs' efforts. The type, variety, and quality of services between organizations are equally important as they cement loyalty (Goode et al., 2014). Technology transfer, dedicated contact points, seamless purchase experiences, robust aftersales support, and cost support policies are especially essential for fostering adoption intention (Holmlund, & Törnroos, 1997; Gil-Saura et al., 2009).

*(iv) Relationship*s – Business relationships are vital for effective B2B interactions and their survival and success and for trust, commitment, and open communication between buyers and sellers (Deeter-Schmelz et al., 2001; Coviello, & Brodie, 2001; Walter et al., 2003; Franco & Haase, 2010). These relationships can deeply influence SIs' adoption intention towards WHAS. Fostering relationships through trust and commitment enhances loyalty, satisfaction, and overall economic performance, making businesses less price sensitive (Holmlund, 2008).

*(v) Cocreation* – The cocreation of value involves collaborative efforts between firms and customers to tailor products, enhance services, and increase engagement (McColl-Kennedy et al., 2009). This approach positively impacts adoption intention by fostering social status, control over support, and improved service offerings (Wilson & Jantrania, 1994; Adner, 2017; Rodriguez-Garcia et al., 2023). Leveraging resources through collaboration enhances capabilities, innovation, and strengthens relationships, reducing adoption effort and facilitating market responsiveness (Hallikas et al., 2014).

**- *Conceptual Framework***

Based on the above discussion, the following conceptual framework was formulated. As shown in Figure 3, adoption intention is the dependent variable, which explores the willingness of SIs to accept and use WHAS in light of the five the independent variables considered in this study: brand, product characteristics (reliability, interoperability, maintainability), supplementary services (seamless purchase experience, contact point, technology transfer, aftersales support, and cost support), buyer and seller relationships, and cocreation.

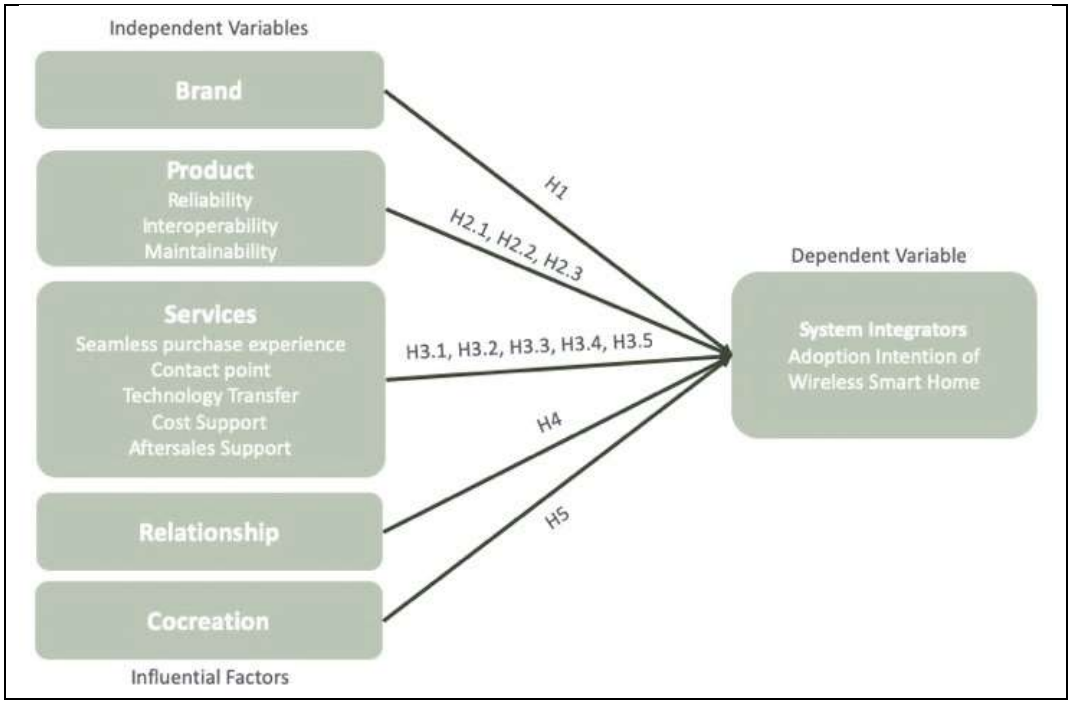



**Figure 3:** Conceptual Framework (Compiled by Authors for this Study)

## 3. Methodology

The study uses a mixed methodology approach that consists of several key steps. First, an extensive literature review was conducted, analysing several publications in the fields of B2B purchasing behaviours, SIs as solution sellers, SHT diffusion factors, and adoption intention on SHT. This approach served as a foundation to fill the existing gap in the literature on adoption factors that value-added resellers face. Next, a qualitative series of convenient interviews with smart home professionals were conducted in order to gain a deeper understanding of their motivations and refine the quantitative digital survey subsequently distributed to a much larger group of professionals, using a combination of databases acquired and snowball sampling techniques. Once data were collected, a thorough data cleaning process was performed to ensure accuracy and reliability. The final phase of the study involved conducting a regression analysis to determine the statistical significance of the factors under study and examine their relationships.

The qualitative interviews, conducted through a semi-structured format, aimed to deep dive into the needs and motivations of smart home professionals (Willis, 2004) and help to explain complex or contradictory survey responses (Driscoll et al., 2007). Sample selection was based on convenience, with the first nine professionals located in the Sydney area expressing availability included in the study. According to the authors, there is no reason to believe that the industry varies significantly from city to city. This however, could be examined in future studies. Semi-structured conversations featuring a blend of open-ended and close-ended

questions facilitated candid responses and allowed the interviewees to freely express their perspectives. The researchers' role was to accurately record notes for later analysis and leverage the conversational flow to explore uncharted territories in the investigation (Adams, 2015).

An analysis of the interview transcripts, followed the qualitative analysis recommendations as outlined by Schulz (2012) and Löfgren (2013). Data conceptualization involved the identification and labelling of recurring themes, the organization of these themes into categories, the description of connections among them, and the ranking of categories based on author perceived importance. Table 1 shows the semi-structured interview format.

**Table 1**: Semi-Structured Interview Format

| Interview Section | Topic |
|---|---|
| Introduction | Researcher and study objective's introduction. |
| Demographic | Interviewee and company, he/she represents demographic information:<br>Interviewee role<br>Interviewee gender<br>Company year of establishment<br>Company owner age<br>Company number of employees<br>Company primary business |
| Company | Business Model<br>Market Coverage<br>Australian System Integration Market |
| Explorative Interview | SHT & WHAS brands and branding<br>SHT products currently marketed and their relative advantages and disadvantages.<br>Relationship with current suppliers.<br>Range and type of services currently obtained.<br>Expectations from suppliers and products.<br>Perception and expectations from WHAS |

**Source:** Compiled by authors for this study

An online self-reported survey was then disseminated to 850 smart home professionals operating in Australia via email, social media posts, and direct contact through the authors' LinkedIn professional network. Dissemination was also based on the snowball methodology, which has the advantage of being able to reach unknown individuals belonging to the population (Burns, Bush, & Sinha, 2014) and those who might actually be interested in contributing to the topic (Voicu, & Babonea, 1997).

Regarding the statistical significance of the sample size, since the population is a sufficiently large, homogeneous, and finite population, this means minimal variation within it (Chaokromthong & Sintao, 2021). The minimum sample size was calculated using the Yamane formula with a confidence level of 95% falling within 99-379 individual range, which was considered satisfactory for the study. As to the reliability of the survey, consistency was examined based on the Cronbach's alpha coefficient technique. The quantitative investigation adopted a seven-point Likert scale, with 1 'strongly disagree' and 7 'strongly disagree'. Table 2 shows the number of questions included in the questionnaire for each variable. The questionnaire also included a final open-ended question, subjected to an analysis similar to

exploratory interviews and eight demographic questions, which were used to divide and compare groups of interviewees.

**Table 2**: Online Survey Format

| Hypothesis | Variable | # of Items |
|---|---|---|
| H1 | Brand (BRAN) | 5 |
| H2.1 | Reliability (PREL) | 4 |
| H2.2 | Interoperability (PINT) | 4 |
| H2.3 | Maintainability (PMAIN) | 4 |
| H3.1 | (Dedicated) Contact point (SCTP) | 4 |
| H3.2 | Seamless purchase experience (SPUR) | 4 |
| H3.3 | Aftersales support (SAFTS) | 4 |
| H3.4 | Technology transfer (STTRA) | 4 |
| H3.5 | Cost support (SCOS) | 4 |
| H4 | Relationship (RELA) | 5 |
| H5 | Cocreation (COC) | 5 |
| DV | Behavioural (Adoption) Intention | 3 |

**Source:** Compiled by authors for this study

## 4. Research Findings

The data collected are presented through descriptive and inferential analyses. Face-to-face interviews and the online self-administered survey data are described separately but analysed in a combined form. Table 3 reports the demographics of the nine smart home professionals interviewed. They are mostly male seasoned professionals aged over 45 with over two decades of experience in the market. Two-thirds of them are employed by companies with fewer than 20 employees, and 56% hold ownership positions within their respective companies.

**Table 3**: Interviews' Demographic Data

| Gender | Freq | % |
|---|---|---|
| Male | 8 | 89% |
| Female | 1 | 11% |
| Total | 9 | 100% |

| Role | Freq | % |
|---|---|---|
| Managing Director | 5 | 56% |
| Sales Manager | 3 | 33% |
| Technical Manager | 1 | 11% |
| Total | 9 | 100% |

| Age | Freq | % |
|---|---|---|
| 15–24 | 0 | 0% |
| 25–34 | 0 | 0% |
| 35–44 | 0 | 0% |
| 45–54 | 3 | 33% |
| 55–64 | 3 | 33% |
| 65+ | 3 | 33% |
| Total | 9 | 100% |

| N# of Employees | Freq | % |
|---|---|---|
| 1 | 0 | 0% |
| 2-5 | 1 | 11% |
| 6-10 | 1 | 11% |
| 11-15 | 2 | 22% |
| 16-20 | 2 | 22% |
| 21+ | 3 | 33% |
| Total | 9 | 100% |

**Source:** Compiled by authors for this study

Table 4 presents the interview findings and underscores the importance of the WHAS brand, reputation, and country of origin, with minimal variance noted among the respondents. Similar findings have been recorded on range and bundle of services, with a convergence on aftersales service, considered essential, and viewed as complementary to the product. In the Product Characteristics and Relationship with Suppliers categories, the respondent provided a wide range of answers and expressed different opinions on what are the key success factors in product characteristics and what makes a buyer-seller relationship meaningful. The top recurring themes, however, were products reliability, maintainability and dedicated contact point.

**Table 4**: Interview Findings

| Category | Recurring Theme | Associated Factor |
|---|---|---|
| Brand Preferences | Preferences for specific brands, countries of origin (Australia, USA, EU), considerations for brand awareness, and importance of selling rates and differentiation. | Brand |
| Product Characteristics | Various features and characteristics considered for smart home products, including innovation, reliability, interoperability, maintainability compliance, ease of install, connectivity, etc. SIs stated that they provided regular feedback to suppliers and manufacturers regarding product weaknesses and required characteristics, but they found the success of these efforts to be limited. | Reliability, interoperability, maintainability, cocreation. |
| Services | Importance of after-sales services, access to a competent contact point, and potential co-creation opportunities with manufacturers. | Aftersales support, contact point, cocreation. |
| | Emphasis on services such as market knowledge transfer, training, and technology transfer. | Technology transfer |
| | Considerations related to profit expectations, cost support, payment terms, promotions, sales targets, and warranty. | Cost support |
| | Factors influencing the purchase process, including use of online order systems, ease of the purchase process, shipment preferences, stock check and stock availability. | Seamless purchase experience, contact point. |
| Relationship with Suppliers and Cocreation | Significance of relationships with suppliers, loyalty programs, contractual agreements, open communication, cooperation in building consumer offer, contact point, and trust in the partnership. | Relationship, dedicated contact point, cocreation. |

**Source:** Compiled by authors for this study

The final questionnaire ended up consisting of 242 full responses. This is within the response range computed (99 to 379 individuals). Table 5 reports the demographic groups identified in the sample. They are predominantly born Australian (72.7%) males (90%) undergraduates (79%) aged between 35 and 54 (76%), who work mainly in companies based in the eastern states of Australia (79.4%) that have between 2 and 15 employees (86%). For simplicity, the

role of respondents in their respective companies were grouped into four categories: Technicians (technician, engineer, support, installer, delivery) 30%; Directors (owner, co-owner, founder, co-founder, director) 26%; Sales (sales director, business developer, sales manager, project sales, sales executive) 24%; and Managers 20%. A majority of them (63%) preferred not to add comments in addition to the questions.

**Table 5**: Online Survey's Demographic Data

| **Gender** | **Frequency** | **%** | | **Role** | **Frequency** | **%** |
|---|---|---|---|---|---|---|
| Male | 218 | 90% | | Technical | 73 | 30% |
| Female | 24 | 10% | | Director | 62 | 26% |
| Total | 242 | 100% | | Sales | 58 | 24% |
| | | | | Manager | 49 | 20% |
| | | | | Total | 242 | 100% |
| **Age** | **Frequency** | **%** | | **# of Employees** | **Frequency** | **%** |
| 15-24 | 1 | 0.4% | | 1 | 17 | 7% |
| 25-34 | 33 | 13.6% | | 2-5 | 45 | 19% |
| 35-44 | 108 | 44.6% | | 6-10 | 92 | 38% |
| 45-54 | 76 | 31.4% | | 11-15 | 71 | 29% |
| 55-64 | 16 | 6.6% | | 16-20 | 8 | 3% |
| 65+ | 8 | 3.3% | | 21+ | 9 | 4% |
| Total | 242 | 100% | | Total | 242 | 100% |
| **Inc. State** | **Frequency** | % | | **Country of Birth** | **Frequency** | **%** |
| New South Wales | 97 | 40.1% | | Australia | 176 | 72% |
| Victoria | 60 | 24.7% | | England | 16 | 6.6% |
| Western Australia | 35 | 14.5% | | Southeast Asia | 13 | 5.4% |
| . Capital Territory | 24 | 9.9% | | India | 13 | 5.4% |
| Queensland | 19 | 7.9% | | China | 9 | 3.7% |
| South Australia | 4 | 1.7% | | North America | 6 | 2.5% |
| Tasmania | 2 | 0.8% | | New Zealand | 3 | 1.4% |
| Northern Territory | 1 | 0.4% | | EU | 3 | 1.4% |
| Total | 242 | 100% | | South America | 2 | 0.8% |
| | | | | South Africa | 1 | 0.4% |
| | | | | Total | 242 | 100% |
| **Education** | **Frequency** | **%** | | **Comment** | **Frequency** | **%** |
| High School Diploma or Lower | 191 | 79% | | No Comment | 152 | 63% |
| Bachelor's Degree | 48 | 20% | | Comment | 90 | 37% |
| Master's Degree | 3 | 1% | | Total | 242 | 100% |
| Total | 242 | 100% | | | | |

**Source:** Compiled by authors for this study

Table 6 reports the themes discussed in the final open-ended question of the survey. Unlike face-to-face interviews, the respondents only focused on two aspects: product characteristics and services. According to them, the industry suppliers are weak in knowledge transfer and in providing the right level of aftersales support or at least in providing the required maintenance tools. This results in widespread concerns about WHAS unreliability and instability. Out of the

90 comments received, reliability scored 35 times, followed by aftersales support, 28 times, and integration (assimilable to interoperability), 21 times.

**Table 6**: Open Ended Question Findings

| Category | Recurring Theme | Associated Factor |
|---|---|---|
| Product Characteristics | Some prefer wired systems due to concerns about reliability, scalability, and durability, while others see wireless as suitable for specific segments like multi-dwellings and small units. Many express widespread concerns about the unreliability and instability of wireless systems, particularly in scenarios like assisted living.<br>SIs stressed the importance and challenges in seamless integration, interoperability among diverse brands and maintenance difficulties.<br>Aesthetic concerns, along with worries about potential security risks for less popular brands, highlight the need for standardized security features in wireless systems. | Reliability, interoperability, maintainability, brand. |
| Services | The importance of training (technology transfer) and maintenance tools was emphasized.<br>Insufficient product training and documentation were mentioned as common issues.<br>After-sale support is considered crucial, and some expressed dissatisfaction with weak support from suppliers. | Aftersales support, technology transfer |

**Source:** Compiled by authors for this study

Table 7 aggregates the relevant descriptive statistics of the sample population: mean, standard deviation, variance, median, mode, kurtosis and skewness.

**Table 7**: Descriptive Statistics (Extended)

| # | Variable | | Obs. | Mean | Median | Mode | Std. Dev | Var. | Kurtosis | Skewness |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BRAN | Brand | 242 | 5,50 | 6,00 | 6,00 | 1,00 | 1,01 | 1,98 | - 1,14 |
| 2 | PREL | Reliability | 242 | 5,74 | 6,00 | 6,00 | 1,24 | 1,55 | 3,98 | - 1,64 |
| 3 | PINT | Interoperability | 242 | 5,90 | 6,00 | 6,00 | 1,04 | 1,08 | 3,75 | - 1,69 |
| 4 | PMAN | Maintainability | 242 | 5,60 | 6,00 | 6,00 | 1,21 | 1,45 | 4,79 | - 1,77 |
| 5 | SCTP | (Dedicated) Contact point | 242 | 5,50 | 6,00 | 6,00 | 0,99 | 0,98 | 2,88 | - 1,26 |
| 6 | SPUR | Seamless Purch.. experience | 242 | 5,51 | 5,50 | 6,00 | 0,89 | 0,79 | 0,95 | - 0,84 |
| 7 | SAFT | Aftersales support | 242 | 5,71 | 6,00 | 6,00 | 1,05 | 1,09 | 4,41 | - 1,75 |
| 8 | STTRA | Technology transfer | 242 | 5,86 | 6,00 | 6,00 | 1,14 | 1,30 | 6,71 | - 2,21 |
| 9 | SCOS | Cost support | 242 | 5,64 | 6,00 | 6,00 | 1,20 | 1,44 | 4,09 | - 1,80 |
| 10 | RELA | Relationship | 242 | 5,67 | 6,00 | 6,00 | 1,18 | 1,40 | 5,28 | - 2,02 |
| 11 | COC | Cocreation | 242 | 5,62 | 6,00 | 6,00 | 1,05 | 1,10 | 1,81 | - 1,19 |
| 12 | DV | Adoption Intention | 242 | 5,49 | 6,00 | 6,00 | 1,09 | 1,18 | 2,96 | - 1,76 |

**Source:** Compiled by authors for this study

Figure 4 highlights the striking similarity among the distributions of each independent variable, both in relation to one another and to the distribution of the dependent variable. There is also a slight clustering of data towards the extreme left of the charts, which is consistent across both the independent variables and the dependent variable.

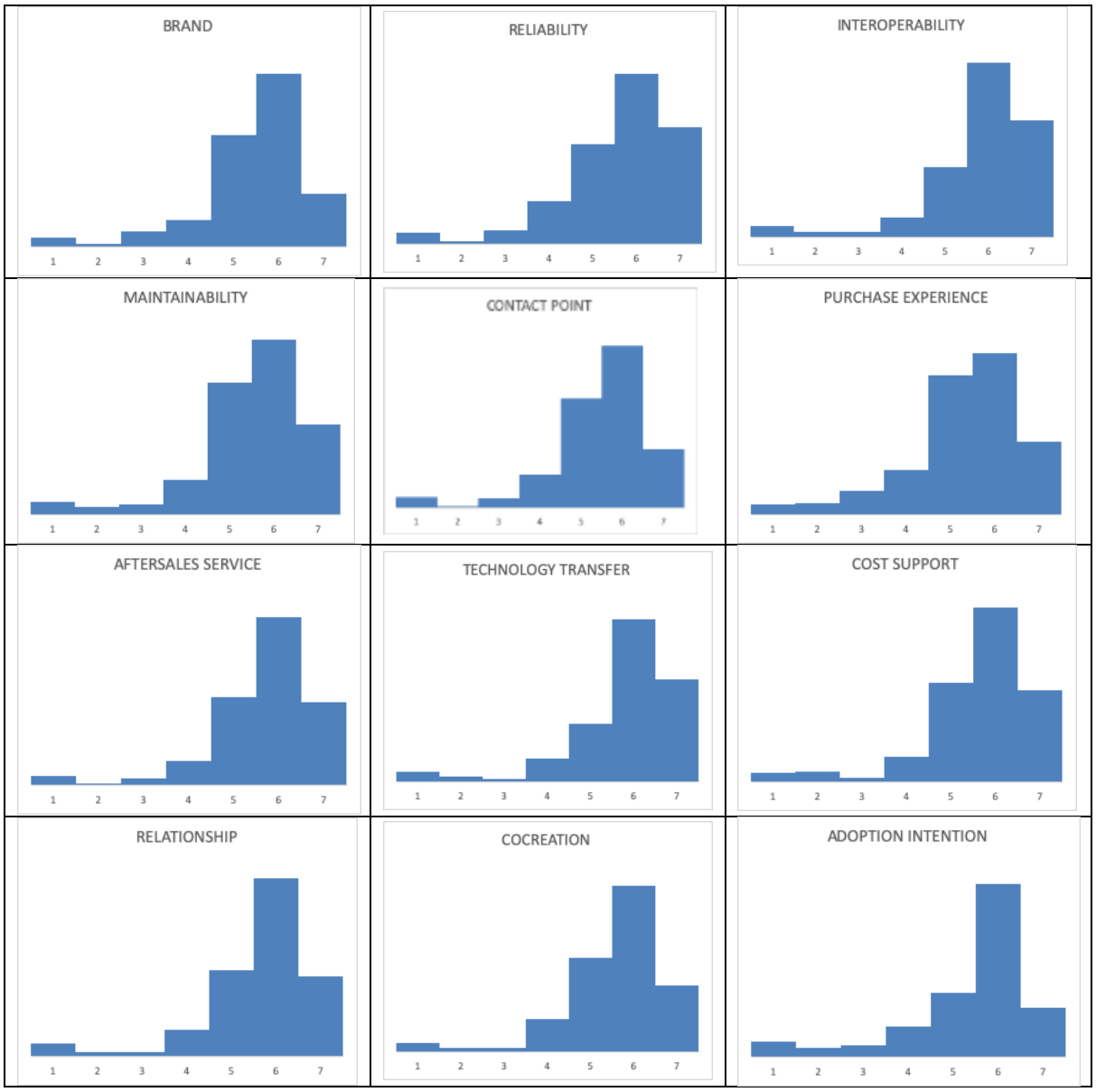



**Figure 4**: Data Distribution Histograms Silhouette (Compiled by Authors for this Study)

The strong similarity in the distribution between the independent variables and the dependent variable raised a legitimate suspicion of the presence of collinearity or even multicollinearity. This suspicion was confirmed by the calculation of the Pearson correlation matrix as shown in Table 8 and the Variance Inflation Factor (VIF) array as can be seen in Table 9.

**Table 8**: Pearson's Correlation Matrix

| r | BRA | PREL_2 | PINT | PMAIN_2 | SCTP | SPUR | SAFTS | STTRA | SCOS | RELA | COC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BRA | 1,00 | | | | | | | | | | |
| PREL_2 | 0,06 | 1,00 | | | | | | | | | |
| PINT | 0,52 | 0,09 | 1,00 | | | | | | | | |
| PMAIN_2 | 0,04 | 0,86 | 0,02 | 1,00 | | | | | | | |
| SCTP | 0,55 | 0,08 | 0,78 | 0,02 | 1,00 | | | | | | |
| SPUR | 0,55 | 0,09 | 0,67 | 0,08 | 0,67 | 1,00 | | | | | |
| SAFTS | 0,46 | 0,16 | 0,84 | 0,07 | 0,84 | 0,69 | 1,00 | | | | |
| STTRA | 0,40 | 0,11 | 0,80 | 0,04 | 0,79 | 0,67 | 0,88 | 1,00 | | | |
| SCOS | 0,47 | 0,08 | 0,86 | 0,01 | 0,81 | 0,72 | 0,90 | 0,91 | 1,00 | | |
| RELA | 0,45 | 0,10 | 0,84 | 0,01 | 0,79 | 0,70 | 0,87 | 0,90 | 0,94 | 1,00 | |
| COC | 0,50 | 0,10 | 0,82 | 0,01 | 0,79 | 0,70 | 0,81 | 0,83 | 0,85 | 0,87 | 1,00 |
| # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| | |
|---|---|
| $0.8 < \|r\| \leq 1.0$: | Very strong correlation |
| $0.6 < \|r\| \leq 0.8$: | Strong correlation |
| $0.4 < \|r\| \leq 0.6$: | Moderate correlation |
| $0.2 < \|r\| \leq 0.4$: | Weak correlation |
| $\|r\| \leq 0.2$: | Very weak or negligible correlation |

**Sources:** For Scale: Hair Jr, Page, & Brunsveld (2019); Compiled by authors for this study

**Table 9**: VIF array

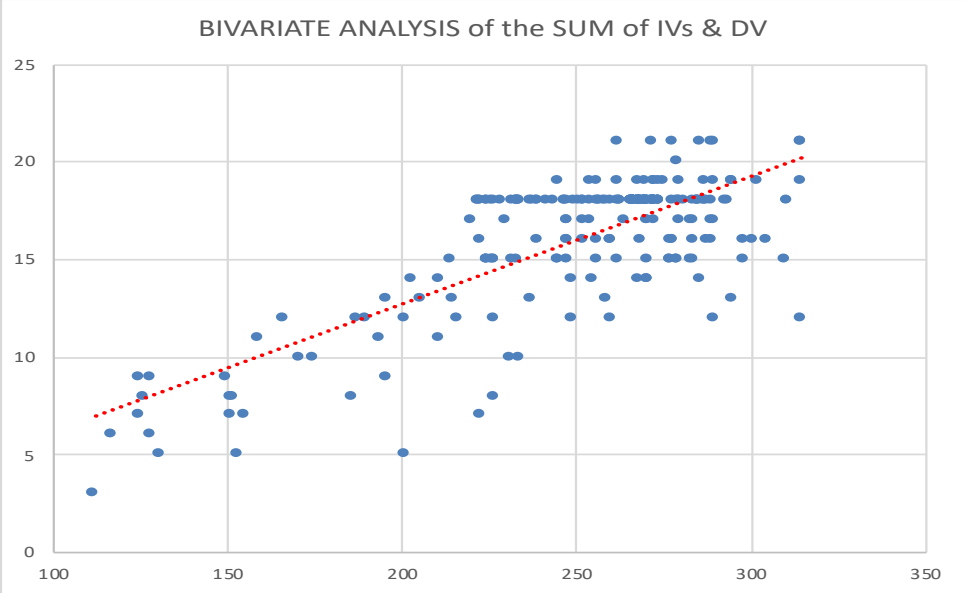
| | BRA | PREL_2 | PINT | PMAIN_2 | SCTP | SPUR | SAFTS | STTRA | SCOS | RELA | COC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VIF | 1,70 | 4,16 | 4,83 | 4,07 | 4,40 | 2,52 | 7,69 | 7,51 | 12,71 | 10,75 | 5,16 |

| | |
|---|---|
| VIF > 10: | High level of multicollinearity |
| 5 < VIF < 10: | Moderate level of multicollinearity |
| VIF < 5: | Low level of multicollinearity |

**Sources:** For Scale: Marcoulides & Raykov (2019) ); Compiled by authors for this study

The results obtained from both methodologies indicate a very strong multicollinearity with SCOS and RELA, as well as with other variables. SAFTS, STTRA, and COC also exhibit strong collinearity, while PINT and SCTP show a moderate correlation. For the remaining variables, the correlation coefficients from the two methodologies do not always align in the same direction but, in any case, show weak correlation.

This study used a discrete interval scale (Likert scale), plotting the entire data set and performing the bivariate analysis between the aggregate independent variable indicators and the dependent variable, a linear relationship between both variables is visually evident in Figure 5). The indicators, the median and the sum of observation scores, are common and suitable for homogeneous, and discrete data.



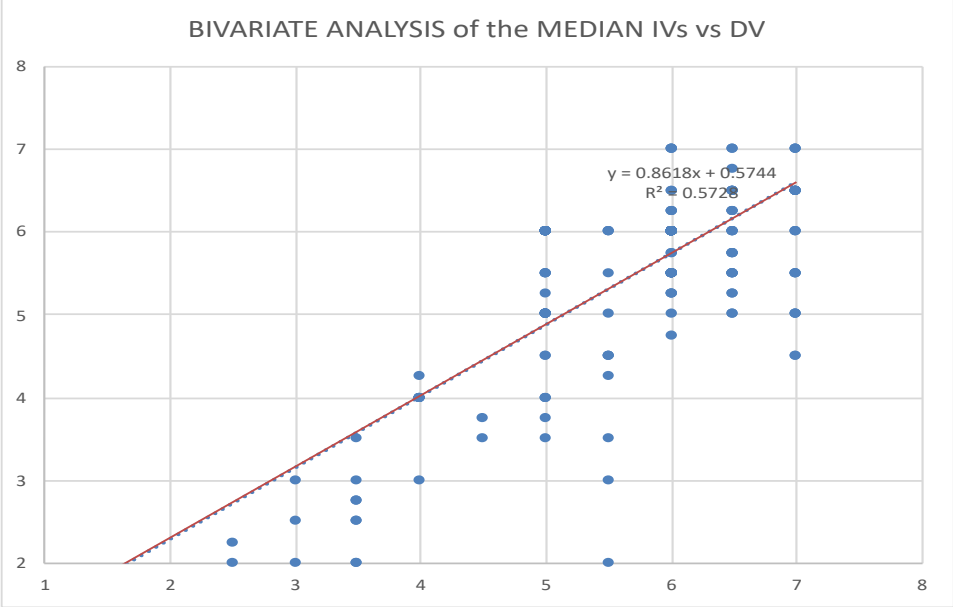




**Figure 5**: Dataset Plotted (Compiled by Authors for this Study)

Based on the above, various multiple linear regressions were conducted, involving the rotation of the variables, discarding any regression of one or more variables exhibiting potential high collinearity, and multicollinearity. As a first step, to evaluate the potential magnitude and direction effect of the explanatory variables on the response variable, each variable was simply linearly regressed on the dependent variable. As shown in Table 10, in addition to being statistically significantly correlated with the response variable (P value < 0.05), each variable presented a positive coefficient: an increase in the explanatory variables led to a corresponding increase in the dependent variable. Table 10 establishes a powerful baseline, no independent variable when taken individually has a negative effect on the dependent variable. In short, all the variables have the same directional effect on the dependent variable.

**Table 10**: IVs Regressed Singularly with DV

| | BRAN | REL_2 | PINT | MIN_2 | SCTP | SPUR | SAFTS | STTRA | SCOS | RELA | COC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Regression Statistics* | | | | | | | | | | | |
| R Square | 34,88% | 44,76% | 51,30% | 51,80% | 54,10% | 32,97% | 50,49% | 58,83% | 58,98% | 61,47% | 57,62% |
| Adj. R Square | 34,61% | 44,53% | 51,09% | 51,60% | 53,91% | 32,69% | 50,29% | 58,66% | 58,81% | 61,31% | 57,45% |
| *Significance F* | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** |
| *Coefficients* | 0,64077 | 0,58552 | 0,75169 | 0,64967 | 0,80845 | 0,70152 | 0,73914 | 0,73310 | 0,69692 | 0,72086 | 0,78683 |
| *P-value* | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** | 0,000** |

*** Statistically significant at 0,01*

**Statistically significant at 0.05*

**Source:** Compiled by authors for this study

As mentioned earlier, in the quest to identify the optimal model, and considering both the VIF array and Pearson's correlation matrix, a series of 41 multiple linear regressions were conducted (2036 are the total potential combinations without repetition of 11 variables taken 2 by 2, 3 by 3, ... up to 11). These series of regressions involved at least two variables and included a rotation of variables. Regardless of the regression model, the IVs: Brand (BRAN), Technology Transfer (STRA) and Relationship (RELA) invariably showed a statistically significant correlation with the DV (Table 11). The significance of all the other variables varied depending on the composition of the model. The VIF array and the Pearson correlation matrix predicted variables conflicts well.

**Table 11**: Summary of the Tested Regression Model

| | Model | Significative | Direction | Note |
|---|---|---|---|---|
| BRAN | 41 | 41 | Positive | **Always Significative** |
| PREL_2 | 24 | 2 | Negative | Positively significative if regressed only with BRAN |
| PINT | 18 | 5 | Positive | Significative only when none of the variable SAFTS, STRA, SCOS, RELA, COC were present |
| PMAIN_2 | 26 | 9 | Positive | Significative only when none of the variable STRA, SCOS, RELA were present |
| SCTP | 19 | 13 | Positive | Significative only when none of the variable SCOS, RELA were present |
| SPUR | 22 | 9 | Negative | Positively significative (1) if regressed only with BRAN |
| SAFTS | 11 | 2 | Positive | Significative only when none of the variable STRA, SCOS, RELA, COC were present |
| STTRA | 12 | 12 | Positive | **Always Significative** |
| SCOS | 10 | 6 | Positive | Significative only when none of the variable PINT, SAFTS, STRA, SCOS, RELA, COC were present |
| RELA | 14 | 14 | Positive | **Always Significative** |
| COC | 10 | 7 | Positive | Not significative only if STTRA and RELA are present |

**Source:** Compiled by authors for this study

Therefore, as can be seen in Table 12, the trimmed multiple regression analysis proposed showed the following 3 variables always statistically significant, BRAN, STTRA, RELA, a high coefficient of determination with the R Square = 70.53%, the Adj. R square = 70 (16%) and the overall significance (P value <0.001) as well as for the β coefficients of each explanatory variable. The following is the related regression equation.

Y= 0.02 + 0,33 (BRAN) + 0,32 (STTRA) + 0,32 (RELA)

**Table 12:** Regression Model with the IVs Always Significative

Multiple Linear Regression IVs always significative

| | Estimated | | CL 95% | | | |
|---|---|---|---|---|---|---|
| *Factor* | *Coefficients* | *Std. Err.* | *LL* | *UL* | *t Stat* | *P-value* |
| Intercept | 0,02141 | 0,24735 | -0,46587 | 0,50868 | 0,08654 | 0,93111 |
| BRA | 0,32612 | 0,04278 | 0,24184 | 0,41040 | 7,62291 | 0,00000** |
| STTRA | 0,31674 | 0,07855 | 0,16200 | 0,47147 | 4,03242 | 0,00007** |
| RELA | 0,32084 | 0,07759 | 0,16799 | 0,47369 | 4,13511 | 0,00005** |

**statistically significant at 0.01

*statistically significant at 0.05

**Source:** Compiled by authors for this study

As mentioned above, the dataset revealed the presence of four distinct demographic groups obtained by grouping the sample population by roles: Directors (62), Managers (49), Technical (73), and Sales (58). The Directors' group was the most animated and contributed most to the variance in the survey responses. Although all groups exhibited a similar central tendency, confirmed by a single-factor ANOVA test on the groups' independent variables means and variances, that indicated no differences in the mean, evidence suggests that at least one group (the Directors) demonstrated a distinct response pattern as compared to the others. In summary, while there isn't sufficient evidence to conclude that the groups express different opinions on average, it is evident that the Directors group exhibited a unique response pattern distinct from the other groups.

By way of concluding the data analysis, it is worth mentioning that two question items in the online survey affected the internal consistency of the variables product Reliability (PREL) and product Maintainability (PMAIN), pushing them well below the minimum acceptability threshold of the Cronbach's Alpha, 0.7. Hence, the researchers' decision to drop these items and carry on the analysis without them.

## 5. Discussion of Results

The research results confirm the male predominance in the sector, with 90 percent of the SIs being males. Geographically, the majority of these professionals (79.4%) are located in the eastern states of Australia. The qualitative interviews, complemented by the open-ended question, yielded insightful categories and recurring themes. The product characteristics variable showed concerns about wireless system reliability and emphasized the need for seamless integration and interoperability. The services variable, most notably aftersales support, training, and technology transfer emerged as significant factors of adoption. The brand variable revealed the importance of awareness and selling rates. And the relationships variable, most notably relationships with suppliers underscored the need for strong loyalty programs, open communication, and trust.

In the online survey, most of the respondents (86%,) were in agreement, endorsing all the factors proposed with scores of 5, 6, and 7 (strongly agree). All the explanatory variables exhibited a strong consensus among respondents, except for the seamless purchase experience variable, which had a lower perceived significance compared to the other proposed factors. The technology transfer, aftersales services, cost support, and relationship variables demonstrated

a pronounced concentration of data around the median, in contrast to other variables (product reliability, seamless purchase experience, and cocreation), which covered a more diverse distribution of responses around the median.

The inferential analysis was consistent across all the regression models tested. Brand, technology transfer and relationship emerged as positive and major significant factors influencing adoption intention. The combination of these three independent variables accounts for more than 70% of the variance in the response variable, which is quite remarkable. Furthermore, the coefficients, beta weights, of these three independent variables were strikingly similar with 0.37 (BRAN), 0.34 (STRA), 0.37 (RELA) respectively, dividing their contribution almost equally. As to the other independent variables, although they were linked to adoption intention, they were not significant in all the regression models tested, most likely due to the high multicollinearity between them. They show that SIs struggle to assess perceived control over the reliability, maintainability, aftersales service and interoperability factors. This correlate with and supports the importance of technology transfer (STRA). Training in particular emerges as a significant and consistent influencing factor for WHAS adoption, emphasizing the importance of knowledge exchange. Another surprising result in the study is the absence of substantial evidence to assert that the four distinct demographics (Directors, Managers, Technical, and Sales) hold different opinions. Directors were the sole group exhibiting a unique response pattern compared to the others who consistently offer more extreme responses (strongly agree and strongly disagree).

## 6. Conclusion & Recommendations

A SI has been defined as a person or a company specializing in selling solutions, with the aim of meeting the needs of homeowners, with specific expectations from suppliers. As Solomon et al. (2014) previously found, SIs demand quality, comprehensive services, access to the latest technology, training and competitive pricing for profitability. At the same time, they need tools to meet homeowners' expectations. SIs are the sole prime contractors responsible for the design, integration and support of a system for a single customer. This why this research was intent on shifting attention from exclusive consumer adoption to SIs adoption and on filling the existing gap in the literature by focusing on SIs' critical role in influencing consumer adoption of WHASs. To secure consumer adoption, WHAS manufacturers must first capture the interest of SIs, who seek practical, technical, and economic advantages when considering a specific WHAS. As determined by Schwartz (2004), SIs are a driving force in the industry since they exercise significant influence recommending and suggesting brands and product features for homeowners to adopt. Their preferences contribute to shaping the market. From the direct voice of SIs comes a second important aspect of this study. Joining the existing literature, this research contributes to highlighting the crucial role the technical characteristics of the product play in determining SHT adoption. One of its main merits is the confirmation and refinement of the importance of reliability, interoperability and maintainability as major technical concerns for WHAS. The Australian SIs interviewed showed a strong inclination to prioritize product performance and aftersales services over other factors. This is in line with other recent studies highlighting the predominance of engineering aspects in the sector (e.g. Gram-Hanssen & Darby, 2018; Sovacool & Del Rio, 2020).

The statistical analysis of the data collected in the survey underlines another significant contribution of this study as, consistent with Kotler and Pfoertsch’s (2007) study, it confirms that brand is a powerful factor. For SIs, brand serves not only as a tool for delivering customer satisfaction but also as a risk mitigator in product decisions. As determined by, for example, Keller and Vanitha (2020), Goode et al. (2014), and Kelley and Dwelley, (2018), brand conveys a promise of quality, fostering trust and loyalty among consumers as well as among SIs.

Regarding training, in keeping with Wuyts, Stremersch, and Franses (2001), technology transfer's positive significance confirms the fact that it facilitates products awareness, technological advancements and reduces difficulties in domesticating technology. This is especially true of micro businesses that rely on knowledge and product technology information from suppliers and in line with Stremersch et al.'s (2003) conclusion in their study. As determined among others by Holmlund and Törnroos (1997), Walter et al. (2003), and Holmlund (2008), the buyer and seller relationship stands out as the other highly influential factor. That the relationship concept is inherently human is evidenced in B2B interactions (ordering, training, and aftersales services). Relationship prominence is probably rooted in our human nature as the awareness that a WHAS is developed, managed, and recommended by humans tends to instil a sense of safety and trust. The statistical significance of factors such as brand, technology transfer and relationship demonstrate how these factors are able to provide better control. As outlined in Ajzen's (2020) TPB, the greater perceived control, the stronger the person's intention to carry out the behaviour whenever the opportunity arises.

In conclusion, companies should invest in solid brand-building initiatives and highlight the quality, innovation, reliability and interoperability of their products. This would contribute to positively influence the intention of SIs to adopt a specific WHAS. This study also confirms the facilitative role of technology transfer. Companies in the SHT industry should focus on enhancing their strategies so as to transfer knowledge and technology effectively to SIs. This includes streamlining training programs, developing knowledge-sharing platforms, and ensuring continuous support so that SIs feel empowered and confident in adopting WHASs and new technologies in general. Therefore, prioritizing product features (reliability, interoperability, maintainability), strengthening brand awareness initiatives, improving technical support and technology transfer strategies, are key recommendations to drive successful adoption of WHASs and cultivate long-lasting partnerships with SIs.

- *Study Limitations*

The research focuses on the adoption intention of SIs towards WHASs, limiting its generalizability to other systems or technological contexts and to countries beyond Australia. Issues with two question items clarity led to their removal, affecting respondent assessment of perceived control over critical product factors like Reliability and Maintainability. High collinearity and multicollinearity among variables prevented from testing the proposed factors all together. This limitation highlights the need for expanding the search for alternative or more refined influencing factors and cautious interpretation of the results. It also highlights the need for further exploration into WHAS adoption dynamics.

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