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Impact of Technology Integration on Customer Retention at ABC Hospital

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Abstract

In today's dynamic world, the integration of technology has been deeply rooted and plays a significant role in improving customer retention. The healthcare sector, particularly hospitals, also find the integration of cutting-edge technology essential in increasing customer retention. Therefore, this research aims to investigate the impact of technological integration, specifically, predictive analytics on personalised healthcare (PAPHC), mobile health (mHealth) application (MHA) and artificial intelligence (AI) chatbots, on customer retention at ABC Hospital, a leading private hospital in Colombo, known for its technological integration. This research employed a quantitative research method, using questionnaires, with a convenience sampling method being adopted to gather data from a sample of 120 patients. The IBM SPSS Statistical Software was utilised for data analysis. Data analysis revealed a significantly strong positive correlation between PAPHC, MHA and AI chatbots, with customer retention. The multiple linear regression analysis proved that all the factors are significant. This analysis further confirmed that PAPHC had a much higher positive impact towards customer retention than MHA and AI chatbots. Therefore, this study recommends that the ABC Hospital integrates predictive analytics, mobile health and AI technologies within existing health care systems to ensure customer satisfaction and customer retention.

Keywords: Customer Retention, Predictive Analytics on Personalised Healthcare, Mobile-Health Applications, Artificial Intelligence Chatbots

1. Introduction

1.1 Background to the Study

Technological integration within the healthcare sector has become essential for improving patient care and retaining customers (Bayramzadeh & Aghaei, 2021; Bhatia, 2021). Productivity and efficiency has improved by integrating cutting-edge technical tools and resources into organisational operations (Bajwa, Munir, Nori, & Williams, 2021). Additionally, it has been found that technological improvements not only increase patient care and quality, but also promote a more patient centered approach which helps increases satisfaction and retention (Darwish, Korouri, Pasini, Cortez, & Ishak, 2021). Mukherjee (2019) claims that technological integration also improves coordination and communication among medical professionals, which is important for improving and delivering high quality patient care. Furthermore, Nwankwo (2015) also states that hospitals must adapt to the patients' needs and improve their services to satisfy them by using technology that would help to obtain data necessary for insights towards patient behaviour and preferences.

Moreover, Consoli, Désiron and Alberto (2023) denote that from simple devices like computers and projectors to sophisticated programs like artificial intelligence and virtual reality simulations, this integration may include many different types of technology. Furthermore, Darwish et al. (2018) states that the use of telemedicine, electronic health records (EHRs), predictive analytics on personalised healthcare has improved the patient care by organising workflows and increasing diagnostic accuracy. Utilising advanced technologies such as data analytics and personalised care platforms, hospitals can better understand and respond to patient needs, enhancing their overall experience (Mukherjee, 2019). This not only strengthens patient trust and loyalty, but also helps healthcare providers maintain a competitive advantage (Liu, Bates, Wiens & Shah, 2019). Overall, as it improves customer

experience, operational effectiveness, and service quality, the strategic integration of technology in healthcare is a major factor in retaining customers (Nwankwo, 2015).

This study intends to focus on technological integration in terms of predictive analytics on healthcare, mobile health applications and artificial intelligence chatbots, to understand its impact towards customer retention. Predictive analytics on personalised healthcare (PAPHC) is used to predict health issues and give patients customisable treatment plans; while, mobile health application is a mobile optimised app where anyone from around the world can get patient support, track their health records and improve their lifestyle (Grundy, 2022; Nelson, Felgen, & Hozak, 2021). On the other hand, AI chatbots will improve patient healthcare by reducing the wait time and helps in giving timely hospital information, appointment scheduling and health tips (Martínez-Pérez, Torre-Díez, & López-Coronado, 2013). Therefore, this research will help prove how these technologies impact customer retention at ABC Hospital.

1.2 Research Problem

ABC Hospital has made significant improvements in integrating cutting-edge technologies within its facilities and services, positioning itself as a modern healthcare provider (ABC Hospital, 2024a). It has developed into a top-tier tertiary care facility inclusive of cutting-edge critical care units and modern theatre complex with state of the art intensive care units (ABC Hospital, 2024b).

Despite these advancements, the hospital has struggled with effectively utilising these technologies to their full potential, particularly in enhancing patient care and service delivery. This underutilisation of advanced technological integration has contributed to a decline in customer retention rates. The hospital serves a customer base of over 18,000 inpatients and 450,000 outpatients, yet, experienced a 32% decline in customer retention over the recent years (ABC Hospital, 2024c).

This study will help in understanding the impact that technological integration has towards retaining customers within ABC Hospital. Further to this, it has also been identified that most studies undertaken focus on investigating the impact that technological integration plays in retaining customers within industries such as the apparel and telecommunication industry. Hence, this research contributes to existing knowledge by providing valuable insights into the effectiveness of technology - driven customer retention strategies that could potentially be adapted within the healthcare sector.

1.3 Research Aim

The aim of this research is to examine the impact of technology integration on customer retention at ABC Hospital.

1.4 Scope of the Study

The study focused on the patients, inclusive of both inpatients and outpatients, of ABC Hospital, located in Colombo.

2. Methodology

This study employed a deductive approach using survey as the strategy. A mono-method quantitative research choice was adopted. A questionnaire was distributed via Microsoft Forms to obtain data from the sample of the study.

2.1 Conceptual Framework

The conceptual framework shown below was utilised to develop the hypothesis of the study.

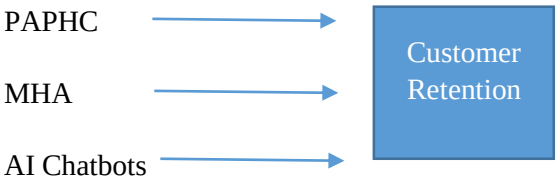

Figure 1. Conceptual Framework

2.2 Hypothesis

$H1_a$: There is a relationship between PAPHC and customer retention.

$H1_o$: There is no relationship between PAPHC and customer retention.

$H2_a$: There is a relationship between MHA and customer retention.

$H2_o$: There is no relationship between MHA and customer retention.

$H3_a$: There is a relationship between AI chatbots and customer retention.

$H3_o$: There is no relationship between AI chatbots and customer retention.

2.3 Population and Sampling

This study focused on the patients of ABC Hospital. ABC Hospital has served about 400,000 patients. A sample of 120 patients was obtained using the convenience sampling technique.

2.4 Data Collection

The study utilised a Likert scale based structured online questionnaire via Microsoft Forms to gather data relevant to the study. The questionnaire comprised of 25 closed-ended questions that included five demographic statements followed by 20 statements that assessed the independent and dependent variables of the study.

2.5 Data Analysis

The IBM SPSS statistical software was used to analyse the gathered data. Reliability, correlation, multiple linear regression and descriptive statistical analyses were carried out.

3. Findings and Discussion

3.1 Response Rate

This study obtained 111 completed responses from the 120 questionnaires that was shared. A response rate of 93% was achieved.

3.2 Demographic Analysis

Table 1 depicts the demographic data of the sample.

Table 1. Demographic Analysis

Age	
20-30	27.03%
31-40	38.74%
41-50	16.21%
51 and above	18.02%
Gender	
Male	45.05%
Female	29.73%
Other	1.80%
Prefer not to say	23.42%
Occupation	
Student	13.51%
Employed (Full-time)	54.95%
Employed (Part-time)	15.32%
Self-employed	16.22%
Unemployed	None
Monthly Income	
Below LKR 50,000	3.60%
LKR 50,001 – LKR 100,000	6.30%
LKR 100,001 – LKR 150,000	28.83%
LKR 150,001 – LKR 200,000	25.23%
Above LKR 200,000	36.04%
Use of services at ABC Hospital	
Never	0.90%
Rarely (Once or twice a year)	14.41%
Occasionally (few times a year)	32.43%
Frequently (Once a month)	35.14%
Very frequently (many times a month)	17.12%

The demographic data presented in Table 1 indicates that the majority of the respondents of the study were within the age group of 31-40 (38.74%). It also appears that the majority of the responses were from males (45.05%).

The findings also showed that most respondents (54.95%) are employed as full time employees and obtain a monthly income of LKR 200,00 or above. It is also evident that most of the respondents (35.14%) use the service of the hospital about once a month.

3.3 Reliability Analysis

A Cronbach alpha test was run to evaluate the internal consistency of the study.

Table 2. Reliability Analysis

No of Items	Variable	Cronbach Alpha
5	Predictive Analytics on Personalised Healthcare (PAPHC)	0.789
5	Mobile Health (mhealth) Applications (MHA)	0.805
5	AI chatbots	0.790
5	Customer Retention	0.792

Based on the findings, it can be concluded that all variables of the study are reliable, as each Cronbach Alpha is above the threshold value of 0.7. This denotes that there is high internal consistency within the variables (Bashir & Marudhar, 2018).

3.4 Correlation Analysis

Table 3 below gives a summary of the correlation analysis of the study.

Table 3. Correlation Analysis

Independent Variables of Technological Integration	Pearson Correlation Coefficient	Sig. Value
PAPHC	0.819	0.000
MHA	0.721	0.000
AI Chatbots	0.753	0.000
Dependent Variable: Customer Retention		

Table 3 shows a clear demonstration of the strong and significant relationship between the factors of technology integration and customer retention. All three independent variables obtained a significance value of 0.000, which is below the threshold significance of 0.05. This proves that PAPHC, MHA and AI chatbots have a significant relationship with customer retention. Further to this, the Pearson correlation coefficient of 0.819 highlights a highly strong positive correlation between PAPHC and customer retention. Furthermore, the relationship between MHA and customer retention shows a Pearson correlation coefficient of 0.721 which implies a strong relationship. Lastly, the Pearson correlation coefficient of 0.753 also demonstrates a strong impact between AI chatbots and customer retention. Thus, it is possible to conclude that these technological integrations will help in improving the customer retention rates of the hospital as they all show a strong and significant relationship with customer retention.

3.5 Hypothesis Validation

Table 4 gives the hypothesis validation based on the correlation analysis.

Table 4. Summary of Hypothesis Validation

Hypothesis		Validation
H1	**$H1_a$:** There is a relationship between PAPHC and customer retention.	Accepted
	$H1_o$: There is no relationship between PAPHC and customer retention.	Rejected
H2	**$H2_a$:** There is a relationship between MHA and customer retention.	Accepted
	$H2_o$: There is no relationship between MHA and customer retention.	Rejected
H3	**$H3_a$:** There is a relationship between AI chatbots and customer retention.	Accepted

	$H3_o$: There is no relationship between AI chatbots and customer retention.	Rejected

$H1_a$: There is a relationship between PAPHC and customer retention - Accepted

The above table indicates that $H1_a$ has been accepted showing that there is a highly strong and significant relationship between PAPHC and customer retention. The findings of this study coincides with that of Chen, Chiang, and Storey (2012) which found that the use of PAPHC is transforming hospital care and patient involvement due to personalised recommendations, medications, and lifestyle changes being offered based on patient health data. In doing so, patients tend to believe that the hospital uses such technological advancements with a patient-oriented focus, making them more likely to accept and return for their routine treatments. This also proves that predictive analytics makes it possible for the healthcare sector to become more patient-centered, effective, and efficient, eventually raising the customer retention rate (Darwish et al., 2018). Similarly, Mukherjee (2019) found that PAPHC reduces the waiting time for the patients thereby, leading to an enhanced experience giving customers a high quality service. Notably, Nelson et al. (2021) found that the use of predictive analytics results in long-term patient loyalty and retention. Thus, it is understood that patients are more likely to accept PAPHC when shown as a tool that supports their healthcare needs and their lifestyle.

$H2_a$: There is a relationship between MHA and customer retention - Accepted

Table 4 shows that $H2_a$ has been accepted. There is a strong and significant relationship between MHA and customer retention. Similar to PAPHC, this study has found that MHA is also an important factor to be considered in technology integration in order to increase customer retention. It is proven by Weinstein et al. (2014) that mHealth applications have grown into significant importance, as this resource increases the healthcare service and provides medical advice to the patients, increasing the credibility of the hospital. Additionally, Grundy (2022) shows in his research that there is a sustained patient retention due to the use of MHA, which provides a connection between the hospital and the patient. Furthermore, according to Moumtzoglou (2019) and Olla & Shimskey (2015), MHAs are used to provide patients with comprehensive patient care with a clear picture of their condition triggering the ability to take quick action contributing to a more responsive and connected healthcare experience. Thus, it can be concluded that the integration of MHA enhances patient care and customer retention within the hospital (Pires, et al., 2020; Sama, Eapen, Weinfurt, Shah, & Schulman, 2014).

$H3_a$: There is a relationship between AI chatbots and customer retention - Accepted

$H3_a$ has been validated showing that there is a strong and significant relationship between artificial intelligence (AI) chatbots and customer retention. Martínez-Pérez et al (2013) found that AI chatbots have greatly impacted and enhanced the customisation of patient interactions by employing machine learning algorithms and natural language processing to understand and react to patient requests, which in turn makes patients to mostly likely use and adopt to its technology. Additionally, Nadarzynski, Miles, Cowie and Ridge (2019) show evidence that AI chatbots give personalised health advice, reminders and active follow ups about patient visits and treatments. As a result of this, patients seem to like the adaptation of AI chatbots, since it helps them receive quick feedback, reduce waiting time and increase their satisfaction leading to an increase in customer retention for the hospital (Nadarzynski, et al., 2019; Nawaz & Gomez, 2020).

3.6 Multiple Linear Regression Analysis

Table 5 below provides the model summary of the regression analysis.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square
1	.826[a]	.682	.673
a. Predictors: (Constant), AI, PAPHC, MHA			
b. Dependent Variable: Customer_Retention			

The regression analysis model has a R^2 value of 0.682, which denotes good degree of accuracy.

Table 6. Multiple Linear Regression Analysis

	Beta Coefficients	Sig. Value
PAPHC	0.642	0.000
MHA	0.569	0.000
AI Chatbots	0.598	0.000

Table 6 shows that the independent variables PAPHC, MHA and AI chatbots are significant variables that determine customer retention as they have a significance level less than 0.05 (p = 0.000).

3.7 Descriptive Analysis

This study also performed a descriptive analysis to identify the mean value highlighting the levels of agreement to the statements provided in the context of the variables. A summary of the descriptive analysis is depicted in Table 7.

Table 7. Descriptive Analysis

Descriptive Statistics	
Variable	**Mean**
PAPHC	3.5901
MHA	3.5739
AI chatbots	3.4937
Customer Retention	3.8036

Table 7 above shows that the mean value generated for PAPHC is 3.59, which means that most respondents agree that PAPHC has an impact towards the patients intending to make repeated visits to the hospital. The use of PAPHC encourages a partnership between patients and healthcare professionals as it actively involves individuals in their treatment journey (Mukherjee, 2019). MHA has a mean value of 3.57, which highlights that the majority agree that mobile health applications play a vital role in determining customer retention. The use of mHealth applications help improve patient and health professionals' communication through continuous interaction over the application creating a better and long term patient retention in the hospital (Grundy, 2022; Sama, et al., 2014). AI chatbots obtained a value of 3.49, depicting that the majority are more or less neutral about using AI chatbots. Lastly, customer retention depicts a mean value of 3.80, reflecting that most responses agree that they would make repeated visits to the hospital. These findings align with the findings of Nwankwo (2015), which concludes that the integration of technology in healthcare is a major factor in improving customer retention.

4. Conclusion

In conclusion, this research found that technological integration strongly influences customer retention at ABC Hospital. PAPHC, MHA and AI Chatbots all had a significantly strong positive correlation with customer retention. Based on the findings, this study provides recommendations to further advance the technological integrations at ABC Hospital in order to be able to retain an increased customer base.

5. Recommendations

The findings of the study proved that all aspects of technological integration, considered for the research, reflected a strong and significant impact towards customer retention.

Goodhue, Wybo, and Kirsch (2019) state that implementing a high end data governance system and standardisation policies would establish a clear set of guidelines for data collection, storage and processing to ensure that the data used by predictive analytics are accurate and complete. Moreover, Darwish et al. (2018) states that the effectiveness of predictive analytics in healthcare can significantly improve when there is a standardised approach to data management, as it enhances the outcome given through its regulated predictions. Thus, by ensuring high - quality data, healthcare providers will be able to make more accurate predictions through predictive analytics leading to better personalised healthcare and improved patient satisfaction, which in turn will lead to better customer retention at the hospital.

Isabelle (2020) states that incorporating gamification elements and personalised feedback methods into the mhealth applications would make it a more user friendly and more engaging with rewards, charts and progress

tracking for the patients. Moreover, Davies and Mueller (2020) states that gamification and personalised feedback significantly improves user experience and long-term usage of mobile health applications. By making the apps more interactive and providing users with personalised health insights and progress reports, ABC hospital will be able to increase the continuous use of these applications, thereby improving customer retention.

Lastly, the findings of this study revealed that AI chatbots have a significant and strong relationship with customer retention. Therefore, it is imperative that the hospital undertakes actions to further strengthen the impact of such chatbots on customer retention. Bajwa et al. (2021) recommends that integrating AI with existing health care systems would ensure that AI chatbots are easily integrated with systems like electronic health records (EHR) and customer relationship management (CRM) systems, which would improve and enhance their systems' effectiveness as well. Notably, Nadarzynski et al. (2019) states that this integration would allow AI chatbots to access comprehensive patient data, providing more accurate and relevant responses. Moreover, Bukowski (2020) highlight the importance of technology integration towards improving patient care and customer satisfaction and rentetion.

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