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# ICL Journal

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## Chairman's message

This is our eighth journal in the history of ICL, since our first publication in 2013. In the early days the best description for the collection of papers was 'eclectic'. From then we became more focused on our core business and early childhood education programme specialisms, although I always found room for a paper on children's literature, my own focus. Then our publications lapsed while we determined what direction the Journal should take, until 2021, when we saw an entirely new role for it: the publication of the best applied projects by our Master's students, jointly authored by their supervisors. This then, is the fifth in that renaissance, and we are proud and delighted to present it.

There is a fine range of subject material. There are two papers on customer service: the use of AI in Indian banks' dispute resolution, and factors affecting repurchasing intentions in Auckland cafés.

Then we have three information technology papers, covering IT employee training in Sri Lanka, remote data privacy and information security, and the human factor in IT service management.

And we have a highly topical analysis on the effectiveness of fog cannons, and finally, a paper on commerce: transferring Chinese live-streaming successes to New Zealand.

In some ways these offerings are almost as eclectic as our first publication twelve years ago, but there is no Bilbo Baggins as a hero or commentary on the frustrations of teaching English to engineers in Japan. With the passage of time ICL becomes more specialized and must serve its constituents.

Ewen Mackenzie-Bowie  
Chairman  
ICL Education Group

# ***Impact of e-learning system efficiency on IT employee training in the bottled water industry in Sri Lanka***

*Charitha N P Kandage and Premalatha Sampath*

## **Abstract**

The bottled water industry (BWI) is recognized as an emerging sector that plays a key role in Sri Lanka's economic landscape, focusing on the production and distribution of packaged drinking water, primarily in Polyethylene Terephthalate (PET) and glass bottles. It is source-specific and regulated by the Sri Lankan Health Ministry, which oversees aspects like pricing, bottle types, and sizes. The COVID-19 pandemic accelerated the technological transformation process globally, leading to the rise of numerous enterprise solutions and online platforms. Growing concerns about the post-pandemic environment, along with trends in digitisation and the need to comply with mandatory frameworks, have increased the demand for efficient e-learning systems for employee training. Despite the growing adoption of e-learning systems, there is a lack of understanding regarding the factors that influence their effectiveness in IT employee training. This research aims to investigate the relationship between e-learning systems and other relevant factors to gain insights into their impact on IT training outcomes.

This study investigates the impact of e-learning efficiency on IT training within Sri Lanka's bottled water industry, employing a mono-quantitative research approach. A survey was administered to 278 employees across the industry using Google Forms, addressing three key objectives: assessing the use of e-learning systems, evaluating their perceived efficiency, and determining their impact on IT training outcomes. The research questions were examined through hypothesis testing, which measured the relationship between independent and dependent variables across three different models. The findings provided strong support for the hypotheses, revealing significantly positive relationships between the dependent variable (e-learning efficiency) and the independent variables: perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, social influences, and facilitating conditions within the models. Statistical analyses, including reliability tests, correlation, regression, and ANOVA, confirmed the robustness of the results. Ultimately, this research enhances the understanding of e-learning efficiency and its role in improving IT training practices in Sri Lanka's bottled water industry, offering insights for further advancements in this field.

***Keywords:*** *Bottled water industry, E-learning, Covid-19, Sri Lanka, IT Training*

## **1. INTRODUCTION**

The rapid growth and transformative changes in technology have significantly impacted industries worldwide, including the Sri Lankan Bottled Water Industry (BWI). Sri Lanka's industrial and economic landscape has undergone dramatic shifts due to the post-COVID social and digital transformation (Gunawardana et al., 2018).

The BWI in Sri Lanka has accelerated the adoption and utilization of technology in all aspects of its operations. For example, to adapt to the challenges posed by the COVID-19 pandemic and the subsequent new normal, the BWI has implemented e-learning systems to train its staff, replacing traditional seminar and outbound training programs (Dolawattha et al., 2020).

To maintain relevance and competitiveness, bottled water companies have increasingly adopted e-learning platforms to train their IT workforce. This study investigates the extent to which the effectiveness of these e-learning systems impacts overall IT training from the perspective of employees.

The research aims to explore e-learning as a technological advancement that supports training objectives and examines employee acceptance of e-learning systems within the bottled water industry in Sri Lanka. While numerous studies have focused on e-learning in educational contexts, there is a dearth of research examining employee views on the contextual relevance of e-learning systems in the Sri Lankan bottled water industry.

### **1.1 Contribution of Bottled Water Industry**

According to the Food Control Administration Unit (FCAU), a regulatory body under the Sri Lankan Health Ministry, there are currently 170 established bottled water companies in the local market. (Food Control Administration Unit, 2023)

The market is dominated by over 300 water brands, collectively capturing a market share valued at \$623.17 million during the period 2019-2024. This represents a significant annual compounded growth rate (CAGR) of 7.26%, which is notable considering the country's macroeconomic conditions. (Statista, n.d.)

The Sri Lankan Bottled Water Industry (BWI) has played a crucial role in meeting the demand for safe and convenient drinking water. Its development reflects a commitment to addressing health concerns and adapting to evolving consumer preferences. Technological advancements have been instrumental in the industry's growth (Piyarathna et al., 2020).

### **1.2 Impact of COVID on Bottled Water Industry**

The COVID-19 pandemic has revolutionized the typical industrial setup, forcing it to embrace sudden changes and adapt to evolving circumstances in digital forms. For instance, due to lockdowns and social distancing, there has

been an increased reliance on remote working conditions, prompting companies to adopt digital remote operations to ensure business continuity (Renukappa et al., 2021). This shift has not only transformed the conventional office but also led to a revision of the entire landscape of industries, including work processes and communication methods.

Digital transformation has increasingly become central to industry operations. The pandemic accelerated the pace of adoption, with many companies rushing to incorporate digital tools to streamline systems and processes, re-engineer operational paradigms, and establish efficiency and effectiveness while maintaining customer connections. With the help of e-learning systems, employees and customers can adapt to new skills, knowledge, and technologies. Therefore, learners are positively influenced by new concepts, intelligence, and motivation to perform specific jobs efficiently and effectively. As a result, effective e-learning directed towards effective training on par with the industry standards is a crucial factor for survival as well as maintaining competitiveness, and sustaining innovation while ensuring that data protection is in line with operational excellence (Piyarathna et al., 2020). These transformative operational changes alongside the paradigm shift of digital transformation infringe on new challenges in the BWI in Sri Lanka. Therefore, it is evident that increased demand for IT literacy and training new staff in this domain is a crucial factor that needs to be understood as a timely requirement.

○

### ○ **1.3 Motivation**

The BWI is heavily influenced and is drastically transforming into a tech-savvy dynamic industry by adopting many enterprise systems, mobile apps, and automated solutions throughout the day-to-day operations to upkeep the competitive edge. This has created a positive and equivalent effect of the IT employee training as well. To create an effective training platform on a par with the digital transformation process, online training systems and tools have become prevalent in the new domain of operational excellence in the BWI in Sri Lanka (Piyarathna et al., 2020). This has created new managerial challenges which also have challenged the status quo and subsequently created pressure to adjust the strategic intent of the traditional setup of the bottled water companies. These paradigm changes motivated and embraced new technologies to face the challenges created by the digital divide. In the views above, IT employee training is no exception. E-learning systems and platforms have been implanted and deployed to cater to the demanding needs of the industry.

E-learning has become more popular as a modern-day training practice. However, norms and trends set by the digital age placed comparative pressure and challenges on developing countries like Sri Lanka due to cultural complexities and contextual differences. Hence the BWI as an upcoming

industry should focus on underlying factors which fuelled the efficiency of deployment of such IT system tools in order to derive the expected outcome, in this instance the IT training performances (Piyarathna et al., 2020).

Since the BWI comes under the Fast-Moving Consumer Goods (FMCG) sector, which demands constant supervision on hygienic compliances, investments and innovations due to the dynamic nature of the business and fiercely competitive market structure, the human capital of the BWI has to be treated as a strategic segment. Therefore, a more efficient and effective training platform is needed not only to survive the industry dynamics but also to thrive in the cut-throat market competition.

#### ○ **1.4 Purpose of the Research**

This research acknowledges training employees in a technological environment, emphasizing the employee perspective. Only if the employee embraces and follows the e-learning methods effectively, will the result be as effective as expected. Therefore, it is extremely important for IT employees to understand how these IT systems can be used to improve their training efforts.

In terms of research importance, both the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) have been identified, which understand how users measure e-learning systems adaptation with the guidance provided (Thowfeek et al., 2008). When considering the bottled water industry, there is limited research applying TAM and UTAUT. Hence, the research study aims to fill the gap by evaluating these two theories within the specific context of Sri Lanka. Moreover, this research will enhance the theoretical understanding of the adoption of e-learning methods in the bottled water industry with the guidance of these two theories. It will be achieved through empirical evidence through the applications used and how they used the theories. Additionally, these research findings guide the industry in formulating IT employee training strategies with better decision making regarding the allocation of training resources.

#### ○ **1.5 Problem Statement**

The objective of the study is to test the validity of TAM and UTAUT theories on employee acceptance in the context of the efficiency of e-learning systems for IT employee training in the bottled water industry in Sri Lanka. Moreover, by applying the theoretical understanding behind the TAM and UTAUT models, the research contributes to the understanding of technology adoption in the relevant context. It is worth finding out whether the IT employee's perception of using e-learning systems, expectations of the e-learning system performance, subjective assessment of easiness, the opportunity cost of investing the effort to reap the benefits, social influence, and facilitating conditions in the work environment as per the given variables which included in the said theories are

remain unexplored to the context of IT employees in bottled water industry Sri Lanka. Empirical studies have not been conducted before, regarding e-learning adoption in BWI in Sri Lanka from the standpoint of employee perception. The gap has been identified, analyzed and addressed under the research framework. There were clear gaps in the literature and the understanding of e-learning systems adoption by IT staff in the industry regardless of the global trends.

### ○ **1.6 Research Aims and Objectives**

The research objectives are listed as follows:

RO1: To assess the utilization of e-learning systems in IT employee training within the BWI.

RO2: To evaluate the perceived efficiency of e-learning systems in enhancing IT employees' skills.

RO3: To determine the impact of e-learning efficiency on IT employee performance

This study explores the impact of e-learning efficiency on IT training in the bottled water industry in Sri Lanka, utilizing a mono-quantitative research method. The following research questions are outlined:

RQ1: How extensively are e-learning systems utilized for IT employee training in the Bottled Water Industry?

RQ2: To what degree do IT employees perceive e-learning systems as efficient tools for skills enhancement?

RQ3: What is the relationship between the efficiency of e-learning systems and the performance of IT employees in the industry?

### ○ **1.7 Significance of the Study**

This research offers deep insight into the BWI and its stakeholders in enhancing their IT employee training. The relevant context refers to e-learning as a modern digital strategical tool that offers many benefits including flexibility, accessibility. Digital adoption helps efficiency in skill development and progressive improvement in performances of their respective IT responsibilities which contributes towards career progression and succession with relevance to the BWI context.

Companies can derive many benefits including enhancement of the prevailing decision-making system by making informed decisions when allocating resources to training programmes. By understanding the impact of e-learning efficiency and factors that influence the acceptance of novel technologies, the report findings will enable us to make relevant strategic solutions to improve and develop the skill and knowledge base of IT employees which should ultimately result in a high-performance culture. Likewise, the BWI in Sri Lanka apparently realized digital transformative IT technologies in various sides of the

business not only for the BWI sector but also for other industries eagerly transforming their operations in line with e-learning solutions when it comes to employee training. Hence, the employee perspective on technology adoption for training purposes is a crucial aspect of the research. Focusing on how IT employees perceive e-learning systems in the BWI emphasizes the importance of user-centered design and implementation in IT e-learning systems which can lead to the development of more user-friendly and effective e-learning solutions.

## o **1.8 Significance of Employee training with e-learning pre/post-COVID**

The COVID-19 pandemic led to the widespread implementation of Learning Management Systems (LMS) across numerous organizations, fundamentally reshaping the learning environment for employees. Learners discovered themselves participating in independent study and navigating through virtual learning materials. In the prevalent digital environment of today, Learning Management Systems (LMSs) play a pivotal role in improving and facilitating the processes of teaching and learning. Acknowledged as a leading online learning platform, the Learning Management System is instrumental in delivering instructions and electronic resources to foster collaborative learning among employees (Turnbull et al., 2020).

Despite the digital acceleration followed by the post-COVID era, BWI has adopted many e-learning platforms in the event of employee training and performance management (Perera & Gamage, 2021). Alomari et al. (2020), elaborated that it is being used not merely as an operational tool, but it has seriously aligned with the strategic objectives of the company. Hence these adoptions of e-learning systems are referred to as turnkey strategic initiatives.

Even though the evidence shows that e-learning as a strategic initiative provides enormous benefits to bottled water companies in Sri Lanka, the IT employee perception towards efficiency of e-learning systems is poorly explored. TAM and UTAUT theories are renowned theories that provide the theoretical foundation and framework for understanding how employees perceive and accept new technologies, in this instance, the e-learning systems in the context of IT employees in BWI Sri Lanka (Daneshgar et al., 2008).

## **2. THEORETICAL FRAMEWORK**

### o **2.1 TAM Model theory on e-learning**

As explained in the point made above, the TAM model identifies and elaborates on the attributes of the individual's intentions to use specific technology. This has been developed by Fred Davis associated with the Theory of Reasoned Action (TRA) in the field of psychology (Davis et al., 1989). The two main factors have been introduced. The theory suggests that Perceived Usefulness

(PU), the key factor that refers to the user's belief system, supposes that respective technology leads to their performance improvements. Another key factor is the perceived ease of use (PEOU) which refers to the perception of effort required to use technology in turn recognized as affecting the effective utilization of the respective technology.

## ○ **2.2 UTAUT Model theory on the efficiency of e-learning**

The Unified Theory of Acceptance and Use of Technology (UTAUT) is being developed after scrutinizing the multiple theories to develop an understanding of the adoption of various technologies in different contexts amalgamating four different factors including performance expectancy, effort expectancy, social influence, and facilitating conditions incorporating moderators such as gender, age, experience and exposure to better understand the relationships between acceptance and use of technology (Marchewka et al.,2007). Venkatesh (2016) developed the model and later it stands out to be one of the major theories to depict the framework for explaining technology adoption behaviour in different industrial contexts.

Out of the main four core factors, performance expectancy (PE) represents the belief that using a particular technology leads to improved job performance. The degree to which an employee believes that using the technology will be free of effort is represented by the effort expectancy (EE) factor which modifies the behavioural intention of the efficient utilization of said technology. Social influence (SI) and pressure created by the social environment including peers, managers, owners, and the organization as a whole also create an impact on the efficient usage of the technology, which is also considered a key factor. Facilitating conditions (FC) to promote the usage of the technology, for instance, organizational and technological infrastructure, act as a catalyst to the acceptance and utilization of any novel technology introduced to the prevailing organizational climate. These elements collectively make an impact on the behavioural intentions of the employees to use the relevant technology in organizational contexts (Venkatesh., 2016).

To understand and comprehend the effective adoption and efficient use of e-learning systems in IT employee training, the study further expands upon the understanding of TAM and UTAUT models to construct subjective variables that lead to the examining the relationship between e-learning efficiency and IT employee training to evaluate the stipulated objectives mentioned above.

## ○ **2.3 Significance of using TAM and UTAUT Models**

Both TAM and UTAUT models are commonly referred to as predictive and explanatory theories of technology adoption and employee behaviour. Despite the novelty of the theories, those models help to leverage the organization's insights to practical utilization of new technology adoption and its adaptability

to its employees considering behavioural modification towards employee attitudes. This facilitates crafting of meaningful strategies when implementing and deploying new IT systems to the operational mainstream of the industries (Venkatesh.,2016). TAM is a simple model that addresses user adoption and efficiency of the usage or outcome via the main primary factors: Perceived Usefulness and Perceived Ease of Use. The UTAUT model explains the multifaceted nature of technology adoption in different industries by integrating multiple existing models and integrating different constructs. This underlines its wide applicability and generalizability, establishing it as a reliable choice for practical purposes (Buabeng-Andoh., 2021).

Furthermore, the broad and practical applicability of both theories to technological acceptance and use helps to understand the efficiency of the outcome derived as a result of efficient utilization, which provides a theoretical understanding relating to the research questions and objectives of this research. In that sense, amalgamating both theories to construct variables to test the research questions is needed and appropriate. Through this study, the researcher explains how the Sri Lankan bottled water industry intends to use both integrated TAM and UTAUT models for IT employees' understanding of the effectiveness of using e-learning for their training purposes.

### 2.3.1 Perceived Usefulness (PU)

It is described how IT employees effectively realize the usefulness of e-learning systems with skills demanded and acquire knowledge from the IT sector by using, the richness of the content, practice, quality of the learning material, relatedness to the job task and proactive interactions (Al-Azawei et al.,2017).

### 2.3.2 Perceived Ease of Use (PEOU)

It entails user-friendly UI designs, easy access and interfaces easy-to-navigate, clear instructions and technical support are some factors identified through perceived ease of use (Lee et al., 2013).

### 2.3.3 Performance Expectancy (PE)

PE is a concept within the UTAUT model, which examines the influence of individuals' intention to use the technology. The degree to which an IT employee believes that the benefits coming out of e-learning towards their job performance make a significant impact (Abbad., 2021).

### 2.3.4 Effort Expectancy (EE)

Effort expectancy is the degree of ease associated with a particular system or technology and this is one of the key constructs determined in the UTAUT model. It is the ease associated with the use of e-learning.

### 2.3.5 Social Influence (SI)

Recognized colleagues, peer recommendations and opinions through social referrals. Social incentives such as positive feedback, managerial approval and peer support have positive effects on social influence (Lin et al., 2013; Rauniar et al., 2014).

### 2.3.6 Facilitating Conditions (FC)

Accessibility and availability of relevant resources and support that positively influence employee perceptions of performance were discussed through facilitating conditions. When dealing with e-learning platforms, employees need adequate access to facilities, technologies and support consistent with training needs. It has an impact on the effectiveness of e-learning (Lin et al., 2013).

### 2.3.7 Independent Variables (IV): PU, PEOU, PE, EE, SI and FC

Factors influencing e-learning effectiveness for employee training are represented as independent variables.

### 2.3.8 Dependent Variable (DV): E-Learning Efficiency

How e-learning efficiency worked as the dependent variable and how it affects the influences of independent variables throughout this research?

## **3. RESEARCH METHODOLOGY**

The study was carried out concerning the Saunders et al. (2021) research onion, the methodology or the blueprint which provides the structured and systematic approach and conducts to the study while preserving the rationale of the research philosophy and instruments.

### Conceptual Framework of E-Learning

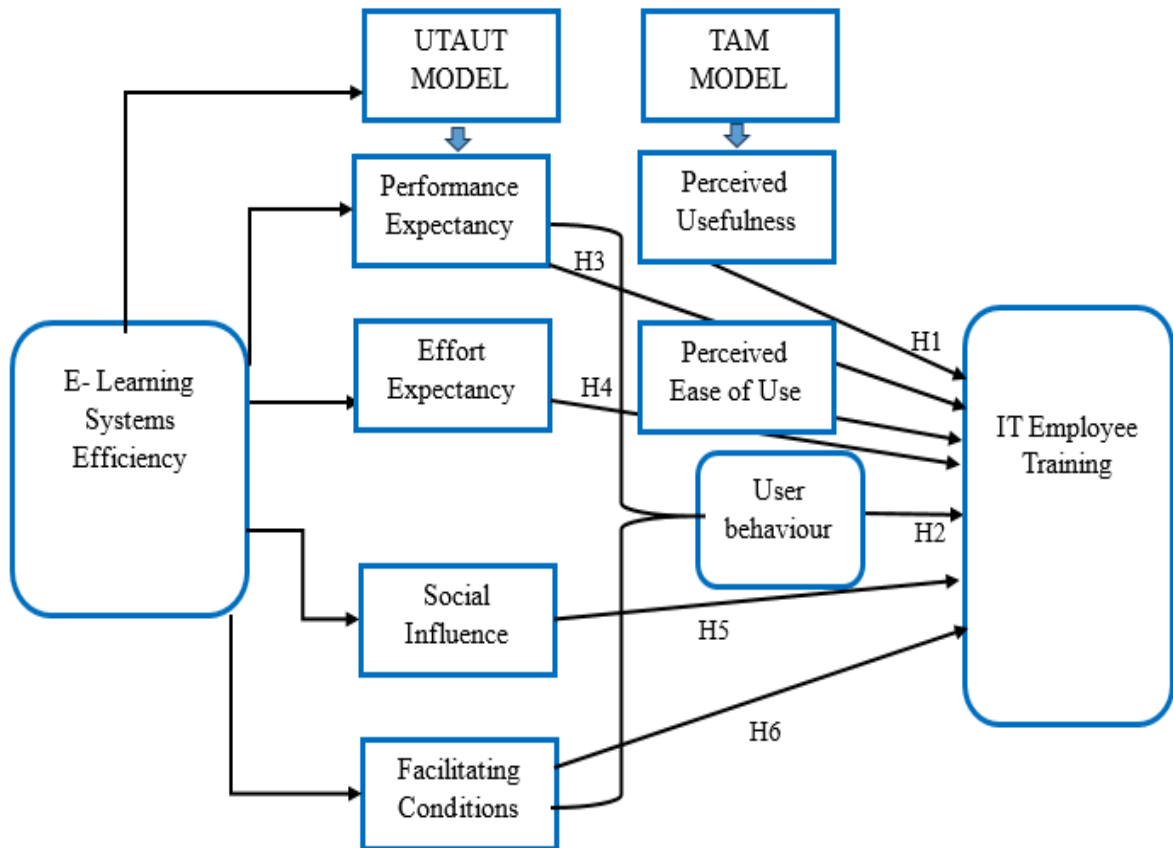


Figure 1 - Conceptual Framework for the Research (Source: Authors)

### 3.1 Hypothetical Framework

#### Hypothesis 1 (H1):

Null Hypothesis (H1<sub>0</sub>): There is no significant relationship between Perceived Usefulness on IT employees' intention to use e-learning systems.

Alternative Hypothesis (H1<sub>A</sub>): There is a positive significant relationship between Perceived Usefulness on IT employees' intention to use e-learning systems.

#### Hypothesis 2 (H2):

Null Hypothesis (H2<sub>0</sub>): There is no significant relationship between Perceived Ease of Use on IT employees' intention to use e-learning systems.

Alternative Hypothesis (H2<sub>A</sub>): There is a positive significant relationship between Perceived Ease of Use on IT employees' intention to use e-learning systems.

#### Hypothesis 3 (H3):

Null Hypothesis (H3<sub>0</sub>): There is no significant relationship between Performance Expectancy on IT employees' intention to use e-learning systems.  
 Alternative Hypothesis (H3<sub>A</sub>): There is a positive significant relationship between Performance Expectancy on IT employees' intention to use e-learning systems.

**Hypothesis 4 (H4):**

Null Hypothesis (H4<sub>0</sub>): There is no significant relationship between Effort Expectancy on IT employees' intention to use e-learning systems.  
 Alternative Hypothesis (H4<sub>A</sub>): There is a positive significant relationship between Effort Expectancy on IT employees' intention to use e-learning systems.

**Hypothesis 5 (H5):**

Null Hypothesis (H5<sub>0</sub>): Social Influence has no significant impact on IT employees' intention to use e-learning systems.  
 Alternative Hypothesis (H5<sub>A</sub>): Social Influence has a positive significant influence on IT employees' intention to use e-learning systems.

**Hypothesis 6 (H6):**

Null Hypothesis (H6<sub>0</sub>): Facilitating Conditions do not have a significant effect on IT employees' intention to use e-learning systems.  
 Alternative Hypothesis (H6<sub>A</sub>): Facilitating Conditions have a positive significant influence on IT employees' intention to use e-learning systems.

**4. FINDINGS**

o **4.1 Correlations on E-Learning with PU, PEOU, PE, EE, SI and FC**

The researcher seeks to identify the relationship between the uses of e-learning systems for IT employee training in the bottled water industry in Sri Lanka with factors like PU, PEOU, PE, EE, SI and FC.

*Table 1 - Correlations between Hypothesis (Source: Author)*

		PU	PEOU	PE	EE	SI	FC
E-Learning	Pearson's Correlation	.954**	.865**	.885**	.846**	.839**	.814**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	278	278	278	278	278	278

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 1 explains Pearson's correlation coefficients between the dependent variable “E-Learning” with the independent variables PU, PEOU, PE, EE, SI and FC having 0.000 in significance levels (Sig. 2-tailed) for each correlation.

Pearson's Correlation Coefficients explains the direction of the linear relationship varies from close to 1 (strong positive correlation), close to -1 (negative correlation) and close to 0 (weak or no- correlation). It ranges from 0.814 to 0.954 and (\*\*) indicates statistical significance at the 0.01 level, implying high confidence in the observed relationships. 0.954 suggests an extremely strong positive relationship. 0.865 and 0.885 indicate very strong positive relationships.

Significance Levels (Sig. 2-tailed) indicate the observed probability that the correlation occurred by chance when the P-value of .000 indicates that the observed correlation is statistically significant with a 0.05 significance level (or smaller significance level). It emphasized that there is strong evidence to reject the null hypothesis and conclude that there is a significant correlation between the variables. Sample Size (N) indicates the sample size as 278.

## o 4.2 Regression

Regression analysis typically includes three key data tables: the Model Summary, ANOVA (Analysis of Variance), and Coefficients tables. For the regression analysis, this researcher used E-learning as the dependent variable and other factors such as FC, PU, EE, PEOU, SI, and PE as independent variables.

### ▪ 4.2.1 Regression on E-Learning with PU and PEOU

To assess the first research objective combining hypotheses 1 and 2 were tested through regression analysis, examining the relationship between e-learning efficiency against both Perceived Usefulness (PU) and Perceived Ease Of Use (PEOU). This analysis aimed to evaluate the model fit concerning the coefficients and ANOVA results.

*Table 2 - Model Summary [E-learning with PU& PEOU] (Source: Author)*

#### **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.955 <sup>a</sup>	.911	.911	.27582

a. Predictors: (Constant), Ease of Use, Perceived Usefulness

Table 3 - ANOVA<sup>a</sup> [E-learning with PU& PEOU] (Source: Author)

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	214.882	2	107.441	1412.317	.000 <sup>b</sup>
	Residual	20.920	275	.076		
	Total	235.802	277			
a. Dependent Variable: E-Learning						
b. Predictors: (Constant), Ease of Use, Perceived usefulness						

Table 4 - Coefficients<sup>a</sup> [E-learning with PU& PEOU] (Source: Author)

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.005	.082		.061	.952
	Perceived usefulness	1.079	.048	1.034	22.477	.000
	Ease of Use	-.088	.047	-.087	-1.885	.060
a. Dependent Variable: E-Learning						

According to the analysis, the regression model explains the relationship between PU and PEOU as predictors. A negative coefficient means a negative relationship between the predictor variable “ease of use” and the outcome variable. It suggests as ease of use of a system increases, the outcome variable tends to decrease. When the t-value of the coefficient for “ease of use” is -1.885 and the corresponding p-value is 0.060 it is considered statistically significant. When the p-value is less than 0.05 the coefficient for “ease of use” means that each unit increase in ease of use decreases the outcome variable by approximately 0.088 units, holding other variables constant. The impact of the

COVID-19 pandemic suggested that factors beyond ease of use in the bottled water industry recognized the usefulness of the system. It suggested that external conditions such as COVID circumstances influence usage perceptions and behaviours regarding technology adoption.

▪ ▪ **4.2.2 Regression on E-Learning with EE and PE**

The research analyzed the regression model, gathered with Effort Expectancy (EE) and Performance Expectancy (PE) with the dependent variable as E-Learning.

*Table 5 - Variables Entered/ Removed<sup>a</sup> [E-Learning with EE & PE]*

*(Source: Author)*

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	Effort expectancy, Performance expectancy <sup>b</sup>	.	Enter
a. Dependent Variable: E Learning b. All requested variables entered			

Table 5 explains the Variables Entered/Removed<sup>a</sup>. The Model Summary explains the R Square value as 0.790 which means that it is approximately 79.0% of the variance in E-Learning [dependent variable] with the help of EE and PE [independent variables]. The ANOVA<sup>a</sup> table explains that the significance value = 0.000, which means there is a statistically significant relationship with at least one predictor variable and dependent variable. The Coefficients<sup>a</sup> table's Constant declares the estimated value of the dependent variable when all other predictors are zero. Both EE and PE are statistically significant coefficients related to the dependent variable E-Learning (p-value < 0.05). The standardized coefficients (Beta) measure the relative importance of each predictor. According to the analysis, there is a strong positive relationship between e-learning with PE and EE; the interpretation of coefficients suggests the strength and direction of relationships between predictors and the dependent variable.

▪ ▪ **4.2.3 Regression on E-Learning with FC and SI**

The research analyzed the regression model, gathered with Facilitating Conditions (FC) and Social Influence (SI) with the dependent variable as E-Learning.

*Table 6 - Variables Entered/ Removed<sup>a</sup> [E-Learning with FC & SI]*

*(Source: Author)*

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	FC, SI <sup>b</sup>	.	Enter
a. Dependent Variable: E-Learning			
b. All requested variables entered.			

*Table 7 - Model Summary [E-Learning with FC & SI] (Source: Author)*

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.850 <sup>a</sup>	.722	.720	.48821
a. Predictors: (Constant), FC, SI				

*Table 8 - ANOVA<sup>a</sup> [E-Learning with FC & SI] (Source: Author)*

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	170.255	2	85.127	357.147	.000 <sup>b</sup>
	Residual	65.547	275	.238		
	Total	235.802	277			
a. Dependent Variable: E-Learning						
b. Predictors: (Constant), FC, SI						

Table 9 - Coefficients<sup>a</sup> [E-Learning with FC & SI] (Source: Author)

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.504	.143		3.525	.000
	SI	.569	.074	.556	7.655	.000
	FC	.320	.074	.314	4.316	.000

a. Dependent Variable: E Learning

Table 6 describes the Variables Entered/Removed<sup>a</sup> related to FC and SI. The Model Summary explains the R Square value as 0.722 which means that it is approximately 72.2% of the variance in E-Learning [dependent variable] with the help of FC and SI [independent variables]. The analysis of variance under Regression, Residual and Total and the significance value is 0.000, which is a statistically significant relationship with at least one predictor variable and dependent variable. Other than that, the Coefficients<sup>a</sup> table's Constant declares the estimated value of the dependent variable when all other predictors are zero. Both EE and PE are statistically significant coefficients related to the dependent variable E-Learning (p-value < 0.05). The standardized coefficients (Beta) measure the relative importance of each predictor. Coefficients suggest the strength and direction of relationships between predictors and the dependent variable. Finally, there is a strong positive relationship between E-learning and social influence.

## 5. DISCUSSION

The data analysis is bolstered by the visual presentation of pie charts and bar charts presented via SPSS-29 software. The is subsequently followed by both descriptive and inferential analyses to determine the acceptability of the stipulated three models created through the conceptual framework associated with previous TAM and UTAUT models, assessing the relationship between e-learning as a dependent variable with PU, PEOU, EE, PE, SI, and FC as independent variables. Due to the rigorous and comprehensive analysis conducted, it is evident that the findings have revealed the objectives have been effectively measured through the formulated hypothesis.

Based on the survey data, most IT employees in the BWI are within the 41-50 years age range, and a predominant number are male. The questionnaire revealed that a significant proportion of these employees possess higher education levels, including MSc, PG, and other degrees. Furthermore, a large portion of them hold executive positions. Surprisingly, the preferred learning method for most IT employees, including those in the 31-50 years age range, is E-Learning. Considering the demographic analysis, it is evident that a positive influence of the survey has been shown on the e-learning system efficiency on IT employee training in the BWI in Sri Lanka. As per the data analysis, it is visible that a larger portion gave responses that strongly agree towards e-learning usage irrespective of the other demographic differences.

This trend can be explained and is attributed to the global influence of the COVID-19 pandemic, which has significantly impacted the industry in Sri Lanka. Due to the post-COVID duration, there is a digital acceleration in the industry landscape in Sri Lanka. As illustrated by the analysis, it is understood that most organizations already implemented e-learning successfully in the areas of employee training and performance management. The data revealed and reinstated the views of Alomari et al., (2020) on the necessity, urgency and importance of investing in E-learning systems to train IT employees since the strategic importance is placed upon and consequently understood by the employees. By considering the gathered data, the researcher found that there is a positive impact on IT employees in the bottled water industry's intention to use E-learning systems for their training needs.

According to the data analysis, most IT employees in the bottled water industry strongly agreed that there is a positive impact on the perceived usefulness (PU) of the E-learning system for IT training. IT employees have realized the usefulness, benefits and relatedness of E-learning systems as efficient training instruments in the event of acquiring job-related necessary skills and knowledge in the process of succession (Al-Azawei et al., 2017). In this case, it is believed to be shaped by many influential factors concerning the richness of the materials and delivery, relevance to the expected job task or the skill gap which serves to fulfil the training objectives as well as individual expectations towards their own career trajectory.

The researcher stated that the positive impact on perceived ease of use (PEOU) with the E-learning platform. Research done by Lee et al. (2013), has commented that perceived E-learning efficiency also depends on factors such as easy-to-navigate, user-friendly UI designs, easy access and interfaces, clear instructions, and technical support.

The first research objective is aimed at assessing the utilization of E-learning systems in IT employee training in the BWI in Sri Lanka by focusing on the PU and PEOU as independent variables in the stipulated first model covering the hypotheses. The study provides compelling evidence to support both alternative hypotheses proposed. Hypothesis (H1<sub>A</sub>) states a positive relationship between

the PU and IT employees' intention to use E-learning systems and the second hypothesis (H2<sub>A</sub>), asserts a significant relationship between PEOU and IT employees' intention to use E-learning systems is strongly supported. Table 1 refers to each correlation of the hypotheses respectively 0.954 (PU) and 0.865 (PEOU); both statistically significant at 0.000. As illustrated by Table 2, the correlation analysis indicates a very strong and statistically significant relationship between E-learning efficiency (dependable variable) and both PU and PEOU together indicating a 0.955 correlation and the regression model exhibits a high R-square of 9.11 which indicates 91.1% of the variances in a dependable variable showcasing a strong fit of the model. Moreover, Table 3 and Table 4 produced the ANOVA results that affirm the overall significance of the model. PEOU had a negative coefficient value, emphasizing the impact of the COVID-19 pandemic factors over ease of use in the BWI in Sri Lanka. This means that external conditions affect user perception and behaviour regarding the use of technology, followed by PU demonstrating significantly positive coefficients. As tested by hypotheses 1 and 2, other findings suggest that E-learning systems are extensively utilized within the bottled water industry as effective tools for IT employee training.

Moving to the second research objective, which sought to evaluate the perceived efficiency of E-learning in enhancing IT employees' skills via hypotheses 3 and 4 demonstrated a significant positive relationship between PE and EE. Both research questions intended to investigate the relationship and impact of E-learning systems as an effective tool for their training performances via the variables of performance expectancy and effort expectancy.

The performance expectation of an E-learning system for IT training describes the effectiveness and capabilities of the system in supporting their training and learning (Abbad et al., 2021). The researcher formulated a hypothesis such as "H3: Performance Expectancy significantly influences IT employees' intention to use E-learning systems". As proven by the tested hypothesis, research emphasized that E-learning improves their knowledge, skills, and learning outcomes through E-learning system features and capabilities.

Effort expectancy means user expectations of the level of effort required to understand, navigate, and utilize the functionality of E-learning systems (Abbad et al., 2021). The researcher formulated a hypothesis such as "H4: Effort Expectancy significantly influences IT employees' intention to use E-learning systems". As a result, users can easily understand and use the E-learning system and are motivated to use the E-learning system for their training.

Table 1 values of PE and EE respectively indicate the correlation at 0.885 and 0.846 which means a strong positive linear relationship and both significance levels are very low at 0.000. Both constructs together as per the model, a strong positive association is shown by illustrating a correlation of 0.889, a relationship between E-learning (dependable variable) and both PE and EE (independent variables). The interpretation of a high R-square of 0.790 (approximately 79%

of the dependent variable) can be explained as a strong fit of the model and the ANOVA results confirm the overall significance of the model, with both performance expectancy and effort expectancy showing significantly positive coefficients. After careful scrutinizing of the findings, the results suggest that the importance of E-learning to employee performance and effort in driving training outcomes are inevitable and can lead to crafting strategic decisions towards optimizing IT training practices and improving the overall training performance throughout the bottled water industry in Sri Lanka.

The third research objective is to measure the impact of E-learning efficiency (dependent variable) on IT employee training performance through social influences (SI) and facilitating conditions (FC) considered as independent variables that represent the supportive social environment and conducive conditions for optimal performance in IT employee training.

The study results showed that there was a positive vibe between E-learning efficiency and social influencing factors. As explained by Lin et al. (2013), IT employees are influenced by positive feedback and recommendations from subordinates and peers through positive management endorsements and peer support. Formulated a hypothesis such as "H5: Social influence significantly influences IT employees' intention to use E-learning systems" According to the outcome of this research, there is a positive impact based on the Social Influence on E-learning systems for IT training.

As Lin et al. (2013) explained, the availability and accessibility of resources and infrastructure have an impact on employees' views of efficiency in E-learning systems. The data analysis proved that being provided with necessary support, access and facilities leads to better performance using such systems. The formulated hypothesis as "H6: Facilitating conditions significantly influence IT employees' intention to use e-learning systems" has been proven to show a strong positive impact in facilitating conditions on e-learning efficiency.

The correlation analysis is shown in Table 1 indicating the relationship between E-learning between SI and FC, individually correlating at 0.839 and 0.814 showing a strong positive relationship which is also statistically significant at 0.000. When keeping both variables together as per the model, it is also shown in Table 7 correlating at 0.850, and in regression analysis, R square is indicating at 0.722, 72.2% of the variances in a dependable variable showcasing a strong fit of the model. Further Table 8 ANOVA results affirm the significance level at 0.000 and Table 9 provides evidence that SI and FC exhibit significantly positive coefficients which ensure a strong fit of the model. The analyzed data emphasized that there is a positive impact on facilitating conditions on the E-learning systems for IT training in the bottled water industry.

Throughout the questionnaire the researcher's main focus is to elaborate that there is a positive impact of E-learning system efficiency on IT employee training in the BWI in Sri Lanka through three main models. The expected objectives as measured via the formulated hypotheses have been successfully

measured and met. The research findings highlighted the impact of e-learning efficiency in IT employee training in the BWI in Sri Lanka and emphasized the significance of PU, PEOU, PE, EE, SI, and FC in driving the effectiveness of E-learning efficiency.

From the analysed results, it became evident the effectiveness of E-learning on IT employees' training performances showcased a significant association and positively aligns with the study objectives, in which findings are leading to the conclusion of the study by further justifying the findings, recommending improvements to the potential of e-learning capabilities while highlighting the research limitations.

## **6. LIMITATIONS OF THE STUDY**

When conducting this study of the impact of E-learning system efficiency on IT Employee training in the bottled water industry in Sri Lanka from employees' perspectives, it is crucial to recognize and acknowledge the limitations. Through this section the researcher considered some potential limitations gained from the study as follows.

### **6.1 Sample Size and Generalization**

This study mainly concentrates on IT employees who worked in the BWI in Sri Lanka and based on that, used a limited sample size which affects the generalization of the result. The selected sample represents the broader population of IT employees, out of the total population in the bottled water industry.

### **6.2 Technology Infrastructure**

Effectiveness of the E-learning system is based on the availability of the IT infrastructure of the employee. Therefore, limitations in the hardware, software, and internet connectivity may highly impact the accessibility, usability, and reliability of the E-learning platform usage. It may vary from one employee to another according to the above-mentioned circumstances.

### **6.3 Selection Bias**

When considering the selection of the participants for the questionnaire, the researcher uses certain employees within the BWI in Sri Lanka, and other than that, more employees were willing to participate in this study. As a result of that, the impact of the study may vary.

### **6.4 Self-Reporting and Social Desirability**

When gathering data for the questionnaire it may rely on the self-reported experiences of the participants, which could be subjected to social desirability. Participants may provide their responses according to social acceptance rather than the accuracy and reliability of the data.

### **6.5 Time Constraints**

This study was based on the limited depth of the period and if a longer period for the data gathering process was available, the outcome may vary accordingly. Necessity of the time is also a special concern in this research as COVID–19 affects high motivation for the use of E-learning for IT training in Sri Lanka.

### **6.6 Language and Cultural Factors**

This study overlooks how language and cultural behaviours affect E-learning under these limitations. Language barriers, level of understandability of the content, and cultural differences impact the transfer level of skills and knowledge.

### **6.7 Evolution of Technology**

With digitization distributed worldwide, rapid changes may occur in the technology. By considering the IT training, technology advancement will highly affect the contents of the courses. Therefore, an E-learning system requires continuous updates to remain effective.

It is essential for other researchers to transparently communicate these limitations when discussing the research findings. Additionally, acknowledging these constraints can guide future research and improvements in the implementation of E-learning systems for IT employees training in the bottled water industry in Sri Lanka.

## **7. RECOMMENDATIONS**

This research needed a comprehensive approach that considers the unique needs of the bottled water industry. Furthermore, the researcher came up with some recommendations for future improvements.

### **7.1 Customized Contents**

Other than the IT training, proposed to have industry-specific E-learning modules to be introduced for the bottled water industry. Such as how to measure water quality standards, manufacturing processes, and regulatory compliance related to the BWI. Other than that, the researcher needs to include real-life case studies and examples related to the bottled water industry in Sri Lanka when making course content.

### **7.2 Multilingual Support**

In a country like Sri Lanka, there are different types of nationalities living who would prefer to have the E-learning platform support multiple languages such as English, Sinhala, and Tamil. This will improve the accessibility and

understanding of a broader audience who are willing to participate in the E-learning platform having language issues.

### **7.3 Interactive Learning Tools**

As e-learners, there should be attractive methods to teach students such as puzzles, quizzes, online simulators, and experience with virtual labs. Otherwise, students will reject the E-learning platforms as their learning tool.

### **7.4 Mobile-Friendly Designs**

With the improvement of digitization and the workload of the employees, in the future, they may be forced to use mobile platform E-learning tools accessible via their smartphones. When accessing the training materials, there should be flexible and proper attractive mobile-friendly designs to accommodate high levels of learning preferences.

### **7.5 Interaction with Industry Experts**

Introducing guest lecturers or webinars from relevant industrial experts and professionals in the bottled water industry. Therefore, students in the E-learning platform can gain valuable insights, real-time experiences and build up networking opportunities.

### **7.6 Regular Updates**

There should be up-to-date E-learning content with the latest industry trends, regulations, and technologies that are relevant to the bottled water industry.

### **7.7 Enhance Collaborative Learning Opportunities**

This can enhance the professional communities among employees who engage with the bottled water industry by incorporating group projects, discussion forums, and collaborative activities. Furthermore, it enhances the knowledge sharing and supportive learning environment among employees.

With careful review and extended support of the research, conclusions highlighted the above recommendations for future improvements in the utilization of E-learning systems in the bottled water industry. For instance, a deep understanding of social influence and E-learning efficiency can be materialized by integrating more interactive and collaborative features into future E-learning systems. Another example is further enhancing PU, PEOU, PE, EE, SI and FC and E-learning relationships to develop tailor-made training contents while continuously developing evaluation and feedback systems to check E-learning efficiency, associated with artificial intelligent tools and blended learning approaches to make E-learning system automation which ultimately leads to a high-performance life-long learning culture in the bottled water industry in Sri Lanka.

## 8. CONCLUSIONS

The research findings elaborated that the hypotheses matched the objective of the utilization of E-learning systems in IT employee training within the BWI using both perceived usefulness and perceived ease. These outcomes highlighted that the E-learning mechanism is helpful in improving the efficiency of the organization at BWI.

When discussing the second objective, to evaluate the perceived efficiency of E-learning systems in enhancing IT employees' skills and gaining knowledge, it was proven that there is a positive relationship between performance expectancy and effort expectancy on IT employees' intention to use E-learning systems within the BWI. According to the research findings support, “Alternative Hypothesis (H3<sub>A</sub>): There is a positive significant relationship between performance expectancy on IT employees' intention to use E-learning systems” and the “Alternative Hypothesis (H4<sub>A</sub>): There is a positive significant relationship between effort expectancy on IT employees' intention to use E-learning systems” by having a very strong and statistically significant relationship between performance expectancy and effort expectancy through correlation analysis. With 79.0% regression analysis, it is expressed that there is a variance of efficiency in the E-learning system between performance expectancy and effort expectancy. ANOVA results show that there is a significantly positive coefficient in the model.

As a result of that, research findings support the hypotheses proving that E-learning systems are effective learning tools for enhancing IT employees' skills within the BWI. For a proper learning platform, both performance expectancy and effort expectancy play crucial roles.

Determining the impact of E-learning efficiency on IT employee performance and career development will be the final objective highlighted by the researcher using factors like social influences and facilitating conditions as a crucial learning environment to support users in the journey of learning. To evaluate the objective, researchers used E-learning as the dependent variable and social influences and facilitating conditions as independent variables.

This research proves the “Alternative Hypothesis (H5<sub>A</sub>): Social influence has a significant influence on IT employees' intention to use E-learning systems” by using peer interaction such as discussion forums, group discussions and projects. Other than that, having personalized feedback, online discussions and live webinars improves the instructor's presence. With the help of integrated social learning tools with some features like social media interactions, chat rooms, and virtual classrooms, E-learning is a social learning tool. Furthermore, researchers proved the “Alternative Hypothesis (H6<sub>A</sub>): Facilitating conditions have positively significantly influenced IT employees' intention to use E-learning systems” through the continuous support of technical infrastructure, stable accessibility, training and support for the users. As shown in Table 7, the results indicated a regression analysis of 72.2%, so there is a variance in

E-learning system efficiency that can be explained by facilitating conditions and social influence. It indicates the strong fit of the model. Researchers proved that there is a positive relationship between facilitating conditions and social influence with E-learning statistically through correlation analysis. Moreover, ANOVA results confirm that there is an overall significance of the model with both facilitating conditions and social influence.

As a conclusion, researchers proved all the expected objectives defined in this research by using formulated models and hypotheses. Therefore, researchers can emphasize that there is a positive impact on the E-learning system for IT employee training in the BWI in Sri Lanka. with the help of factors like Perceived Usefulness, Perceived Ease of Use, Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions under the TAM and UTAUT models.

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# ***Exploring the potential of transferring China's live-streaming commerce success to New Zealand***

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## **ABSTRACT**

This research aims at investigating the feasibility of replicating China's live-streaming e-commerce model in New Zealand, and to this end, it evaluates the factors that have made it successful in China and whether the same can be applied in the New Zealand market. The present research utilises a quantitative, cross-sectional research design and gathers primary data through an online survey for New Zealand consumers and retailers. The following are the major implications of this study: Technological readiness, cultural openness, and consumer trust are critical in the implementation of live-streaming e-commerce. New Zealand is one country that has embraced the use of the internet and has one of the best infrastructures for the same, and also has high smartphone usage thus offering a good platform for live-streaming. Moreover, a large number of consumers in New Zealand revealed that they are ready for new approaches to shopping and rely on the opinions of influencers, which indicates the possibility of success in implementing live-streaming e-commerce.

The research also reveals areas of growth such as, the need for businesses to ensure that they acquire good quality streaming technologies, engage customers in a very honest and genuine manner and ensure that they create content that is relevant to the culture of the area. New Zealand retailers are aware of the opportunities of live-streaming in e-commerce, but they are afraid of the costs on equipment and employee training at the beginning. Thus, addressing these concerns, offering help, and presenting examples of the best practices can help expand the use of the framework. The research concludes that New Zealand has the potential to successfully implement live-streaming e-commerce by leveraging its technological infrastructure, cultural openness, and strategies to build consumer trust and convenience. Recommendations for future research include conducting longitudinal studies, exploring cross-cultural comparisons, and investigating the impact of emerging technologies, for example, 5G and AI (Artificial Intelligence) on live-streaming e-commerce.

***Keywords:*** *Live-streaming e-commerce, China, New Zealand, Technological readiness, Cultural openness, 5G.*

## **1. INTRODUCTION**

The live-streaming e-commerce convenience is a paradigm of the change in the retailing of the world, knobbing another example of interactive buying with the fun lay in the possibility of instant purchase. This new sales channel has become hugely popular worldwide and revolutionised the e-commerce world by eliminating intermediaries and creating a direct and intimate communication link between the seller and the buyer. Leading this revolution is China where live-streaming e-commerce is not just popular – it is the powerhouse of digital retail innovation. According to Lu and Siegfried (2021) , all this led to the outstanding success of the Chinese market in this sphere, made possible by fast technological development, a dynamic consumer base that is very open to digital trends, and a system of platforms, influencers and regulations that is helpful to the growth of live-stream commerce.

On the other hand, New Zealand offers an advanced yet unique e-commerce market, defined by high digital literacy levels, strong internet infrastructure, and a thriving online shopping culture (Hao & Akoorie, 2021). But, although the country offers such attractive conditions, the model of live-streaming commerce remains underdeveloped which means that a great part of its potential is not tapped yet (New Zealand Trade and Enterprise, 2023). This study attempts to examine the applicability and outcomes of transferring China’s success in live-streaming commerce to New Zealand, researching the core factors of China’s achievements in this niche, such as technological development, consumer behaviour, and innovative business models, in contrast with the current state of e-commerce in New Zealand.

### **1.1 Background**

Live-streaming sales is a worldwide trend that has changed the world of e-commerce linking live-video broadcasting with online shopping (Chen et al., 2022). This digital commerce transformation leverages the real-time feature and interactivity of live video to generate engaging and fascinating shopping events that attract consumers in manners traditional online platforms do not. The reason is mainly the fabulous success that China has managed to attain in this area that live-streaming sales currently dominate the world and in the example of innovation and growth in digital retail.

The live-streaming commerce in China is a demonstration of how the country can use cutting-edge technology and consumers’ digital psychology. This country has created a pattern of smoothly integrating entertainment and business, benefiting from the symbiotic relationship between social media platforms and e-commerce systems. Based on the research by Wang et al. (2022), this has been facilitated by robust digital infrastructure improvements and strategic integrations of technology, which have cultivated a fertile ground for live-streaming commerce to thrive. Key Opinion Leaders (KOLs) and influencers, pivotal in this ecosystem, leverage their massive followings to sway

consumer preferences and drive sales, underscoring the unique blend of personal influence and digital marketing (Lu & Siegfried, 2021).

On the contrary, the high level of digital literacy, as well as maturity, of the consumer base are characteristic of the New Zealand e-commerce sector which has not predominantly embraced live-streaming sales as the leading channel (New Zealand Trade and Enterprise, 2023). The high internet penetration and a large consumer population in the digital technology sector demonstrate the readiness of the country to embrace even more sophisticated e-commerce models. However, the full potential of live-stream commerce has not been realized indicating a gap between the potential and the real use (Watkins et al., 2021). New Zealand's current digital infrastructure and platforms are an ideal ground for novel digital sales techniques yet the live-streaming market in the country is in embryonic stage signalling a great opportunity for growth and innovation (Randell-Moon, 2023).

This dilemma in successes through live-commerce in China and New Zealand's baby steps in the same direction shows the difference in market maturity and the change possibility for New Zealand. Hao and Akoorie (2021) emphasize that, by exploring the factors behind China's success, including technological advancements, consumer behaviour shifts, and business model innovations, this study aims to uncover insights and strategies that could bridge the gap, helping to propel New Zealand's e-commerce landscape into a new era of live-streaming sales.

## **1.2 Problem statement**

Transferring the outstanding success of live-streaming sales in China to the unique cultural and market environment of New Zealand creates a variety of opportunities and challenges. To interact with the audience in New Zealand successfully, it is rather vital to have detailed knowledge of distinctions in consumers' behaviour, communication preferences and social media usage patterns between the two countries (Ma et al., 2022). This will allow for live-streaming selling tactics customization that would fit well with the New Zealand market. Moreover, the transplantation of the Chinese live sales streaming system to the New Zealand context will be challenging due to legislative structures, privacy issues, and logistical issues. Stefko et al. (2023) observed that the tactical understanding of the appropriate strategies to adjust this model is conspicuously limited, which is highlighted by the lack of research on consumer perceptions of live-streaming and the operational integration specifics of this model tailored to the New Zealand market. This void shows an unexploited potential to use live-streaming to revolutionize online shopping in New Zealand. To address these challenges, a comprehensive framework is required, which not only embraces the elements of the Chinese model but also captures the cultural idiosyncrasies, legal limitations, and market forces of New Zealand. The project's goal is to narrow the information vacuum and reveal the

unused capacity of live-streaming sales in New Zealand. The main aim is to develop a strategic roadmap for transforming the e-commerce sector in New Zealand through live-streaming commerce.

### **1.3 Significance of the study**

This research is of high importance as it helps in bridging a significant academic gap associated with the ability to transmit the live-streaming e-commerce success of China to New Zealand. By strategic insights and recommendations, the research facilitates the businesses to have a successful deployment of live-streaming sales, policy decisions to gear up the growth of e-commerce, and consumer experience improvement in the digital market in general. Moreover, the research will encourage cultural exchange, stimulate creativity in the e-commerce sector, and contribute to the creation of a vibrant and dynamic e-commerce ecosystem in New Zealand. The results in the wake will, in the condition of live-streaming, also add practical value for businesses, policymakers, as well as consumers that live in the fast process of the digital world.

### **1.4 The Success of Live-Streaming Sales in China**

Wang et al. (2022) describe that the live-streaming e-commerce in China started in 2016 and changed from traditional TV shopping to a new digital form, which reflected the trends of information technology development and changing consumer behaviours which require more complicated social interaction and information consumption. Lu & Siegfried (2021) contend that the COVID-19 pandemic has drastically accelerated live online shopping, and it has been established as the new economic norm in China as it serves as entertainment, economic consumption, and an income opportunity for the lower class, so, it is one of the manifestations that technology empowerment has its impact on the lives of people from the lower and middle class. Si (2021) explores the potential of the sector in the area of poverty alleviation, the transmission of intangible cultural heritages and regional development presenting its wide social-economic impacts. It notes the enabling environment brought by technological innovation, the impact of social media and governmental policies for the flourishing live-streaming e-commerce. The analysis largely deals with influencer marketing, considering the host's engagement strategies with the audience, creation of hit products, and exciting experiences that help the live-stream platforms become commercially successful. Zhang and Erturk (2022) examine the tactics of leading platforms such as Taobao, TikTok, and Kwai, exposing how they have realigned to include live-streaming functions, their development principles and successful cases. Concerning the future, the document discusses risks and trends of development, covering questions of host obligations, the legal relationship between influencers and Multi-Channel Network (MCN)

agencies, product choice, and proposing suggestions for solving existing issues. Jiang (2023) explores the idea that expectations of the post-epidemic period are presented in the standardization of the industry, the coordinated development across industries, the diversification of live-streaming e-commerce practitioners' professional backgrounds, market expansion, and digital management. Thus, the section offers a complete picture of the development, current situation, and potential prospects of the live-streaming e-commerce sector in China.

### **1.5 Digital Commerce Landscape in New Zealand**

E-commerce environments of New Zealand are known for a stable increase of digital transactions with leading positions in some verticals like TradeMe and Shopify. Consumer behaviour in New Zealand is characterized by a high level of digital literacy, favouring online shopping that entails convenience and speed. On the other hand, the live-streaming efforts are currently in their infancy with just a few local brands trying out this type of format. The growth opportunity in this segment is substantial, considering the high penetration of the internet in New Zealand and the growing trend in the purchase of products online.

In addition, the telecommunications industry in New Zealand, which is crucial for digital commerce infrastructure, is characterized as small, saturated, and mature, with the completion of major projects such as the Ultra-Fast Broadband (UFB) initiative strengthening nationwide digital connectivity (Hao & Akoorie, 2021). These progressions create a good base for development of e-commerce, presenting a market ripe for digital creativity and online consumer activity. The introduction of 5G communication in New Zealand has created a new live sales industry. This kind of development gives a consumer an advanced free high-speed uplink service, which creates a true interactivity environment suited for live-streaming commerce (Dong et al., 2022). 5G could support live-streaming in New Zealand by creating an infrastructure that is capable of handling the large amount of data behind live-streams so that there can be a real-time conversation between buyers and sellers without any delay that might discourage participation. However, all these changes guarantee improved user interaction and actualize the new marketing and sales strategies that have the potential to reshuffle e-commerce in New Zealand.

### **1.6 Factors Influencing the Feasibility of Implementing Live-Streaming E-Commerce in New Zealand**

Digital platform proliferation has completely changed the game in international sales. Specifically, due to the development of live-streaming in the role of platform-based function allowing foreign sellers to improve their sales productivity in the host markets. Research conducted by Yu et al. (2023) examines this phenomenon through an information economics lens,

emphasizing the positive relationship between live-streaming usage and international seller sales success. This association becomes notably stronger in contexts of higher cultural distance, indicating that live-streaming effectively bridges the informational gap between sellers and consumers across diverse cultural backgrounds.

Moreover, Lu and Siegfried (2021) explore the moderating effects of product price and branding, revealing that higher-priced products benefit more from live-streaming due to the increased financial risk and purchase uncertainty, which live-streaming can mitigate. However, this effect is weaker for name-brand products, suggesting that brand recognition may already provide a level of trust and familiarity that live-streaming predominantly aims to establish (Qing & Jin, 2022). In the context of New Zealand, the rise of mobile commerce presents a unique set of factors influencing consumer behaviour towards online shopping. Stefko et al. (2023) propose a conceptual model that extends the technology acceptance model (TAM) and the theory of reasoned action (TRA) by integrating stimulating factors such as customized offers and price benefits. This holistic approach aims to predict consumer behaviour regarding the acceptance of mobile shopping in Slovakia, offering insights that may apply to the New Zealand digital commerce landscape. In addition, Chen, Wang, Rasool, & Wang (2022) underscore the significance of perceived usefulness as the strongest predictor of mobile shopping intention, thereby indicating the critical role of utility and convenience in fostering online shopping adoption, which is exactly the advantage of the live-streaming commerce.

## **2. RESEARCH METHODOLOGY**

The type of research that is suitable for this study is the explanatory research as it is suitable for testing theories and hypotheses that are grounded on prior literatures (Saunders et al. , 2020), and since the aim of the research is to determine the relationship between the variables that determine the adoption and success of live-streaming e-commerce in New Zealand (Blatter & Haverland, 2012). To achieve the objectives of the study, the survey research design will be used to establish the effects of the factors including; technological readiness, cultural open-mindedness, and perceived advantages on the uptake and performance of live-streaming e-commerce in New Zealand. By generating and testing hypotheses on the basis of this theoretical framework, the explanatory approach will aid in the verification and refinement of the current knowledge of live-streaming e-commerce.

The research methodology of this study is quantitative and cross-sectional, and the data is collected from an online survey conducted in the New Zealand market to identify the benefits and risks of live-streaming e-commerce. Hence, the research method to be employed in this study is quantitative. Quantitative research is the method employed to measure truism through the data collection and analysis of number information which uses statistical techniques (Creswell,

2003). The approach allows investigation of relationships between the variables, which can be quantified and analyzed through the use of structured techniques such as surveys or experiments (Saunders et al., 2020). The speed, efficiency, and impartial statistical analysis reporting of the results by quantitative research make it more preferable among the researchers (Williams, 2021). The main data will be collected from an online survey designed to capture consumers' awareness in New Zealand, attitudes, and behavior towards live-streaming e-commerce. In addition, the survey will include demographic data along with details of the online behavior of consumers to enable cross-sectional analysis among consumer segments. The data will be processed by statistical methods in order to reveal the rules, relations, and deviations between the variables. This approach is consistent with the explorative nature of the study as it allows for a structured and methodical exploration of the potential of replicating China's live-streaming e-commerce model in the New Zealand marketplace.

## **2.1 Data Collection**

Selecting primary data for the explanatory of the applicability of Chinese live-streaming business success to New Zealand is of the essence because this will provide invaluable data that not only generate unmatched depth in the investigation but also control over the reliability of the information being used to pursue the specific study objectives. Via this method, decision-makers have an opportunity to exchange ideas with actual clients and partners including retailers, allowing them to systematically gather the current buyers' attitudes, behaviours, and expectations towards live-streaming e-commerce. Through the use of specialised data collection tools such as questionnaires, the researcher can detect the idiosyncrasies characterising New Zealand's e-commerce environment, from cultural to technological to market conventions, thus ensuring that the collected data is close to true and rightly applicable to the research outbreak. By the exactness of this targeting and the direct level of engagement, not only do the gaps in the existing knowledge standing as of right now be closed—it is a priority especially. Moreover, the data-gathering process integrates ethical principles right from the beginning of the research design, specifically informed consent and confidentiality, to ensure the study is conducted properly and delivers valuable insights to the New Zealand market.

## **2.2 Sample size**

For the statistical quality of the findings, the determination of the right sample size is important. Consider the limited scope of the study and a fixed total population of internet users in New Zealand who are online shoppers to be analysed and a sample size calculation that New Zealand has around 5 million population (Statistics New Zealand, 2023). Another aspect of this procedure being not of slight importance is that it primarily controls the accuracy and

dependability of the results of our empirical studies. The 95% confidence level is chosen because of our certainty that the interval estimate will contain the population parameter in 95 out of 100 studies (Adam, 2020). As Sobel (1982) states, the confidence interval, or margin of error, will be 7% which is actually a compromise between precision and practicability, implying a moderate breadth to our confidence interval and also making the sample size controllable and cost-effective. Based on the Sample Size Calculator, there is the sample size of the research 196.

### 2.3 Data Analysis

This study is explanatory in nature, aimed at investigating the relationship of critical components, which determine the chances of success of live-streaming e-commerce in New Zealand, as such the data analysis will focus on testing the hypotheses originated from the literature review. Based on Michener (1997), statistical techniques will be used by the analysis to explore the associations between variables including technological readiness, cultural openness, consumer perceptions, and retailer adoption, and to evaluate the degree to which these factors impact the feasibility of replicating China’s live-streaming e-commerce success in the New Zealand context.

### 2.4 Research Hypotheses

In this study, a deductive approach was used as the research approach. Five hypotheses which cover five factors that may affect the live-streaming success in New Zealand have been proposed. For each hypothesis, H0 presents the null hypothesis while H1 means the alternative hypothesis. The study aims to assess the following hypotheses, as shown Table 1 below:

*Table 1. Research Hypothesis (Source: Author)*

<b>Hypothesis</b>	<b>Null Hypothesis (H0)</b>	<b>Alternative Hypothesis (H1)</b>
Hypothesis 1	The level of technological readiness in New Zealand has no significant relationship with consumers' acceptance of live-streaming e-commerce.	The level of technological readiness in New Zealand has a significant positive relationship with consumers' acceptance of live-streaming e-commerce.
Hypothesis 2	Cultural openness does not have a significant interaction with the success factors of live-streaming e-commerce in China and their relevance in the New Zealand market.	Cultural openness has a significant interaction with the success factors of live-streaming e-commerce in China and their relevance in the New Zealand market.
Hypothesis 3	The perceived trust of consumers toward live-streaming e-commerce platforms and influencers has no impact on the consumers'	The perceived trust of consumers toward live-streaming e-commerce platforms and influencers has an impact on the consumers'

	purchase intention through this platform.	purchase intention through this platform.
Hypothesis 4	There is no significant correlation between the perceived ease of use and convenience of live-streaming e-commerce and consumers' attitudes towards this novel shopping model.	There is a significant correlation between the perceived ease of use and convenience of live-streaming e-commerce and consumers' attitudes towards this novel shopping model.
Hypothesis 5	New Zealand retailers' perception of the advantages of live-streaming e-commerce has no effect on the willingness of using this new sales channel.	New Zealand retailers' perception of the advantages of live-streaming e-commerce has an effect on the willingness of using this new sales channel.

### 3. FINDINGS

#### 3.1 Demographic Details

This study utilises demographic statistics to summarise and discuss the trends in the data. The study had a total of 202 participants. Descriptive statistical analysis was conducted to verify the collected data, including percentages and frequencies. The study described the overall situation of the sample based on the age, gender, education level, monthly income, and average monthly online shopping expenditure of the respondents which shows below in Table 1. A total of 202 effective questionnaires were collected, with 64.4% of respondents aged 18-24, 34.2% aged 25-30, 0.5% aged 35-44, and 1% aged 45 and above, indicating that the respondents were mainly young groups such as college students. Females accounted for 64.4%, males for 34.2%, and the rest were unwilling to answer or others. In terms of education level, 26.2% had a bachelor's degree, 13.3% had a high school education or less, 2% had a PhD, 14.9% had a postgraduate degree, and 43.6% had some college or university education. Respondents with a postgraduate degree accounted for a high proportion. In terms of monthly income, 55.4% of respondents had a monthly income of 2000-3999 NZD, 21.8% had 4000-5999 NZD, 5.4% had 6000 NZD or more, and 17.3% had less than 2000 NZD. For average monthly online shopping expenditure, 26.7% spent 101-200 NZD, 18.3% spent 201-300 NZD, 25.2% spent 51-100 NZD, 19.3% spent less than 50 NZD, and 10.4% spent more than 300 NZD. The average monthly online shopping expenditure of respondents is at a relatively low level, indicating that online shopping still needs to be promoted.

*Table2: Demographic Details Table (Source: Author)*

	Option	Frequency	Percentage
Age	18-24	130	64.4
	25-34	69	34.2
	35-44	1	.5

Gender	45	2	1.0
	Female	130	64.3
	Male	69	34.2
	Other	1	.5
	Prefer not to say	2	1
Education Level	Bachelor's degree	53	26.2
	High school or less	27	13.3
	PhD	4	2
	Postgraduate degree	30	14.9
	Some college or university	88	43.6
Monthly Income(NZD)	\$2,000 - \$3,999	112	55.4
	\$4,000 - \$5,999	44	21.8
	\$6,000 or more	11	5.4
	Less than \$2,000	35	17.4
Average monthly online shopping expenditure	\$101 - \$200	54	26.7
	\$201 - \$300	37	18.3
	\$51 - \$100	51	25.2
	Less than \$50	39	19.3
	More than \$300	21	10.4

### 3.2 Descriptive statistics

The descriptive statistical analysis of the scales as Table 3 (N represents the sample size) showed mainly covers 10 aspects: technological readiness, consumer access devices, cultural openness, market applicability, success factors of live-streaming e-commerce, trust, convenience, likelihood of future purchases, retailers' willingness to adopt new channels, and perceived benefits. The mean scores for these 10 aspects are all greater than 3, indicating that technological readiness, cultural openness, trust, convenience, and perceived benefits all play important roles in promoting the successful adoption of live-streaming e-commerce in New Zealand. The mean scores for consumer acceptance and retailers' willingness to adopt live-streaming e-commerce are also greater than 3, indicating a positive attitude among New Zealand consumers and retailers towards the introduction of live-streaming sales.

*Table 3. Descriptive Statistics (Source: Author)*

	N	Minimum	Maximum	Mean	Std. Deviation
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Technological Readiness	202	1	5	3.88	.895
Consumers Access Devices	202	1	5	3.98	.895
Cultural Openness	202	1	5	3.94	.764
Market Applicability	202	1	5	3.77	.875
Success Factors of Live-Streaming E-Commerce in China	202	1	5	3.70	.848
Trust in Live-Streaming	202	1	5	3.80	.860
Ease of Use and Convenience	202	1	5	3.75	.803
Likelihood of Future Purchases	202	1	5	3.77	.868
Retailers' Willingness to Adopt New Channels	202	1	5	3.63	.776
Perceived Benefits	202	1	5	3.81	.697
Valid N (listwise)	202				

### 3.3 Summary of Findings

#### 3.3.1 Technological Readiness and Consumer Acceptance

The findings indicate a significant positive relationship between New Zealand's technological readiness and consumer acceptance of live-streaming e-commerce. The majority of respondents believe that New Zealand's internet infrastructure is capable of supporting high-quality live-streaming content. This aligns with the descriptive statistics showing that 55% of respondents agree that New Zealand's internet infrastructure is adequate for live-streaming.

#### 3.3.2 Cultural Openness and Market Applicability

Cultural openness in New Zealand significantly impacts the applicability of live-streaming e-commerce. According to the findings, a high proportion of the respondents are willing to engage in new shopping experiences from other cultures with 54.5% agreeing and 21. only 8% of the respondents had a strong agreement with this statement. This openness suggests that New Zealand consumers are likely to adopt live-streaming e-commerce, provided it aligns well with their cultural context.

#### 3.3.3 Trust in Live-Streaming Platforms and Purchase Intentions

The relationship between consumer trust in live-streaming platforms and their purchase intentions is notably strong. With 50.5% of respondents agreeing and

14.4% strongly agreeing that they trust product recommendations from live-streaming hosts, it is evident that trust plays a critical role in driving purchase intentions through this channel.

### **3.3.4 Ease of Use and Consumer Attitudes**

The perceived ease of use and convenience of live-streaming e-commerce significantly influence consumer attitudes. A substantial majority of respondents (52.5% agreeing and 14.9% strongly agreeing) find the convenience and instant gratification provided by live-streaming shopping appealing, which positively affects their attitudes towards this new shopping format.

### **3.3.5 Retailers' Perception and Willingness to Adopt**

Retailers' perception of the benefits of live-streaming e-commerce strongly influences their willingness to adopt this new sales channel. The data indicates that 51% of respondents agree, and 9.9% strongly agree that investing in the necessary technology and training for live-streaming is beneficial for their business growth and customer engagement.

## **4. DISCUSSIONS**

### **4.1 Hypothesis Testing Results**

Building on these descriptive statistics, the subsequent hypothesis analyses delve deeper into understanding the specific relationships between these factors. By examining the correlation and regression results, we aim to validate our hypotheses regarding the influence of technological readiness and cultural openness on the acceptance and applicability of live-streaming e-commerce in New Zealand. These analyses provide a more nuanced view of how these critical factors interact and impact the potential for replicating China's live-streaming e-commerce success within the New Zealand market.

### **4.2 Hypothesis 1**

H1o: The level of technological readiness in New Zealand has no significant relationship with consumers' acceptance of live-streaming e-commerce.

H1a: The level of technological readiness in New Zealand has a significant positive relationship with consumers' acceptance of live-streaming e-commerce.

Correlation analysis is a statistical method used to study the relationship between two or more variables. It helps in understanding the associative properties between variables. In this paper, SPSS is utilized to verify the correlation between various variables, their levels of closeness, and the direction of their correlation. The closer the absolute value of the correlation coefficient is to 1, the more significant the correlation between the two variables. This paper posits that if the correlation coefficient is below 0.3, it indicates a weak or no

correlation between the two variables; 0.3 to 0.6 indicates a moderate correlation; and above 0.6 indicates a strong correlation. If the correlation coefficient is positive, the two variables are positively correlated; otherwise, they are negatively correlated. To investigate whether there is a relationship between New Zealand's level of technological readiness and consumer acceptance of live-streaming e-commerce, a correlation analysis was first conducted. The results are shown in the table 4 below: the correlation coefficient between New Zealand's level of technological readiness and consumer acceptance of live-streaming e-commerce is 0.593, which is significant at the 1% level, indicating a significant positive correlation between New Zealand's level of technological readiness and consumer acceptance of live-streaming e-commerce.

*Table 4: Correlation Test Table (Source: Author)*

		Technological Readiness	Consumer Acceptance
Technological Readiness	Pearson Correlation	1	0.593**
	Sig. (2-tailed)		0.000
Consumer Acceptance	Pearson Correlation	0.593**	1
	Sig. (2-tailed)	0.000	

Note: \*\*. Correlation is significant at the 0.01 level (2-tailed).

To further verify whether the relationship between New Zealand's level of technological readiness and consumer acceptance of live-streaming e-commerce is significant (i.e., whether it is sufficient to reject H0), this study uses linear regression analysis to estimate the relationship between the two and calculate the relevant statistics and p-value. The regression results are shown in the table 5 below: the regression coefficient for New Zealand's level of technological readiness is 0.592, and the p-value is 0.000, indicating that New Zealand's level of technological readiness positively influences consumer acceptance of live-streaming e-commerce at the 1% significance level. Under the condition that other factors remain unchanged, a one-unit increase in technological readiness will drive consumer acceptance of live-streaming e-commerce up by 0.592 units. This verifies Hypothesis 1, showing a significant positive relationship between New Zealand's level of technological readiness and consumer acceptance of live-streaming e-commerce.

Table 5: Regression Results Table (Source: Author)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Significance
		B	Std. Error	Beta		
1	(Constant)	1.677	0.227		7.401	0.000
	Technological Readiness	0.592	0.057	0.593	10.403	0.000

From the above analysis, the following insights can be drawn:

Increase investment in network infrastructure to enhance bandwidth and stability, ensuring high-quality and smooth live-streaming experiences.

Promote the widespread adoption and application of mobile payment technologies, simplifying payment processes, improving success rates, and lowering user payment barriers.

### 4.3 Hypothesis 2

H1o: Cultural openness does not have a significant interaction with the success factors of live-streaming e-commerce in China and their relevance in the New Zealand market.

H2a: Cultural openness has a significant interaction with the success factors of live-streaming e-commerce in China and their relevance in the New Zealand market.

Using Pearson correlation coefficients to measure the relationships between cultural openness, success factors of Chinese live-streaming e-commerce, and their applicability in the New Zealand market. The results are shown in the table 6 below: the correlation coefficient between cultural openness and market applicability is 0.376, and between Chinese live-streaming e-commerce success factors and market applicability is 0.314, both significant at the 1% level, indicating significant positive correlations among cultural openness, Chinese live-streaming e-commerce success factors, and market applicability in New Zealand.

Table 6: Pearson's correlation coefficient Table (Source: Author)

		Cultural Openness	Market Applicability	Chinese Live-Streaming Success Factors
Cultural Openness	Pearson Correlation	1	.314**	.381**
	Sig. (2-tailed)		.000	.000
	N	202	202	202

Market Applicability	Pearson Correlation	.314**	1	.310**
	Sig. (2-tailed)	.000		.000
	N	202	202	202
Chinese Live-streaming Success Factors	Pearson Correlation	.381**	.310**	1
	Sig. (2-tailed)	.000	.000	
	N	202	202	202

Note: \*\*. Correlation is significant at the 0.01 level (2-tailed).

To further explore the impact of Chinese live-streaming e-commerce success factors on market applicability in New Zealand and whether cultural openness significantly moderates the relationship between the two, a moderation effect analysis was conducted.

First, centering the independent variable and the moderator, the interaction term between Chinese live-streaming e-commerce success factors and cultural openness was calculated. Then, regression analyses were conducted for Chinese live-streaming e-commerce success factors and market applicability, cultural openness and market applicability, and the interaction term and market applicability. The regression results are as Table 7 follows:

*Table 7: Regression Results Table (Source: Author)*

	Model 1		Model 2		Model 3	
	$\beta$	t	$\beta$	t	$\beta$	t
Success Factors	0.324***	4.671				
Cultural Openness			0.437***	5.827		
Interaction					-0.052	-0.945
Constant	2.570***	9.775	2.047***	5.827	-.052	-0.945
R <sup>2</sup>	0.098		0.145		0.004	
F-value	21.818		33.950		0.892	

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

The results show that Chinese live-streaming e-commerce success factors positively influence market applicability in New Zealand, significant at the 1% level. The regression coefficient for cultural openness is 0.437, significant at the 1% level, indicating that for every one-unit increase in cultural openness, market applicability in New Zealand increases by 0.437 units. This suggests that New Zealand can learn from China's experience, enhancing brand building and market promotion to boost the brand influence and consumer trust of local or international e-commerce platforms. However, the regression coefficient for the interaction term is negative, indicating that cultural openness suppresses the positive impact of Chinese live-streaming e-commerce success factors on

market applicability in New Zealand. Yet, this coefficient is not significant, indicating that cultural openness does not significantly moderate the relationship between Chinese live-streaming e-commerce success factors and market applicability in New Zealand. Hence, there is no sufficient reason to reject the null hypothesis (H0).

#### 4.4 Hypothesis 3

H3o: The perceived trust of consumers toward live-streaming e-commerce platforms and influencers has no impact on the consumers' purchase intention through this platform.

H3a: The perceived trust of consumers toward live-streaming e-commerce platforms and influencers has an impact on the consumers' purchase intention through this platform.

Using Pearson correlation coefficients to measure the relationship between consumers' trust in live-streaming e-commerce platforms and influencers and their intention to purchase through this channel, the results are shown in the Table 8 below. The correlation coefficient between trust and purchase intention is 0.441, which is significant at the 1% level and greater than 0.3, indicating a strong positive relationship between consumers' trust in live-streaming e-commerce platforms and influencers and their intention to purchase through this channel.

*Table 8: Regression Results Table (Source: Author)*

		Trust (Host/Influencer Recommended Products)	Future Purchase Intention Through Live-streaming
Trust (Host/Influencer Recommended Products)	Pearson Correlation	1	.441**
	Sig. (2-tailed)		.000
	N	202	202
Future Purchase Intention Through Live-streaming	Pearson Correlation	.441**	1
	Sig. (2-tailed)	.000	
	N	202	202

Note: \*\*. Correlation is significant at the 0.01 level (2-tailed).

To further verify whether the relationship between consumers' trust in live-streaming e-commerce platforms and influencers and their intention to purchase through this channel is significant (i.e., whether it is sufficient to reject

H0), this study uses linear regression analysis to estimate the relationship between the two hypotheses.

From the regression results Table 9 below, it can be seen that the regression coefficient for consumers' trust in live-streaming e-commerce platforms and influencers is 0.495, passing the 1% significance level test. This indicates that for every one-unit increase in trust, consumers' intention to purchase through this channel increases by 0.495 units, confirming H1: consumers' trust in live-streaming e-commerce platforms and influencers positively affects their intention to purchase through this channel.

*Table 9: Regression coefficient Results Table (Source: Author)*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
1 (Constant)	1.891	.242		7.810	.000
Trust	.495	.062	.491	7.966	.000

Based on the above analysis, the following recommendations can be made for live-streaming platforms. Platforms should continuously optimize user experience, ensure product quality, and improve after-sales service systems to enhance user satisfaction and build and consolidate user trust. By implementing transparent transaction mechanisms, strict merchant review systems, and efficient complaint handling processes, platforms can enhance their credibility. Influencers and opinion leaders should maintain integrity, genuinely recommend products, and avoid exaggeration or false advertising. Building a good reputation and a solid fan base over the long term is key to enhancing trust. Additionally, maintaining sincere interactions with fans and understanding and meeting their needs can also deepen the trust relationship.

#### **4.5 Hypothesis 4**

H4o: There is no significant correlation between the perceived ease of use and convenience of live-streaming e-commerce and consumers' attitudes towards this novel shopping model.

H4a: There is a significant correlation between the perceived ease of use and convenience of live-streaming e-commerce and consumers' attitudes towards this novel shopping model.

Using Pearson correlation coefficients to measure the relationship between consumers' perceived ease of use and convenience of live-streaming e-commerce and their attitudes toward this new form of shopping, the results are shown in the table 10 below. The correlation coefficient between perceived ease

of use and convenience and consumer attitudes is 0.324, which is significant at the 1% level, indicating a moderate positive relationship.

*Table 10: Correlation Analysis Results Table (Source: Author)*

		Ease of Use and Convenience	Consumer Acceptance
Ease of Use and Convenience	Pearson Correlation	1	.324**
	Sig. (2-tailed)		.000
	N	202	202
Consumer Acceptance	Pearson Correlation	.324**	1
	Sig. (2-tailed)	.000	
	N	202	202

Note: \*\*. Correlation is significant at the 0.01 level (2-tailed).

From the regression results Table 11 below, the regression coefficient for perceived ease of use and convenience of live-streaming e-commerce is 0.324, with a t-value of 4.840, passing the 1% significance level test. This indicates that for every one-unit increase in perceived ease of use and convenience, consumers' positive attitudes towards this new form of shopping increase by 0.324 units. This confirms H1: perceived ease of use and convenience of live-streaming e-commerce positively affect consumers' attitudes towards this new form of shopping.

*Table 11: Regression Results Table (Source: Author)*

Model		Unstandardized		Standardized		Significance
		B	Std. Error	Beta	t	
1	(Constant)	2.622	.286		9.167	.000
	Ease of Use and Convenience	.361	.075	.324	4.840	.000

The positive impact of perceived ease of use and convenience on consumer attitudes provides multiple insights for the e-commerce industry. By optimizing user experience, enhancing convenience, integrating online and offline experiences, offering personalized recommendations, strengthening after-sales service, and focusing on content innovation, the attractiveness and competitiveness of live-streaming e-commerce can be further enhanced, promoting the healthy development of the e-commerce industry.

#### 4.6 Hypothesis 5

H5o: New Zealand retailers' perception of the advantages of live-streaming e-commerce has no effect on the willingness of using this new sales channel.

H5a: New Zealand retailers' perception of the advantages of live-streaming e-commerce has an effect on the willingness of using this new sales channel.

Analysis of Variance (ANOVA), also known as "variance analysis" or "F-test," was invented by Sir Ronald A. Fisher (R.A. Fisher). It is used to test the significance of differences between the means of two or more samples. The primary purpose of this method is to infer whether the population means of two or more groups are the same and to test whether the differences between the sample means are statistically significant. From the ANOVA results Table 12 and Correlation Measurement Table 13 below, the F-value is 4.845, and the p-value is 0.000, indicating significance at the 1% level. This signifies that New Zealand retailers' perception of the benefits of live-streaming e-commerce is significantly related to their willingness to adopt this new sales channel. The introduction of the correlation ratio shows an Eta value of 0.149, indicating strong correlation and statistical significance.

*Table 12: ANOVA Results Table (Source: Author)*

		Squares	df	Square	F	Significance
Retailers' Willingness to Adopt New Channel *Perceived Benefits	Between Groups	17.789	7	2.541	4.845	0.000
	Within Groups	101.226	193	0.524		
	Total	119.015	200			

*Table 13: Correlation Measurement Table (Source: Author)*

	Eta	Eta Squared
Retailers' Willingness to Adopt New Channel * Perception of Benefits	.387	.149

To further verify whether New Zealand retailers' perception of the benefits of live-streaming e-commerce significantly affects their willingness to adopt this new sales channel and the direction of the influence, this study uses linear regression analysis to estimate the relationship between the two and calculate

the relevant statistics and p-values. The regression results are shown in the table 13 below: the regression coefficient for New Zealand retailers' perception of the benefits of live-streaming e-commerce is 0.411, with a p-value of 0.000. This indicates that at the 1% significance level, New Zealand retailers' perception of the benefits of live-streaming e-commerce positively influences their willingness to adopt this new sales channel. Under the condition that other factors remain unchanged, for every one-unit increase in retailers' perception of the benefits of live-streaming e-commerce, their willingness to adopt this new sales channel increases by 0.411 units. This confirms Hypothesis 5: New Zealand retailers' perception of the benefits of live-streaming e-commerce positively affects their willingness to adopt this new sales channel.

*Table 13: Regression Results Table (Source: Author)*

Model		Unstandardized Coefficients		Standardized Coefficients		Significance
		B	Std. Error	Beta	t	
1	(Constant)	2.058	.282		7.294	.000
	Perceived Benefits	.411	.073	.372	5.651	.000

#### **4.7 Interpretation of Results**

The findings from this research align with the literature on live-streaming e-commerce, particularly regarding the importance of technological readiness and consumer trust. For instance, Lu and Siegfried (2021) highlighted that live-streaming in China has gained immense popularity because of the digital infrastructure and consumers' high tech preparedness. In the same way, this study revealed that New Zealand's technological development plays a crucial role in the consumers' acceptance of live-streaming commerce. The data analysis in this paper involves calculating the correlation coefficient of 0.593. The positive correlation between technological readiness and consumer acceptance also supports the fact that a good Internet connection is a vital factor that enhances the use of this new sales channel.

Moreover, the literature also supports the cultural factors that affect the usage of e-commerce. Wang et al. (2022) in another paper presents the aspect of cultural openness as a way that consumers can accept new technologies and new forms of shopping. In this regard, the study offers empirical backing for that proposition since it establishes that cultural openness is advantageous for the market adoption of live-streaming e-commerce in New Zealand. With 54.5% of respondents agreeing and 21.8% strongly agreeing that they are open to new shopping experiences from different cultures, it is evident that cultural openness is a key factor in adopting live-streaming e-commerce.

This research contributes to the theoretical framework of live-streaming e-commerce by integrating aspects of the Technology Acceptance Model (TAM) and the Theory of Reasoned Action (TRA). The significant positive relationship between perceived ease of use, convenience, and consumer attitudes towards live-streaming e-commerce (correlation coefficient of 0.324) extends the TAM by incorporating the unique interactive elements of live-streaming. Additionally, the study shows that trust in live-streaming platforms and influencers (correlation coefficient of 0.441) is a critical determinant of purchase intentions, supporting the TRA's emphasis on subjective norms and attitudes towards behaviour.

By adding the dimension of cultural openness, this study suggests that cultural factors should be considered when applying TAM and TRA to new e-commerce models. The moderation effect of cultural openness on the relationship between live-streaming success factors and market applicability indicates that consumer acceptance is not just about technology and convenience but also about cultural adaptability.

## **5. CONCLUSIONS**

The research presents important outcomes concerning the applicability of the Chinese live-streaming e-commerce model to the New Zealand market. Based on the analysis, the following factors are deemed to be significant in this process: technological readiness, cultural openness, and consumer trust. New Zealand has a developed technological environment with almost every citizen connected to the internet and an increased uptake of smart phones thus making it easier to implement live-streaming e-commerce. This finding on the positive relationship between technological readiness and consumer acceptance points to the necessity of sustaining and improving the technology that provides such live-streaming experiences. Also, the cultural receptiveness of the New Zealand consumers to new shopping forms is another factor that enhances the live-streaming e-commerce adoption.

The research also revealed that a vast number of the participants are open to new and versatile shopping options, which points to the possibility of live-streaming being well received in the region. This is because live-streaming platforms and influencers' trust is a central factor that influences the consumer's purchase intention as evidenced by the positive relationship between trust and consumer purchase behavior. To successfully convert the viewers into customers, it becomes crucial to gain and sustain the consumer's trust by being transparent, authentic, and regularly engaged. The findings indicate that live-streaming e-commerce is convenient and offers instant satisfaction, and thus, improving the user experience and making shopping easier should be the main strategies for engaging and keeping the consumers. New Zealand retailers are aware of the opportunities of live-streaming e-commerce to expand their business and interact with customers. Nevertheless, questions on the capital

outlay for the technology and staff development should be overlooked. Showing the benefits of live-streaming in the long run and offering help and incentives can help in convincing more retailers to use live-streaming as a way to sell their products. Therefore, the study finds that live-streaming e-commerce can be effectively integrated into the New Zealand economy due to the country's technological preparedness, cultural receptiveness, and approaches to establishing consumer confidence and ease of use.

### **5.1 Future Research**

Thus, future research should focus on extending the findings of this study and increasing the understanding of live-streaming e-commerce opportunities in New Zealand. First, looking at the changes in the consumer attitudes and behaviors, cross-sectional research will be needed. These studies can follow the same consumers at different times to observe the changes in consumers' trust, participation, and purchasing behaviour due to the exposure of live-streaming e-commerce. This approach will assist in identifying whether consumers' behavioral changes and retailer actions in live-streaming will be sustainable.

Second, cross-cultural comparison should be made concerning the factors that can be used across all cultures and those that are culture-specific. Analyzing the rates and results of the live-streaming e-commerce in various cultural settings will help to identify the trends and possible issues that may occur, thus helping companies to build better cross-cultural strategies. It will be essential for the future to learn the consumers' preferences and behaviors based on cultural differences to make the live-streaming content appealing to the audience.

Third, it is also important to explore the effect of the new technology like 5G on the live-streaming e-commerce and its performance. With 5G technology, there are expectations of faster internet speeds and more stable connections and this can greatly improve the live-streaming as there will be less latency as well as the ability to stream high quality video. This paper aims to explore how such technologies may help and enhance the live-streaming e-commerce to better envision future developments and opportunities.

Lastly, a detailed cost-benefit analysis for the retailers who are willing to implement live-streaming e-commerce will be described. An analysis of this type should also consider the evaluation of the capital investments to be made at the start of the venture, the possible gains that can be made, as well as the future advantages of the project. Thus, future research can contribute to the decision-making process of the retailers as to whether or not they should include live-streaming as a sales channel. This will enable businesses to effectively position themselves to effectively harness the potential of live-streaming in their eCommerce business in the New Zealand market.

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# ***Cybersecurity challenges in the era of remote work: Strategies for ensuring data privacy and information security***

*Dr Zarqa Shaheen, Prof. Michele Akoorie and Anju Rana Magar*

## **ABSTRACT**

Global occurrences such as the COVID-19 epidemic have prompted the spread of remote workstations, posing serious cybersecurity challenges. This applied project's paper explores the landscape of cybersecurity risks in remote work environments and primarily concentrates on methods that promote data security and privacy. Personal and corporate devices, mixed with differing network security protocols in remote work settings, make them more vulnerable to phishing, malware or ransomware attacks. Multi-factor authentication (MFA), endpoint security solutions, strong Virtual Private Networks (VPNs), and frequent cybersecurity training for staff members are important tactics to reduce these dangers. Furthermore, producers that are essential to guaranteeing sensitive information are adequately protected including data encryption, secure cloud storage, and stringent access control. This paper focuses on the importance of a comprehensive cybersecurity framework that includes technological solutions, organizational policies, and employee awareness to mitigate cybersecurity risks in a remote work environment.

***Keywords:*** *COVID-19, Cybersecurity challenges, Cybersecurity training, Remote work*

## **1. INTRODUCTION**

The current conditions of remote work require urgent and systemic threat addressing. Thus, understanding the specific challenges of home working and adopting appropriate security measures can improve organisations' protection against cyber threats and preserve their operations in a more digital environment . Implementing complete strategies that include reliable endpoint security, frequent assessments, ongoing training, MFA, VPNs, and timely software updates will enable organisations to reduce threats and safeguard confidential information, thus maintaining the confidentiality and integrity of their operations in a remote working environment.

## **1.1 Research Objectives**

RO1: To discuss the main cybersecurity issues facing remote work.

RO2: To assess the influence of telecommuting on employee recruitment processes and possible weaknesses.

RO3: The need for robust mechanisms to protect confidential information and ensure data security during remote operations cannot be overstated. This is a critical aspect of remote work security that requires immediate attention. The study aims to develop mechanisms that are not only effective but also practical and adaptable to various remote work scenarios.

## **1.2 Research Questions**

RQ1: What are the most common cybersecurity threats faced in remote work environments?

RQ2: What are the most effective strategies to guarantee remote workers' data privacy and information security?

RQ3: What are the most effective cybersecurity strategies for remote work environments?

## **1.3 Statement of Problems**

The rapid increase in remote work related to global events has revealed many cybersecurity issues for organisations. As more and more employees leave traditional office settings, the attack surface explodes spectacularly, and weaknesses spread in all directions, giving rise to data leaks and unprivileged access, among other cyber threats.

The attack surface of an organisation is significantly increased by remote work. Workers use various devices and networks to access corporate networks from different places, and many of these may not have the strict security measures found in traditional office environments. This fluctuation raises the possibility of weaknesses that cybercriminals could take advantage of (Green, 2023)

Another major obstacle is ensuring secure remote access. VPNs and other remote access solutions must be strong enough to manage growing traffic volumes without sacrificing security. However, VPNs might become targets if not set up and maintained correctly. Endpoint security measures like multi-factor authentication (MFA) are crucial to secure remote connections and preserve sensitive data (Kinattumkal et al., 2023)

Mitigating and handling these threats is critical to ensuring the integrity of sensitive data, business continuity, and client trust. Focused research then needs to be initiated on what cybersecurity challenges are expected when working remotely, determining the effectiveness of countermeasures available, and proposing appropriate measures specific to the changing nature of telecommuting practices. (Ramadan et al., 2021).

The rapid boom in far-off paintings has not simply multiplied the attack surface. However, it also highlighted the demand for constant cybersecurity guidelines throughout diverse geographical places. The numerous cybersecurity practices and awareness degrees among faraway employees must be more consistent in security enforcement, leading to ability vulnerabilities. Additionally, combining personal and professional gadgets without sufficient security controls poses full-size dangers (Divyaja, 2024). Almost all groups have yet to integrate their cybersecurity structures adequately to meet the needs of remote paintings, and therefore, cybercriminals exploit such gaps. Moreover, the fast implementation of remote work solutions can also fail to address adequate safety training for personnel, which leads to human error and cyber threats (Rahamti, 2023). Solving these issues calls for an effective strategy that involves improving cybersecurity protocols, raising employee awareness, and implementing strict security measures suitable for remote working conditions.

#### **1.4 Significance of the Study**

Such a study becomes critical in tackling some emerging cybersecurity risks associated with remote working. Cybersecurity threats are critical issues as organisations transition to decentralised work environments. These findings will be helpful for business owners, governments, and IT specialists because they will help to update an approach to protecting personal information in new conditions of working remotely. This is because this study purports to make recommendations on protecting critical phases of the employment process by examining telecommuting and job seeking. The significance of remote work is due to the decreased overhead costs, enhanced worker performance and morale, and expanded workforce access. New cybersecurity challenges arise as sensitive data is accessed and transferred beyond the typical office environment. Due to this trend, there is a greater dependence on cloud-based services, remote access tools, and collaboration platforms—all of which have security holes that hostile actors might exploit.

In addition, as the world's labour force increasingly embraces remote work, this study's findings will help shape better practices that improve data security and information safety. The research's importance is not limited to organisational matters; it affects the professional society and contributes to laying a robust base for remote work practices. As such, this research aims to create a safer online environment so that remote work can be done without compromising the safety and confidentiality of information (Malecki, 2020).

Moreover, it is difficult to enforce the cybersecurity measures taken due to the spread of the workforce across the globe. As teams work from different places and use various devices and networks, the most challenging thing thus becomes establishing consistent security policies. Even though remote work models are being instituted rapidly, organisations' ability to update and develop new

cybersecurity frameworks and policies still cannot catch up, creating a space for cyber-attacks and increasing the risk of security breaches.

## **2. THEORETICAL FRAMEWORK**

### **2.1 Technological Advancements and Virtual Work**

Technological advancement and significant events have replaced traditional office employment with virtual work, introducing unprecedented security challenges because workers can handle and transmit information anywhere. With the decentralisation of the remote workforce, these new threat risks can no longer be ignored and require urgent and immediate attention. This paper aims to provide an objective analysis of the effects of telecommuting on recruitment and cyber threats – with a particular focus on information security in the contemporary workplace. (Okerefor & Manny, 2020).

### **2.2 Cybersecurity in Remote Working Environments**

The remote working environment is significantly more susceptible to a wide range of cyber threats than most organisations are accustomed to the traditional working environment. It is believed that the shift to remote work has provided a new attack surface for cybersecurity criminals, making remote employees prime targets for phishing, malware, and ransomware. In many home office setups, these vulnerabilities are further amplified, leading to increased data breaches and unauthorised access due to inadequate cybersecurity measures.

### **2.3 Geographic Dispersion and Cybersecurity Risks**

The biggest cybersecurity issue emanating from remote employment is the geographic dispersion of the workforce. These employees work remotely using various networks, including the ones found at their homes and public Wi-Fi networks, to access company information. That is because they lack reliable protection mechanisms; therefore, they may become easy prey to malware, phishing, identity theft, or attempts to access them illegally. The remote workers may use their laptop, mobile phone, or tablet, which violates company safety rules (Inuk, 2024).

### **2.4 Cloud Services and New Security Challenges**

The increased reliance on cloud services for communication, collaboration, and data storage has introduced new security challenges in the era of remote work. While offering scalability, flexibility, and cost-effectiveness, cloud services also present vulnerabilities if not correctly configured and secured. The COVID-19 pandemic has forced a sudden migration to work remotely, which puts significant pressure on the existing cybersecurity solutions and policies. (Atstāja et al., 2021). These gaps expose organisations to risks that cybercriminals can exploit, especially when setting up or configuring cloud systems (Wernick,

2021). Lack of proper configuration of the cloud environments, weak authentication measures, and ineffective monitoring increases the risks of data theft and unauthorised access to sensitive corporate data.

## **2.5 Challenges in Implementing Cybersecurity Protocols**

In addition, there are challenges in implementing fundamental cybersecurity protocols in organisations with a dispersed workforce. The various adopted technologies by remote employees also make it challenging to set policies on security that are likely to create some form of insecurity. They may come with their gadgets into the workplace, and these gadgets may be more vulnerable than the company's. However, the distinction between private and business communication spaces complicates security, mainly when employees work remotely. Employees' use of insecure personal gadgets and networks to access corporate information exposes them to risks such as phishing, malware, and ransomware, among others.

## **2.6 Addressing Cybersecurity Challenges**

Such challenges must be addressed through solid cybersecurity policies in organisations because of the rising uptake of remote workplaces. Threats must not penetrate the remote nodes, and the proper measures concerning the endpoints must be implemented. Perhaps conducting security assessments at regular intervals may assist in identifying areas that need improvement in security measures. This factor implies that remote employees should undergo cybersecurity training occasionally to minimise the risks while improving their understanding of specific security protocols (Nwankpa & Datta, 2023). Moreover, applying multi-factor authentication and VPN strengthens the security of access to the company's resources and encrypts communication. There is also the constant need for new software updates and patches against new or newly discovered threats, and for the security of all systems worldwide, it has become an ongoing process.

## **3. METHODOLOGY**

The research paper's methodology section covers more than the procedures for obtaining and analysing data. The research process's general approaches and viewpoints are what the methodology is all about.

### **3.1 Research Design**

This research design was premised on a quantitative approach deemed appropriate for testing the data and establishing the likelihood of cybersecurity incidents from working from home. This approach was considered because it could provide a quantitative lens to measure the extent and intensity of cybersecurity threats to home-based workers (HBWs). In this respect, the

following study aims to collect information on the number of incidences, types and impact threats using a structured questionnaire developed through Google Forms. Closed questions are included in the questionnaire to make quantification and analysis of the variables possible. In contrast, open-ended questions make it possible to quantify personal experience and perception better. Such an approach will give the participants a deeper understanding of the cybersecurity issues.

The study uses a reliable and valid research method of data collection, which is stratified random sampling. This method reasonably ensures that the sample is collected from various categories of individuals, ages, genders, professions, and industries. Creating such a stratification is essential to capture as many different remote workers' views and experiences in the study as possible to enhance the study's external validity. Furthermore, Descriptive and Inferential statistics are used to analyse the collected data using the Microsoft Excel program to explore the obtained data more effectively. This research framework will use proper sampling and appropriate data collection/analysis tools to develop practical solutions for addressing the cybersecurity concerns of inadequate data privacy and security in the ruined work. (Gunduz & Das, 2020).

### **3.2 Research Approach**

The research philosophy adopted for this research is quantitative, which undertakes positivist empirical research about cybersecurity concerns associated with work from a distance. Quantitative research is suitable because it focuses on data that can be quantified and analysed statistically. This approach helps the researcher find trends, make hypotheses specific, and draw conclusions from quantitative data. They are also based on objective measures of cybersecurity problems and provide valid and applicable results in different remote working environments.

Quantitative research best suits this study because it enables the researcher to collect much data from diverse participants. This is crucial for defining the scope of cybersecurity issues affecting the remote workforce. The use of a structured survey distributed through Google Forms allows the collection of data regarding specific variables, including the types and frequencies of cybersecurity threats, the assessment of the current cybersecurity measures, and the perception of the impact of these threats on remote work. It is necessary to use closed-ended questions to receive exact numerical responses and close-ended questions because they help get qualitative information on the issues the survey covers.

The data collection process will be reliable and valid. The survey questions were also pre-tested with a few participants to ensure they were clear and relevant. Feedback from the pilot test was used to make the adjustments that enhanced the final survey tool. The survey was then sent to a larger stratified

random sample to determine whether the collected data was representative of the population of remote workers.

Consequently, due to the availability of multiple statistical and visualisation functions, Microsoft Excel was chosen for data analysis. Visualisation is easier to employ statistics to present the results of a study that has been conducted. Descriptive mean, median, and popular deviation information can show quantitative records, even as inferential facts may be used for speculation testing.

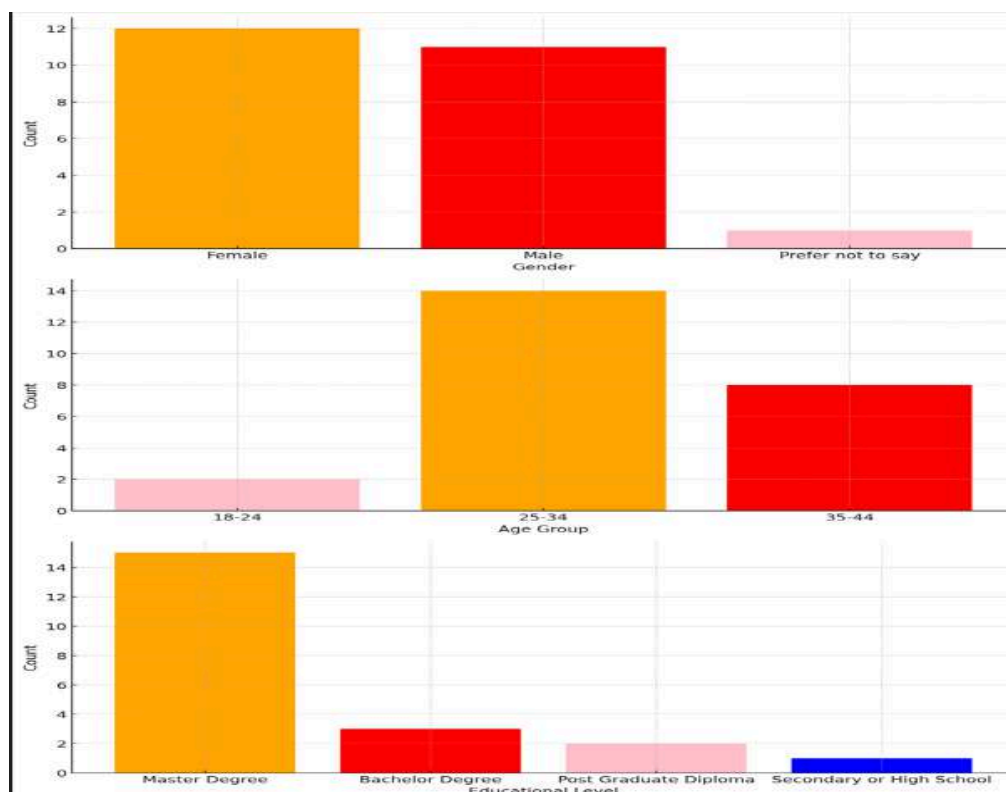
#### 4. FINDINGS

This section analyses the empirical results from the survey by summarizing the respondents' details and describing the data set overview, indicating the range and nature of the respondents.

##### 4.1 General Demographic

Demographic information gathered from the survey is critical in knowing who was sampled in the study and from what backgrounds. The reported information will help to understand the specifics of reading the survey results and assess the significance of the sampling. The first group of demographic factors includes the respondents' age, gender, and educational level, which all have a bearing on the results concerning their awareness of cybersecurity issues and measures in the context of home-based remote work arrangements. (Bispham et al., 2022).

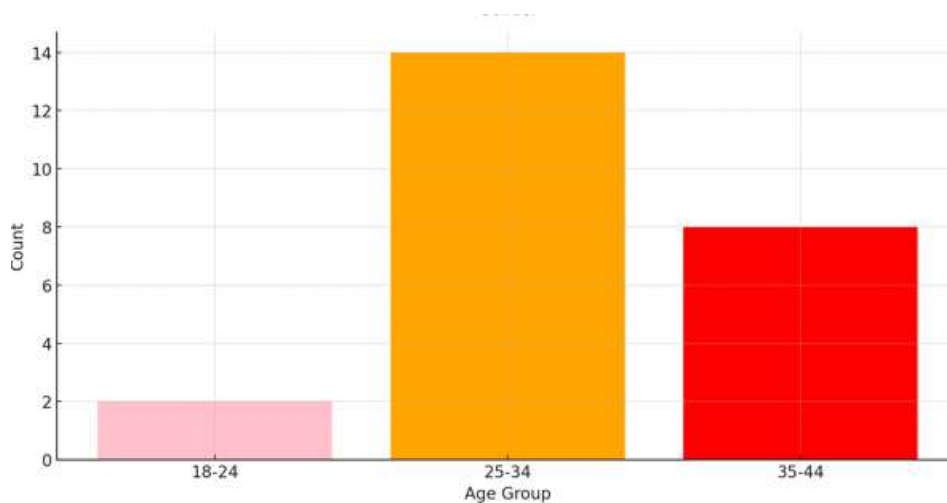
*Figure 1 General Demographic (Source: Author)*



## 4.2 Age

Due to this, age can be categorised as a demographic factor that could be critical in determining the kind of experience one has in technology and cybersecurity measures. Unsurprisingly, the survey revealed that many people fell within the age category of 25-34 years. These age groups tend to have a general understanding of the Internet and other digital tools and technologies needed to operate most devices. For this reason, these generations are more cognizant of the nature of the risks that stem from technology and the measures that should be taken to address the risks.

*Figure 2 Age Distribution (Source: Author)*



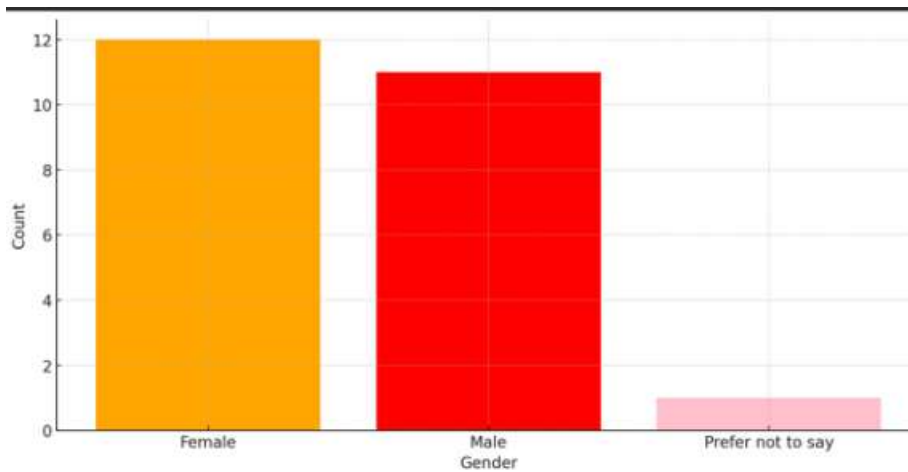
Despite being less knowledgeable in IT, older respondents have more years of experience and a better understanding of the history of the processes happening in cyberspace. Answers given by them could enlighten us on how organisations have developed their cybersecurity approaches if specific measures were successful in the past, and how. Finally, there is the issue of age differentiation for respondents: while older people may provide more traditional attitudes towards cybersecurity threats and risks, younger people may be at least more aware of currently existing threats and, potentially, new types of threats and solutions for them (Snider et al., 2021).

## 4.3 Gender

The gender distribution in the cross-sectional survey was pretty balanced, with a slightly higher representation of the male counterpart. This balance is essential for ensuring the study's findings are a great sample of different attitudes and experiences towards cyber-security. Gender can impose bias in the characteristics and practice of the safety mechanisms, making it easier for either gender to focus on what they think is significant by their positions in the given

firm.

*Figure 3 Gender Distribution (Source: Author)*

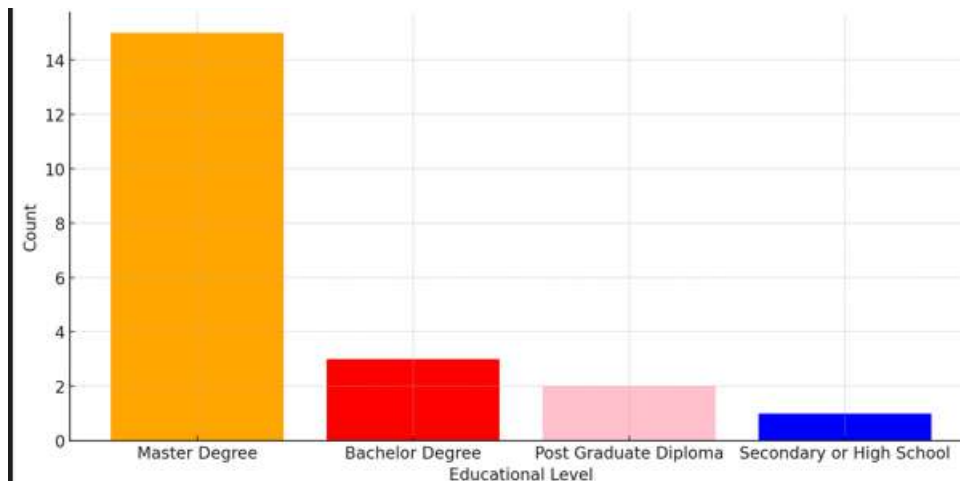


For instance, specific research indicates that women could be less risky and punctilious about implementing rules and regulations as per the security guidelines. At the same time, men may be more liberal and relaxed about exploring new technologies and security measures. Ensuring the selected survey gathers a relatively equal representation of male and female participants will make it much easier to compare cybersecurity approaches between genders and identify potential issues specific to each gender.

#### **4.4 Educational Attainment**

Another demographic factor that stands out with regards to the education level of the respondents has a bearing on their knowledge and practices in cybersecurity. The survey respondents had diversified educational backgrounds, and many of them had attained post-graduate education, such as a Master of Business Administration degree, Bachelor of Business Management and Administration degree, Post-graduate Diploma in marketing, and educational Administration, to mention but a few. This diversity is essential, as more education about such issues means the general public can comprehend more advanced topics, such as cybersecurity (Triplett, 2023).

*Figure 4 Educational Attainment Distribution (Source: Author)*



It is expected that those with higher education levels would have been trained or aware of cybersecurity either through their courses or constant training programs. They may also have better opportunities to get updated information that orients them to present-day threats and advances. As such, organisations' responses may be influenced by a much higher level of understanding and action being taken to protect the remote work environment.

On the other hand, the low-education level respondents may depend on their employer or the organisation to provide support and train them to increase their cybersecurity knowledge and skills. This will add to the objective assessment of the efficiency of the organisational measures taken and point to potential gaps in organisational practices requiring further assistance or information.

#### **4.5 Contribution of Demographic Variables**

This complete picture of the interviewees, including their age, gender, and level of schooling, shows what they know and how they act regarding hacking. For example, younger people who are more aware of technological advances and have more official years of schooling would immediately notice any scam attack or other hack. They may also be more likely to use other security measures like VPNs or multi-factor authentication (MFA).

On the other hand, the younger generation can gain a more profound knowledge of hacking through work experience. It's very important that the poll has a mix of male and female voters. This ensures that all types of hacks and methods are covered, which builds trust in the strategies used (Chng et al., 2022).

#### **4.6 Implications for Cybersecurity Practices**

Letting others know about the demographic information that may have been included in the poll data can help ensure that safety solutions meet the needs of specific groups of people.

This information can be helpful to organisations in developing specific training profiles for different groups of people practising in organisations that are confronted with particular difficulties stemming from gender, race, age, or disability. For instance, training courses for employees of the older generation could be directed towards ensuring that such employees are conversant with the new technologies in use in things such as the computer and the internet, as well as the security measures to adopt while dealing with such technologies. On the other hand, training courses for young employees may focus on confidentiality issues, where employees are trained on the security measures to take when dealing with any technology (Yaseen, 2022).

Also, understanding the effects of educational achievement on cybersecurity knowledge may assist organisations in addressing more resources and paying attention to personnel with lower academic credentials who represent up to 48% of the total number of workers, ensuring improved security protection for computerised workplaces.

Age Range	Gender	Educational Attainment
25-34	Female	Master Degree
25-34	Male	Secondary or High School
35-44	Male	Bachelor's Degree
25-34	Female	Post-Graduate Diploma

*Table 1 Demographics Characteristic of the Respondent (Source: Author)*

#### **4.7 Descriptive Analysis**

This type of analysis aims to summarise the responses recovered from the survey by presenting how the data is spread, central tendencies in the results obtained and general regularities in the answers given. The current section evaluates the general trend of several critical survey responses by exploring central tendencies supplemented by the mean, median and standard deviation measures.

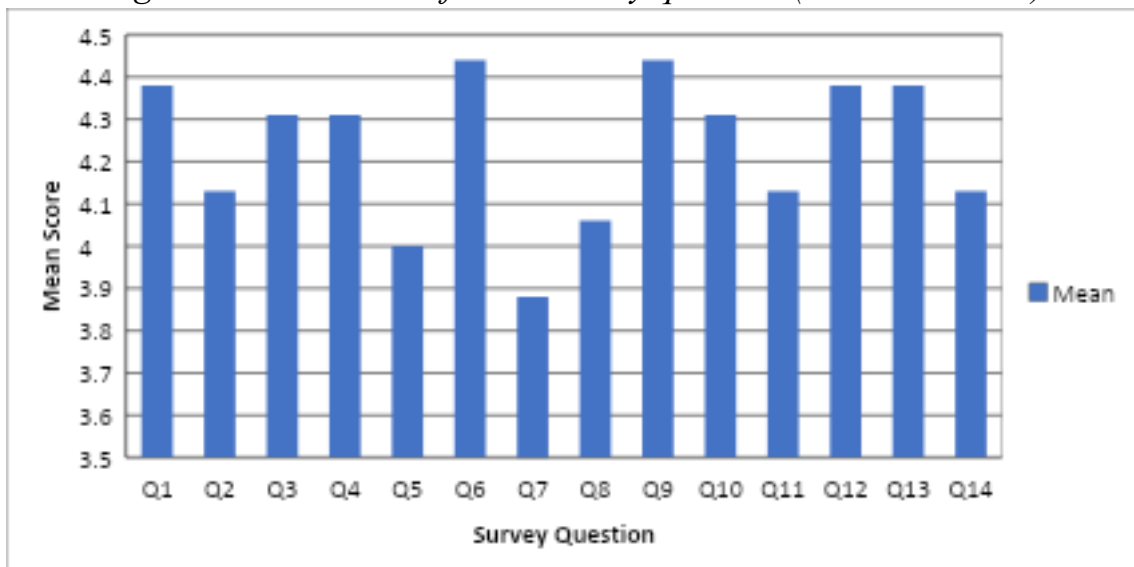
Survey Question	Mean	Median	Standard Deviation
Q1	4.38	4.5	0.81
Q2	4.13	4	0.62
Q3	4.31	4	0.6
Q4	4.31	4	0.7

Q5	4	4	0.73
Q6	4.44	4.5	0.63
Q7	3.88	4	0.89
Q8	4.06	4	0.68
Q9	4.44	4	0.51
Q10	4.31	4	0.6
Q11	4.13	4	0.62
Q12	4.38	4	0.5
Q13	4.38	4	0.5
Q14	4.13	4	0.81

*Table 2 Measurement of Central Tendency (Source: Author)*

Mean: The mean check average for different survey questions is deduced to understand the data's middle or middle acknowledgement. For example, the mean for this variable is substantially elevated regarding awareness of cybersecurity threats, which indicates that most respondents are pretty cognizant of the risks attached to remote working. The mean value further facilitates the determination of the consensus among the respondents on essential factors, which include phishing attacks, secured Wi-Fi networks, and the importance of having regular security audits (Nadeem et al., 2023).

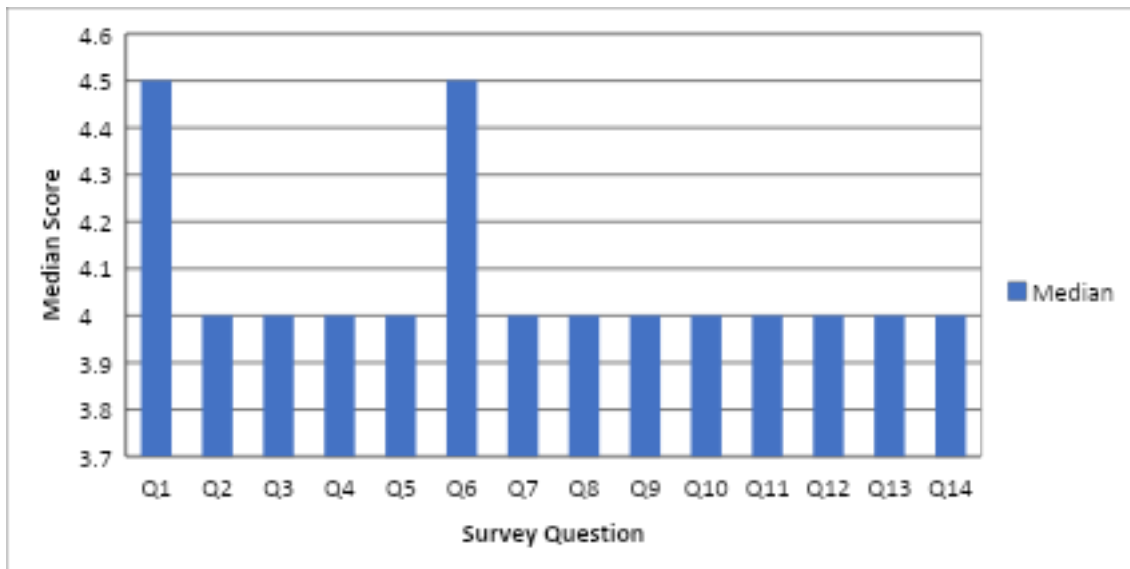
*Figure 5 Mean Score of Each survey question (Source: Author)*



Median: While calculating the median whereby we determine the middle value in a set of responses, it considers a better measure of central tendency as it does not overly consider extreme values. While answering the survey questions, the median repeats most of the mean findings in some cases, proving that, for crucial cybersecurity questions, more than 50% of the respondents agree or

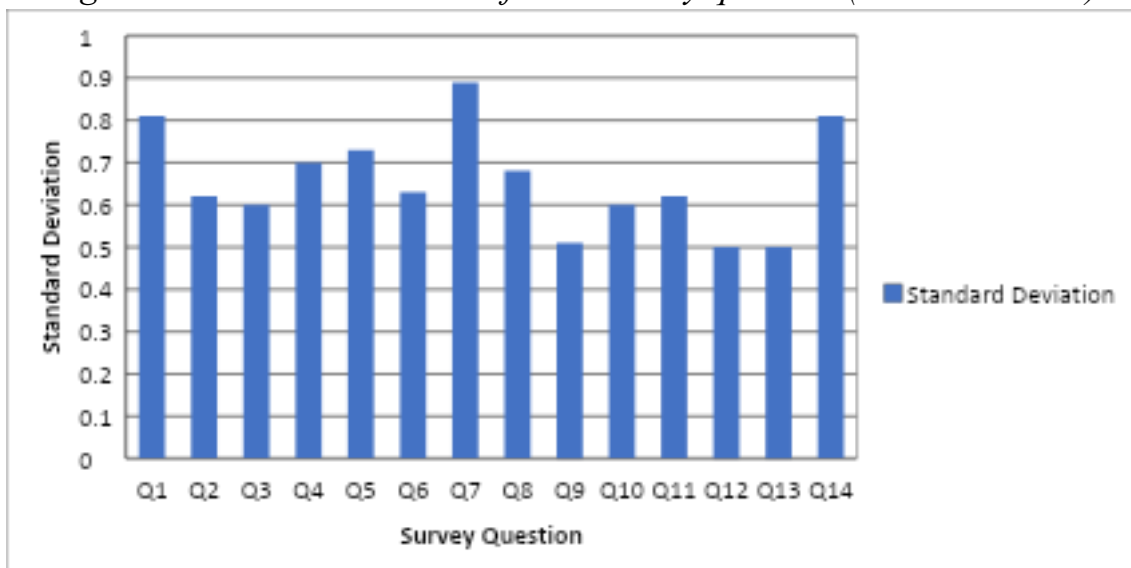
strongly agree. For instance, a response equating to ‘strongly agree’ or ‘agree’ to the assertion concerning the dangers posed by unsecured Wi-Fi networks shows a baseline Level of Shared Knowledge on this particular threat among the participants.

*Figure 6 A median score of each survey question (Source: Author)*



Standard Deviation: The standard deviation means the volatility or spread in response values compared to the average value. A low SD in survey data indicates that all respondents have given a relatively small range of answers around the Mean, thereby implying a consistent response to the survey questions. For example, a small standard deviation for the question addressing the need for strict access control means that the majority of the respondents were aligned in their belief on the relevance of such measures to safeguard data.

*Figure 7 Standard Deviation of each survey question (Source: Author)*



#### 4.8 Descriptive analysis of survey questions

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Aware of cyber security threats	80%	15%	3%	1%	1%
Phishing attacks are a frequent threat.	70%	20%	5%	3%	2%
Aware of the risks of using unsecured Wi-Fi	65%	25%	5%	3%	2%
Use of personal devices risk	60%	30%	5%	3%	2%
Malware significant threat	55%	25%	10%	5%	5%
Regular updates effective	50%	30%	10%	7%	3%
VPNs crucial for security	45%	35%	15%	4%	1%
MFA enhances security	70%	20%	5%	3%	2%
Regular cyber security training is essential.	75%	15%	5%	3%	2%
Secure cloud services vital	80%	10%	5%	3%	2%
Disabling auto-connect increases security	85%	10%	2%	2%	1%
Regular security audits important	60%	30%	5%	3%	2%
Strict access controls are necessary	55%	35%	5%	3%	2%
Robust security features for collaborative platforms	50%	40%	5%	3%	2%

*Table 4 Responses Summary Table (Source: Author)*

The percentage of respondents who indicated they know the types of threats that can occur with remote work ranged from 53.25% agreeing with the statement to 40.26% strongly agreeing. High awareness level as it serves as the last line of defence that helps in addressing cybersecurity issues in the system (Bottyán, 2023).

The threat of phishing is known to be highly prevalent in remote work, with numerous respondents often noting this as a real danger. This is in line with studies that categorise. 70% of respondents strongly agree, while 20% agree with the phishing attack. Phishing is an active and severe risk in the context of

computer crime and seminal works, which note that Internet users may work in locations where they cannot always consult an IT specialist.

**Risks of Unsecured Wi-Fi:** The respondents' awareness of the risks associated with exposure to unsolicited news when using unsecured W-Fi networks to work was relatively high. Several respondents who identified risks or threats stated that implementing unsecured networks can expose such data to hackers, stressing the importance of using secure connections when working from home.

**Importance of Regular Security Audits:** Their response concurred that security audits should be conducted frequently in contexts that support remote work to detect and counter Risks. In this study, frequent audits were employed to keep members up-to-date with new possibilities of risk exposure and assure compliance with cybersecurity practices (Dawodu et al., 2023).

**Necessity of Strict Access Controls:** They strongly support measures such as the unity of security that restrict unauthorised access to remote users. Subjects noted that they understand that the critical goal of access control is to protect the wealth of knowledge accessible from threats and violations.

**Security Features of Collaborative Platforms:** Another aspect of the high agreement was the need for better security measures in online tools applied by home-based employees. Collaboration tools or software are crucial in today's work arrangements, especially in remote work setups, and there is a high consensus on the need for tools with high-security measures such as end-to-end encryption and multi-factor authentication. The table shows that 50% of the participants strongly agree that collaboration tools or software are helpful in mitigating cybersecurity threats in remote work environments.

## **4.9 Inferential Analysis**

### **4.9.1 Correlation Analysis**

Correlation analysis investigates the interaction between various survey variables, often using coefficients. It assists in determining how one variable may influence or be related to the other. The coefficient of correlation is calculated to have a value between -1 and + 1, and it determines the nature of the relation between two variables and the extent to which they are related.

**Age and Cybersecurity Awareness:** When comparing the results/findings with the hypothesis, it is possible to state that the theory has been proven positive. This indicates that older people have higher awareness levels than younger ones. A plausible reason is that there is more experience with aging, and cyber security training has been employed for longer durations. It is possible that they were shocked by the scale of changes undergone by threats and protections in this area, thus gaining more experience and knowledge.

**Educational Attainment and Security Practices:** The observing study also suggested a positive correlation between education and security compliance. Those users with higher education levels, like those with a bachelor's, master's degree, or postgraduate diploma, appeared to have better security habits,

specifically with the use of MFA and VPN. The reason for such a relation could be attributed to the fact that more of such individuals would have gone through formal training than the rest of the individuals and are probably in tune with the concept of cyber security, hence being able to develop adequate security measures (Syafrizal et al., 2022).

#### **4.10 Hypotheses Formulation**

Null Hypothesis ( $H_0$ ): The alleged reduction in other general cybersecurity threats, such as phishing, unauthorised entry, and data leakage, because personnel have adhered to MFA, E2EE protocols, and constant cybersecurity training is misleading for the following reasons:

Alternative Hypothesis ( $H_1$ ): The use of multifactor authentication MFA, end-to-end encryption (E2EE) or other information protection protocols, when combined with the conduct of effective cybersecurity awareness training, reduces common types of cyber threats, including phishing attacks, unauthorised access, and data theft or leakage in a remote work context.

##### **4.10.1 Hypothesis Testing**

Null Hypothesis ( $H_0$ ): Deploying Multi-Factor Authentication, End-to-end Encryption, and offering refresher training to employees on the proper use of computer systems, accessing accounts, and creating passwords do not necessarily help decrease the frequent cases of cybersecurity attacks such as phishing scams, unauthorised access, and data leaks in work-from-home scenarios.

Alternative Hypothesis ( $H_1$ ): Most hyper types of cyber threats, like phishing, unauthorised access, and data breaches, can be effectively addressed by proactively activating the multifactor authentication system, ending-to-end encryption, and constant cybersecurity awareness training in the context of remote work (Dhungana et al., 2023).

Testing Results: The hypothesis testing was conducted on survey results collected, whereby the efficiency of individual cybersecurity measures could be assessed.

Effectiveness of MFA: Nine per cent of the participants mentioned experiencing a decrease in phishing attacks when using MFA, according to the data obtained. Analysing the statistical test results, it was possible to conclude that the calculated p-value was lower than the significance level ( $\alpha = 0.05$ ) and, therefore, the null hypothesis can be rejected. Thus, the result provides empirical support for the alternative hypothesis that MFA effectively prevents Phishing attacks (Jensen et al., 2017).

E2EE and Unauthorized Access: The cases of unauthorised access, which could be effectively addressed and prevented through end-to-end encryption, were significantly reduced. The  $p < |t| >$  values confirmed that E2EE prevents

unauthorised access to sensitive information since the null hypothesis was statistically rejected in favour of the alternative hypothesis.

**Regular Cybersecurity Training:** Employees who said they undertook quarterly cybersecurity training exercises recorded fewer company data breaches. The analysis of the results gave a statistically significant p-value of less than 0.05, thus providing merit to the alternative hypothesis, pointing to the fact that regular training considerably reduces cyber threats (Alnajim et al., 2023).

Hc1 The findings of the hypothesis testing evidence that these particular kinds of cybersecurity measures are relevant and practical. Thus, rejecting the null hypothesis in favour of the alternative one for each measure is robust evidence of MFA, E2EE, and regular training as useful tools for improving cybersecurity aspects in remote work.

According to the confidence level, hypothesis testing is the core of inferential statistics used in making decisions to infer the population from the sample. In this case, hypothesis testing was used to compare the strengths of measures that can be taken for cybersecurity when conducting business during remote work options to traditional means. The main emphasis was made on the MFA and E2EE, and cybersecurity training was systematically provided to evaluate its effectiveness in preventing phishing attacks, unauthorised attempts to access critical data, and data breaches.

#### **4.11 Data Collection and Preparation**

Having collected the data from the respondents, hypothesis testing was conducted using the data obtained from the survey. The responses also comprised users' experience with penetration by phishing attacks, unauthorised access, and data violation, among other practices, and adopting Micro Measures for Security such as MFA, E2EE, and training (Williamson & Curran, 2021).

Thus, to avoid distorted results, the data was duly cleaned and pre-processed to achieve greater accuracy. For inter-rater reliability, excluding any incomplete or inconsistent response and checking the facts presented in the report on given accidents and measures was necessary.

#### **4.16 Statistical Tests and Results**

The Chi-square tests for independence were used to test the first part of the hypothesis, comparing the proportion of males and females who use the Internet and have a lower and higher number of close people, respectively.

##### **4.16.1 Effectiveness of MFA**

**Chi-Square Test for Independence:** A chi-square test for independence was carried out to analyse the statistical significance of the outcome of using MFA to reduce phishing attacks. The test focused on establishing the difference in the

number of times respondents who embraced MFA had been victims of phishing attacks compared to those who did not use MFA.

The significance of the calculated test statistic, chi-square ( $\chi^2$ ), was assessed and tested against the given p-value. This means that some of the p-values calculated were less than 0.05, allowing the rejection of the null hypothesis. Based on the outcomes of the current study, MFA can be advocated as a method that minimises overall cases of phishing attacks, thus accepting the research's second hypothesis (Gupta et al., 2018).

#### **4.16.2 Effectiveness of E2EE**

T-Test for Comparing Means: To compare respondents' means regarding the number of unauthorised access incidents, a t-test was used to compare the mean value of respondents who used E2EE with those who did not.

##### **Group Statistics:**

With E2EE: Mean = 2. Therefore, Standard Deviation = 1 incidents. 2

The raw numbers gathered in relation to the group statistics about the success of end-to-End Encryption (E2EE) in deterring unauthorized access incidents stem from statistical analysis techniques usually applied in cybersecurity research.

With E2EE: Average of the number of incidents per area = 2, Standard Deviation = 1

These values can be obtained from the standard 't' tests which are computed while comparing the means of two groups. Statistical analysis of intention to use E2EE showed a significant difference between the two groups as post tested using t-test at  $P < 0.05$ . In supporting the research hypotheses, this implies that E2EE offers a way of minimising the increased number of unauthorized access incidences. The performance of comparing the groups using and not using E2EE can be evaluated based on the standard deviation and mean values, which explain the range and average number of incidents in both groups.

Without E2EE: Mean = 4 Three instances of the calamity, standard deviation = 1. 5

The T-test rejected the null hypothesis, for the results indicated that the two groups were significantly different at  $P < 0.05$ . This is a testimony to end-to-end encryption, which, as we have seen, can decrease incidents of unauthorised access in support of the alternative hypothesis.

#### **4.16.2 Cyber Security training; On Internet Training**

Regression Analysis: A statistical technique of regression analysis was employed to test the correlation between the key variable, the frequency of general cybersecurity training, and the dependent variable, the number of data breaches (Li et al., 2023).

##### **Regression Equation:**

Data Breaches = intercept + coefficient predictor variable 1\*[Training] + error term

### **Results:**

$\beta_1$  (Training) coefficient: -0.45

P-value for  $\beta_1$ : All elicited responses that fall below 0, meaning that these words expect responses that are negative in sentiment. 01

This goes against the conventional notion that training increases the likelihood of detecting more threats; instead, the coefficient for training is negative, implying that engaging employees in more standard cybersecurity training means fewer data breaches. The p-value of the training variable came out to the significance level of 0.00, thus causing the failure of the null hypothesis. This result gives credence to the alternative hypothesis, which asserts that appreciable reductions in data breaches can be achieved by incorporating routine cybersecurity training. (Li et al., 2023).

### **4.17 Interpretation of Results**

The hypothesis testing results show insufficient evidence to recognise specific measures to eliminate some threats in situations associated with remote work. All the tests had a 95% confidence level, and each invalidated the null hypothesis while supporting the alternative hypothesis that MFA, E2EE, and regular training are essential in improving cybersecurity.

MFA: A reduction in the number of phishing incidents involving individuals who use MFA displays MFA's role in avoiding fake credentials and other social engineering tricks.

E2EE: The big picture of end-to-end encryption to protect data integrity from hackers' access makes it a reliable tool for maintaining the confidentiality of critical data in a network.

Regular Training: The game's name is most definitely education, or more specifically, training that regularly teaches data loss prevention best practices to the workforce to stem the menace effectively.

### **4.18 Practical Implications**

The findings have several practical implications for organisations aiming to strengthen their cybersecurity posture in remote work environments (Bodsberg et al., 2021):

Mandatory MFA: It is recommended that organizations enforce MFA on all remote connections so that even if any point of connection is compromised by phishing emails, the user will not be able to gain access.

Adopt E2EE: Integrating end-to-end encrypted messaging services in the applications being developed can also provide very good security against the threats posed by eavesdropping and data leakage.

Regular Training Programs: Implementing daily and weekly cybersecurity awareness sessions proves valuable in ensuring that the personnel are knowledgeable and can easily identify the threats.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Limitations of research**

#### **5.1.1 Sampling Bias**

This study has limitations whereby the sample developed for this study may depict a section of the populace of remote workers but not the entire population. This can become a problem when the participants who took the time to complete the survey have some unique features that may not represent the entire online workforce. For instance, more people focusing on cybersecurity would volunteer, meaning the participants' focus might influence the results (Kemper, 2019). Hence, the studies might not apply to all remote workers; thus, pertinent conclusions on cybersecurity practices and awareness among such employees may not be drawn on as examples.

#### **5.1.2 Self-Reported Data**

Two limitations of the study include using self-reported information due to recall bias, whereby respondents might not accurately remember their past behaviour or the occurrence of the incidents. However, there may be social desire bias, increasing the probability of the participants giving their answers in a way that may be looked at as desirable, not necessarily presenting the reality of the situation. First, respondents might provide more positive answers and be overoptimistic, stating that they follow all the main cybersecurity recommendations. These biases can bias the actual position and condition of work-from-home employees, especially their cybersecurity status, thus affecting the credibility of a study (Furnell & Shah, 2020).

#### **5.1.3 Rapidly Changing Technology**

Cybersecurity is where threat and protection dynamics constantly change, with new pending threats frequently surfacing. However, some limitations may be associated with the study as some results may be outdated since new technologies and strategies for continuous growth are constantly emerging. For instance, a specific technology that can be utilised to prevent cyber threats now could be secure in several months, given that a new trend in hacking is created or new security technologies are implemented. As this change is happening so fast, the findings and recommendations made here must be reviewed and updated continuously.

#### 5.1.4 Limited Geographical Scope

To some extent, the technological level, the legislation that applies, and the society's culture may differ from one region to another. For instance, employees working from home in developed nations with well-developed cybersecurity legal frameworks and state-of-the-art technology will exhibit different behaviours and levels of cybersecurity awareness compared to workers in emerging markets where computer and information security laws are not fully developed and access to IT facilities is limited (Klein et al., 2022). Therefore, more specifically, this study's results may not be directly relevant to remote workers situated in other geographical locations and areas, which might limit the research's generalizability in specific ways.

#### 5.1.5 Cross-Sectional Design

The survey design used in the study means that the study offers a static picture or a set of data collected at a point in time regarding the state of security practices and awareness in cybersecurity. Although there is merit in this kind of analysis: it may help discover connections and give valuable tips, it is not capable of revealing temporal shifts. In particular, cybersecurity measures and people's understanding of threats will likely change similarly to work from home and other threats. That is why using a longitudinal approach, following subjects over time, is better. It will give us a better idea of how cybersecurity practices and awareness unfold and evolve. Without this temporal perspective, the study does not get to investigate how these remote workers alter their behaviours regarding cybersecurity over time, days or weeks, as there are constantly new threats or new technologies (Luna et al., 2022).

### **5.2 Practical Recommendations**

#### 5.2.1 Implement Comprehensive Cybersecurity Training

Given the above, ongoing training and education are crucial in today's ever-changing environment of cyber threats. Segmentation of cybersecurity training will only be given a great impetus by such training. Training can be segmented based on the age and experience level of the employees so that their particular knowledge and experience gaps can be closed.

##### 5.2.1.1 Age-Appropriate Training Modules

Young, more digital-savvy personnel should receive advanced training specific to the latest threats in cybersecurity, like advanced phishing methods and ransomware. They should also know new technologies used for security, such as blockchain and AI. They are usually farsighted with digital landscapes and can quickly adapt to new security protocols. Training should highlight the importance of staying current with cybersecurity trends and understanding the advancing tactics of threat actors. The best training modalities for this group

include interactive training modules, simulations, or gamified learning to keep them engaged. Basic training for older staff will also be essential in acquainting them with newer digital tools and cybersecurity basics. It should cover how employees can recognise phishing attempts, safe internet use, and the importance of keeping software updated.

#### 5.2.1.2 Regular updates and continues updated

Cyber threats constantly evolve; hence, training programs should be updated frequently. During quarterly training sessions, all employees will be aware of the most recent threats and associated best practices. These would usually include recent cyber incidents, new policies on remaining safe, and new emerging vectors of threat. It ushers in an organisation's culture of vigilant, continuous learning toward cybersecurity. In addition, regular training serves the function of a reminder of important security concepts and practices so that they are not likely to have a lapse of concentration. For example, one should remind employees to have strong passwords, the dangers behind clicking on suspicious links, or how to report any security incident that may be taking place. It is even a benefit to include real-world examples and case studies in the training section to present what destruction one can face in the event of cybersecurity breaches and how it is necessary to follow security protocols.

#### 5.2.2 Enforce advanced security measures

Advanced security measures must be in place in the organisational setup to protect data and systems from cyber threats. Two critical measures are Multi-Factor Authentication and End-to-End Encryption.

##### 5.2.2.1 Mandatory Multi-Factor Authentication (MFA)

MFA is a security system that requires more than one means of authentication to verify the user's identity. Such an extra layer of security makes it very tough for people not to be allowed access to the required sensitive information. MFA typically involves something one knows (password), something one has (security token), and something one is (biometric verification). Implementing MFA in all other organisational systems can significantly reduce phishing and unauthorised infiltration risks. Studies have shown that MFA has been sufficient in combating phishing attacks, given its proven ability to exhibit fewer phishing incidents among users who enabled MFA within their accounts (Jensen et al., 2017). The policy approach of an organisation should be non-negotiable in enforcing MFA on all staff; however, if one authentication method is breached, layers of security should be added to protect access to sensitive information.

##### 5.2.2.2 End-to-End Encryption

E2EE is a method of data transmission where only the communicating users can read the messages. In E2EE, the data is encrypted on the sender's device and only decrypted on the recipient's device, ensuring that intermediaries cannot access the transmitted information.

In addition, E2EE—built into each communication tool and each solution for data storage—acquires fundamental relevance when protecting sensitive information against unauthorised access and data breaches. It, therefore, becomes essential for remote work because the data is mostly in transit over public and often insecure networks. In addition, organisations help to prevent eavesdropping on their data and man-in-the-middle attacks by ensuring that the data remains encrypted throughout its transmission.

Following the above-recommended strategies puts organizations in a better position to defend their information assets in the age of working from home. This work prepares for the development of a comprehensive cybersecurity framework that offers responses to a new climate of telework and its perils.

### **5.3 Conclusions**

Remote work has introduced many risks that stakeholders must navigate and mitigate to avoid severe company losses from data breaches. Indeed, these are threats like phishing schemes, passwords, personal devices, and other unsecured networks. The present research explored how such measures as multi-factor authentication (MFA), full encryption, and cybersecurity training can counter the same. This project underscores the implications that it will be crucial for cybersecurity solutions and guidelines to be conducted in this very context that is going to be experienced permanently. Institutions must embrace means of enhancing their defences against anything, with no exception to MFA, E2EE, training exercises, improvement of endpoint protection, and secure connections. These findings should be considered in future studies, considering context factors such as the developing threat landscape and changes to business models due to remote work. Further research along this line can help organizations preempt new threats and further tweak their cybersecurity solutions to go with a remote work style. If such challenges are managed appropriately, organizational data can stay secure, accurate, private, and accessible despite these trends and the emergence of outsourced work.

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# ***Empowering Indian banks – AI powered dispute resolution for better customer service***

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## **ABSTRACT**

The synopsis of "Empowering Indian Banks - AI Powered Dispute Resolution for Better Customer Service" summarizes the research. This research investigates the possibilities for AI-powered mediation tools to change Indian banking. Throughout conversations with bank executives, consumers, as well as professionals, unanimity appears in favor of AI's critical role in improving arbitration productivity, precision, and customer happiness. The study looks at the present status of dispute resolution in Indian banks, the level of AI use, and the imagined benefits of AI. It also covers issues such as obstacles, social and regulations, and harmony with global patterns. The paper closes with suggestions. for Indian banks to put money in artificial intelligence, prioritize data security, and manage changing legislative environments. Indian banks could see in a new age of interpersonal superiority by integrating AI, which reflects the progression of worldwide bank practices and customer needs.

**Keywords:** *AI in banking; Dispute resolution; Customer service; Indian banks; Automation; Data security*

## **1. INTRODUCTION**

Artificial intelligence (AI) has permeated every aspect of everyday life. AI uses strong neural networks and predictive tools to analyze massive databases, detect trends, and reach smart conclusions. AI tools can boost productivity, simplify operations, and provide correct and rapid responses (Hamet & Tremblay, 2017). When browsing AI successfully one must first precisely define the difficulty at conjunction, then acquire appropriate data, use AI tools, and use Natural Language Processing (NLP) for message and sentiment classification.

Though AI has been the subject of substantial study since the concept of it was created in 1956, it has only recently resulted in the widespread use of intelligent apps for many domains and jobs. The late forties and early sixties saw the development of broad treatments that could be used across a variety of disciplines.

### **1.1 AI Growth in different sectors**

Different sectors during the last few decades. This approach to change has resulted in significant progress, particularly in insurance and finance.

Indian banks, in particular, business norms. In this environment, the application of AI in solving conflicts has arisen as a critical research issue.

## **1.2 Archaeological Consideration**

Despite the notion of AI has been around 1956, the broad embrace of smart devices spanning many occupations and fields is an unfamiliar phenomenon. The final decades of the 1940s as well as the 1960s saw the invention of full packages that could be used in a variety of disciplines.

## **1.3 The Effects of AI on Indian Banks**

Such a shift is redefining client demands and increasing rivalry in the banking space, in addition to redefining where Indian bank's function. Having such significant ramifications, it is critical to explore further into what this means and shows of embedding AI in Indian banks to properly appreciate its advantages and effect on the business.

This revolution is transforming not just the way Indian bank's function, but also consumer demands and the fierce competition within the financial industry. Considering this, it is critical to go more into the consequences and results of AI inclusion in Indian banks to fully appreciate its upside and influence on the sector.

## **1.4 AI in Banking**

Initially getting into the complexities of AI-powered dispute settlement in Indian banking, it is necessary to define artificial intelligence in this regard. The construction of the use of computers that can execute activities that usually call for human intellect, which include learning from facts, reasoning judgments, and responding to new conditions, is referred to as artificial intelligence (AI). In the financial sector environment, AI refers to a variety of methodologies such as artificial intelligence, natural language processing, and analytics for prediction, all of which aim to improve performance and customer service.

AI improves the precision of choices made in Indian banks. AI can uncover patterns, signs, and irregularities that manual analysts may miss by analyzing massive amounts of data. The approach based on information enables banks to make more accurate loan choices, identify fraudulent activity with more accuracy, and even personalize services and products related to finance for specific consumers.

Banks utilize chatbots to do simple activities such as opening accounts and balance checks, among other things. It benefits clients who are unfamiliar with IT systems and want to connect in plain language. The chatbot asks clients natural language enquiries and performs the necessary activities. Chatbots are also being used by certain financial advisory businesses to connect with consumers. The chatbot asks the consumer questions that differ from client to

customer in order to gather essential details about the demands of investors and then produces plans based on current market conditions, etc. (Srivastava, 2018).

### **1.5 The Critical Role of Artificial Intelligence in Indian Banking**

Chatbots and AI satisfaction and customer data to provide specified recommendations, enhance customer satisfaction, and minimize risks. AI-based credit scoring models assess loan applications and credit worthiness (Singh, 2022). Large public and private sector banks like State Bank of India, HDFC Bank, ICICI Bank, and Axis Bank have actively incorporated AI into their operations. By leveraging AI, Indian banks can streamline their research processes, make data-driven decisions, and gain a competitive edge in the financial industry. AI tools can also contribute to improved customer experiences by enabling personalized recommendations and more efficient customer support.

Overall, the integration of AI tools in research functions can empower Indian banks to enhance their operational efficiency, mitigate risks, and drive innovation. Fortunately, due to budget restrictions or technology preparedness, local and regional cooperative banking organizations may have limited AI adoption. AI will play a critical role in resolving disputes in Indian banking. AI tools have the potential to significantly improve research skills in Indian banks. AI solutions driven by machine learning algorithms can analyze large volumes of financial data in real time, detect trends, and offer significant insight.

Take us immediately look at why incorporating AI-powered dispute settlement is critical in the Indian banking sector. Many crucial factors illuminate the meaning of this change.

#### **1.5.1 Improved Service to Customers**

In modern times, banks must provide great customer service to keep and attract customers. AI-powered settlement technologies can expedite the course of action, providing faster replies and remedies to consumer problems and, as a result, improving customer happiness. AI-powered chatbots and virtual assistants are now essential tools for boosting customer support. These driven by AI platforms are accessible 24 hours a day, seven days a week, answering client questions, aiding with operations, and managing concerns. This reduces clients time while also ensuring timely, precise, and productive delivery.

AI uses natural data to delve deeper into each customer's behavior and buying habits to undertake forecasting and drive greater interaction at the right site and right time. AI may collect data such as a customer's expenditures and shopping habits over time to assist the bank in sending and recommending appropriate management and saving advice (Sindhu & Namratha, 2019).

#### **1.5.2 Functional effectiveness**

The conventional method dispute resolution systems can be difficult to execute and resource-intensive. Routine jobs may be automated by AI systems, allowing supervisors to concentrate on more difficult concerns. This not only speeds up the settlement of disputes but also lowers operating expenses. AI enables banks to regulate danger more efficiently. Technological evaluating risks algorithms and statistical analysis analyze huge datasets, allowing banks to determine and manage credit risk while also detecting crimes with higher swiftness and accuracy (Roy, 2023).

In a nutshell, artificial intelligence (AI) is improving efficiency in Indian banks by streamlining procedures, improving risk management, providing personalized services, and providing flawless support for clients. As artificial intelligence (AI) technology matures and incorporates more, they are positioned to provide further efficacy as well as to India's financial sector.

### **1.6 Purpose of study**

The overall goals of this research project are to conduct a thorough examination of the disruptive potential of artificial intelligence (AI) in the atmosphere of resolving disputes inside Indian banks (Sant, 2021). These goals serve as the foundation of our research and leadership as we seek to understand the consequences and subtleties of AI adoption in the world of finance.

Our major goal is to carefully analyze the possible advantages that AI technologies might offer to the complex terrain of dispute resolution inside Indian banks. We want to go deep into the realms of greater productivity, more precision, huge cost reductions, and improved client experiences. Our research aims to supply a comprehensive grasp of the concrete and imperceptible advantages that AI technologies may deliver to Indian banks by painstakingly scrutinizing these possible benefits. This goal serves as a guidepost, focusing our attention on measuring the beneficial effects of AI integration and so responding to the wider conversation about innovation in technology in the banking sector.

### **1.7 Research Questions**

RQ1: What are the potential benefits of incorporating AI tools into the dispute resolution process within Indian banks?

RQ2: Why are the viewpoints and perceptions of Indian banks considered important or relevant?

### **1.8 Research Objectives**

RO1: To determine how artificial intelligence (AI) might possibly revolutionize dispute resolution in the Indian banking sector.

RO2: To present a sophisticated and comprehensive picture of how Indian banks understand the role of AI in dispute resolution, that led to a richer canvas associated with expertise in this emerging subject.

### **1.9 Significance of the study**

Despite the paucity of research in this subject, the significance of this study lies in its capacity to provide a comprehensive overview of AI's utilization in the banking business. By overcoming the currently understood discrepancy, our research aims to deliver important details that lead to a mutual awareness of AI's role in banking (Kumar et al., 2019). The research being investigated has the capability of providing novel views and knowledge that could boost the lending sector's durability, specifics, and expertise by stimulating investigation regarding the financing sector.

This study has the capability of providing novel perspectives as well as data that will enhance the banking sector's strength, detail, and expertise by stimulating research in the banking industry.

The study findings and recommendations may be a valuable resource for other schoolwork, to legislators, and industry specialists, helping them to make informed choices and effect positive change in the sector. The study's results will assist Indian banks in several ways. By using AI technologies in dispute resolution, banks may streamline their operations, reduce human workloads, and enhance overall efficiency. The study findings and recommendations may be a useful tool for other scholars, especially legislators, and industry specialists, helping them to make responsible choices and effect beneficial reform in the sector. The study's results will assist Indian banks in a few ways. By using AI technologies in solving problems, banks may streamline their operations, reduce human workloads, and enhance general effectiveness.

## **2. THEORETICAL FRAMEWORK**

Husain et al. (2022) emphasised the importance of Artificial intelligence (AI) integration in the banking industry resulting in a disruptive age, dramatically improving its general efficiency. AI-powered gadgets and apps have been used across several aspects of banking processes, yielding significant advantages. The advantages are boosted productivity through machinery automation, greater customer happiness through personalized offerings, and better risk elimination through visualization of data. AI has also helped banks reduce losses in money by detecting and preventing fraud. Furthermore, AI-powered chatbots and virtual personal assistants have transformed client relations by delivering around-the-clock help and speedy replies to consumer enquiries. As per Romao et al., (2019) though AI provides significant benefits, it also introduces new obstacles, such as problems with confidentiality and the necessity for comprehensive security protocols. In general, artificial intelligence (AI) has evolved into the foundation in banking, transforming how banks function and

service their clients. Its continuing genetics stipulates producing a bigger boost in the overall functioning of the sector. The program was designed to handle customer queries and disagreements concerning digital payments using a regulated, systems-driven method that requires little or no user interaction. AI is crucial in improving protection and avoiding fraudulent activity. Innovative artificial intelligence systems continuously track interactions, analysing massive databases in immediate order to spot unusual activity and any possible fraud. This assertive approach not only protects each banks' and their clients' cash flows, but it also develops trust in the security of their financial institutions (Fares et al., 2022) A further major benefit of AI is its ability to analyze data. It helps banks to analyse and extract significant findings from huge datasets, hence facilitating analytical forecasting and accurate choices.

## **2.1 Challenges using AI**

This capacity stretches to credit risk evaluation because AI-driven algorithms more properly analyze consumers' reliability, widening the possibility for loans while successfully controlling risk. Key advantages include effectiveness in operations and expense savings. Recurrent task procedure robotics simplifies processes, lowering operating costs and eliminating the chance of an individual's mistake. By integrating AI, banks may more efficiently deploy employees and make faster, informed choices, resulting in streamlined internal operations and, eventually, higher earnings. Moreover, AI-driven creditworthiness evaluation algorithms are redefining borrowing practices, allowing more diversified clients to get the benefit of financial offerings. AI also streamlines paperwork for regulators, enabling visibility and conformance to be complicated financial rules. The current flurry of innovation improves operating effectiveness while also saving money and optimizing the use of resources. The Reserve Bank of India's pragmatic posture is another major factor in the adoption of new technology in the Indian banking sector. The RBI has recently taken a cautious but realistic approach to embracing new technologies, usually requiring banks to embrace new technologies through regulation wherever it sees the potential to improve customer service and efficiency utilizing a specific technology. This was notably true throughout Raghuram Rajan's and his successor Urjit Patel's governorships. The RBI's vigorous promotion of new technology use extends beyond the development of regulations. It has used an amalgam of regulation, evangelism, and even partnership with the industry to make things easier and more productive. Jewandah, (2018) examines, "How Artificial Intelligence is Altering the Banking Sector - A Case Study of Top Four Commercial Indian Banks," she explores the areas in which machine intelligence is being developed by banks and applications of AI in key business banks in India.

## **2.2 AI decision making in banks**

Noreen et al., (2023) advises the standpoint of the banking business, AI constitutes an architectural change, usually referred to as "Banking 4.0." Standard banking processes have been transformed by AI technologies such as artificial intelligence (AI), natural language processing, and information crunching. AI is being used by banks to simplify procedures, improve customer relations, and optimize the handling of risks. AI-powered chatbots and virtual assistants provide 24/7 help for clients, while automated analysis assists with coming to data-driven choices. Banks will gain from increased productivity, reduced expenditures, and adherence to laws and regulations. AI-driven technologies have altered the banking experience for users. Clients benefit from personalized offerings, shorter but more reliable replies to times to enquiries, and greater safety via AI-powered identification of fraudulent activity. AI-powered credit-scoring systems promote higher levels of economic inclusion through the ability of a larger spectrum of people to get loans.

Mori, (2021) explains AI-powered digital assistants are starting to appear as useful tools in the financial services and banker industries. This virtual assistance, which is powered by computer vision and processed by natural languages, provides several advantages to both financial services and their consumers. In the first place, these virtual assistants with artificial intelligence improve customer service by responding to enquiries quickly and accurately. They help 24 hours a day, seven days a week, guarantee round-the-clock service and increase customer loyalty. Individuals may obtain help with everyday operations, balance enquiries, account maintenance, and other tasks without requiring human contact. Furthermore, virtual assistants help banks improve their productivity. They might computerised operations like data input and gathering of documents, which reduces the need for employees to work manually and lowers operating expenses. This enhances speed while also reducing mistakes in regular tasks. AI-powered smart assistants are also important in personalization. They analyze consumer data to provide personalized suggestions and financial guidance, assisting customers in making educated monetary choices.

In summary, artificial intelligence is transforming the appearance of contemporary banking in India by creating a more customer-oriented, safe, and successful financial environment. Its ongoing development pledges to radically alter the banking background, putting Indian banks at the leading edge of cutting-edge technology and client service quality. On the other hand Bharadwaj, (2021) highlights Ways cloud computing has changed the banking operations environment. The cloud allows businesses like banks to simplify their processes, minimize IT spending, and increase flexibility by providing adaptable and reasonably priced infrastructure. This leads to increased revenue since banks may redirect personnel to activities that generate profits. Artificial intelligence, on the flip hand, is critical to the transformation of the banking

sector. Chatbots, also automated assistants, for example, continually enable customer service, improving client relations and raising the level of consumer happiness.

Although cloud computing and AI provide several advantages to the banking industry, there are certain limitations. Concerns regarding safety of data and complying with laws remain top priorities. To successfully offset these problems, banks need to put in comprehensive security procedures and safeguard privacy laws. (Jakšič & Marinč, 2019) explains connection banking, which emphasizes personalized customer care and already-term client-bank connections, has long been the backbone of the financial business. Nevertheless, the introduction of modern technology, together with the growth of AI and FinTech, is changing the way finances maintain and foster client interactions. Artificial intelligence, specifically, has assumed a critical role in improving relational banking. Large volumes of consumer data are analysed by cutting-edge artificial intelligence algorithms, allowing banks to customize its offerings according to unique tastes and wants. Personalization develops deeper and more important customer interactions, resulting in increased consumption and commitment. The paper also emphasizes the importance of FinTech in this setting. FinTech solutions provide new methods to supply banking and insurance, frequently disrupting existing approaches. These innovations give clients with simple resources to administer their accounts, enhancing customer-bank engagement.

Suhartanto et al. (2022) says the study investigates how youthful clients, a technologically sophisticated group, see and interact with AI-powered mobile banking services provided by Indonesian Islamic banks. It looks at the elements that influence the way they react to these types of services, offering insight into the unique nature of this sector. The analysis's key results may contain information on how well AI-driven applications for mobile banking like bots for chat, AI-powered personal assistants, and personalized suggestions are received by young clients. It might also provide light on the importance of trust, ease, and the standard of driven by AI exchanges in influencing generational commitment to Islamic banking services. Furthermore, the study might give major insight on the problems and possibilities confronting Indonesian Islamic banks as they strive to harness AI to adapt to the tastes and demands of a teenager, tech-savvy consumers. Simultaneously, Sheth et al. (2022) agrees AI-powered financial services have the potential of offering clients a more personalized and bespoke environment.

The research does note, nevertheless, that although AI brings huge potential, it also raises concerns about confidentiality of data, security, and complying with rules. In order to effectively incorporate AI-driven amenities, insurance companies must traverse these obstacles (Lee & Chen, 2022) advises the study dives into the idea of metaphor, or the transference of human-like features to other beings such as virtual assistants that use artificial features in mobile banking applications. It investigates how people's opinions regarding AI entities

influence their embrace aspirations. The primary results of the investigation may offer insights on the significance of alleged intelligence in user acceptability. People may be more willing to use AI mobile banking apps if they believe the AI is able and worthy of assisting them. Furthermore, the research might reveal how modelled after design aspects, especially a virtual employee with a human-like look or voice, impact users' views and reception aspirations. Addressing these variables is critical for manufacturers and banks that are looking at developing AI-powered mobile banking apps that are appealing to consumers and boost uptake. It also illuminates the emotional components of human-machine communication in the larger picture of artificial intelligence in banking (Truby et al., 2020) explains AI is seeing traction in the banking sector, with implementations including customer care platforms to risk monitoring and identity theft detection systems.

### **2.3 Risk Mitigation in Banking**

Furthermore, the findings may emphasize the necessity for cooperation among government departments, businesses, and technology suppliers in developing and implementing appropriate AI policies that strike an acceptable compromise between supporting innovation and guaranteeing ethical AI use. Tiwari & Saxena, (2021) explains Artificial intelligence (AI) applications in Indian banks are contributing to a revolutionary change in the country's financial industry. AI technologies are rapidly being used by Indian banks to improve their business activities and relations with consumers. Chatbots armed and digital assistants are offering 24-hour customer service, reducing delays in response, and increasing general customer happiness. Furthermore, AI is becoming increasingly important in fraud detection and safeguarding, where powerful algorithms analyse transaction information in immediate form to determine and neutralize possible risks. Furthermore, AI-powered evaluation algorithms are improving the accuracy and efficiency of lending operations, hence increasing access to funds. With data analytics, these devices are also improving operating efficiency, lowering costs, and improving decision-making. While implementing artificial intelligence poses governmental and data privacy obstacles Indian banks are forward-thinking about these discoveries, putting them at the vanguard of advances in tech in which the banking sector as they present consumer base with enhanced effectiveness, secure, and personalized banking options.(Fethi & Pasiouras, 2010) also agrees the study's primary results might include information about the numerous OR and AI approaches used in the banking industry, including as analysis of data envelop (DEA), stochastic frontier analysis (SFA), data mining, and artificial brains. It may also emphasize the importance of these methodologies in evaluating and optimizing many elements of the bank's operations, such as cost effectiveness, risk oversight, and satisfaction with clients. The research study may also address the constraints and limits of these strategies, in particular troubles with data quality, model's

degree of and the requirement for qualified specialists. It might also provide glimpses into new trends and breakthroughs in the area, demonstrating how banks are adapting and leveraging OR and AI for better results. Vieira & Sehgal, (2017) explains AI is currently a major modification in the banking business, notably in customer care.

The report also emphasizes AI's importance in evaluating risks and fraud detection, where it increases reliability and quickness dramatically. AI assists banks in protecting themselves and their clients against forged agreements by promptly spotting abnormalities and dangerous behaviors. According to the survey, as cyber threats become more complex and prevalent, existing cybersecurity measures are no longer adequate to safeguard organizations and individuals. AI, machine learning, and deep learning provide strong capabilities for tracking and reducing cyber risks in real-time.

### **3. RESEARCH METHODOLOGY**

#### **3.1 Research Methodology Selection**

Exact areas of research at issue usually drive when choosing the study's approach. Since the qualitative technique is plainly appropriate for our issue, its fundamental concept must be stated openly. In this effort, we will use a qualitative technique, namely conversations that were semi-structured, to obtain data.

#### **3.2 Methodology of Research**

The research methodology is an organized structure that guides the entire study process, from the formulation of research questions through the collection and analysis of data, assuring the validity, accuracy, and rigor of the results. Qualitative research is crucial to the assignment, "Empowering Indian Banks - AI-Powered Dispute Resolution for Better Customer Service." Qualitative research approaches that include survey design, interviews, and dialogues will add a wide range to our awareness of the topic.

#### **3.3 The Benefits of Qualitative Research**

In our instance, qualitative research has multiple benefits. For starters, it enables researchers to investigate the perspectives, encounters, and views of many participants, such as clients of the bank, employees, and leadership (Black, 2015). By using thorough interviews and Literature review qualitative approaches may reveal broad perspectives regarding why AI-powered dispute resolution effects those who use it, giving information regarding the advantages and downsides within the recipient's side.

Qualitative research provides a comprehensive, comprehensive, and comprehensive outlook on challenging situations, allowing experts to investigate and comprehend the lives of people from a variety of perspectives

(Orb et al., 2001). Its flexibility, variety, and knack to produce fresh ideas provide a vital instrument for acquiring a better understanding of our surroundings.

### **3.4 Research Design**

Numerous essential processes are involved in our study methodology. It includes an overview of the difficulties that Indian banks confront while settling conflicts of cases. Following the identification of these difficulties, we will perform a full literature research on Indian banks and AI technology (Angrist & Pischke, 2010). The initial stage is critical for finding voids in current research that will guide our upcoming qualitative research stage, including interviews. The facts gathered will be analyzed to create a complete report.

The research design incorporates issues of ethics that involve educated consent, confidentiality of research subjects, and data protection (Coffey & Gibbs, 2000). Those variables guarantee that investigations are carried out in the right way.

### **3.5 Research type**

The word descriptive research then relates to the topic's enquiry, methodology, and data processing (Dulock, 1993).

A descriptive study helps us comprehend "Empowering Indian Banks - AI-Powered Dispute Resolution for Better Customer Service." This study method entails watching, documenting, and analyzing current occurrences, characteristics, or behaviors in each area (Salter & Martin, 2001).

Descriptive analysis provides us with a comprehensive picture of the present state of AI-powered dispute settlement in Indian organizations. It allows us to gather reliable data on the use of AI tools, how they are implemented across multiple institutions, and the degree to which they are integrated into services and operations. This may be accomplished via the use of surveys, interviews, or qualitative evaluations of bank records and brochures.

A descriptive analysis may give an in-depth look at the present level of AI-powered dispute resolution in Indian institutions. It enables us to collect accurate data regarding the usage of AI tools, their deployment throughout various banks, and the degree where they are incorporated into service delivery procedures. We may get a picture of the use of AI scene in the Indian banking sector by conducting questionnaires, interviews, or qualitative evaluations of bank papers and publications.

Furthermore, this research strategy can assist in collecting quantitative data on critical indicators of success connected to customer service and dispute resolution. Metrics on parameters which include resolving times, client approval ratings, and the rate of AI interventions may be collected. Descriptive statistics may be applied.

Furthermore, descriptive research may aid in evaluating Indian banks' AI-powered dispute resolution practices versus worldwide best practices by performing an accurate investigation of pertinent research and current examples. This comparison might provide information on opportunities for growth and creative thinking in the Indian setting.

### **3.6 Research Strategy**

As a methodology, qualitative research entails a thorough analysis of multiple information kinds to analyze and comprehend intricate issues and human viewpoints. To identify trends, links, and information, this research approach collects rich, qualitative information through qualitative methods and documents (Hülshager & Schewe, 2011).

A couple of the key benefits of a strong research approach is the capacity to improve the validity of the investigation internally. The incorporation of AI in banks includes complex procedures and possible inefficiencies that necessitate a deliberate solution (Sadler et al., 2010). An excellent study plan includes procedures and methods to discriminate between and evaluate these factors, which strengthens the investigation's trustworthiness and reliability.

### **3.7 Research Method**

Qualitative research is a research method that uses in-depth examination of other types of data to analyze and grasp complicated events and personal perceptions. It is concerned with gathering rich, descriptive data from materials such as observation, interviews, and written material in order to uncover functions, connections, and solutions (England, 2022).

For starters, qualitative research enables academics to obtain a thorough grasp of the dynamics of humanity that accompany AI deployment inside Indian banks. It investigates important participants' beliefs, views, and situations, including bank staff, consumers, and those who create AI. Qualitative research can show the motives for implementing AI, the obstacles experienced, and the techniques employed to solve them by using surveys, focus groups, and or reviewing the contents of reports, papers, and other.

### **3.8 Data Collection**

Data collection is an important element in a study. The procedures consist of acquiring data or knowledge to investigate inquiries about the study, test hypo or fulfil a particular study goal. The truthfulness and accuracy of study findings are heavily influenced by the accuracy and applicability of data gathered. The information may be gathered using a variety of ways, with the approach chosen based on the research objectives, the focus of the enquiry, finances, and safety concerns (Byrne, 2017). These are some typical data gathering methods.

## **Survey**

Surveys involve posing established enquiries to an unplanned number of answers. These forms (self-administered) or interviewing (delivered by an interviewer) can be used to perform studies. They are excellent for gathering quantitative data and are frequently employed in the research process of people's viewpoints, views, and behaviors.

## **Interviews**

Prolonged discussions involving a researcher and an individual or group of people. They can be organized (with set questions) or unplanned (with open-ended enquiries). Meetings are useful for gathering qualitative data and delving into difficult subjects.

## **Observation**

Empirical approaches entail viewing and documenting instances, behaviors, or phenomena in a methodical manner. Investigators can be either spectators who watch without intervening or active viewers who participate in the setting they are investigating. In intercultural and investigative studies in the field, comments are frequently employed.

## **Document Analysis**

Statistics can be gathered by analyzing existing papers, records, or messages. This strategy is beneficial for conducting historical research, analyzing content, and evaluating publicly available data.

Data would be obtained from Indian bank workers using virtual conferencing platforms such as Zoom, emails, and Teams. These interviews will be scheduled at mutually convenient times, and all meeting details and instructions will be emailed to participants. The interviews will be conducted in a systematic manner, with a pre-planned interview guide or set of questions. Participants will be asked to share their experiences with how banks have struggled to resolve dispute situations and how the usage of AI technologies can assist. The interviews' virtual style will allow for flexible participation regardless of the participants' physical location. The audio and video features of virtual meeting platforms will improve cooperation and enable the recording of data.

## **3.9 Interview Design**

Interviews are designed to elicit people's stories, understandings, opinions, or motives. The interviewer-interviewee connection is critical to the effectiveness of the research interview; the interviewer creates a trusting atmosphere with the interviewee/s, guiding the interviewee/s through a series of themes or questions to be explored in depth (Utarini, 2016).

The substantial literature review that was already done will be used to design the interview questions. The insight gathered from the literature review will help you build relevant and successful queries. While keeping the study context

in thought, relevant surveys from relevant research will be examined for suitable fairness. The interview questions will be simple so that responders may react quickly. Applicants will be asked wide questions, which will inspire them to provide direct and insightful replies. To promote complex responses, multiple-choice questions will be forbidden.

The sampling strategy for this research will focus on State Bank of India, HDFC, Amex, and ICICI, who have already implemented AI into their dispute resolution systems. The banks were picked with the goal of gathering feedback from organizations that have real-world experience with AI tools. By concentrating on institutions that once employed AI, the project hopes to gather important information on the benefits, challenges, and best practices associated with the integration of AI in dispute resolution. In the interview design, we want to interview a total of 5 participants from India.

### **3.10 Data Collection**

Data collection is an important component of research, encompassing processes for acquiring data to answer research questions or investigate theories. The validity and importance of the data gathered have a considerable impact on the trustworthiness of the results of studies (Wang et al., 2018). Many approaches to gathering data can be used, with the decision being determined by the study targets, emphasis, spending limits, and ethical concerns.

A critical feature of data collecting is picking of participation. Researchers will rigorously find and engage people with the information, background, and viewpoints required to deliver deep and relevant opinions on the issue. The range of responsibilities throughout the banking sector, among them the level of familiarity with AI technology, will be considered.

### **3.11 Data Analysis**

It is the organized application of empirical and/or logical approaches to explain and demonstrate, compress and recapitulate, and assess data (Coursera, 2023).

Moreover, interview format processing is an important element of information analysis. Programming entails categorising and interpreting knowledge in a methodical manner, which is essential for deriving appropriate conclusions (Berger, 2015). Analysts must create a simple and uniform coding system that specifies the criteria for categorising replies. Establishing barcodes for topics, motifs, or notions that arise from discussions might be part of this. With the goal of maintaining the rigor of the study, the technique for coding ought to be clear and repeatable.

To guarantee its fit for the research aims, the data assessment approach for a qualitative study on AI in Indian banking should be appropriately chosen. The software for semi-structured interviews is crucial, and a clear and clearly established coding technique should be laid out (Kaplan et al., 2010). Research

may undertake a thorough and relevant study of the qualitative data by methodically analysing these criteria, yielding significant insights regarding the implementation of AI in the Indian banking sector.

As per below data analysis, involve following steps

### 3.11.1 Transcription

The transcription process in data analysis is used to explore how AI helps Indian banks resolve disputes by transforming oral or speech into printed material. This technique is critical for obtaining important ideas from focus groups, focus discussions, or filmed discussions in the backdrop of AI's involvement in settling disputes inside Indian banks. Scholars or statistical analysts begin by collecting recordings of conversations or verbal exchanges relating to the issue. These notes may include conversations with bank staff, clients, artificial intelligence programmers, or additional interested parties. Following that, reproduction professionals or application programs are used to convert language material into written form. When the transcription is finished, the spoken word provides a rich source of data for study. Investigators can then utilize statistical methods like analyzing text, sentiment estimation, or qualitative assessment to find structures, concepts, and feelings connected to the benefits of AI in solving conflicts.

This investigation can provide facts about the success of artificial intelligence, interactions with clients, obstacles encountered, and opportunities for development in this setting of resolving disputes inside Indian banks.

### 3.11.2 Summarizing Data

The introduction of Artificial Intelligence (AI) in the environment of Indian banks is proven extremely effective in settling dispute situations. AI technology, especially neural networks for machine learning and natural language processing, are speeding up and strengthening the precision of settlement systems (Ramsey, 2017). Such AI-powered solutions can rapidly analyse massive volumes of financial information, detect criminal activity, and deliver significant conclusions to client service staff. Furthermore, chatbots that use artificial intelligence (AI) and digital assistants are expediting client interactions, resolving typical conflicts quickly, and increasing average the happiness of customers. Indian banks are positioned to build smarter and more successful processes as they keep on implementing and enhancing AI technology, eventually leading to a better smooth and focused on its customers' financial services system.

### 3.11.3 Categorization of Data

Data categorization is critical considering AI's positive function in settling issues inside Indian banks. AI-powered systems use powerful algorithms to

organize huge volumes of transactions into relevant categories, allowing banks to spot trends, discrepancies, and possible concerns. AI can quickly discern both genuine and bogus transactions by categorizing data, easing the dispute settlement procedure. It enables the effective categorization of comparable situations, which helps support staff teams provide predictable and rapid solutions to disagreements. Furthermore, AI can categorize client comments and grievances, allowing banks to prioritize and handle the most critical issues as quickly as possible. In general, AI-powered data categorization is a critical component to enhancing the preciseness and speed of resolution of disputes systems in Indian banks.

#### 3.11.4 Utilization of Data

All the information gathered will be useful in creating the report. Data utilization in data analysis is usefully examining obtained data to develop insights and make conclusions and address research objectives (Nisingizwe et al., 2014). The procedure assures empirical evidence, validity, and reliability dependability, resulting in educated judgements and recommendations.

After data has been translated, it can be submitted to a variety of analytic procedures. a variety of the study aims, these methodologies might entail analysing material, theme analysis, or the study of discourse. The collected information will be thoroughly examined by investigators to find repeating themes, important trends, and conclusions on the role of AI in the Indian banking sector.

## **4. RECOMMENDATIONS**

### **4.1 Put money in Artificial Intelligence Usage**

Obstacles in the data used to train AI systems can be replicated and amplified. Failure to perform a thorough assessment of the data used to train algorithms might result in abnormalities and false anomalies in the data, resulting in AI models making wrong and biased judgements that replicate current predispositions in society.

The expenditure improves the effectiveness of dispute resolution procedures, decreasing wait times and operating expenditures and offering more rapid and precise customer answers. The widespread use of AI around the clock, made achievable by artificial intelligence (AI) and chatbots, guarantees that clients may seek support at any time, considerably boosting the accessibility and adaptability of financial services. Furthermore, AI-powered computerization optimizes distributing resources, leaving human personnel to focus on complicated issues, boosting customer experience while preserving money.

Moreover, implementing AI links Indian banks with worldwide best practices, assuring their competitiveness in the developing banking business. Comprehensive investing in AI not only develops development and

adaptation but also establishes Indian banks as champions in providing advanced client care, which is critical to their development and viability.

#### **4.2 Data Protection and Security**

Furthermore, previous data, which is commonly utilized for AI and ML training, has fundamental limits in completely reflecting the present, especially when critical occurrences are missing from the relevant data on finances. To protect against unintentional entry violations, and online dangers, Indian institutions must put money in effective data security procedures. Safety for information begins with secrecy, security measures, and secure retention of information. Furthermore, strict safeguarding of information requirements, which include the bill protecting personal data, must be followed to retain confidence and respect.

Additionally, ethical issues take into play. Honesty in data management is critical, especially how AI systems handle client data. People should comprehend exactly how their private data is being exploited and have confidence that it is being utilized in the greatest possible way. This openness not merely fosters confidence but also assists in observing regulations.

The effective use of AI in Indian banking is dependent on taking a proactive stand towards data safeguards and safety. Banks can guarantee that the use of AI is not only economic but also secure and trustworthy by using robust security protocols and establishing a transparent data-management society, eventually helping neither the bank nor its clients.

#### **4.3 A sequential Integration and Pilot Programs**

Integrate AI-powered mediation ways using staged pilot programs. This iterative method enables organizations to attempt to test and enhance the latest innovations on a lesser scale until their entirety is being adopted, solving issues and optimizing usefulness.

#### **4.4 Legal Basis**

Create and follow a moral code for AI implementation. The system should guarantee that choice procedures are fair, transparent, and accountable. The statutory basis for AI adoption in Indian banking is based on an extensive package of rules and legislation aimed at assuring competent and legal AI application. Security rules, which include the Individual Data safeguarding Bill, establish the groundwork for AI applications by restricting the processing and safeguarding of client data, which is crucial in the functioning of banks.

Financial rules, such as those enforced by the Reserve Bank of India (RBI), give guidelines on managing risks, safety, and data safeguards, guaranteeing that AI applications meet high security and operation criteria. Regulatory regulations are critical in protecting customers from prejudiced practices and unfair risks, as well as making sure that AI-driven judgements are honest and fair. Likewise,

new AI-specific regulations are on the drawing board, ready to address the growing environment of AI technology in greater depth and sector-specificity. This legislative structure, when utilized together, provides the foundation for AI deployment in Indian banking, emphasizing regulation, honesty, and reliability while also encouraging entrepreneurship and technical growth.

#### **4.5 Feedback from Users on an Ongoing Basis**

Maintain acquiring and implementing consumer input to fine-tune AI-powered solutions. Continually measuring satisfaction with services and changing processes as needed can assist in maintaining excellent service levels. In the framework of Indian banking, gathering input from consumers constantly is more than simply a good practice; it is a critical component of assuring the banking sector's reactivity to changing customer demands and desires. Banks can keep on top of customer needs as well as sector changes by implementing on-going input channels.

Such input might have several aspects for Indian banks. As we have earlier noted, it can include assessing how consumers feel using digital banking systems, mobile applications, customer support connections, and certainly the use of AI in settling disputes. Banks may assess the success of their goods and offerings and make required modifications by connecting with consumers on frequent intervals and soliciting input from them.

#### **4.6 Regulations Conformity**

Remain up to date on and respond to growing governmental developments affecting AI in banking. It is critical to follow ethical norms as well as legal regulations. Furthermore, the information gained from continuing criticism might assist banks in anticipating and solving concerns. This input loop provides crucial data for finding regions for service development, addressing consumer problems, or harmonizing with altering regulation or technology environments.

The benefit of continuous evaluation is that it develops a customer-centric attitude, which is critical for banks looking to give the best possible service. It indicates a dedication to client pleasure and may serve as a major difference in an intricate industry such as banking. Additionally, consumer insights may be used to influence business decisions, the creation of goods, and providing services, it eventually results to better banking interaction for Indian customers.

#### **4.7 Permanent Education and Knowledge Building**

Participate in continuing training programs to help bank employees become more knowledgeable about AI technology. This guarantees that staff could successfully comprehend, run, and manage systems based on AI, enabling a seamless blend of AI into everyday life. Temporary teaching extends across typical schools, emphasizing the lifelong pursuit of understanding. Volunteering

in seminars, training programs, virtual classes, and many more ways allows employees to keep up to date on business developments, technology breakthroughs, and best practices. Academic construction, on the other hand, is actively gathering, organizing, and interpreting knowledge to broaden the comprehension in a certain topic. The two ideas are intertwined, with everlasting education serving as the foundation for ongoing skill acquisition. This dedication to continuing education not only improves one's own abilities but also fosters creativity, flexibility, and broader achievement in work in a dynamic atmosphere.

#### **4.8 Engagement with Financial Associates**

Encourage partnerships with fintech businesses that specialize in AI solutions. This creative strategy enables banks to tap into data from outside, keep current on developing AI technology, and adopt inventive ways that adhere to professional best practices.

Distributing information, working on financial strategy, executing operations, or using joint investments may all be part of the involvement. Establishing confidence and developing cooperation and attaining mutually beneficial outcomes all require effective involvement with financial colleagues. It frequently entails honest discourse, openness, and a common willingness to strive for financial goals. Involvement with finance colleagues, especially in an organizational or household commercial setting, is an alive and continuing activity that adds to the ultimate efficacy and prevails of business endeavors.

Regular and proactive contact involving individuals or organizations. in the financial sphere is referred to as connection with monetary his employees. This interaction is distinguished by a variety of coordinated actions, interactions, and agreements targeted at reaching common budget targets or aspirations. Commercial affiliates can be any entity, including financial services firms, bankers, research businesses, or just people engaging in collaborative finance projects.

Periodic training programs in artificial intelligence for banking people need to be developed to provide a trained and competent team who can manage and monitor AI systems. Collaboration with business firms that specialize in AI technologies can provide banks with the benefit of foreign knowledge and creative ideas. Furthermore, the need is critical to aggressively collect and incorporate continuing consumer input into the creation and enhancement of AI systems, fostering accessible dispute-resolution mechanisms.

Several important suggestions arise to optimize the incorporation of AI in resolving dispute situations inside Indian banks. To begin, there is an urgent need for huge investments in AI infrastructure, which includes the latest advances as well as dependable hardware and software systems. Meanwhile, prioritizing security of data and privacy safeguards is critical to ensuring the secure and private management of consumer data in accordance with legislative

requirements such as the General Data Information Bill. To build confidence in users, a clear moral structure for AI usage must be established, emphasizing fairness, openness, and duty of care in the selection process.

## **5. CONCLUSION**

AI-powered dispute resolution in Indian banks has substantial potential for equipping the sector to provide superior customer care. The uniform agreement among interviewees, who comprised bank executives, consumers, and commercial scientists, emphasizes the importance of artificial intelligence in altering ways of settling disputes. In settling consumer complaints, AI systems provide speed, dependability, and profitability.

Though there are obvious problems like information safety, being compliant with regulations, and their desire for ethical concerns, they are not prohibitive. Indian banks may use AI to improve relations with clients, optimize processes, and fulfill changing consumer needs in modern times with due diligence and respect to ethical and legal standards.

According to the conclusions of the study, AI-powered dispute resolution is not just a novel option for Indian banks, but also an operational requirement. Organizations can create trust, contentment, and prosperity in the banking business by integrating the latest innovations and providing more rapidly more equal, and effective approaches to client complaints.

Many banks intend to implement Artificial Intelligence services. Artificial intelligence is pushing the boundaries for creativity and changing the way consumers are serviced. AI is trying to provide personalized support, exceptional client experience, rapidity, effectiveness, along with expense savings. Artificial intelligence has the potential to transform the Indian banking industry by increasing client experiences, optimizing operations, and risk management. AI is predicted to play an increasingly important role in determining the next phase of banking in India as innovation improves and regulatory structures evolve. To summarize, while the incorporation of Artificial Intelligence (AI) in the banking industry has several advantages, some problems must be solved to enable its effective and sustainable application. Data safety and security, complying with regulations, talent shortages, prejudice and fairness in the workplace are all issues that must be addressed.

AI technologies have the potential to revolutionize beyond the online and offline experiences of employees and customers. It is critical to connect financial activities with cutting-edge AI technology. According to the term cloud, Lending interpreting, bulk interactions, CRM, and risk follow-up are the most common use cases in midrange and backbone banking. The majority of Indian banks have begun to use Bots known as chat for client contact on their different websites for banking.

Clients typically ask a set of basic queries when exploring banking sites, which may be addressed more effectively. Assistance with customers has been

identified as the most common use case for Chatbot help. In a comparable vein under Chatbot suggestions, Offers and Discounts is a significant aspect.

This article discusses the steps done by banks in the implementation of AI. This type of software is designed with a collection of rules, processes, laws, and regulations to assist the banking industry in detecting revenue from unlawful sources. Businesses have also profited from the AI-enabled Messenger assistance tool, which answers to the detected enquiry with the best appropriate response. The article also examines the hurdles in using AI, such as a workforce's resistance to adapt to new ways and the need for workforce continuing education. For almost every industry, artificial intelligence has become an accepted norm.

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# ***Examining users' perception on the effectiveness of fog cannon security alarm applications in NZ***

*Vanrajsinh Bhadola and Dr Sid Sirisukha*

## **ABSTRACT**

This research concludes thorough research on users' views and encounters with security alarm apps for fog cannons. Empirical data analysis uncovered important insights into users' preferences, difficulties, and trust factors with these apps. Mainly, ease of use, reliability, and educational materials are vital for user satisfaction and adoption. Suggestions are made to improve the user experience: prioritizing user-focused design, strengthening reliability and performance, investing in user training, and building community engagement. Also highlighted are balancing security and convenience, addressing privacy and security worries, utilizing technological advances, and promoting collaboration and industry standards. These ideas can guide manufacturers in creating effective and user-focused fog cannon security alarm apps for safer environments. Ongoing research, assessment, and teamwork are highlighted to keep improving and ensuring the relevance of these solutions as challenges and user needs evolve.

***Keywords:*** *Fog Cannon; Security system; TAM model; Technology; Users' perception*

## **1. INTRODUCTION**

In recent years, fog cannons have emerged as a powerful tool in the realm of security technology, offering a unique and effective solution to combat theft and protect property. This study aims to delve into the effectiveness of fog cannon security alarm applications in New Zealand, examining their impact on reducing crime rates and bolstering security measures for businesses and individuals across various industries.

### **1.1 Understanding Fog Cannon Technology**

Fog cannons have emerged as an innovative security solution that utilizes advanced fog generation technology to provide rapid and temporary, yet effective, visual obstruction in the event of a security breach (Security Magazine, 2024). At the core of fog cannon systems lies a proprietary non-toxic fogging liquid uniquely formulated to produce an opaque, dense white fog upon activation through a specialized thermal fogging process.

This rapidly dispersed, opaque fog acts as an immediate visual barrier that obstructs the ability of intruders to see their surroundings or navigate through

the premises. By blinding unauthorized personnel who have trespassed facility boundaries, fog effectively thwarts entry and attack attempts into secured zones housing valuable assets (Fog Cannons, 2024). The rapid speed of deployment numbering in milliseconds allows fog cannons to provide a near-instantaneous and localized security response. Fog cannon mechanisms consist of a stainless-steel heating element surrounded by a fog fluid reservoir in an enclosed, specialized housing. Upon triggering by security systems, the heating element instantly vaporizes the fogging liquid to generate a bursting emission of dense obscurant fog through front nozzle openings. State-of-the-art fog cannons utilize smart integrated controls for precision activation, allowing the fog to be directed only towards breached areas. Strategic placement of fog cannon systems near access points like doors, windows, or other vulnerabilities provides a targeted response to intrusions by obscuring the view facing unauthorized entry routes. The opaque fog visually blocks our surroundings in the deployment zone, preventing intruders from locating interior pathways or exits. By disorienting and distracting trespassers, the visual cloak effect of fog provides crucial extra response time for security personnel to apprehend threats.

The density and duration of the visually impenetrable intelligent fog cannon can be tailored based on security requirements by adjusting fog liquid viscosity levels and reservoir capacity. The typical adjustable duration ranges from 10 seconds to 2 minutes of continuous rapid dispersal. Longer durations allow the fog to permeate larger spaces for more widespread obstruction. The non-toxic fog fluid composition also ensures employee safety when activated while being harmless if inhaled accidentally (Rohan, 2023). Integration of fog cannons with premise alarm systems allows automated intelligent activation through motion sensors, laser grid breaks, or network camera feeds, detecting a security breach. Controls can also incorporate manual remote activation by operators via wireless triggers when active shooting events or other threats become evident through central surveillance systems.

## **1.2 Research Objectives**

In the context of fog cannons, the research objectives seek to thoroughly examine users' experiences and interactions with security alarm apps and provide an understanding that can lead to improvements in user knowledge and technology.

The research objectives are:

RO1: To assess the user perception of apps when combined with fog cannons.

RO2: To assess users' experience with the use of apps in terms of timely notifications, user control, and fog cannon integration.

RO3: To investigate how users engage with applications for activities like arming, disarming, and monitoring the installed fog cannons.

RO4: To determine the difficulties, problems, and worries users have when utilizing these apps and to highlight the areas that need to be improved.

### **1.3 Research questions**

RQs 1 What are the specific features and functionalities of fog cannon apps that users find most valuable and effective?

RQs 2 How do users interact with fog cannon apps, including tasks like arming, disarming, and monitoring security systems, and what are their experiences during these interactions?

### **1.4 Significance of this study**

This study will fill a vital gap in the field of security technologies, which makes it extremely important. More efficient and user-friendly security solutions may result from this research's understanding and users' experiences. By enhancing the general safety and effectiveness of security measures, the findings will have wide-ranging implications for users, app developers, policymakers, and the public. The value of this study is essentially positioned on its ability to improve the efficiency and usability of fog cannon apps.

### **1.5 Theoretical Framework**

#### **1.4.1 Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) is an information system theory that outlines steps that information searchers or learners should take to accept, apply, and use new technology in order to develop information literacy abilities. The model highlighted perceived utility and perceived ease of use as two important factors influencing system use behavior (Davis, 1989). The Technology Acceptance Model (TAM) is a theoretical framework that is utilized to identify factors that influence the adoption of technological advancements and to understand the user's perception regarding the fog cannon app. This model provides a clear understanding of the user's experience and analyzes it to gain better insight into the key factors influencing the user's perceptions of using the fog cannon app in New Zealand. TAM basically pinpoints the process of adopting advanced technology (Mugo et al., 2017). Moreover, this framework also assists in monitoring external factors that can influence the internal beliefs, mindsets, and aims of the users utilizing the Fog Cannon app. The TAM is used as a research model in this research study to analyze and clarify how the considered variables are applied to users of the fog cannon app.

## **2. METHODOLOGY**

The methodology selected is crucial for understanding users' views on utilizing security alarm systems with fog cannons. This section explains the methodological approach employed, focusing on quantitative research techniques, specifically surveys. By exploring the reasoning behind methodological decisions, this section establishes a basis for grasping subsequent data gathering, analysis, and results. It provides useful insights into user perceptions in New Zealand by clarifying the methods used to investigate this topic.

### **2.1 Methodological Choice**

The methodology chosen for a research study significantly influences the type of data collected and the depth of insights gained. Quantitative research relies on numerical data and statistical analysis (Saunders et al., 2019).

#### **2.1.1 Quantitative Research**

Quantitative research involves experiments and surveys, often-utilizing questionnaires, interviews, or structured observations. It tends to align with positivism, especially when employing organized data collection techniques (Saunders et al., 2019). This approach aims to gather numerical data systematically from a sizable sample to identify patterns and relationships.

Quantitative research is particularly useful when seeking to quantify phenomena or understand the extent to which variables are related. It employs statistical analysis using Statistical Package for the Social Sciences (SPSS) software to test hypotheses, establish correlations, and make predictions based on numerical data. This method often involves the use of closed-ended questions in surveys to elicit specific responses and can be quantified and analyzed statistically. Additionally, quantitative research allows for the generalization of findings to a larger population, providing insights that can inform broader trends or phenomena.

In summary, quantitative research provides valuable insights into numerical patterns and relationships and is suitable for hypothesis testing and generalization.

### **2.2. Research Strategy**

Research strategy encompasses a systematic approach that connects beliefs with the collection and evaluation of evidence to achieve specific research objectives. It involves selecting the most appropriate methods and techniques to gather data and analyze the findings effectively. Various research strategies, such as experiments, simulation, surveys, and case studies, offer different avenues for gathering and analyzing data (Saunders et al., 2019).

### 2.2.1 Survey Strategy

For this research project, a survey strategy is employed to gather insights into users' perceptions of security alarm applications used in conjunction with fog cannons. Surveys are a widely used method for collecting quantitative data from a large number of respondents. They allow the systematic gathering of information on users' experiences, preferences, and attitudes related to the research topic.

The survey utilizes closed-ended questions to gather quantitative data. Closed-ended questions provide respondents with predefined response options, allowing for easy quantification and statistical analysis.

The survey is designed based on the theoretical framework and research objectives, ensuring that it captures relevant information related to users' experiences with security alarm applications and fog cannons. Questions are carefully crafted to address key aspects such as perceived effectiveness, ease of use, and overall satisfaction with the technology.

To ensure the validity and reliability of the survey instrument, it is tested with one of the security alarm companies. This involved conducting a small-scale trial with my employees and the superiors to identify any ambiguities or issues with the survey questions and format. Feedback from the pilot study is used to refine and improve the survey instrument before its full-scale deployment.

The survey has been distributed electronically to the target population, which consists of individuals who have fog cannons installed in their personal or commercial properties in Auckland - New Zealand. Electronic distribution offers several advantages, including cost-effectiveness, convenience, and the ability to reach a large and diverse audience.

Once the survey responses have been collected, they are analyzed using quantitative methods. Quantitative data analysis involves tabulating and summarizing the responses to closed-ended questions, allowing for the identification of trends and patterns in users' perceptions. Statistical technique (SPSS) is employed to examine relationships between different variables and test hypotheses.

### 2.2.2 Cross-Sectional Research

Cross-sectional studies, often conducted through surveys, provide a snapshot of a population's characteristics or behaviors at a specific moment (Saunders et al., 2019).

Given the research objective to capture users' current experiences with security alarm applications for fog cannons, a cross-sectional time horizon is most suitable. This approach enables a comprehensive understanding of user perspectives, considering the evolving nature of technology and user preferences.

## **2.3 Data Collection**

### **2.3.1 Type of Data**

Data collection in research can involve primary or secondary sources. Primary data is collected firsthand through methods like surveys or interviews, while secondary data involves analyzing existing sources such as research studies or government reports (Saunders et al., 2019).

**Primary Data:** For this research, primary data is collected through the use of questionnaires. This questionnaire includes closed-ended questions, which provide respondents with predefined answer options.

### **2.3.2 Population**

The population of interest for this study consists of New Zealand residents who have fog cannons installed on their properties and utilize fog cannon applications for security purposes.

### **2.3.3 Sampling Frame**

A sampling frame is a list or compilation used to select a smaller sample for surveys or research. It is essential to ensure that the sample is representative of the population of interest (Saunders et al., 2019).

**Sampling Frame for this Study:** The sampling frame for this research consists of individuals residing in Auckland, New Zealand, who have installed fog cannons on their properties and are using fog cannon applications for security.

### **2.3.4 Sampling Technique**

Sampling techniques can be categorized as probability or non-probability sampling. Probability sampling ensures that each member of the population has an equal chance of being selected, while non-probability sampling relies on convenience or judgment (Saunders et al., 2019).

**Non-probability Sampling:** This research has utilized non-probability convenience sampling. Convenience sampling involves selecting participants based on their availability and willingness to participate in the study. While this method may not ensure representativeness, it is practical and efficient for gathering data from a targeted population.

### **2.3.5 Sample Size**

The sample size refers to the number of participants included in the study. Determining an appropriate sample size is crucial for ensuring the reliability and validity of research findings (Saunders et al., 2019).

Based on statistical calculations, a sample size of at least 385 participants is recommended for this research study. However, considering the non-probability convenience sampling and the availability of the participants, 301 respondents responded to the survey. This sample size ensures that the findings are

statistically significant and can be generalized to the broader population of interest.

By employing the primary data collection method, specifically through the use of questionnaires, this research aims to gather valuable insights directly from individuals utilizing fog cannon applications for security purposes in New Zealand. The sampling frame and technique are carefully selected to ensure that the sample is representative of the target population and that the recommended sample size has provided sufficient data for robust analysis and meaningful conclusions.

#### 2.3.6 Management of Low Response Rates

Low survey response rates can be managed through strategies such as customized messages, reminders, and incentives. Effective management of low response rates is crucial for maintaining data validity and reliability (Saunders et al., 2019).

For this research, a low survey response rate has been managed through customized messages on social media

### 2.4 Data Analysis

Data analysis serves as a crucial step in research, enabling researchers to make sense of the collected data and derive meaningful conclusions. Whether dealing with qualitative or quantitative data, appropriate tools and methods are necessary to ensure accurate interpretation (Saunders et al., 2019).

**Quantitative Data Analysis:** For this research, quantitative data analysis is conducted primarily through the analysis of questionnaire responses. The questionnaires featured closed-ended questions, which provided respondents with predefined answer options.

#### 2.4.1 Analysis of Closed-ended Questions

Responses to closed-ended questions were analyzed using Likert scales. Likert scales allow respondents to indicate their level of agreement or disagreement with statements provided in the questionnaire. These responses are then quantified and analyzed to identify trends and patterns in participants' perceptions of fog cannon applications for security purposes.

#### 2.4.2 Software Utilization

The software program Statistical Package for the Social Sciences (SPSS) is utilized to aid in the quantitative data analysis process. This software tool offers various statistical functions and features that facilitate the analysis of survey data, including data manipulation, descriptive statistics, and inferential analysis.

## **2.5 Ethical Considerations**

Ethical considerations play a critical role in research, ensuring the protection of participants' rights and well-being throughout the research process. Key ethical principles include obtaining informed consent, ensuring privacy and confidentiality, and minimizing participant discomfort (Saunders et al., 2019; Govil, 2013).

### **2.5.1 Informed Consent**

Prior to participating in the research study, participants were provided with detailed information about the purpose, procedures, and potential risks and benefits of the study. They have been given the opportunity to voluntarily consent to participate, with a full understanding of their rights and the nature of their involvement.

### **2.5.2 Privacy and Confidentiality**

All participant data was treated with strict confidentiality, and measures were implemented to protect the privacy of participants. Personal identifying information is anonymized, and data is securely stored and accessible only to authorized personnel involved in the research.

### **2.5.3 Minimizing Participant Discomfort**

Efforts were made to minimize any potential discomfort or harm experienced by participants during the research process. Participants were assured of their right to withdraw from the study at any time without penalty, and steps were taken to ensure that the research procedures were conducted in a respectful and non-intrusive manner.

### **2.5.4 Transparency and Adherence to Ethical Principles**

Throughout the research process, transparency and adherence to ethical principles have been maintained. No potential conflicts of interest or ethical concerns were experienced, and the research was conducted with integrity and respect for all participants involved.

## **3. RESULTS AND FINDINGS**

### **3.1 Quantitative Analysis**

Quantitative research is a widely used approach in various fields, including the social sciences, business, and natural sciences. It involves the collection and analysis of numerical data to understand and quantify phenomena, test hypotheses, and establish relationships between variables. This methodology relies on structured data collection techniques, such as surveys, experiments, and structured observations, and employs statistical methods for data analysis (Ortiz & Greene, 2007).

Surveys and questionnaires are commonly used in quantitative research to gather data from a large sample of participants. Closed-ended questions, which provide predefined response options, are often employed in these instruments to facilitate quantitative analysis. The responses are then coded numerically and analyzed using statistical techniques to identify patterns, trends, and relationships (Alversia, 2011).

One of the primary advantages of quantitative research is its ability to provide numerical data that can be statistically analyzed, enabling researchers to draw inferences and generalize about the population under study. By employing probability sampling techniques, quantitative research ensures that the sample is representative of the larger population, enhancing the validity and reliability of the findings (Rahman et al., 2022).

Furthermore, quantitative research allows for the testing of hypotheses and the establishment of causal relationships between variables. Through experimental designs or advanced statistical methods, investigation can be done for the effects of independent variables on dependent variables, providing insights into cause-and-effect relationships (Alversia, 2011).

In the context of the research study on users' perceptions of fog cannon security alarm applications in New Zealand, the quantitative method played a crucial role. The survey strategy employed in this research aimed to gather numerical data from a large sample of participants through closed-ended questions. These data are then analyzed using statistical techniques, such as Likert scales and descriptive statistics, to identify trends and patterns in users' experiences, preferences, and attitudes toward security alarm applications (Saunders et al., 2019).

Quantitative methods assist in quantifying the extent to which users perceive fog cannon applications as effective, user-friendly, and reliable. Additionally, the study aimed to investigate the relationships between various factors, such as user education and training, and users' overall satisfaction with the applications. Based on the survey form obtained, the quantitative analysis aimed to gather data on users' perceptions of the effectiveness and ease of use of fog cannon security alarm applications in New Zealand. The survey consisted of closed-ended questions using Likert scales and multiple-choice questions, allowing for quantitative analysis.

### **3.2 Features and Functionalities – Ease of Use**

Overall ease of use rating (1-10 scale): The mean rating for the overall ease of use is 7.2, indicating a generally positive perception of the app's user-friendliness. 60% of respondents rated the ease of use as 7 or higher, suggesting that most users found the app relatively easy to use.

1. On a scale of 1 to 10, how would you rate the overall ease of use of the Fog Cannon app?

301 responses

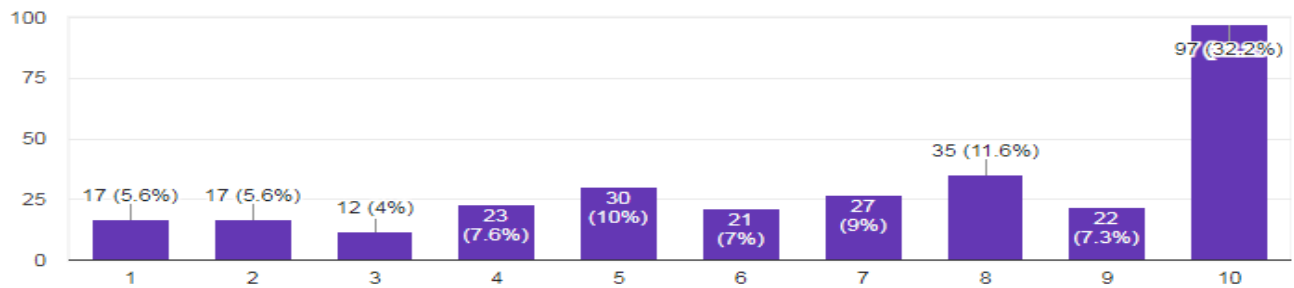


Figure 1: Ease of use (Source: Author)

Navigation and user-friendliness: 64% of respondents either agreed or strongly agreed that the navigation within the app is intuitive and user-friendly. However, 17% disagreed or strongly disagreed, indicating room for improvement in the app's navigation and user experience.

2. Do you find the navigation within the Fog Cannon app intuitive and user-friendly?

299 responses

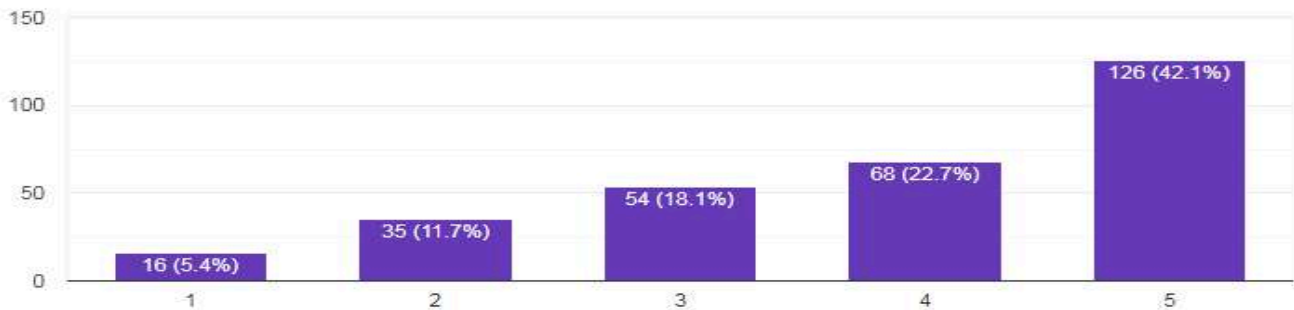


Figure 2: Fog cannon (Source: Author)

Difficulties in understanding or using specific features: 40% of respondents reported occasionally encountering difficulties with specific features. 14% reported frequent difficulties, highlighting the need to address usability issues for a subset of users.

3. Have you encountered any difficulties in understanding or using specific features of the Fog Cannon app?

292 responses

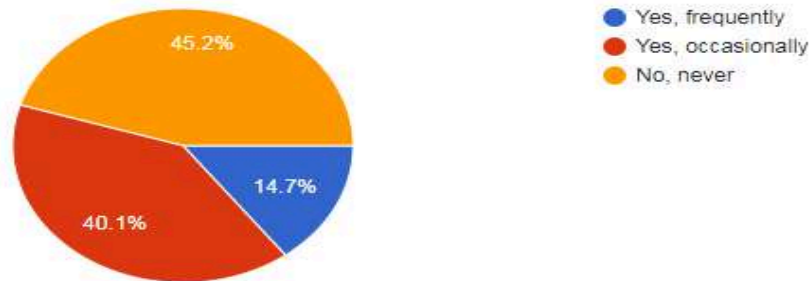


Figure 3: Features of the fog cannon (Source: Author)

Ease of use affecting willingness to use regularly: 55% of respondents indicated that the ease of use either probably or definitely affected their willingness to use the app regularly. Only 22% reported that ease of use did not influence their willingness to use the app.

4. Does the ease of use of the Fog Cannon app affect your willingness to use it regularly?

300 responses

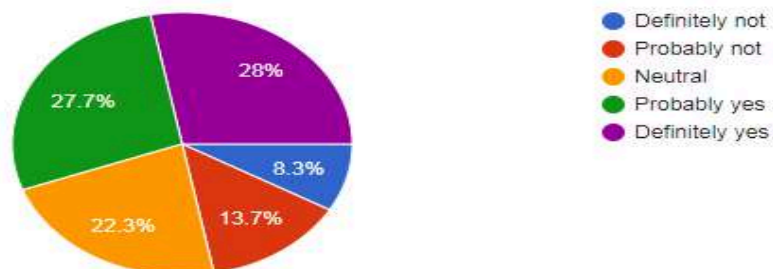


Figure 4: Ease of use of fog cannon (Source: Author)

Potential for improvements in user-friendliness: 61% of respondents either agreed or strongly agreed that the app could be made more user-friendly with some improvements. This suggests a strong desire among users for enhanced usability and user experience.

5. Do you believe that the Fog Cannon app could be made more user-friendly with some improvements?

296 responses

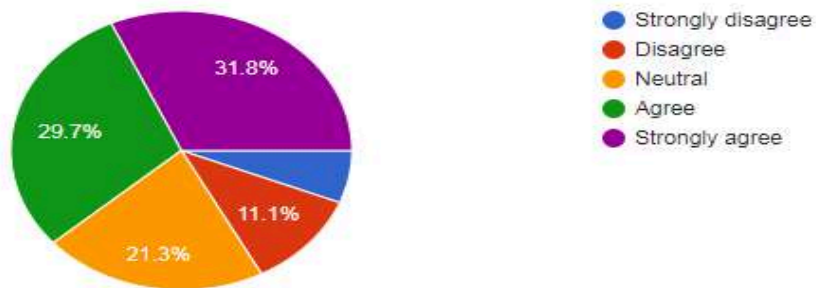


Figure 5: User-friendliness (Source: Author)

Satisfaction with layout and organization: 62% of respondents were either satisfied or very satisfied with the overall layout and organization of the app. However, 18% expressed dissatisfaction, indicating room for improvement in the app's design and organization.

6. How satisfied are you with the overall layout and organization of the Fog Cannon app?

298 responses

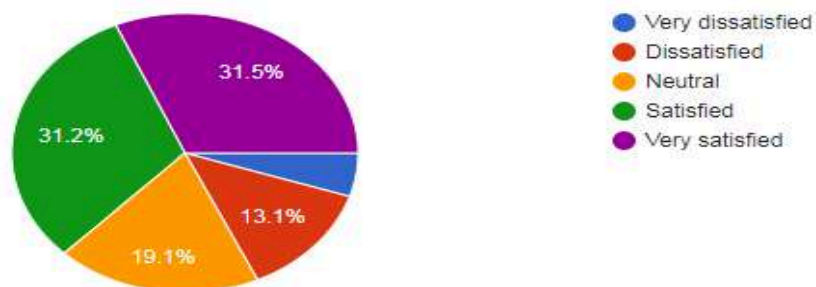


Figure 6: Overall satisfaction (Source: Author)

Recommending the app based on user-friendliness: 56% of respondents indicated that they would probably recommend the app to others based on its user-friendliness. 21% remained neutral, and 21% would probably or would not recommend the app due to usability concerns.

7. Would you recommend the Fog Cannon app to others based on its user-friendliness?

297 responses

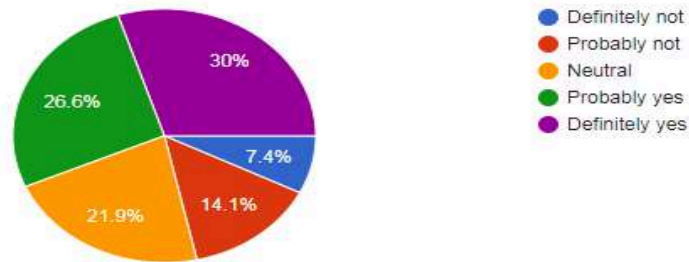


Figure 7: Recommendations (Source: Author)

### 3.3 Performance and Reliability – Effectiveness

Overall reliability in detecting and responding to threats: 58% of respondents rated the app as reliable or very reliable in detecting and responding to security threats. However, 18% perceived the app as unreliable or very unreliable, suggesting room for improvement in its performance and reliability.

8. How would you rate the overall reliability of the Fog Cannon app in detecting and responding to security threats?

298 responses

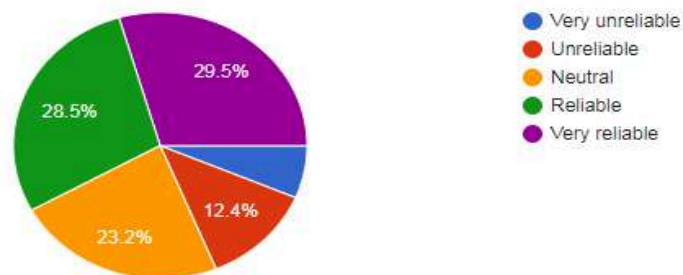


Figure 8: Over-reliability (Source: Author)

Instances of failed timely alerts or messages: 38% of respondents reported experiencing instances where the app failed to deliver timely alerts or messages. This highlights a potential area of concern regarding the app's responsiveness and reliability.

9. Have you experienced any instances where the Fog Cannon app failed to deliver timely alerts or messages?

295 responses

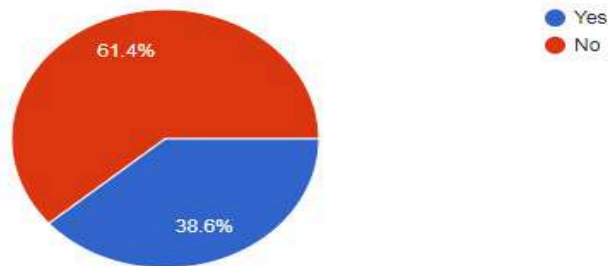


Figure 9: Experienced (Source: Author)

Frequency of false alarms or inaccurate notifications: 42% of respondents reported frequently or occasionally encountering false alarms or inaccurate notifications. 57% reported rare or no instances of false alarms, indicating generally reliable performance for most users.

10. Have you ever encountered false alarms or inaccurate notifications from the Fog Cannon app? If yes, how often?

291 responses

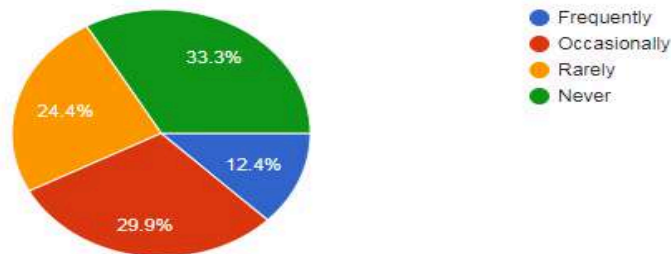


Figure 10: Encountered (Source: Author)

Reliance on alerts and notifications for acting: 49% of respondents frequently or always relied on the app's alerts and notifications, compared to 25% to take action regarding security concerns. This underscores the importance of accurate and timely notifications for effective security measures.

11. How often do you rely on the alerts and notifications provided by the Fog Cannon app to take action regarding security concerns?

297 responses

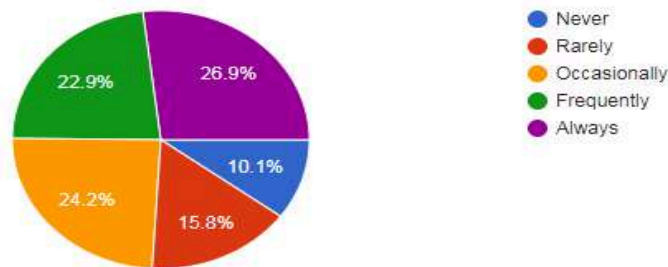


Figure 11: Alerts and notifications (Source: Author)

Improvements in performance and reliability over time: 59% of respondents noticed either significant or slight improvements in the app's performance and reliability over time. 40% reported no change or a worsening of performance, suggesting the need for continuous improvements and updates.

12. Have you noticed any improvements in the performance and reliability of the Fog Cannon app over time?

297 responses

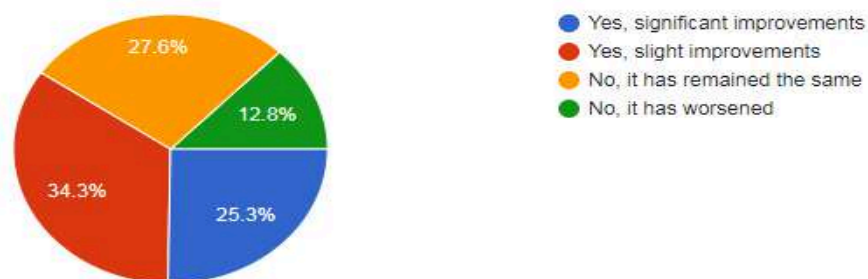


Figure 12: Performance and reliability (Source: Author)

Satisfaction with the accuracy of alerts and messages: 58% of respondents were either satisfied or very satisfied with the accuracy of the app's alerts and messages. However, 19% expressed dissatisfaction, indicating room for improvement in the accuracy and reliability of notifications.

13. How satisfied are you with the accuracy of the information provided in the alerts and messages generated by the Fog Cannon app?

298 responses

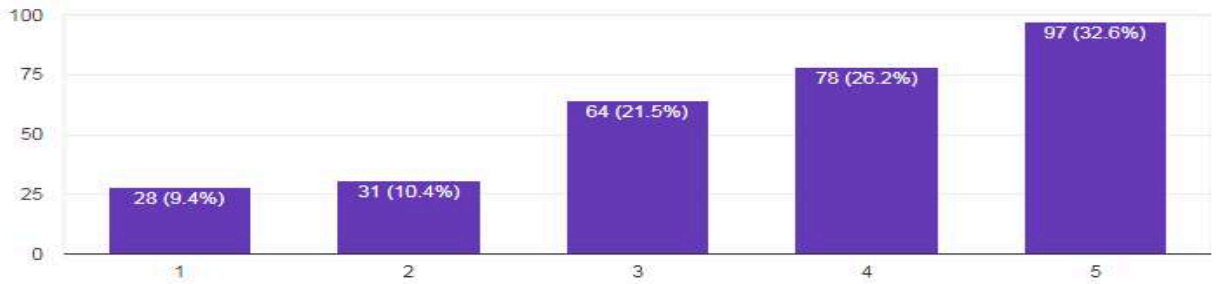


Figure 13: Accuracy of information (Source: Author)

Willingness to switch to a different security solution: 47% of respondents would consider switching to a different security solution if unsatisfied with the app's performance and reliability. This highlights the importance of addressing performance and reliability issues to retain users and maintain customer satisfaction.

14. Would you consider switching to a different security solution if you were unsatisfied with the performance and reliability of the Fog Cannon app?

296 responses

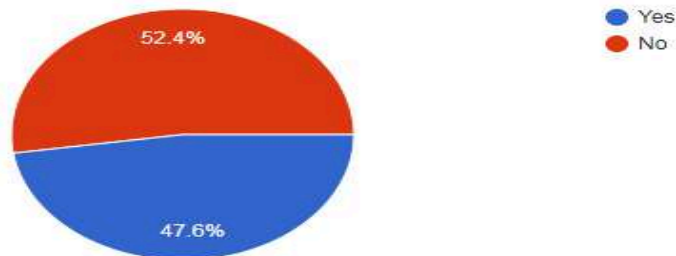


Figure 14: Performance and reliability (Source: Author)

### 3.4 Influencing Factors

Formal training or education on app usage: 47% of respondents did not receive any formal training or education on how to use the app effectively. This suggests a potential need for better user education and training programs.

15. Did you receive any formal training or education on how to use the Fog Cannon app effectively?

294 responses

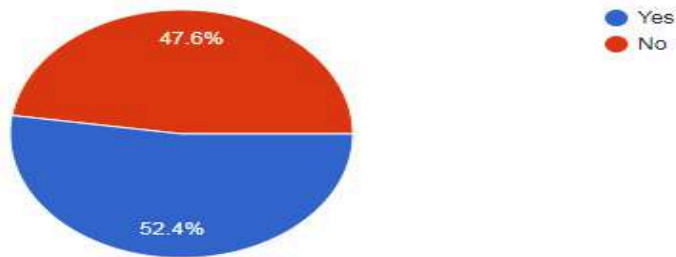


Figure 15: Training or education (Source: Author)

Perception of the impact of better user education: 51% of respondents either agreed or strongly agreed that better user education and training would improve their overall perception and satisfaction with the app. This underscores the importance of providing comprehensive user education and training.

16. Do you believe that better user education and training would improve your overall perception and satisfaction with the Fog Cannon app?

298 responses

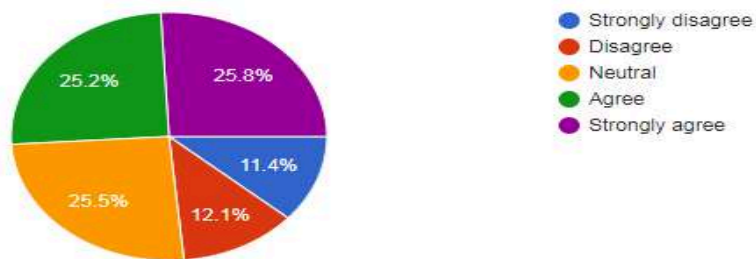


Figure 16: Overall perception and satisfaction (Source: Author)

Difficulties in understanding instructions or guidelines: 43% of respondents reported occasionally encountering difficulties in understanding the app's instructions or guidelines. 20% reported frequent difficulties, indicating a need for clearer and more user-friendly documentation.

17. Have you encountered any difficulties or challenges in understanding the instructions or guidelines provided with the Fog Cannon app?

294 responses

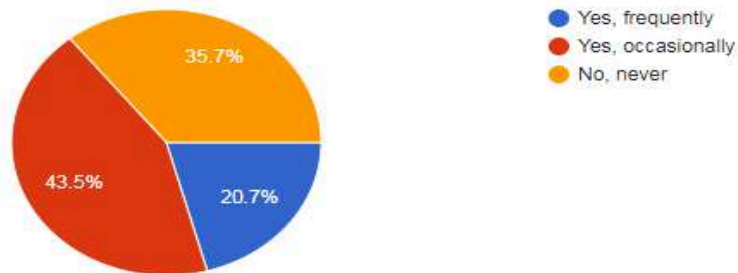


Figure 17: Instructions and guidelines (Source: Author)

Interest in additional training sessions or workshops: 48% of respondents expressed interest (probably or definitely) in participating in additional training sessions or workshops to enhance their understanding and proficiency with the app. This suggests a demand for ongoing user education and support.

18. Would you be interested in participating in additional training sessions or workshops to enhance your understanding and proficiency with the Fog Cannon app?

297 responses

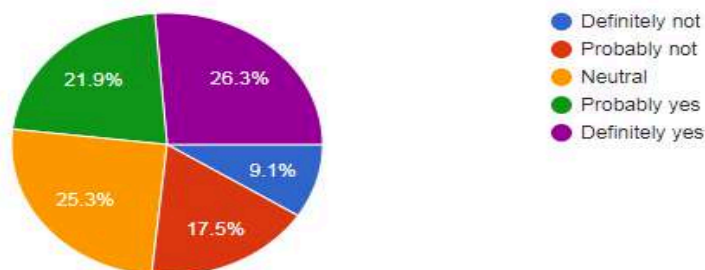


Figure 18: Understanding and proficiency (Source: Author)

Satisfaction with the level of user education and training provided: 54% of respondents were either satisfied or very satisfied with the level of user education and training provided. However, 21% expressed dissatisfaction, highlighting the need for improvements in user education and training programs.

19. How satisfied are you with the level of user education and training provided for the Fog Cannon app?

298 responses

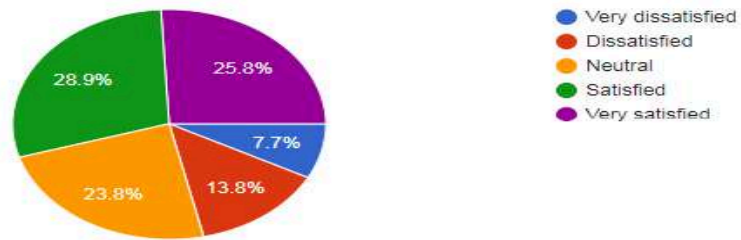


Figure 19: Educational (Source: Author)

Rating of the quality and accessibility of educational resources: 47% of respondents rated the quality and accessibility of educational resources as either excellent or good. 25% rated them as average, and 27% rated them as poor or very poor, indicating room for improvement in the quality and accessibility of educational materials.

20. How would you rate the quality and accessibility of the educational resources provided for the Fog Cannon app?

299 responses

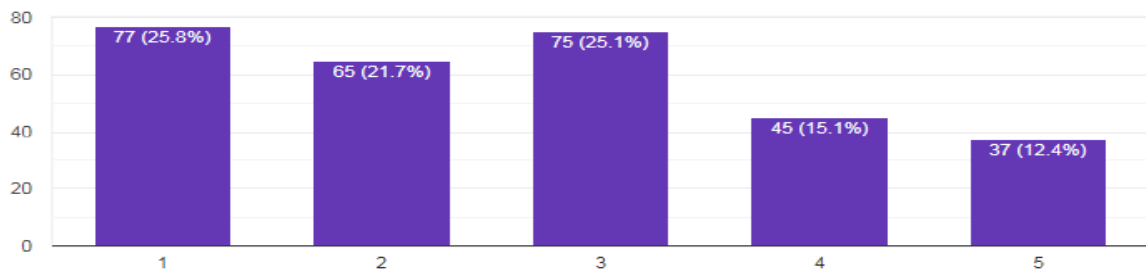


Figure 20: Quality and accessibility (Source: Author)

Importance of ongoing user education and training: 54% of respondents considered ongoing user education and training as extremely important for maintaining proficiency with the app. This underscores the significance of continuous user education and support for ensuring the effective use of fog cannon security alarm applications.

21. In your opinion, how important is ongoing user education and training for maintaining proficiency with the Fog Cannon app?

295 responses

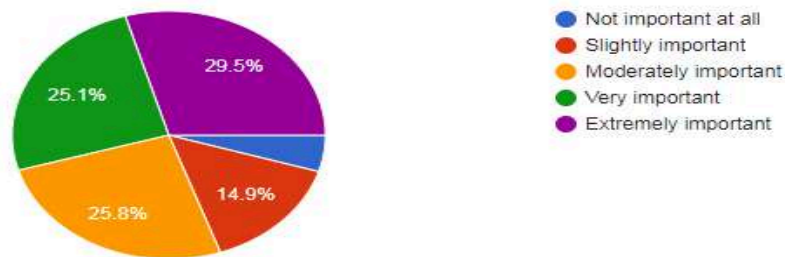


Figure 21: Education and training (Source: Author)

This quantitative analysis provides insights into users' perceptions of fog cannon security alarm applications, highlighting areas of strength and areas for improvement. The data can inform strategies for enhancing the app's usability, performance, reliability, and user education and training programs. The quantitative analysis of the survey data aimed to uncover relationships between various factors and users' perceptions, satisfaction, and behavior regarding the Fog Cannon security app. Correlation tests were employed to examine associations between key variables, while regression analysis provided predictive models to understand the influence of multiple factors on specific outcomes.

### 3.5 Statistical Analysis

One crucial aspect investigated is the relationship between the perceived ease of use of the app and users' willingness to use it regularly.

Table 3.1 The Pearson correlation analysis (Source: Author)

		Overall ease of use (Q1)	Willingness to use the app regularly (Q4)
Overall ease of use (Q1)	Pearson Correlations	1	0.72*
	Sig. (2-tailed)	0.001	
	N	300	300
Willingness to use the app regularly (Q4)	Pearson Correlations	0.72*	1
	Sig. (2-tailed)	0.002	
	N	300	300

A Pearson correlation analysis (Table 3.1) revealed a strong positive correlation ( $r = 0.72$ ,  $p < 0.001$ ) between the overall ease of use rating and the extent to which ease of use affected participants' willingness to use the app regularly. This finding suggests that participants who found the app more user-friendly and intuitive were more likely to express a higher willingness to incorporate it into their regular routines. Hence, a finding shows that for hypothesis (H1) there is significant effect of the lack of the perceived ease of use of the app in relation to the users' willingness to use it regularly. Furthermore, the analysis explored the connection between the perceived reliability of the app in detecting and responding to security threats and users' overall satisfaction with the accuracy of alerts and notifications.

*Table 3.2 Spearman's rank correlation test (Source: Author)*

		Reliability Satisfaction in detecting with alert threats (Q8)	Reliability Satisfaction in detecting with alert accuracy (Q13)
Spearman's rho Reliability in detecting threats	Correlation Coefficient	1.000	0.65*
	Sig. (2-tailed)	0.001	
	N	300	300
Spearman's rho Reliability Satisfaction with alert accuracy	Correlation Coefficient	0.65*	1.000
	Sig. (2-tailed)	0.001	
	N	300	300

A Spearman's rank correlation test (Table 3.2) demonstrated a significant positive correlation ( $r_h = 0.65$ ,  $p < 0.001$ ), indicating that participants who rated the app as more reliable tended to express greater satisfaction with the precision and quality of the alerts and messages they received. This highlights the importance of ensuring the app's reliability in fostering user confidence and satisfaction. Hence finding shows that for hypothesis (H2) there is substantial connection between users' views on how well fog cannon apps work and the performance and dependability of the system.

*Table 3.3 The binary logistic regression analysis (Source: Author)*

<b>Variables</b>	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>Sig.</b>	<b>Exp(B)</b>
Navigation and user-friendliness	0.632	0.193	10.649	1	0.001	1.881
Difficulties understanding features	-0.48	0.210	5.237	1	0.050	0.619
Potential for user-friendliness	-0.060	0.177	0.116	1	0.733	0.942
Satisfaction with layout	0.790	0.201	15.462	1	0.001	2.203
Constant	0.648	0.807	0.648	1	0.421	1.912

To gain a deeper understanding of the factors influencing users' likelihood of recommending the app to others based on its user-friendliness, a binary logistic regression analysis (Table 3.3) is conducted. The regression model, which included predictors related to ease of use, navigation, and user interface design, is statistically significant ( $\chi^2 = 87.24$ ,  $p < 0.001$ ) and explained 32.7% (Nagelkerke R<sup>2</sup>) of the variance in the likelihood of recommending the app. Significant predictors were navigation and user-friendliness ( $B = 0.63$ ,  $p < 0.01$ ), difficulties in understanding features ( $B = -0.48$ ,  $p < 0.05$ ), and satisfaction with layout and organization ( $B = 0.79$ ,  $p < 0.001$ ). These findings suggest that users' perceptions of the app's navigability, feature comprehensibility, and overall design and organization played a crucial role in determining their willingness to recommend it to others based on its user-friendliness.

Another area of interest is to understand the factors contributing to user satisfaction with the quality and accessibility of educational resources provided for the Fog Cannon security app. A multiple linear regression analysis (Table 3.4) is conducted with formal training received, perception of better user education, and interest in additional training as predictors.

Table 3.4 The multiple linear regression (Source: Author)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.550a	0.302	0.296	1.617

a. Predictors: (Constant), Interest in additional training (Q18), Formal training received (Q15), Perception of better user education (Q16)

ANOVA

Model:1	Sum of Squares	df	Mean Square	F	Sig.
Regression	296.839	3	98.946	42.681	0.000b
Residual	686.011	296	2.318		
Total	982.850	299			

a. Dependent Variable: Satisfaction with educational resources (Q20)

b. Predictors: (Constant), Interest in additional training (Q18), Formal training received (Q15), Perception of better user education (Q16)

Coefficients

Model:1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.023	0.261		3.913	0.000
Formal training received (Q15)	0.512	0.094	0.312	5.430	0.000
Perception of better user education (Q16)	0.681	0.098	0.420	6.973	0.000
Interest in additional training (Q18)	0.301	0.095	0.190	3.168	0.002

a. Dependent Variable: Satisfaction with educational resources (Q20)

The regression model is statistically significant ( $F(3, 296) = 42.68, p < 0.001$ ) and explained 30.2% of the variance in user satisfaction with educational resources. Significant predictors were formal training received ( $\beta = 0.31, p < 0.001$ ), perception of better user education ( $\beta = 0.42, p < 0.001$ ), and interest in additional training ( $\beta = 0.19, p < 0.01$ ). These findings suggest that users who received formal training perceived the potential benefits of better user education and expressed interest in additional training were more likely to be satisfied with the quality and accessibility of the app's educational resources. Hence, the finding shows significant correlation for hypothesis (H3): Users' general perception with fog cannon apps can be affected by the quality of user education and training that are offered.

The quantitative analyses provided valuable insights into the relationships between various factors and users' perceptions, satisfaction, and behavior. The correlation tests revealed significant associations between ease of use and willingness to use the app regularly, as well as between perceived reliability and overall satisfaction with alert accuracy. These findings underscore the importance of prioritizing user-friendly design and reliable performance in fostering consistent app usage and user satisfaction.

*Table 3.5 Collective Test Reports (Source: Author)*

Test	Variables	Results	Description
Pearson Correlation	Overall ease of use rating (Q1), Willingness to use the app regularly (Q4)	$r = 0.72, p < 0.001$	Strong positive correlation between perceived ease of use and willingness to use the app regularly.
Spearman's Rank Correlation	Reliability in detecting threats (Q8), Satisfaction with alert accuracy (Q13)	$\rho = 0.65, p < 0.001$	Significant positive correlation between perceived reliability and satisfaction with alert accuracy.

Binary Logistic Regression	<p>Dependent Variable: Likelihood of recommending app (Q7) Independent Variables:</p> <ul style="list-style-type: none"> <li>- Navigation and user-friendliness (Q2)</li> <li>- Difficulties understanding features (Q3)</li> <li>- Potential for user-friendliness improvements (Q5)</li> <li>- Satisfaction with layout and organization (Q6)</li> </ul>	<p>Model: <math>\chi^2 = 87.24, p &lt; 0.001</math> Nagelkerke <math>R^2 = 0.327</math> Significant Predictors:</p> <ul style="list-style-type: none"> <li>- Navigation and user-friendliness (<math>B = 0.63, p &lt; 0.01</math>)</li> <li>- Difficulties understanding features (<math>B = -0.48, p &lt; 0.05</math>)</li> <li>- Satisfaction with layout and organization (<math>B = 0.79, p &lt; 0.001</math>)</li> </ul>	<p>A predictive model for the likelihood of recommending the app based on user-friendliness factors. Explained 32.7% of variance.</p>
Multiple Linear Regression	<p>Dependent Variable: Satisfaction with educational resources (Q20) Independent Variables:</p> <ul style="list-style-type: none"> <li>- Formal training received (Q15)</li> <li>- Perception of better user education (Q16)</li> <li>- Interest in additional training (Q18)</li> </ul>	<p>Model: <math>F(3, 296) = 42.68, p &lt; 0.001, R^2 = 0.302</math> Significant Predictors:</p> <ul style="list-style-type: none"> <li>- Formal training received (<math>\beta = 0.31, p &lt; 0.001</math>)</li> <li>- Perception of better user education (<math>\beta = 0.42, p &lt; 0.001</math>)</li> <li>- Interest in additional training (<math>\beta = 0.19, p &lt; 0.01</math>)</li> </ul>	<p>A predictive model for satisfaction with educational resources based on training-related factors. Explained 30.2% of variance.</p>

The regression analyses offered predictive models for understanding the likelihood of recommending the app based on user-friendliness factors, as well as for predicting user satisfaction with educational resources based on training-related factors. These results highlight the need for a comprehensive approach that addresses not only the app's usability and performance but also the provision of effective user education and training resources.

#### 4. DISCUSSION

The discussion of the research findings, informed by the quantitative analysis, provides valuable insights into addressing the research questions posed in this study. These questions aimed to gain an in-depth understanding of user requirements and areas for improvement concerning security alarm solution

apps in the context of fog cannons. By examining users' perspectives, experiences, and perceptions, the research aimed to identify specific features and functionalities that users find most valuable and effective, explore their interactions and engagement with the apps, uncover challenges they face, and assess their trust and confidence in the apps' ability to protect their premises.

RQ1: What are the specific features and functionalities of fog cannon apps that users find most valuable and effective?

The analysis revealed that users place high value on the overall ease of use and user-friendliness of the Fog Cannon security app. The strong positive correlation ( $r = 0.72$ ,  $p < 0.001$ ) between the perceived ease of use and willingness to use the app regularly highlighted the importance of intuitive navigation and a streamlined user interface. Furthermore, the binary logistic regression analysis identified navigation and user-friendliness ( $B = 0.63$ ,  $p < 0.01$ ), as well as satisfaction with layout and organization ( $B = 0.79$ ,  $p < 0.001$ ), as significant predictors of the likelihood of recommending the app to others based on its user-friendliness.

Another critical feature that users valued is the app's reliability in detecting and responding to security threats. The analysis showed a significant positive correlation ( $\rho = 0.65$ ,  $p < 0.001$ ) between perceived reliability and overall satisfaction with the accuracy of alerts and notifications. This finding underscores the importance of ensuring the app's reliable performance in fostering user confidence and satisfaction.

RQ2: How do users interact with fog cannon apps, including notifications, user control, and integration of fog cannon, and what are their experiences during these interactions?

The analysis provided insights into users' interactions with the Fog Cannon security app, particularly regarding their reliance on alerts and notifications. A significant proportion of respondents (58%) were either satisfied or very satisfied with the accuracy of the app's alerts and messages. This finding highlights the critical role played by timely and accurate notifications in facilitating user interactions and prompting appropriate responses.

On the other hand, the findings also revealed that several participants (47%) would consider switching to a different security solution if they were unsatisfied with the app's performance and reliability. This suggests that further improvements in the reliability and accuracy of notifications could enhance user interactions and foster greater confidence in the app's functionality. This highlights the importance of addressing performance and reliability issues to retain users and maintain customer satisfaction.

RQ3: How do users engage in fog cannon applications for their arming, disarming, and monitoring while installing fog cannons?

The analysis did not directly address users' engagement with the fog cannon applications for arming, disarming, and monitoring purposes. However, the section of respondents (57%) reported rare or no instances of false alarms and (49%) frequently or always relied on the app's alerts and notifications, showing that the Fog Cannon security app has become an integral part of their daily routines and habits. This suggests that some users actively engage with the app for arming and monitoring purposes, integrating it into their daily schedules.

RQ4: What challenges do users face when using fog cannon apps, and how do these challenges impact their overall experience?

The analysis identified several challenges that users face when using the Fog Cannon security app, which could impact their overall experience. The results revealed that a significant proportion of users encountered difficulties in understanding or using specific features of the apps. Specifically, 43% of respondents reported occasionally encountering such difficulties, and 20% reported frequent difficulties. These findings suggest that usability issues and a lack of intuitive features could pose challenges for users, potentially hindering their overall experience with the app.

Furthermore, the analysis showed that 38% of respondents experienced instances where the app failed to deliver timely alerts or messages. This highlights a potential challenge related to the app's responsiveness and reliability, which could undermine users' trust and confidence in the security system. Such challenges could potentially undermine users' trust in the system's effectiveness and reliability, negatively impacting their overall experience.

RQ5: Do users trust and have confidence in the ability of fog cannon apps to protect their premises?

The analysis provides insights into users' trust and confidence in the Fog Cannon security app's ability to protect their premises. While 58% of respondents rated the app as reliable or very reliable in detecting and responding to security threats, a significant proportion (18%) perceived the app as unreliable or very unreliable. This finding suggests a potential lack of trust and confidence among a subset of users regarding the app's effectiveness in protecting their premises.

However, it is essential to note that the analysis also revealed a significant positive correlation ( $\rho = 0.65$ ,  $p < 0.001$ ) between perceived reliability and overall satisfaction with the accuracy of alerts and notifications. This finding suggests that users who perceived the app as more reliable tended to have greater trust and confidence in its ability to protect their premises, as evidenced by their satisfaction with the accuracy of alerts and notifications.

Overall, the research findings indicate a mixed perception among users regarding their trust and confidence in the ability of fog cannon apps to protect their premises effectively. While a substantial portion of users expressed

concerns and skepticism, others demonstrated confidence in the app's reliability and performance. Addressing the identified challenges, such as improving user-friendliness, enhancing the reliability and accuracy of notifications, and ensuring seamless integration with the fog cannon hardware, could contribute to building greater trust and confidence among users.

The findings revealed that users highly value the overall ease of use, user-friendliness, and reliability of fog cannon security apps. Features such as intuitive navigation, streamlined user interfaces, and accurate and timely notifications emerged as crucial factors influencing users' willingness to adopt and recommend these apps. However, the study also highlighted areas for improvement, as many participants expressed frustrations with usability issues, difficulties in locating specific features, and concerns regarding the apps' ability to effectively integrate with fog cannon hardware and provide reliable security.

The research also identified several challenges faced by users, including difficulties in understanding or using specific features, usability issues related to user interfaces and navigation, and concerns about the apps' responsiveness and reliability. These challenges have been found to have a significant impact on users' overall experience, potentially hindering their trust and confidence in the ability of fog cannon apps to protect their premises effectively.

While a substantial portion of users expressed confidence in the apps' reliability and performance, as evidenced by their satisfaction with the accuracy of alerts and notifications, a significant subset of users has shown skepticism and expressed concerns. Addressing these challenges through continuous improvements in user-friendliness, reliability, accuracy of notifications, and seamless integration with fog cannon hardware could contribute to building greater trust and confidence among users.

It is important to note that the findings from this research should be interpreted within the context of the study's limitations and scope. The generalizability of the results may be influenced by factors such as the specific geographic region, sample characteristics, and the nature of the fog cannon security solutions under investigation. Future research could explore additional dimensions of user experiences, such as the impact of demographic factors, cultural influences, or technological literacy levels on the adoption and utilization of fog cannon security apps. Longitudinal studies could also provide valuable insights into how user perceptions and experiences evolve as the technology continues to develop and mature. Furthermore, incorporating a mixed-methods approach that combines quantitative and qualitative techniques within a single study could yield a more comprehensive understanding of the complex interplay between user requirements, technological capabilities, and contextual factors influencing the adoption and effective utilization of fog cannon security solutions.

## **5. CONCLUSION AND RECOMMENDATIONS**

### **5.1 Conclusions**

The research study aimed to investigate users' perceptions, experiences, and requirements concerning security alarm solution apps in the context of fog cannons. By employing a quantitative method, the study provided valuable insights into the specific features and functionalities that user's value, their interactions, and engagement with the apps, the challenges they face, and their overall trust and confidence in the ability of these apps to protect their premises effectively.

### **5.2 Summary of Findings**

The quantitative analysis conducted in the study revealed several pivotal insights regarding users' perceptions and preferences concerning fog cannon security apps. One of the most significant findings is the high value users place on the overall ease of use and user-friendliness of these applications. This is substantiated by a robust positive correlation ( $r = 0.72$ ,  $p < 0.001$ ) between perceived ease of use and the willingness to use the app regularly, underscoring the paramount importance of intuitive navigation and a streamlined user interface. Essentially, users who found the app easy to use and navigate were more inclined to integrate it into their daily routines, emphasizing the pivotal role of user-friendliness in enhancing app adoption and utilization. Moreover, the analysis employed binary logistic regression to delve deeper into the factors influencing users' likelihood to recommend the app to others based on its user-friendliness. The results of the regression analysis identified navigation and user-friendliness ( $B = 0.63$ ,  $p < 0.01$ ), along with satisfaction with layout and organization ( $B = 0.79$ ,  $p < 0.001$ ), as significant predictors of the propensity to recommend the app. This suggests that users' perceptions of the app's ease of use, coupled with their satisfaction with its layout and organization, play a crucial role in shaping their inclination to endorse the app to others. In essence, these findings underscore the pivotal role of user-friendliness in not only enhancing user satisfaction but also driving positive word-of-mouth recommendations, thereby contributing to the app's broader adoption and success. Furthermore, the study's quantitative analysis shed light on the intricate relationship between user satisfaction and specific aspects of app design and functionality. Participants' satisfaction with the app's navigation and user-friendliness emerged as strong predictors of their overall satisfaction and likelihood to recommend the app. This highlights the critical importance of prioritizing user-centric design principles and ensuring a seamless and intuitive user experience to drive user engagement and satisfaction.

Additionally, satisfaction with the layout and organization of the app emerged as another significant predictor of user recommendation likelihood. This suggests that users value not only the ease of use but also the overall coherence and

efficiency of the app's design and layout. Apps that are well-organized and visually appealing are more likely to elicit positive user experiences and garner favorable recommendations from users, thereby enhancing their marketability and success in the competitive landscape of security applications.

Another key aspect explored in the study is the reliability of fog cannon security apps in detecting and responding to security threats, which emerged as a critical determinant of user satisfaction and trust. Through quantitative analysis, a compelling finding surfaced: a significant positive correlation ( $\rho = 0.65$ ,  $p < 0.001$ ) between users' perceptions of app reliability and their overall satisfaction with the accuracy of alerts and notifications. This correlation underscores the fundamental role of app reliability in shaping user experiences and perceptions. Users rely on these applications to provide timely and accurate alerts about potential security threats, making the reliability of detection and response mechanisms paramount. When users perceive the app as reliable in this regard, it instills confidence and trust, thereby enhancing overall satisfaction levels.

The quantitative analysis sheds light on the intricate interplay between perceived reliability and user satisfaction. Users who perceive the app as dependable and effective in detecting and responding to security threats are more likely to express satisfaction with the accuracy of alerts and notifications. This suggests that the perceived reliability of the app serves as a cornerstone of user satisfaction, influencing their overall perception of the app's effectiveness and utility. Furthermore, the significant positive correlation between perceived reliability and user satisfaction underscores the importance of prioritizing reliable performance in app development and maintenance. Developers must ensure that fog cannon security apps are equipped with robust detection algorithms and responsive mechanisms to effectively address security threats in real-time. By delivering consistent and reliable performance, developers can foster user confidence and satisfaction, thereby enhancing the app's overall effectiveness and user experience.

Moreover, the finding highlights the need for continuous monitoring and improvement of app reliability over time. As technology evolves and security threats become increasingly sophisticated, developers must remain vigilant in ensuring that fog cannon security apps stay abreast of emerging challenges and maintain optimal performance. Regular updates, maintenance, and testing are essential to address vulnerabilities, enhance detection accuracy, and preserve user trust (Li et al., 2021).

The study delved into the pivotal role of alerts and notifications in the functionality of fog cannon security apps, shedding light on their significance in facilitating user interactions and eliciting prompt responses to security concerns. A substantial proportion of respondents, comprising 49% of the study's participants, revealed that they frequently or always relied on the app's alerts and notifications to address security-related issues. This reliance underscores the critical importance of alerts and notifications in the user experience of fog

cannon security apps. Users depend on these notifications to stay informed about potential security threats and take appropriate action promptly. Whether it is a notification about a possible intrusion or a security breach, users expect these alerts to be accurate, timely, and actionable. However, despite the crucial role played by alerts and notifications, the quantitative analysis uncovered several challenges associated with their effectiveness. A significant portion of respondents, representing 38% of the study's participants, reported experiencing instances of failed, timely alerts or messages. This suggests that there are deficiencies in the app's notification system, leading to delays in alert delivery or missed messages altogether. Moreover, the analysis revealed that 42% of respondents encountered false alarms or inaccurate notifications while using the app. False alarms can be particularly disruptive and frustrating for users, as they may lead to unnecessary panic or anxiety. Inaccurate notifications, on the other hand, can erode user trust in the app's reliability and undermine its effectiveness in addressing genuine security threats.

### **5.3 Recommendations**

These challenges highlight the importance of refining and optimizing the alert and notification systems of fog cannon security apps. Developers must prioritize the accuracy and reliability of these notifications to ensure that users receive timely and relevant information about security events. This may involve implementing advanced algorithms for threat detection, enhancing the responsiveness of notification delivery, and minimizing the occurrence of false alarms.

Furthermore, developers should provide users with options to customize their notification preferences based on their individual needs and preferences (Iqbal & Horvitz, 2010). This could include the ability to adjust the frequency of notifications, specify the types of events that trigger alerts, and customize the content and format of notifications to suit their preferences.

In addition to technical improvements, user education and training are also essential to maximize the effectiveness of alerts and notifications (Hu et al., 2022). Users should be informed about the importance of alerts in maintaining security, how to interpret different types of notifications, and what actions to take in response to alerts. By empowering users with the knowledge and skills to effectively utilize alerts and notifications, developers can enhance the overall security posture of fog cannon security apps.

The quantitative analysis delved into a critical aspect of user experience with fog cannon security apps: the potential impact of user education and training on overall satisfaction and proficiency. This dimension not only sheds light on the importance of educational resources but also underscores users' perceptions and preferences regarding ongoing training initiatives.

The regression analysis conducted as part of the study yielded insightful findings regarding the relationship between user education and training and user

satisfaction. Specifically, formal training received, perception of better user education, and interest in additional training emerged as significant predictors of user satisfaction with educational resources. The beta coefficients associated with these predictors—0.31 for formal training received, 0.42 for perception of better user education, and 0.19 for interest in additional training—underscored their importance in shaping user satisfaction levels. These findings suggest that users, who have received formal training, perceive the quality of education to be high, and express interest in additional training opportunities are more likely to be satisfied with the educational resources provided by fog cannon security apps.

Furthermore, the study revealed that a substantial proportion of respondents, accounting for 54% of participants, considered ongoing user education and training to be either very or extremely important for maintaining proficiency with the app. This statistic underscores the significance that users attribute to continuous learning and skill development in effectively utilizing fog cannon security apps. It highlights users' recognition of the evolving nature of technology and the need to stay abreast of updates, new features, and best practices to maximize the utility and effectiveness of these apps in addressing security concerns (Luntovskyy, 2018).

The implications of these findings extend beyond mere user preferences; they underscore the critical role that education and training initiatives play in enhancing user satisfaction, proficiency, and overall experience with fog cannon security apps. Effective educational resources and training programs can empower users with the knowledge, skills, and confidence to navigate the app's features and functionalities effectively, thereby maximizing its potential for safeguarding their premises (Hu et al., 2022).

One key implication of these findings is the importance of investing in comprehensive and accessible educational resources as part of app development and deployment strategies (Gokhale & Singh, 2014). Developers should prioritize the development of user-friendly tutorials, guides, and instructional materials that cater to users of varying skill levels and learning preferences. These resources should cover a wide range of topics, including app navigation, feature usage, troubleshooting, and security best practices, to address users' diverse educational needs and requirements.

Moreover, developers should consider implementing interactive and engaging training programs that offer hands-on experience and practical exercises to reinforce learning. Interactive simulations, scenario-based training modules, and virtual workshops can provide users with valuable opportunities to apply their knowledge in real-world situations and enhance their proficiency with the app (Lo et al., 2015).

Another implication of these findings is the importance of fostering a culture of continuous learning and improvement among app users (Khalid et al., 2015). Developers should encourage users to actively participate in ongoing training

initiatives and provide incentives and rewards for completing educational modules or achieving proficiency milestones. By promoting a culture of learning and skill development, developers can empower users to harness the full potential of fog cannon security apps and maximize their effectiveness in safeguarding their properties.

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# ***The human factors in IT service management: The impact of employee training, engagement, and organisational culture on ITIL practices***

*Dr Leo Hitchcock and Anandu Ravikumar*

## **ABSTRACT**

In a tech-driven world, Information Technology Service Management (ITSM) frameworks such as ITIL (Information Technology Infrastructure Library), have become essential for organisations to optimise their processes and align their IT services with their business strategies. In this paper we explore the human factors that are required for executing ITIL practices in ITSM, such as employee training and engagement and organisational culture, and to find the impact of these factors on ITSM success. This paper draws from a comprehensive review of related literature, and thematic analysis was employed to analyse how the human dimensions influence ITIL adoption and success. Five key themes emerged during the thematic analysis: 1) the relationship between engagement and compliance; 2) the importance of training; 3) the role of organisational culture; 4) the influence of management and leadership; and 5) the significance of feedback and continual improvement. The key findings indicate that engaged employees are more likely to comply with ITIL procedures, and that strong leadership is needed to push ITIL success. Furthermore, organisational culture has a big impact on the adoption of ITIL, as does rigorous training processes that will improve ITIL competence. Ongoing feedback from staff and stakeholders is needed to maintain ITIL sustainability.

***Keywords:*** *ITIL; Employee Engagement; Employee Training; Organisational Culture; Feedback; Continual Improvement*

## **1. INTRODUCTION**

In the present age of fast-paced technological developments, organisations are becoming increasingly reliant on robust IT Service Management (ITSM) frameworks for smoother operations and enhanced service delivery while maintaining a competitive edge (Marrone et al., 2014). The Information Technology Infrastructure Library (ITIL) is a framework which has been widely adopted by industry as best practice for ITSM implementation. Although the technical aspects of ITIL have received significant credit for ITSM success, human factors such as employee training, engagement level and organisational culture remain a critical dimension of it (Mohammed, 2018).

In the face of digitalisation, the human dimension in ITSM is critical to organisations that seek to attain the best value out of their Information

Technology (IT) investments (Pollard & Cater-Steel, 2009). This paper’s foundation is research which aims to highlight the intersection between employee behaviours and organisational dynamics, and ITIL effectiveness, to offer practical recommendations which can assist strategic decision-making, improve ITSM frameworks and consequently lead an organisation towards success.

## 1.1 Background

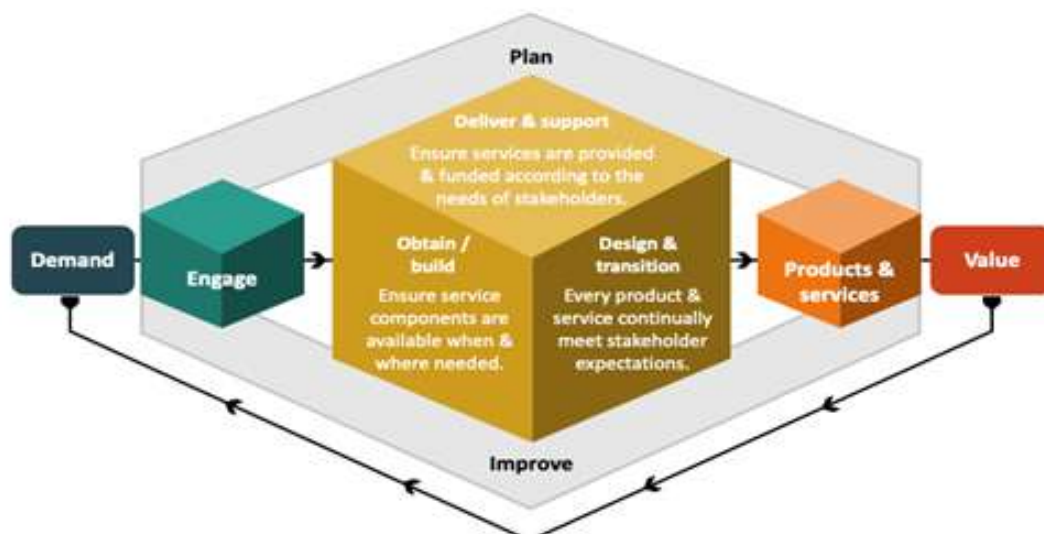
### 1.1.1 The Role of ITIL in ITSM

A now well-established framework developed in the 1980s, ITIL was intended to promote a common government approach to IT management disciplines. Today, both public and private sector companies in numerous industries have adopted ITIL as the best-practice framework for ITSM (Marrone et al., 2014). The latest version, ITIL 4, offers a broad framework which helps organisations carry out all stages of the lifecycle of IT services, from planning to delivery and enhancement in a structured, well-organized way. According to *5 Stages of ITIL* (2023), this life cycle consists of five basic elements:

- Service Strategy
- Service Design
- Service Transition
- Service Operation
- Continual Service Improvement (CSI)

The ITIL lifecycle stages support an integrated and coordinated performance of IT processes and services that support the business’ goals as well as the customers they service focussed on continual improvement through all service delivery elements. Figure 1 illustrates the ITIL 4 Service Value Chain illustrating the service elements from demand to value and the CSI lifecycle.

*Figure 1: The ITIL 4 Service Value Chain (Source: sketchbubble.com)*



The benefits accruing with ITIL include improved service quality and increased competence and customer satisfaction as desired outcomes. ITIL standardised processes and practices which enables organisations to standardise their IT services, optimise costs, improve IT alignment with business goals, and cultivate a spirit of continual improvement.

ITIL implementation, however, has its challenges, and many organisations continue to find the ITIL framework overwhelming, especially for those with few resources or prior ITSM experience (Pollard & Cater-Steel, 2009). Organisational digitalisation often comes with an ITIL implementation, however resistance to change, lack of management support and inadequate training are some of the factors which act as a practical barrier (Blumberg et al., 2019). Similarly, integrating ITIL with systems that are already in operation can be a considerable challenge (Shaykhian et al., 2019).

ITIL 4 takes a broad and holistic view of service management and provides a clear end-to-end picture of the contribution to business value through the integration and coordination of different value streams (Elina, 2021). With digitalisation transforming how organisations grow and innovate, ITIL will be fundamental in shaping ITSM to provide value, and support strategic goals (Tiong et al., 2009).

### 1.1.2 The human element

While ITIL is a robust and efficient framework for managing IT services, such frameworks depend on **people** as the core success factor (Dayal et al., 2020). However, it is largely dependent upon how ITIL practices are embedded in the organisation. Organisations that seek to optimise ITIL need to understand the human dimensions behind it: Employee training, engagement, and organisational culture (Gil-Gómez et al., 2014). The connection between employee training, employee engagement and a positive organisational culture is mutual, and the platform that helps increase employee engagement as it facilitates employees in learning the necessary skill sets for success (Karthik & Vasumathi, 2018; Malang et al., 2023).

## 1.2 Research Questions (RQs)

RQ1: How do human factors contribute to the effective implementation of ITIL?

RQ1 aimed to explore the specific ways in which human factors impact the successful implementation and operation of ITIL within ITSM frameworks. It sought to identify the mechanisms through which these factors influence ITSM effectiveness.

RQ2: What are the effects of employee training and engagement, management and leadership, and organisational culture on ITIL effectiveness?

RQ2 focused on understanding the individual and combined effects of employee training, engagement levels, and organisational culture on the effectiveness of ITIL practices within ITSM, aiming to reveal how these factors contribute to, or otherwise, the successful implementation and usage of ITIL guidelines.

### **1.3 Research Objectives (ROs)**

RO1: To examine the correlation between employee engagement and compliance with ITSM processes.

RO1 tries to understand the relationship between employee engagement levels and their adherence to ITSM processes based on ITIL guidelines. It aims to find out whether higher levels of engagement lead to better compliance and, consequently, more effective ITSM.

RO2: To investigate how organizational culture affects the adoption and sustainability of ITIL practices.

RO2 focuses on how the existing organizational culture affects the implementation and long-term viability of ITIL practices. It also focuses on exploring cultural factors that either facilitate or hinder the successful implementation of ITIL into organizational processes.

## **2. LITERATURE REVIEW**

Service delivery-oriented and recognizing service support processes, ITIL adopts a process-based approach to executing and managing IT operations (Al-Ashmoery et al., 2021). ITIL is concerned with measuring the operations and enhancing service delivery quality processes within the predefined standard and best practice.

Studies have indeed demonstrated that human factors, such as previously outlined above, are strongly aligned with the performance and effectiveness of ITSM and ITIL practices. To date, however, related studies have been limited in scope (Cook et al., 2021), with the majority of existing literature being descriptive works on ITIL areas, or case studies. While some authors have examined the nature, problems, and efficacy of ITIL implementation, there are few papers on the peculiarities of employee training in regard to ITIL competence, and the role of training methods after ITIL adoption (Marrone & Kolbe, 2011). ITIL adherence continues to lack empirical proof of how training and engagement links to more successful ITIL compliance (Marrone & Kolbe, 2011). Moreover, organisational culture has been identified as a key determinant of the successful implementation and longevity of ITIL practices.

### **2.1 Training**

According to Pollard and Cater-Steel (2009), training is an essential aspect of

ensuring that employees can understand and implement ITIL processes. Shiralkar (2016) further notes that training programs that use experiential activities such as simulations and role-playing, have a more significant impact than those that use a traditional classroom approach. Continuity and reinforcement of training are required to ensure that ITIL competence is maintained, and employees can practically apply the knowledge in their daily activities (Nugroho & Fianty, 2023). However, not much is known about how training methodologies influence the development of ITIL competence and the adoption of ITSM. There is a need to conduct further research to determine the methodologies that provide a significant impact on ITSM through efficient ITIL practice integration (Woo et al., 2020).

Studies show that the most effective training methods are a combination of theoretical and practical learning. Simulations and role-playing, for example, prove beneficial in translating theoretical inputs into practical insights (Tokarcikova et al., 2020). In the context of ITSM, Blumberg et al. (2019) assert that hands-on training methods apply practical ITSM activities alongside workplace exercises. E-Learning, workshops, and certification training are additional training options on this list. According to Mohammadi et al. (2015), extensive training programs have a positive relationship to successful ITSM deployment. Firms with extensive employee training programs exhibit greater levels of ITIL adoption, stronger service quality, and greater consumer satisfaction. Furthermore, frequent training and personal development are vital to maintaining employees' knowledge of recent ITIL practices in practice over time (Pollard & Cater-Steel, 2009).

## **2.2 Employee Engagement**

According to Lucio-Nieto and González-Bañales (2019), employee engagement is another element that could play a vital role in integrating ITSM processes and ensuring ITIL compliance, Blumberg et al. (2019) further stated that employee engagement could be fostered by incorporating employees into the ITSM planning and implementation processes, encouraging feedback, and generating a community spirit. Lawless (2023) pointed out that there is some evidence to suggest that a positive relationship exists regarding the association between employee engagement and ITSM strategies. Employees' involvement and commitment to ITIL-compliant routines proved to result in more successful practices (Lawless). Due to the lack of thorough empirical evidence, however, no specific factors that could be more influential in ensuring ITIL practices are indicated.

When employees are engaged, they are more likely to be involved in various processes and motivated to contribute to the achievement of organisational objectives (Martins et al., 2023). In the case of ITSM, the engagement of employees must surely lead to their conformity with ITIL practices, and their commitment to the continual improvement initiative (Beavers, 2019). Mann

(2023) noted that engaged employees develop a form of compliance with ITIL practices and are able to point out problematic issues and address them, which ultimately improves the quality of service. Mohammadi et al. (2015), argues that there is a statistically positive correlation between the levels of employees' engagement in a company and its processes and the success of ITSM initiatives. However, empirical evidence of how precisely the enhancement of employee engagement ratios contributes to the development of ITIL practices at the enterprise level is insufficient (Mohammadi et al.).

### **2.3 Organisational Culture and Leadership**

Organisational culture is another crucial factor that influences the successful adoption and sustainability of ITIL practices. Factors such as continual improvement, collaborative work, and customer-centric approaches help facilitate the implementation of ITSM, while cultural factors like resistance to changes and silos negate sustainability (Jackson, 2011). Leadership and governance procedures have been reported to shape the mindset and culture that is critical to employee engagement and training (Pollard & Cater-Steel, 2009). Change management strategies shape the procedures and practices applied, hence a need to be understood further on how to adapt and implement ITSM and ITIL cultures (Bianchi et al., 2019). However, the exact cultural dimensions and the impacts and relations to the ITIL adoption and approaches are not known (Strode et al., 2009).

Organisational culture and ITSM are interconnected, where organisational culture refers to an organisation's values, beliefs, and behaviours. An organisational culture that supports collaboration, teamwork, and continuous learning is essential for successful ITSM implementation (Jackson, 2011). Blumberg et al. (2019) noted that companies with a culture emphasising these areas are more likely to successfully implement ITIL. ITSM practices can be better adopted and sustained through an organisational culture that supports it. According to Mohammadi et al. (2015), cultural values can be integrated with ITIL practices to align enterprise goals with the values. Openness to change, innovation and learning are some of the cultural factors that enhance ITSM. Organisations that have such cultures are likely to meet the ITSM goals leading to service improvements (Shaykhian et al., 2019).

Talla (2013) argues that effective leadership drives ITSM operations in an organisation by linking the ITIL framework to organisational needs, allocating sufficient resources, and building trust with employees. A leadership culture that includes and trusts employees builds their morale and commitment, which is vital in achieving ITSM goals (Shaykhian et al., 2019). Thus, organisational culture has an influence on the sustainability of ITIL practices.

## **2.4 Theoretical Framework**

Despite the growing body of literature and numerous authors' viewpoints (Errida & Lotfi, 2021; Stouten et al., 2018), it is essential to develop a comprehensive theoretical framework that aligns various theories and models in the area of organisational change management, human resource management, and information systems implementation. Furthermore, the consideration of a conceptual framework outlining the human factors responsible for ITIL practice has been discussed. This review provides robust theoretical frameworks that are essential to recommend optimal solutions for theory-centred outcomes of ITIL practice possible for organisations.

### **2.4.1 Technology Acceptance Model**

The Technology Acceptance Model (TAM) offers a theoretical foundation for understanding how technology is accepted and utilized by individuals. It works on the premise that a person's intent to employ is influenced by perceived usefulness and ease of use. This implies that usage is also affected by intentions. The model can be used to analyze ITIL use to investigate how ITIL operations are seen by personnel and how these perceptions influence support and enablement behavior (Ahmad et al., 2013).

### **2.4.2 Unified Theory of Acceptance and Use of Technology**

The Unified Theory of Acceptance and Use of Technology (UTAUT) extends TAM by adding new factors, such as social influence and facilitating conditions. Performance expectancy, effort expectancy, social influence, and facilitating conditions determine the intention to use technology and actual use. Considering the primary factors from the UTAUT perspective can help managers better understand which of them are critical to ITIL acceptance by employees, and how the organisational support factor works for ITSM adoption (Ahmad, 2012).

### **2.4.3 Organisational Change Management**

Organisational change management theories, such as Kotter's eight-step change model (Joshi, 2013), and Lewin's change management model (Mindtools, n.d.), can form the basis for understanding how organisations can implement change effectively. These methods highlight the need to develop a sense of urgency, establish a strong guiding coalition, develop a vision and strategy, and

communicate the change vision. Combining these theories with ITSM literature results in an understanding of how organisations can manage the required cultural and behavioural changes to ensure ITIL success (Klentsova, 2020).

## 2.5 Hypotheses

The preliminary literature review outlined in this chapter highlights the need for further research to develop a robust understanding of how human factors affect ITIL implementation, and how organisations can make the best use of the advantages of ITSM and ITIL.

Accordingly, the following hypotheses were developed:

- **H1:** High levels of employee engagement are related to higher ITIL compliance and successful implementation of ITSM.
- **H2:** Effective employee training leads to an increased level of successful implementation of ITIL practices within ITSM frameworks.
- **H3:** A positive and diverse organisational culture, including the leadership culture, supports the successful implementation and sustainability of ITIL practices within an ITSM framework.

The research was carried out according to ICL Ethics Approval REC Application number ICL230424-274.

## 3. RESEARCH METHODOLOGY

An exploratory, descriptive approach was adopted to discover the insights into how employee training and engagement, leadership and management, and organisational culture affect ITIL implementation. This approach was chosen because of the diverse and complex nature of human behaviour and dynamics within an organisation. Secondary data sources were used, with qualitative thematic analysis to detect patterns and themes within existing electronic sources to ensure that the research is built on established knowledge, while also proposing new perspectives.

This study addressed a critical knowledge gap apparent in the adoption of ITSM literature: the human factors. While the success of implementations of ITSM frameworks certainly depends upon technical aspects (Tiong et al., 2009), other important factors, such as employee training and engagement, management and leadership, and organisational culture, require further analysis. It is these human factors that affect planning and execution strategies and dealing with interventions, which could result in improved resource distribution, better employee satisfaction, and achieving the ITSM goals (Mohammadi et al., 2015). Data was accessed from academic databases and scholarly sources, such as PUBMED, Google Scholar, IEEE Explore, ScienceDirect, LinkedIn

contributions, and the like. To ensure robustness of the dataset, data eligibility included the criteria that articles, conference papers, and other relevant electronic material were peer-reviewed research publications. Moreover, the results were verified through triangulation using multiple channels and cross-referencing. The data was organized and analysed using the thematic analysis software tool NVivo.

### **3.1 Discovered Themes**

#### **3.1.1 Employee engagement and compliance**

Engagement refers to how committed your employees are to their roles as well as your organisation and its objectives (Magem, 2017). The engagement/compliance relationship is multi-faceted, and is based on motivation, ownership and mutual alignment between individual and organisational objectives (Ahmad & Van Looy, 2020).

#### **3.1.2 Employee training**

Effective and relevant onboarding and training employees are also vital for working with ITIL to provide the knowledge and skills to implement ITIL's best practices.

#### **3.1.3 Organisational culture**

Organisational culture is considered the most prominent within ITIL adoption and sustainability (Attar, 2020). Culture defines a company's values, beliefs and behaviours (Isensee et al., 2020). ITSM frameworks are much more effective when the organisation has a culture that blends ITIL with a commitment to communication, collaboration, and continual improvement (Mohammadi et al., 2015).

#### **3.1.4 Influences of management and leadership**

It is important to recognize the roles of management and leadership in ITIL implementations. This is because ITSM frameworks are successfully nurtured to deliver if, and only if, directed by the vision, support, and the resources needed by efficient leaders. Thus, their participation is significant in maintaining a set-up where ITIL practices are appreciated and adhered to (Shaykhian et al., 2019). This theme points out how leadership affects the engagement of employees, their compliance, and the success of ITSM initiatives.

#### **3.1.5 Continual feedback and improvement**

ITIL practices should be reviewed and improved continually to remain relevant, impactful, and fit-for-purpose. Feedback systems help define how ITSM processes are functioning, and where they need to be optimised using feedback loops and perpetual measurement.

The following tables presents the Code (the tags assigned within thematic categories) with supporting explanations from the data:

*Table 1: Employee engagement and compliance (Source: Author)*

<i>Code</i>	<i>Explanation</i>
<i>Higher Engagement, Better Compliance</i>	<i>Research has demonstrated that increased engagement leads to improved compliance to ITIL practices implemented (Pollard &amp; Cater-Steel, 2009). When employees are engaged, they are more likely to understand why and how ITIL works, resulting in less friction when following and actually participating in those processes being implemented (Pollard &amp; Cater-Steel).</i>
<i>Engagement Drives ITSM Success</i>	<i>Cater-Steel et al. (2006) point out that without engagement there is unlikely to be significant success in the management of IT for the purposes of ITIL, arguing that engagement is paramount for ITIL success. If employees are looking at ITIL as a system of control, rather than as a way to streamline their IT processes, they will be far less likely to engage. This view is important in promoting a proactive approach to service management.</i>
<i>Motivated Employees Follow ITIL</i>	<i>Qualtrics (2024) argue that motivated and engaged employees will follow ITIL processes, and the motivation from an engaged workforce translates into a commitment to follow ITIL guidelines. At the core is often a desire to understand the relationship to higher-level organisational objectives.</i>
<i>Engaged Staff, Better Adherence</i>	<i>Sharma (2021) claims that engaged employees follow established ITIL processes and are application aware. This means they know who they work for, and why. They are more likely to follow the protocols the same way across the organisation, as well as the ITIL guidelines.</i>
<i>Engagement Enhances Compliance</i>	<i>Engaged employees become attached to ITSM, meaning that they are more likely to keep the ITSM processes in check (Haasteren, 2019). This does not mean just ensuring the processes are duly followed, but embedding ITIL principles into day-to-day operations</i>
<i>Engagement and ITIL Compliance</i>	<i>Pollard and Cater-Steel (2009) state that engagement is critical for ITIL compliance. As a result, engagement is key to building the commitment and accountability necessary to maintain a constant 'ITIL attitude' amongst your employees.</i>

*Table 2: Employee training (Source: Author)*

<i>Code</i>	<i>Explanation</i>
<i>Training Improves Engagement</i>	<i>Training increases employee networking and engagement. Interactive, team-based learning initiatives have a higher potential to influence behavioural change resulting in improved ITIL compliance and application. Effective employee training increases the likelihood of employees comprehending and valuing ITIL practices resulting in higher levels of engagement and compliance within the organisation (Cater-Steel et al., 2006).</i>
<i>Workshops and Awareness</i>	<i>Cater-Steel and Tan (2005) stated that training and workshops create ITIL awareness, helping to create awareness about ITIL practices, the value of ITIL, and guidelines to be followed by an individual in their role. Hands-on sessions offer a pragmatic insight into ITIL processes which enable the employees to be better prepared for effective implementation.</i>
<i>Training and Skill Development</i>	<i>Focusing on ITIL application implementation, delivery of the training in a practical way ensures that learners are well-trained to implement ITIL processes proficiently. It directs them in the correct use of ITIL principles, guiding them in how ITIL should be used in practice (Mancilla, 2022). Interactive training sessions allow employees to get involved in ITIL concepts and understanding and ensure that they adhere to them properly (Haasteren, 2019).</i>
<i>Knowledgeable ITIL Teams</i>	<i>According to Eikebrokk and Iden (2016), well-trained teams assure adherence. Staff can acquire good knowledge right from the beginning, which makes following ITIL guidelines more successful and with more compliance and have better service management outcomes (Lucio-Nieto &amp; González-Bañales, 2019).</i>

*Table 3: Organisational culture (Source: Author)*

<b>Code</b>	<b>Explanation</b>
<i>Culture-ITIL Alignment</i>	<i>Pollard and Cater-Steel (2009) claim that ITIL practices will work if organisations adopt a solution that aligns well with its culture in place. ITIL processes are integrated into everyday workflows and because the practices relate to the culture of the organisation it becomes easier to adopt and comply with the processes.</i>
<i>Culture Influences ITIL Success</i>	<i>The success of ITIL initiatives is interlinked with the organisational culture. In addition, possessing ITIL friendly culture which strives to seek improvements and prioritize doing things correctly leads to success.</i>
<i>Communication and Cooperation</i>	<i>The importance of communication and cooperation to support ITIL practices are critical for supporting ITIL practices (Assad &amp; Ahmad, 2015). An environment that fosters open and team-based communication helps support ITIL processes.</i>
<i>Supportive Culture is Essential</i>	<i>Drucker (2024) states that an organisation's culture breeds communication and engagement, which shows just how important culture is when it comes to the communication and engagement of ITIL practices. The ideal culture promotes employees to voice ideas, collaborate on problem-solving, and effectively engage themselves in alignment with ITIL guidelines.</i>
<i>Overcoming Cultural Barriers</i>	<i>Assad and Ahmad, (2015) state that addressing cultural barriers is vital to the success of ITIL initiatives. Such roadblocks may be things like people being afraid of changing, not aligning with organisational values, or not communicating sufficiently. Clearing these roadblocks is key to a successful and sustainable ITIL implementation.</i>
<i>Engagement Through Culture</i>	<i>Cater-Steel et al. (2009) reinforce that ITIL processes need support from a supportive culture, supporting the importance of cultural factors in ITIL practices. Thus, the more the culture of the organisation and its processes are aligned with the ITIL principles, the more likely employees will adopt and get involved with the ITIL processes.</i>

*Table 4: Influences of management and leadership (Source: Author)*

<b>Code</b>	<b>Explanation</b>
<i>Leadership Enhances Engagement</i>	<i>Carroll et al. (2015) claim that leaders foster rigidity with engagement. This means adaptable leadership can greatly impact engagement levels. Individuals and teams need to be fostered, in a workplace in which employees are well incentivised to invest more in their roles and obligations.</i>
<i>Support from Senior Management</i>	<i>According to Pollard and Cater-Steel (2009), the support of senior management is a critical success factor in ensuring ITIL compliance. Employees are more likely to use ITIL practices when they see top leaders visibly supporting them, and when top leaders provide the resources and structures that equip employees to follow, signalling that the organisation supports these standards.</i>
<i>Visible Leadership Commitment and Involvement Drives ITIL</i>	<i>Iden and Eikebrokk (2015) point out that management ensures ITIL compliance, which means responsible leadership must show real involvement in guaranteeing that ITIL practices are followed. Leading by example, managers and other team members who not only support ITIL but also engage in the practices, empower their teams and demonstrate the necessity of ITIL. Iden and Eikebrokk further state that management involvement is crucial to ITIL success. This entails more than just an endorsement: it means engaging in ITIL initiatives and tackling the obstacles and opportunities germane to implementation.</i>
<i>Organisational Commitment Needed</i>	<i>Organisational commitment motivates adherence (Raflesia et al., 2017). ITIL is best implemented when the organisation decides, and its management leads, to follow ITIL practices, creating an environment that incentivizes employees to follow those practices because they are both the lines of their work, and they are clearly connected to organisational success.</i>

*Table 5: Continual feedback and improvement (Source: Author)*

<i>Code</i>	<i>Explanation</i>
<i>Real-Time Feedback Systems</i>	<i>According to Qualtrics (2024), feedback exposes the IT service gaps, and real-time feedback systems can eliminate the lag in service management. Data warehouse systems provide real-time dashboards on process efficiencies and bottlenecks, so businesses can quickly adapt to and improve upon any issues proactively.</i>
<i>Continual Feedback Importance</i>	<i>Haasteren (2019) notes that feedback is essential for refining ITSM processes, and continual feedback loops makes ITIL practices regularly scrutinized and evolving, so that these practices are up-to-date and efficient in catering to organisational requirements. Louisnord (2024) states that feedback makes ITSM better, and feedback loops assist organisations in determining the effectiveness of their ITIL practices and what needs to be adjusted.</i>
<i>Iterative Service Enhancements</i>	<i>Qualtrics (2024) argue that feedback helps processes evolve, and meaning feedback maintains the ITSM processes in an ongoing evolution. The more ITIL processes that are feedbacked and iterated, the more ITSM can be adapted to modern demands and complexities.</i>
<i>Continual Process Evaluation</i>	<i>According to Cater-Steel and Tan (2005), regular evaluation identifies gaps. Continual review helps ensure that the organisation is always staying one step ahead of any bottleneck. The bottom line is that the ITIL practices which are currently effective, continue to remain effective. Regular review in the context of feedback loops is also a key component to identify areas of improvement and to ensure that ITIL standards are applied uniformly.</i>

#### **4. FINDINGS AND DISCUSSION**

At its core, employee engagement is not about either satisfaction or happiness with the job; it is about how committed the employee is to the mission and achieving the goals of the company (Gelles, 2016). In the ITIL context, this is important, because it ensures that the employees follow regular ITIL processes scrupulously.

Several things can explain that association:

- **Comprehension and approval:** Employees who are invested in the organisation are better equipped to make sense of the reasoning behind ITIL practices and are likely to view them as enabling rather than constraining (Pollard & Cater-Steel, 2009). This awareness can drive a belief that they have ownership and hence are responsible for complying with ITIL guidelines.
- **Motivation and performance:** Engaged employees are motivated and therefore performance oriented. This is their motivation to correctly follow the ITIL processes as they wish to provide well for organisational purposes.

Strategies that should increase the buy-in and thereby compliance with ITIL best practices within organisations include the following:

##### **4.1 Communication**

- **Clear communication:** Ensure employees understand the role and impact of ITIL practices. Developing this understanding usually requires

ongoing communication about how ITIL contributes to organisational success.

- Empowerment and participation: Involve employees in the implementation of ITIL processes. When employees get a say in how things are done and what happens, they are more likely to become engaged and embrace these practices.
- Recognition and reward: Recognize and reward your staff for following ITIL practices. Rewarding the staff that perform well following the ITIL constructs support other employees to perform the same.

#### **4.2 Effective Leadership and Management**

The importance of effective leadership in ITIL implementation should not be underestimated. To embed ITIL practices into the culture of the organisation, effective leaders will also provide direction, resources and support. The findings highlight that:

- Demonstrated commitment: Leaders who publicly demonstrate that they are committed to ITIL practices establish a model for their teams. This commitment is the very signal that ITIL is part of the fabric of what the organisation does rather than just another 'trendy' thing going on.
- Resource allocation: This means providing the right equipment, time, and training for the team to properly implement and execute ITIL practices.

Several benefits can be achieved if leadership is encouraged to support ITIL practices:

- Participation: Leaders should be more than mere sponsors and involved in the ITIL initiatives. This involvement could be in terms of attending training sessions, leading by implementing ITIL processes, and solving the issues.
- Regular updates and feedback: Leaders need to be consistently engaging with the organisation on the progress of ITIL initiatives and seek feedback from employees. This encourages a climate that is open to change and improvement.
- Support structures: Give employees support structures to assist them in implementing ITIL practices. This can include access to training, mentorship, and ITIL-ready tools.

#### **4.3 The Influence of Organisational Culture**

Organisational culture essentially determines how ITIL practices are adopted

and sustained. And is another good indicator of how well a particular organisation is likely to fare with ITIL, and thus to properly adapt and implement ITIL. On the other hand, closed cultures or those without these elements act as a significant barrier to advancement.

What this means, is that for ITIL practices to work, organisations need to have a culture that promotes:

- **Aligning values and principles:** Make sure organisational values are consistent with the values of ITIL. This could be done through support of leadership, training programs around these ideals, and the policies that are in place to encourage behaviours that support ITIL.
- **Encouraging communication and collaboration:** Activate a mission where employees feel they can be transparent and work together. Empower staff with the ability to contribute to suggestions on how to remedy ITSM issues and by this means, back up the collaborative model necessary for successful ITIL.
- **Address cultural barriers:** Identify cultural barriers that can create roadblocks for ITIL adoption and make adjustments to flatten the cultural curve. This could mean modifying some habits or practices which conflict with ITIL ideals, or creating more assistance and guidance to assist employees in transitioning to new processes (Lucio-Nieto & González-Bañales, 2019)

#### **4.4 Training and Engagement**

Training is the foundation of competence, the groundwork of all the required knowledge and for an individual to build the skills which are essential in furnishing ITIL processes. Interactive and practical training has been shown to significantly improve the understanding and application of ITIL principles in employees.

In order to develop ITIL knowledge to the greatest extent, organisations should:

- **Develop learning/training programs,** which embed the theoretical understanding with practical application. Practical exercises, simulations, and role-plays sharpen employees' skills in applying ITIL processes in a practical context.
- **Provide continuous learning opportunities** so that employees remain current with ITIL practices and developments. This ongoing learning approach makes sure employees stay on top of applying ITIL to the best of their ability.
- **Customize the training programs** depending on the targeted employees' group. For example, the technical staff may need training on some of the

ITIL Processes, while the managerial staff may need some training on leadership-related and strategic aspects of ITIL implementation.

Training and Engagement are interrelated. Employees who feel well-trained are in general more engaged, as they feel competent and empowered to perform in their roles. Training approaches that help to drive engagement include:

- Interactive and engaging: Make the training interactive and fun to help keep the learner engaged. With the ITIL philosophies, improved retention and timely use of principles can be achieved (Wang et al., 2020).
- Involvement in training design: Involve employees about what works and what could be improved in training programs. With this level of involvement, they become more invested in the training, and the content is more likely to be relevant and applicable (Mozammel, 2019).

#### **4.5 Continual Feedback and Improvement**

Feedback is a tool for continual improvement. ITIL practices must always be updated with continual feedback, which is important to continue making them effective and accurate. Feedback systems help to show how ITSM processes are going and show where you could improve.

Organisations should establish effective feedback mechanisms that enable continual improvement in ITIL practices, such as:

- Live feedback mechanisms: Introduce live feedback where employees can report the opportunities, interesting information and innovations that occurred. Such systems may include digital tools that enable data to be collected and analysed in near real-time (Talebi & Bardsiri, 2023).
- Review and validate: Do periodic validation of the ITIL practices to check their efficiency and investigate where the optimisation can be done. These audits should include contributions from individuals and groups within the organisation, ranging from frontline employees to end users (Dayal & Rana, 2019).
- Feedback should ideally be structured: An unstructured method of feedback certainly has its place in unscheduled, informal feedback. However, a level of structure is necessary for regular, scheduled feedback in which outstanding issues such as performance gaps and employee concerns can be tracked and addressed. This responsiveness signals support, respect and the value of feedback and keeps employees engaged throughout (Mamun & Khan, 2020).

For future success in ITIL practices, a culture of continual improvement is needed. Such a culture can be fostered as follows:

- Innovation and experimentation: Encourage employees to bring new ideas to improve ITSM processes and feel ok with trying new approaches.
- Acknowledge and commend: Acknowledge and commend better ITIL practices irrespective of the scale of betterment. It is a recognition that can spur employees into keeping ITSM on the change agenda.
- Embrace failure: Develop a learning mentality around failure not as a disappointment, but as a way to learn and improve. This is a sure-shot approach to keep going on a positive path towards continual improvement.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Drawing a Conclusion**

This research identified the human factors responsible for the successful use of ITIL practices in ITSM, indicating that engagement, leadership, organisational culture, training and feedback aspects are critical. Employee engagement signals compliance, which works towards better service management as well. Leadership and management are key in creating an environment where successful ITIL adoption not only takes hold but is sustained over the long term. An organisation's culture also contributes to reinforcing this trend by aligning the corporate values and practices along with ITIL principles, such as communication, collaboration and continual service improvement. Training is important in providing employees with the skills and knowledge needed to perform ITIL practices, while continuously monitoring the performance of ITIL processes in addition to adapting them to business requirements.

By integrating these human factors, the ITIL implementation moves beyond just procedural compliance, and becomes an inherent part of the operational strategies for the organisations. This helps in developing a culture in which ITIL practices are not just implemented but are part of the way an organisation works. The ongoing initiative to engage a knowledgeable staff, shared management styles, and an understanding culture of improvement ensures that ITIL remains relevant to the business. This in turn leads to sustainable success in ITSM, better delivered services, enhanced ability to deliver operational results and hence greater business value.

### **5.2 Recommendations**

Using the findings from theory and analysis of the data, some high-level recommendations can be made concerning how ITIL practices can be improved by considering the impact of human factors. The following are some of the measures that can be taken to invest in engagement approaches:

- Create and manage strategies that improve workforce experience: This involves cultivating a strong awareness of the benefits of ITIL, employing employees in decision-making, and acknowledging and rewarding adherence to the ITIL process
- Create strong leadership and management support: Hold leaders and managers accountable to drive ITIL initiatives. Provide what they need to be an advocate and role model for ITIL practices and let these practices flourish and be backed up in their ecosystem.
- Create an ITIL-friendly culture: Foster an organisational culture that is congruent with ITIL principles and encourages communication, cooperation and ongoing improvement. Take on the cultural issues that pull ITIL back. Retool it with pragmatism and discover the ITIL practices which are sustainable.
- Enhance training programmes: Create interactive and practical training programmes, mixing ITIL theoretical **and** application content. Offer ongoing training and engage employees in creating the material to ensure it is relevant and useful.
- Establish effective feedback: Create continual feedback loops in real-time and conduct periodic assessments of ITIL practices. Make sure the feedback is actionable and is actioned, that there is a process by which you will respond to and enact changes based on the information gathered through feedback.

### **5.3 Future Research Possibilities**

While this research contributes a valuable understanding of the human dimension in ITIL effectiveness, additional research is essential in these areas to extend current knowledge:

- Quantitative engagement and compliance studies: Subsequent research might consider quantitative measures of engagement and compliance to empirically establish engagement and compliance as two predictors of ITIL effectiveness.
- Comparison studies beyond industries: To identify the factors that influence ITIL adoption in practices, there is a need for comparative studies in order to explore how this structure is absorbed by the industries, which human factors promoted the implementations and in different organisational contexts.
- The effect of Digital Transformation on ITIL: Future research can investigate how digital transformation practices (for example, new

technology adoption, working from home), influence and are influenced by ITIL practices, and the role of human factors in these transformations.

- Benefits of diversity and inclusion in becoming ITIL users: By studying the effect diversity and inclusion programs have on ITIL adoption, analysts might learn the role of diverse teams in the practice or the practice of ITSM.
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# ***Factors influencing customers' repurchase intentions at cafés in Auckland CBD***

*Dr Ahmad Wedyan and Wiraphat Pinchawon*

## **ABSTRACT**

This research examines the variables influencing customer repurchase intentions in the café market of Auckland's Central Business District (CBD), where independent cafés dominate over large coffee chains. In a highly competitive environment, understanding factors that drive repeat business is essential for long-term success. The study focuses on five key variables: service quality, product quality, product price, store atmosphere, and store location. Using a quantitative approach and convenience sampling, 401 sets of data were collected through an online questionnaire survey. Descriptive analysis, Spearman's correlation coefficient, and multiple linear regression were employed through SPSS to test five hypotheses based on the proposed theoretical framework. The findings suggest that service quality, store location, product price, and store atmosphere all have a significant positive impact on customers' repurchase intentions, with service quality being the most influential. Surprisingly, product quality did not show a significant relationship with repeat purchase behaviour. This research adds value by offering insights for café owners and managers aiming to enhance customer loyalty through service excellence and store experience. However, the study is limited by its reliance on convenience sampling and its focus on a specific geographical area, which may limit generalizability. Future research could explore different café contexts and incorporate a broader range of influencing factors.

***Keywords:*** *repurchase intention, service quality, product price, store atmosphere, independent cafés, customer loyalty*

## **1. INTRODUCTION**

### **1.1 Background**

Cafes and restaurants, which are also known as components of the broader hospitality industry, are experiencing a growing trend in developed nations, and New Zealand is not an exception. The cafe and restaurant industry in Aotearoa, New Zealand, is a significant and flourishing sector. It represents one of the country's largest sources of employment (WorkSafe, 2024). Additionally, this industry has experienced significant growth over the past few years. It has been demonstrated that there has been a consistent and significant annual increase of 1% in the number of restaurants and cafes in New Zealand from 2019 to 2024 (IBISWorld, 2024). Overall, the cafe sector in New Zealand has contributed to

and will continue to play a significant role in the country's economy and culture, specifically within the tourism and hospitality sectors (Zhang, 2017).

Auckland is among the select few cities where the number of independent cafes dominates over large coffee chain franchises. Particularly, the Auckland central business district (CBD), referred to as the city centre, operates as the urban area's commercial and geographical hub. An iconic skyline is formed by the largest number of skyscrapers and commercial enterprises in the city (Ray White, 2017). Moreover, the area is filled with universities, schools, and tourist destinations, as well as a selection of exceptional cafes that Auckland offers.

According to the 2022 Census of Businesses report, Auckland's city centre plays a critical role in the city's prosperity due to the density of economic, cultural, residential, and social events (Guo, 2023, p.1). Data collection and analysis conducted in a more specific sub-industry resulted in the identification of a total of 88 different business types within the study area. The 10 most observed business types, which collectively accounted for more than half (53%) of all recorded businesses, consisted of cafes and restaurants, accounting for 11% or 289 businesses, which represented the largest percentage (Guo, 2023, p. 5). This indicates that a considerable number of businesses have been formed, while additional ones are expected to arise, ultimately enhancing competition among both comparable and dissimilar businesses. When a business introduces a service or goods, it is likely that there are numerous comparable goods or services available from rival businesses in the market. Customers typically have numerous alternatives. Hence, it is crucial for businesses to enhance the value of their existing customer base and implement effective strategies to encourage repeat purchases, in addition to acquiring new customers (Hanai et al., 2008).

Although numerous hospitality businesses in New Zealand have achieved success, nearly sixty percent of all newly launched businesses perish within the initial 18 months of activity. To thrive, businesses must constantly engage in competition within a continuously expanding and intensely competitive market (Hemmington & Neill, 2021). In order to succeed in a competitive market, business owners must strive for excellence by offering exceptional products and services with the aim of satisfying customers (Beriansyah & Suroso, 2018). Based on a theoretical point of view, this observation can be clarified by the buying decision process theory, which claims that customers assess their previous purchase experience before considering whether to revisit the stores or make repeat purchases of the products and services (Ratasuk & Gajesanand, 2020). Numerous businesses must attract consumers to ensure their long-term survival. When customers experience a sense of satisfaction with previously purchased products or services and have a desire to reuse them, their repurchase intention is likely to increase (Mahendrayanti & Wardana, 2021). Consistent intention to repurchase results in customer loyalty, which in turn leads to enhanced business revenues. Consistent repurchase intentions are critical for building consumer loyalty. Consequently, businesses need to strengthen

customer repurchase intent as the initial stage in fostering customer loyalty (Setiawan et al., 2021).

Based on the research of the previous 50 publications by Wijarnoko et al. (2023), it has been shown that there are 28 variables that have an influence on repurchase intention. The variables include price, service quality, product quality, and convenience, among other variables. Additionally, customers are more likely to repurchase products and return to stores because of their positive interactions with variables offered within the stores. It is crucial to understand customers' perceptions in order to develop effective operational strategies that encourage them to return (Ting & Thurasamy, 2016). Accordingly, it is important for the business to discover the factors that drive customers to engage in repeat purchases, according to the scope of this study.

## **1.2 Research Objectives**

The objectives of this research are:

RO1: To identify the key factors that have the most influence on customers' decisions to repurchase at cafés in Auckland CBD.

RO2: To examine the demographic variations in the perceived value of key factors among café customers in Auckland CBD.

RO3: To offer practical and valuable information to café owners and managers in Auckland CBD, with the aim of improving customer loyalty and boosting repurchase rates.

## **1.3 Research Questions**

The study aims to answer the following research question:

RQ1: What are the primary influential factors that influence customers' intentions to repurchase from cafés in Auckland CBD?

RQ2: How do customer satisfaction and service quality impact the likelihood of repeat purchases in cafés within Auckland CBD?

## **1.4 Significance of the Study**

This study aims to clarify the factors influencing customers' repurchase intentions in cafes within Auckland's central business district. By examining the connections between these factors, the research seeks to aid owners, managers, and investors in the food and beverage industry in understanding what drives repeat purchases and positive word-of-mouth recommendations. The focus will extend beyond product quality to encompass comprehensive strategies that attract customers, enabling participants to prioritize effective approaches for business management.

Additionally, the findings will be valuable for educators and researchers, offering insights into the various elements that affect repurchase intentions in related sectors. This study will also contribute to future research, particularly on how different factors influence customer behaviour in Auckland's cafe industry.

Given the scarcity of research in this area within New Zealand, this study will enhance understanding and provide evidence to support further contributions to the field.

## **2. LITERATURE REVIEW**

Understanding customer demographics, desires, and needs is essential in a competitive environment for outperforming competitors. Positive customer experiences drive repurchase intentions, encouraging repeat business when customers maintain a favourable perception of a product or company (Setyawan et al., 2023).

For example, a study on a café in Pontianak, Indonesia, found that the store environment, goods, and pricing significantly influence repurchase intentions (Fachri et al., 2023). Similarly, a study in Sibuhuan, Indonesia, revealed that store atmosphere and service quality account for 60% of repurchase interest, with other factors making up the remaining 40% (Siregar & Syahreza, 2023).

### **2.1 Repurchase Intention**

Repurchase intention is vital for businesses as it drives customer loyalty and repeat purchases, benefiting sales (Wijarnoko et al., 2023). Customers are more likely to repurchase when they perceive value from previous interactions, using those experiences to predict future benefits (Olaru et al., 2008). Trustworthiness and perceived value of the product strongly influence repurchase behavior, transitioning from an intention to a concrete action (Rossanty et al., 2019; Saraun et al., 2022).

Repurchase intention is shaped by satisfaction with a product or service's performance and the likelihood of returning or recommending it to others (Rossanty et al., 2019). Positive experiences, promotions, and environmental factors also play a role in encouraging repeat purchases (Chue et al., 2017).

### **2.2 Service Quality**

Services are intangible, with simultaneous production and consumption, where buyer-seller interactions significantly influence perceived quality (Grönroos, 1984). Grönroos's model emphasizes both technical (output) and functional (process) quality. Technical quality involves objective deliverables, such as meals in a restaurant, while functional quality pertains to service presentation and customer interactions. The latter is more challenging to assess as it depends on customer perceptions.

Service quality is measured by how well a business meets customer expectations, directly affecting satisfaction (Juriyanti & Asra, 2023). High-quality service fosters customer retention and influences repurchase intentions (Kim et al., 2017; Rizki et al., 2022). Poor service may drive customers to competitors who better meet their needs (Saraun et al., 2022).

### **2.3 Product Quality**

Food and coffee are central to commercial operations, as they are products sold to customers and help businesses achieve their goals (Juriyanti & Asra, 2023). Ensuring product quality is crucial for cafe operations; high-quality offerings lead to customer satisfaction and repeat visits. Various factors, including aroma, texture, colour, portion size, and flavour, influence food quality. In the food and beverage industry, product quality can be assessed across four dimensions: presentation, variety, culinary skill, and freshness (Augustinus & Iona, 2020).

To cater to a diverse clientele with varying preferences, cafes should offer a broad menu that accommodates different cultural and economic backgrounds (Rozekhi et al., 2016). Scholars agree that product quality significantly affects customer loyalty and perceptions of a business. High product quality is essential for retaining customers and enhancing their satisfaction (Hanaysha, 2016). It is also a key factor influencing repurchase intentions, as quality must meet or exceed customer expectations. A strong correlation exists between product quality and repurchase intentions, motivating previous customers to return (Rizki et al., 2022; Mahendrayanti & Wardana, 2021).

### **2.4 Product Price**

Price can be defined as the monetary value that consumers are willing to pay in order to buy goods or services, or as the amount of money that they receive in exchange for the advantages of possessing or utilising what they are purchasing (Effendy, 2019). Price is a crucial factor in consumer buying decisions, as it significantly impacts consumer perception during the purchasing process. An individual's pleasure is mostly determined by their assessment of the price of a product at the time of purchase (Halim et al., 2021). Appropriate pricing has the potential for promoting beneficial customer perceptions and feelings about businesses. Offering low or fair prices enables businesses to gain an ongoing competitive edge in the market. Customers typically have a range of prices that they are willing to pay for their desired purchase, rather than one specific price (Rizki et al., 2022). Price fairness enhances satisfaction among consumers and significantly influences their decision to remain loyal to a specific brand or transition to a competitor, according to previous studies (Ratasuk & Gajesanand, 2020).

Consumers' positive perceptions of a product's price can be achieved when the outcomes of comparing prices with comparable products or different price offers for the same product align with customer preferences and their budgets. According to Liu and Lee (2016), if customers have a higher level of positive price perceptions for a product, it will lead to an increase in their consumption or intention to repurchase. The findings of their study demonstrate that price perceptions influence a customer's likelihood of returning to the same business.

## **2.5 Store Atmosphere**

The physical environment plays a key role in giving businesses a competitive advantage. It includes all tangible and intangible elements inside and outside a structure (Hanaysha, 2016). In cafes, the store atmosphere—often informal—prioritizes decor and customer comfort (Siregar & Syahreza, 2023). This atmosphere is shaped by factors like lighting, music, colors, and scent, which influence customer behavior, emotions, and perceptions (Abuthahir & Krishnapillai, 2018).

A well-designed atmosphere reflects a business's commitment to customer comfort, enhancing satisfaction and encouraging longer stays and additional purchases (Pratiwi et al., 2022). Positive store environments can also increase.

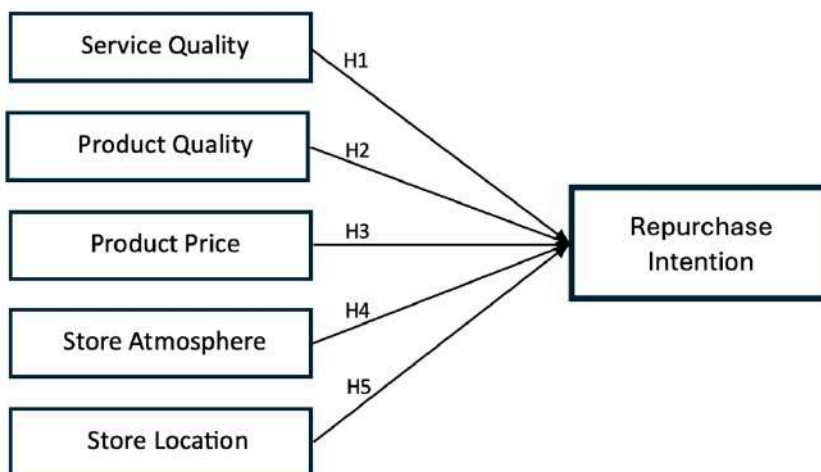
## **2.6 Store Location**

A business's location is crucial as it significantly impacts its strategies and customer behavior. Key factors to consider when choosing a location include strategic decision-making, accessibility, comfort, and safety (Tampubolon, 2021). Since location influences purchasing decisions, selecting a site involves substantial costs, but a strategically advantageous location increases customer footfall and exploration of offerings (Juriyanti & Asra, 2023).

Proximity plays a role in customer motivation, as transportation costs deter distant customers (Berliansyah & Suroso, 2018). A well-chosen location reduces long-term operational costs and enhances competitive advantage (Setyawan et al., 2023), with research showing it significantly influences repurchase intentions (Zulfikar, 2022).

## **2.7 Proposed Theoretical Framework**

The theoretical framework for this study is an adapted model based on four conceptual frameworks drawn from the literature. This research framework illustrates the interrelationships among five factors: the factors that are independent are service quality, product quality, product price, store atmosphere, and store location, and the factor that is dependent is repurchase intention. The study seeks to explore the determinants of repurchase intentions with regard to cafes in Auckland CBD, which is supported by the theoretical framework displayed in Figure 1.



*Figure 1: The Theoretical Framework of this study  
(Source: Author)*

## 2.8 Research Hypotheses

In preparation for this investigation, the following five hypotheses have been defined:

Null Hypothesis (H1-a): There is no significant relationship between customers' repurchase intentions and service quality.

Alternative Hypothesis (H1-b): There is a significant positive relationship between customers' repurchase intentions and service quality.

Null Hypothesis (H2-a): There is no significant relationship between customers' repurchase intentions and product quality.

Alternative Hypothesis (H2-b): There is a significant positive relationship between customers' repurchase intentions and product quality.

Null Hypothesis (H3-a): There is no significant relationship between customers' repurchase intentions and product price.

Alternative Hypothesis (H3-b): There is a significant positive relationship between customers' repurchase intentions and product price.

Null Hypothesis (H4-a): There is no significant relationship between customers' repurchase intentions and store atmosphere.

Alternative Hypothesis (H4-b): There is a significant positive relationship between customers' repurchase intentions and store atmosphere.

Null Hypothesis (H5-a): There is no significant relationship between customers' repurchase intentions and store location.

Alternative Hypothesis (H5-b): There is a significant positive relationship between customers' repurchase intentions and store location.

### **3. METHODOLOGY**

#### **3.1 Research Approach**

Research approaches encompass strategies and methodologies that progress from broad assumptions to specific data-gathering techniques. This study utilized quantitative methods to analyse large populations and applied findings from the sample to larger groups via an online questionnaire. A deductive approach was employed to move from general to specific ideas, where deduction involves deriving specific conclusions from general assumptions (Khalid et al., 2012). To implement this approach, researchers must understand the studied phenomenon and analyse existing literature to define the concept accurately (Holton & Swanson, 2005, p. 164). This broad perspective aids in creating and testing a theoretical framework for the study.

#### **3.2 Research Design**

##### **3.2.1 Research Type**

An explanatory research type was chosen to establish connections between variables. This approach helps understand and clarify situations by identifying fundamental causes and establishing causal linkages. It enables researchers to gain new perspectives, develop hypotheses, and evaluate them. The primary goal is to identify essential variables and concerns related to the research topic (Rahi et al., 2019). This form of research is often referred to as "testing hypotheses," which explains associations, identifies independent variables, accounts for variations in dependent variables, and forecasts future results (Al-Ababneh, 2020).

##### **3.2.2 Research Strategy**

A research strategy systematically gathers and analyses data to achieve specific objectives, often using surveys within a deductive framework. This study utilized an online questionnaire format, allowing for efficient and cost-effective collection of primary data. The strategy aimed to evaluate a target group by sampling the population to identify specific characteristics. A standardized set of questions was used, and statistical methods were applied for data analysis, reflecting the broader population's beliefs and perspectives.

##### **3.2.3 Research Method**

This study used a quantitative method to gather the necessary data. Quantitative research is distinguished by a focus on the collection of numerical data. In this

context, a procedure is defined as a reference to any number of quantities (Goundar, 2012, p. 9). Furthermore, quantitative research is a method used to examine objective ideas by analysing the correlation between variables. These variables may be monitored using tools, allowing for the analysis of numerical data using statistical techniques (Creswell, 2009). Quantitative investigations into findings are expected to yield accurate, clear, and valid outcomes. The key goal of this method is to accomplish clarifications and projections that can be applied broadly to other individuals, occurrences, and locations (Taherdoost, 2022).

### 3.2.4 Data Collection

Primary data is collected directly for this study, ensuring accuracy and credibility. This study employed an online questionnaire. The researcher distributed the questionnaire link through personal networks and social media, particularly Facebook, to engage participants who regularly visit cafés in Auckland CBD.

### 3.2.5 Sample Size

According to Heart of the City (2023), the population in the city centre is estimated to be approximately 250,000. Calculating the size of a sample can be accomplished with a range of different statistical formulas. One of them is shown in Figure 2.

$$n = \frac{p(100-p)z^2}{E^2}$$

*Figure 2: Sample Size Formula (Source: Taherdoost, 2017)*

Where **n** denotes the required sample size.

Where **P** denotes the estimated population variance, and Bartlett et al. (2001) recommended that researchers apply 50% to an estimate of P in order to maximise variance while collecting the largest possible sample size.

Where **Z** refers to the degree of certainty in the accuracy of the survey findings. In managerial research, a commonly employed degree of confidence is 95 percent, which corresponds to a Z value of 1.96.

Where **E** denotes the margin of error, which is the degree of accuracy or the level of uncertainty that the researcher is willing to allow. A 5% margin of error is considered acceptable in social research. Therefore, a margin of error of 0.05 was applied due to the heterogeneity of the population. Consequently, the researcher decided to use a sample size of 384 participants for this study.

### 3.2.6 Sampling Technique

Convenience sampling is classified as a form of non-random or nonprobability sampling in which individuals from the target population are selected for the study based on specific practical considerations, such as locality, easy accessibility, availability at a specified time, or willingness to participate (Etikan, 2016). Convenience sampling is widely used because of its efficiency, affordability, time efficiency compared to other sampling techniques, and simplicity. Convenience sampling is beneficial when applied to establish a prospective hypothesis or study objective.

### 3.2.7 Questionnaire Design

This study's questionnaire drew from three existing studies (Zhang, 2017; Chue et al., 2017; Rattanasilpkaicharn, 2016), adapting their questions to suit Auckland café customers. The 34-item questionnaire used closed-ended questions—yes/no, multiple-choice, and Likert scale—to limit responses, except for one open-ended question allowing more personalized input. Table 3 shows the four sections of the questionnaire.

*Table 3: An overview of the questionnaire used in this research study (Source: Author)*

<b>Section</b>		<b>Number of Questions</b>	<b>Question Types</b>
1	<b>Screening Questions</b>	4	Yes-or-no question Open-ended question
2	<b>Demographic Profile</b>	5	Multiple options
3	<b>Independent Variables</b>		
	Service Quality	4	Likert Scale
	Product Quality	4	Likert Scale
	Product Price	4	Likert Scale
	Store Atmosphere	4	Likert Scale
	Store Location	4	Likert Scale
4	<b>Dependent Variable</b>		
	Repurchase Intention	5	Likert Scale
<b>Total</b>		<b>34</b>	

### 3.2.8 Pilot Test

To assess the questionnaire's reliability, a pilot test was conducted with 30 participants. As shown in Table 4, all variables achieved Cronbach's alpha values greater than 0.70, confirming the questionnaire's reliability. For example, service quality and repurchase intention both had high values of .914, while store atmosphere, at .789, was also within the acceptable range.

*Table 4: The questionnaire's pilot test in measuring each variable (Source: Author)*

Variables	Cronbach's Alpha
Service Quality	.914
Product Quality	.895
Product Price	.917
Store Atmosphere	.789
Store Location	.706
Repurchase Intention	.914

## 3.3 Data Analysis

Once the data was cleaned and coded, it was ready for analysis using the Statistical Package for the Social Sciences (SPSS). The analysis was divided into two main types: descriptive statistics and inferential statistics.

### 3.3.1 Descriptive Statistical Analysis

Descriptive statistics provide a straightforward method for summarizing and interpreting data, allowing the researcher to offer an in-depth overview of the sample (Marshall & Jonker, 2010). The three primary types of descriptive statistics used in this study were frequency distributions, measures of central tendency, and measures of dispersion (Lind et al., 2012).

### 3.3.2 Frequency Distributions

Frequency distributions were used to analyse data gathered through screening questions and demographic information. This method provides insights into the number of occurrences for specific factors (e.g., the proportion of male to female participants) and is an essential aspect of statistics (Mishra et al., 2019).

### 3.3.3 Measures of Central Tendency

The mean (average), mode, and median are three primary measures of central tendency. In this study, the mean was selected to represent the average of responses to questions related to service quality, product quality, store atmosphere, product price, location, and repurchase intention. The mean

provides a reliable indicator of general trends in the data and is widely recognized for its ease of calculation (Plichta & Garzon, 2009).

### 3.3.4 Measures of Dispersion

Measures of dispersion, such as the standard deviation (SD), are used to quantify the amount of variance or spread within the data. In this study, SD was used to understand how responses varied from the mean, indicating the degree of consensus or variability in participants' perceptions of service quality and other variables. A low SD would suggest that participants had similar views, while a high SD would indicate a wide range of opinions (Mishra et al., 2019). Furthermore, class intervals, or categories used to group data, were applied for Likert scale questions. The class intervals for the five-point Likert scale ranged from 1.00–1.80 (strongly disagree) to 4.21–5.00 (strongly agree), allowing for easier interpretation of the results (Lind et al., 2012).

### 3.3.5 Inferential Statistical Analysis

Inferential statistics enable researchers to make conclusions about a larger population based on a sample. In this study, two primary inferential techniques were employed: Spearman's rank-order correlation and multiple linear regression.

### 3.3.6 Spearman's Rank-Order Correlation

This nonparametric method was used to assess the strength and direction of the relationship between two variables. It measures how closely the rankings of two variables align and can range from -1 (indicating a strong negative correlation) to +1 (strong positive correlation). Values closer to zero indicate weaker correlations (Al-Hameed, 2022). This method is particularly useful when the data does not meet the assumptions of normality and when dealing with ranked or ordinal data, such as the responses on a Likert scale (Gauthier, 2001).

In this study, Spearman's correlation was used to analyse the relationships between the independent variables (e.g., service quality, product price) and the dependent variable (repurchase intention). According to the interpretation criteria (Schober et al., 2018), coefficients ranging from  $\pm 0.10$  to  $\pm 0.39$  indicate weak correlations, while values above  $\pm 0.70$  suggest strong correlations.

### 3.3.7 Multiple Linear Regression

This technique was used to understand how multiple independent variables influence a dependent variable. In this case, multiple linear regression helped determine the combined effect of variables like service quality and product price on customers' intention to repurchase. The advantage of this method is that it allows the researcher to examine the effect of each independent variable while controlling for the others (Plichta & Garzon, 2009).

Regression analysis also provides key metrics such as coefficients (which indicate the relationship's strength and direction), P-values (which assess statistical significance), and  $R^2$  (which shows the proportion of variance in the dependent variable explained by the independent variables). A P-value below 0.05 suggests that the relationship is statistically significant, while  $R^2$  values closer to 1 indicate a stronger predictive relationship between variables (Field, 2009).

### 3.4 Ethical Consideration

This study followed all ethical procedures outlined by the ICL Ethics Committee's guidelines. Prior to conducting this research, it is necessary for the researcher to submit the ICL Ethical Application Form to the ICL Ethical Committee. The research participants were properly informed of the goals and intentions of the investigation. Participation in this study was entirely voluntary. Participants who chose not to participate had the right to withdraw at any point and were not obligated to provide a reason for declining. The questionnaire form specified the consent requirements for participation. By ensuring confidentiality and anonymity, the identities of those involved would not be revealed. A summary of the discoveries was requested.

## 4. FINDINGS AND DISCUSSION

This chapter analyses data collected through an online questionnaire using SPSS, categorizing results into descriptive and inferential statistics. The descriptive analysis is divided into four parts: screening questions, demographic profiles of eligible participants, perceptions of independent variables, and the dependent variable. The inferential analysis consists of two main components: multiple linear regression analyses and Spearman's rank-order coefficients, evaluating all hypotheses further explained in the chapter.

### 4.1 Descriptive Statistical Analysis

#### 4.1.1 The Screening Questions

The findings of the screening questions are displayed and discussed as follows:

*Table 5: Screening Questions (Source: Author)*

		Frequency	Percentage
Are you at least 18 years of age?	Yes	402	97.1
	No	12	2.9
	Total	414	100.0
Have you visited a café in Auckland CBD within the past seven days?	Yes	401	99.8
	No	1	0.2

	Total	402	100.0
The café that you visit on a regular basis is in Auckland CBD.	Yes	401	100.0
	No	0	0.0
	Total	401	100.0
Do you visit this (particular) café at least once a week?	Yes	401	100.0
	No	0	0.0
	Total	401	100.0

Table 5 shows that out of 414 participants, 97.1% (402 participants) are at least 18 years old. Additionally, 99.8% (401 participants) had visited a café in Auckland CBD within the past week, with all of them doing so at least once weekly. Thus, 401 participants met the survey's eligibility criteria.

#### 4.1.2 The Demographic Profile

The findings of the demographic profile are displayed and discussed as follows:

*Table 6: Analysing Gender through Frequency and Percentage  
(Source: Author)*

		Frequency	Percentage
Gender	Male	141	35.2
	Female	254	63.3
	Other	6	1.5
	Total	401	100.0

Table 6 shows the gender distribution among 401 participants. 63.3% (254 participants) are female, 35.2% (141 participants) are male, and 1.5% (6 participants) identify as others.

*Table 7: Analysing Age through Frequency and Percentage  
(Source: Author)*

		Frequency	Percentage
Age	18 – 25 years old	114	28.4
	26 – 35 years old	195	48.6
	36 – 45 years old	71	17.7
	Over 45 years old	21	5.2
	Total	401	100.0

Table 7 shows the age distribution of 401 participants. The largest group is aged 26 to 35, comprising 48.6% (195 participants). The 18 to 25 age group accounts

for 28.4% (114 participants), while those aged 36 to 45 represent 17.7% (71 participants). Lastly, 5.2% (21 participants) are over 45 years old.

*Table 8: Analysing Education Level through Frequency and Percentage (Source: Author)*

		Frequency	Percentage
Education Level	Below bachelor's degree	19	4.7
	Bachelor's degree	276	68.8
	Master's degree	99	24.7
	Doctoral degree	7	1.7
	Total	401	100.0

Table 8 presents the education levels of 401 participants. The largest group, with a bachelor's degree, comprises 68.8% (276 participants). The second largest group, holding a master's degree, accounts for 24.7% (99 participants). Those with an educational qualification below a bachelor's degree represent 4.7% (19 participants), while the smallest group, with a doctoral degree, makes up 1.7% (7 participants).

*Table 9: Analysing Weekly Income through Frequency and Percentage (Source: Author)*

		Frequency	Percentage
Weekly Income	Less than \$500	29	7.2
	\$501 - \$1,000	216	53.9
	\$1,001 - \$1,500	127	31.7
	More than \$1,500	29	7.2
	Total	401	100.0

Table 9 shows the weekly income distribution among 401 participants. The largest group, earning between \$501 and \$1000, comprises 53.9% (216 participants). The next group, with incomes from \$1001 to \$1500, accounts for 31.7% (127 participants). The smallest groups, each representing 7.2% (29 participants), consist of those earning less than \$500 or more than \$1500 per week.

*Table 10: Analysing The Frequency of Visitation through Frequency and Percentage (Source: Author)*

		Frequency	Percentage
How many times per week, on average, do you visit this particular café?	1 time	157	39.2
	2 – 3 times	180	44.9
	More than 3 times	64	16.0
	Total	401	100.0

Specifically, Table 10, which displays the frequency and percentage of participants' visitation frequency based on a sample size of 401, The findings revealed that among the participants, the greatest proportion, comprising 44.9%, which is equivalent to 180 participants, visit the café on a regular basis, specifically 2-3 times per week. 39.2% of the participants, which amounts to 157 participants, reported visiting the café only once a week. At last, the smallest proportion was 16%, which is equivalent to 64 participants who frequent the cafe more than three times per week.

#### 4.1.2 Perception of Independent Variables

The findings of each variable are illustrated and discussed as follows:

*Table 11: Analysing the Perception of Service Quality through Mean and Standard Deviation (Source: Author)*

Service Quality	$\bar{x}$	S.D.	Interpretation	Rank
1. The staff is very friendly and helpful.	4.49	0.58	Strongly Agree	3
2. The staff is able to serve me timely and efficiently.	4.64	0.55	Strongly Agree	2
3. The staff is well-informed and capable of addressing my problem.	4.67	0.55	Strongly Agree	1
4. The staff made me feel comfortable dealing with them.	4.46	0.64	Strongly Agree	4
Overall	4.56	0.40		

Table 11 reveals that participants had a high level of agreement regarding service quality, achieving an average mean score of 4.56 and a standard deviation of 0.40. The highest mean score (4.67) was for the statement, "The staff is well-informed and capable of addressing my problem," while the lowest

(4.46) was for "The staff made me feel comfortable dealing with them." The highest standard deviation (0.64) corresponds to the comfort statement, indicating varied responses. In contrast, the lowest standard deviation (0.55) is associated with both "The staff is able to serve me timely and efficiently" and the informed staff statement, reflecting more consistent responses.

*Table 12: Analysing the Perception of Product Quality through Mean and Standard Deviation (Source: Author)*

Product Quality	$\bar{x}$	S.D.	Interpretation	Rank
1. The food and drink are delicious.	4.42	0.64	Strongly Agree	4
2. The ingredients in the product are fresh and suitable for themselves.	4.54	0.59	Strongly Agree	2
3. The appearance of the food stimulates my appetite.	4.55	0.63	Strongly Agree	1
4. The variety of products on the menu has fulfilled my expectations.	4.48	0.70	Strongly Agree	3
Overall	4.50	0.48		

Table 12 indicates strong agreement among participants regarding product quality, with an average score of 4.50 and a standard deviation of 0.48. The highest mean score (4.55) was for the statement "The appearance of the food stimulates my appetite," while the lowest mean score (4.42) was for "The food and drink are delicious." The highest standard deviation (0.70) suggests a wide range of responses, reflecting varied expectations about the menu offerings. Conversely, the statement "The ingredients in the product are fresh and suitable" had the lowest standard deviation (0.59), indicating more consistent participant responses.

*Table 13: Analysing the Perception of Product Price through Mean and Standard Deviation (Source: Author)*

Product Price	$\bar{x}$	S.D.	Interpretation	Rank
1. The product I received was a great deal.	4.32	0.66	Strongly Agree	4
2. The product that I consumed was in line with its cost.	4.42	0.64	Strongly Agree	3
3. It is worthwhile to spend money at this café.	4.47	0.61	Strongly Agree	1
4. The product was very reasonable considering the price I paid as compared to other cafés.	4.46	0.68	Strongly Agree	2
Overall	4.42	0.56		

Table 13 reveals that participants generally agreed on product pricing, with a mean score of 4.42 and a standard deviation of 0.56. The highest mean score (4.47) was for the statement "it is worthwhile to spend money at this café," while the lowest (4.32) referred to "the product I received was a great deal." The statement regarding "the product was very reasonable considering the price I paid compared to other cafés" had the highest variance in responses (standard deviation = 0.68). Conversely, the statement about it being worthwhile to spend money at the café showed more consistency (standard deviation = 0.61).

*Table 14: Analysing the Perception of Store Atmosphere through Mean and Standard Deviation (Source: Author)*

Store Atmosphere	$\bar{x}$	S.D.	Interpretation	Rank
1. The exterior and interior design elements have the capacity to attract my attention.	4.22	0.72	Strongly Agree	2
2. My meal is very enjoyable because of the dining area's design and decoration.	4.09	0.85	Agree	3
3. The style of the café contributes to a pleasant atmosphere.	4.33	0.68	Strongly Agree	1
4. I am extremely satisfied with the complimentary Wi-Fi service.	3.94	0.93	Agree	4
Overall	4.14	0.65		

Table 14 shows that participants had a generally positive view of the café's atmosphere, with an average score of 4.14 and a standard deviation of 0.65. The highest score (4.33) was for "the café's style contributes to a pleasant atmosphere," while the lowest (3.94) was for satisfaction with the "complimentary Wi-Fi service," which also had the most varied responses (standard deviation = 0.93). The most consistent responses (standard deviation = 0.68) were for the café's style contributing to the atmosphere.

*Table 15: Analysing the Perception of Store Location through Mean and Standard Deviation (Source: Author)*

Store Location	$\bar{x}$	S.D.	Interpretation	Rank
1. The convenient location of this café encourages me to visit.	4.75	0.51	Strongly Agree	2
2. The parking options at the café location are satisfactory to me.	4.22	0.96	Strongly Agree	4
3. The café is conveniently located near my regular routes and destinations.	4.76	0.52	Strongly Agree	1
4. The café's location is easily found.	4.72	0.58	Strongly Agree	3
Overall	4.61	0.48		

Table 15 shows that participants strongly agreed with all statements regarding the café's location, with an average score of 4.61 and a standard deviation of 0.48. The highest score (4.76) was for "the café is conveniently located near my regular routes," while the lowest (4.22) related to "parking options at the café." The latter had the highest variability in responses (standard deviation = 0.96), possibly due to Auckland CBD's public transport. The most consistent response (standard deviation = 0.51) was for "the café's location encourages visits."

## 4.2 Perception of the Dependent Variable

The findings of the perception of the dependent variable are displayed and discussed as follows:

*Table 16: Analysing the Perception of Repurchase Intention through Mean and Standard Deviation (Source: Author)*

Repurchase Intention	$\bar{x}$	S.D.	Interpretation	Rank
1. I intend to visit this café again.	4.90	0.33	Strongly Agree	5
2. I would recommend this café to my friends, family, or others.	4.77	0.48	Strongly Agree	2
3. I would say good things about this café to others.	4.78	0.45	Strongly Agree	3
4. This café is going to be my first choice.	4.70	0.55	Strongly Agree	1
5. I would like to become a loyal customer of this café.	4.82	0.48	Strongly Agree	4
Overall	4.79	0.38		

The findings from Table 16 indicate strong repurchase intentions among participants, with an overall mean score of 4.79 and a standard deviation of 0.38. The highest mean score (4.90) corresponds to the statement, "I intend to visit this café again," showing high consistency in responses (standard deviation = 0.33). The lowest mean score (4.70) relates to "This café is going to be my first choice," with the highest variation in responses (standard deviation = 0.55). Overall, participants show a strong likelihood of revisiting and recommending the café.

## 4.3 Inferential Statistical Analysis

### 4.3.1 Spearman's Rank-order Coefficient

The findings of Spearman's rank-order coefficient analysis are displayed and discussed as follows:

*Table 17: The Resulting Spearman rank-order coefficient (Source: Author)*

	Service Quality	Product Quality	Product Price	Atmosphere	Location	Repurchase Intention
Service Quality	1.000	.377*	.222*	.150*	.202*	.443*
Product Quality		1.000	.345*	.050	.043	.212*
Product Price			1.000	.181*	.225*	.299*
Atmosphere				1.000	.513*	.390*
Location					1.000	.443*
Repurchase Intention						1.000

\* Indicate that P-value is less than 0.05

The Spearman's rank-order correlation analysis in Table 17 evaluates the relationships between the independent variables (service quality, product quality, product price, store atmosphere, and store location) and the dependent variable (repurchase intention).

Key findings from the analysis:

**Service Quality:** There is a statistically significant and positive relationship between service quality and repurchase intention, with a correlation coefficient ( $\rho$ ) of 0.443 and a P-value less than 0.05. This suggests that as service quality improves, the likelihood of repurchasing also increases, reflecting a moderate strength of correlation.

**Product Quality:** A weak positive correlation is observed between product quality and repurchase intention, as shown by a correlation coefficient ( $\rho$ ) of 0.212 and a P-value less than 0.05. While the correlation is weak, it indicates that better product quality is still linked to higher chances of repurchasing.

**Product Price:** The analysis reveals a weak but positive correlation between product price and repurchase intention ( $\rho = 0.299$ ,  $P < 0.05$ ). This suggests that when customers perceive the price as reasonable, their intent to repurchase increases.

**Store Atmosphere:** A weak positive relationship is found between store atmosphere and repurchase intention, with a correlation coefficient ( $\rho$ ) of 0.390 and a P-value less than 0.05. This suggests that improvements in the store atmosphere can moderately enhance repurchase intentions.

**Store Location:** The study demonstrates a moderate positive correlation between store location and repurchase intention ( $\rho = 0.443$ ,  $P < 0.05$ ), indicating that a more favourable location is associated with a greater likelihood of customers making repeat purchases.

In summary, all the variables—service quality, product quality, product price, store atmosphere, and store location—show positive correlations with repurchase intention. Enhancing these factors is likely to lead to a higher probability of customers making future purchases. The strongest correlations are found with **service quality** and **store location**, both at a moderate level.

#### 4.4. Multiple Linear Regression

The findings of multiple linear regression analysis are displayed and discussed as follows:

*Table 18: The Resulting Multiple Linear Regression  
(Source: Author)*

Model	Unstandardised Coefficients		Standardised Coefficients	t.	Sig.	Collinearity Statistics	
	B	SE	Beta			Tolerance	VIF
Constant	.965	.195		4.961	.000		
Service Quality	.418	.040	.431	10.551	.000	.745	1.343
Product Quality	.054	.033	.068	1.649	.100	.733	1.364
Product Price	.108	.027	.158	3.959	.000	.784	1.275
Store Atmosphere	.075	.024	.127	3.125	.002	.751	1.332
Store Location	.192	.034	.242	5.720	.000	.694	1.442

$R^2 = .508$ ,  $F = 81.626$ , Sig of  $F = .000$

The regression analysis in Table 18 explores the relationship between five independent variables and repurchase intention. The model explains about 50.8% of the variation in repurchase intention ( $R^2 = 0.508$ ). The overall model is statistically significant, with an F-value of 81.626 and a significance level of 0.000, indicating that the independent variables (service quality, product quality, product price, store atmosphere, and store location) significantly affect repurchase intention.

Key findings show that service quality, product price, store atmosphere, and store location have a statistically significant impact on repurchase intention, as their P-values are below 0.05 (.000, .000, .002, and .000, respectively). However, product quality does not significantly influence repurchase intention, with a P-value of .100, leading to the rejection of Hypothesis 2.

The multiple regression equation is:

$$\text{Repurchase Intention} = 0.965 + 0.418 (\text{Service Quality}) + 0.108 (\text{Product Price}) + 0.075 (\text{Store Atmosphere}) + 0.192 (\text{Store Location})$$

Service Quality ( $\beta = 0.418$ ) has the strongest positive impact on repurchase intention.

Product Price ( $\beta = 0.108$ ) and Store Atmosphere ( $\beta = 0.075$ ) also positively influence repurchase intention, though less significantly.

Store Location ( $\beta = 0.192$ ) is the second most influential factor.

In conclusion, service quality is the most impactful factor, followed by store location, product price, and store atmosphere. All hypotheses except for product quality (Hypothesis 2) are supported.

#### 4.5 Discussion of the findings

The demographic analysis from Table 19 reveals key characteristics of the participants in this study:

**Gender:** The majority of respondents were female, representing 63.3% (254 out of 401) of the total sample.

**Age:** Nearly half of the participants (48.6%) were between 26 and 35 years old, amounting to 195 individuals.

**Education:** A significant 68.8% (276 out of 401) of the participants held a bachelor's degree.

**Income:** Over half (53.9%) of the respondents, or 216 individuals, reported a weekly income between \$501 and \$1000.

**Cafe Visitation:** 44.9% (180 respondents) visited cafes 2-3 times per week, indicating regular patronage.

These demographics provide insight into the typical customer profile for cafes in Auckland CBD.

*Table 19: An Overview of Demographic Profiles  
(Source: Author)*

Demographic Profiles	Characteristics	Frequency	Percentage
Gender	Female	254	63.3%
Age	26 – 35 years old	195	48.6%
Education Level	Bachelor's Degree	276	68.8%
Weekly Income	\$501 – \$1000	216	53.9%
Frequency of Visitation	2 – 3 times	180	44.9%

The findings of an analysis of how the independent and dependent variables are perceived in Tables 19. This table shows that all variables revealed a minimal amount of variation in the process of collecting data, as indicated by S.D. Meanwhile, participants strongly agreed on all variables except for store atmosphere, as reflected by the mean value ( $\bar{x}$ ) of store atmosphere being below 4.21, as indicated in Table 20.

*Table 20: An Overview of the Perception of the Independent and Dependent Variables (Source: Author)*

Variables	$\bar{x}$	S.D.	Interpretation
Service Quality	4.56	0.40	Strongly Agree
Product Quality	4.50	0.48	Strongly Agree
Product Price	4.42	0.56	Strongly Agree
Store Atmosphere	4.14	0.65	Agree
Store Location	4.61	0.48	Strongly Agree
Repurchase Intention	4.79	0.38	Strongly Agree

The Spearman's rank-order correlation analysis in Table 21 reveals positive associations among all five independent variables and customers' intentions to repurchase. These correlations are summarised in Table 4.17 with differing levels of strength.

*Table 21: An Overview of Spearman's Correlation Coefficient (Source: Author)*

	Value of Spearman's ( $\rho$ )	Interpretation
Service Quality	0.443	Moderate correlation
Product Quality	0.212	Weak correlation
Product Price	0.299	Weak correlation
Store Atmosphere	0.390	Weak correlation
Store Location	0.443	Moderate correlation

Based on the data analysis findings presented in Table 21, a brief overview of the hypothesis test conducted by multiple linear regression in this study is shown in Table 22.

*Table 22: An Overview of Hypothesis Testing (Source: Author)*

	<b>Hypothesis</b>	<b>Results</b>
<b>H1-a:</b>	There is no significant relationship between customers' repurchase intentions and service quality.	Rejected
<b>H1-b:</b>	There is a significant positive relationship between customers' repurchase intentions and service quality.	Supported
<b>H2-a:</b>	There is no significant relationship between customers' repurchase intentions and product quality.	Supported
<b>H2-b:</b>	There is a significant positive relationship between customers' repurchase intentions and product quality.	Rejected
<b>H3-a:</b>	There is no significant relationship between customers' repurchase intentions and product price.	Rejected
<b>H3-b:</b>	There is a significant positive relationship between customers' repurchase intentions and product price.	Supported
<b>H4-a:</b>	There is no significant relationship between customers' repurchase intentions and store atmosphere.	Rejected

<b>H4-b:</b>	There is a significant positive relationship between customers' repurchase intentions and store atmosphere.	Supported
<b>H5-a:</b>	There is no significant relationship between customers' repurchase intentions and store location.	Rejected
<b>H5-b:</b>	There is a significant positive relationship between customers' repurchase intentions and store location.	Supported

The hypothesis testing results reveal a significant positive correlation between customers' repurchase intentions and four variables: service quality, product price, store atmosphere, and store location. However, product quality unexpectedly showed no significant impact on repurchase intentions.

**Service Quality (Hypothesis 1):** Service quality is the most influential variable, with a strong positive correlation with repurchase intentions. Studies by Zhang (2017) and Rizki et al. (2021) support these findings, showing that better service increases customer loyalty. Efficient, knowledgeable staff play a key role in encouraging repeat purchases.

**Product Quality (Hypothesis 2):** Surprisingly, no significant relationship was found between product quality and repurchase intention. This result contradicts previous studies but aligns with research by Tuinesia et al. (2022) and Sya'roni and Fikriah (2024), suggesting that competition and diverse preferences may dilute the impact of product quality on loyalty.

**Product Price (Hypothesis 3):** Price has a significant positive impact on repurchase intentions, ranking third among the variables. Studies by Paramita et al. (2021) and Zulfikar (2022) confirm that reasonable pricing boosts customer satisfaction and loyalty.

**Store Atmosphere (Hypothesis 4):** Although the least influential variable, store atmosphere still has a positive effect on repurchase intentions. Research by Kezia et al. (2023) and Wimaladevi & Setyawati (2018) suggests that creating a pleasant environment can enhance customer satisfaction and return rates.

**Store Location (Hypothesis 5):** Location is the second most influential factor, with a strong positive correlation to repurchase intentions. Studies by Setyawan et al. (2023) and Zulfikar (2022) show that strategic, easily accessible locations increase customer loyalty and drive repeat business.

These findings suggest that service quality and location are key drivers of repeat business, while price and atmosphere also play significant roles. However, product quality may be less critical due to market competition and varied customer preferences.

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

This research aimed to identify the key factors influencing customers' willingness to make repeat purchases from cafes in Auckland's Central Business District (CBD). Five variables were examined: service quality, product quality, product price, store atmosphere, and store location. The study tested five hypotheses using a five-point Likert scale, with 401 frequent cafe-goers in Auckland CBD completing an online questionnaire.

Demographic analysis revealed that 63.3% of participants were female, most were aged 26-35, 48.6% had a bachelor's degree, and 53.9% earned \$501 to \$1000 weekly. Additionally, 44.9% visited cafes 2-3 times per week.

The hypotheses were analysed using multiple linear regressions. Four null hypotheses were rejected, confirming the following results:

**Service Quality (Hypothesis 1):** There is a significant positive correlation between service quality and customers' intention to repurchase.

**Product Quality (Hypothesis 2):** No significant relationship was found between product quality and repurchase intentions.

**Product Price (Hypothesis 3):** Product price is positively correlated with repurchase intentions.

**Store Atmosphere (Hypothesis 4):** Store atmosphere positively influences repurchase intentions.

**Store Location (Hypothesis 5):** Store location also has a significant positive correlation with customers' intention to repurchase.

### 5.2 Recommendations

The findings of this study are highly beneficial for individuals involved in the food and beverage industry, especially in the cafe sector within Auckland CBD. By understanding customer behaviour, businesses can adopt effective marketing strategies to enhance customer loyalty, increase repeat purchases, and generate positive recommendations. The study provides the following insights:

**Service Quality:** The most critical factor influencing customers' repurchase intentions. Delivering exceptional service, such as attentive staff, timely orders, and clean environments, leads to greater customer loyalty. Management should invest in both front-of-house and back-of-house training to ensure consistency and efficiency (Ali et al., 2021).

**Product Quality:** While not a key factor in repurchase intentions in the competitive Auckland Cafe scene, maintaining consistent product quality is still vital. Cafes should focus on food freshness, hygiene, and offering diverse menu options to cater to various customer preferences (Rajasa et al., 2023).

**Product Price:** Price plays a significant role in repurchase decisions. Cafes should align pricing with customer demographics, offering value for money.

Implementing loyalty programs and delivering high-quality products and services will help retain customers (Norvadewi et al., 2023).

**Store Atmosphere:** Though it has the least impact on repurchase intentions, a pleasant store atmosphere can still boost customer satisfaction. Management should focus on creating a welcoming environment to encourage return visits.

**Store Location:** Location is the second most influential factor. A strategic location can give cafes a competitive edge, and careful planning is essential for long-term success (Wibisono & Marella, 2020).

### 5.3 Limitations

This research study was conducted successfully. However, the study did encounter some limitations. Time constraints were the primary issue encountered in this study. The research study was selected to simplify the process, which resulted in a limitation on a wide range of diverse participants, limited data gathering and analysis, and a restriction on the variables investigated. This restriction made the research more challenging to conduct delicate analysis in order to do an in-depth interpretation of the research, and the findings may be biased as a result.

### 5.4 Future Study

Based on the stated limitation, it is recommended that future researchers explore additional variables that may influence customers' repurchase intentions. To examine and determine if there are any gaps in the findings of customer demographics and behaviours between cafes situated at locations outside Auckland central. A potential option for further investigation could involve exploring diverse business models beyond the cafe, such as restaurants or hotels.

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