CUBIC JOURNALS Informative Journal of Management Sciences (IJMS) www.cubicjournals.com www.cubicwriter.com

ASSESSING THE IMPACT OF DIGITAL TRANSFORMATION ON CUSTOMER EXPERIENCE CHANGES

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Abstract: This study delves into the impact of digital transformation on customer experience within a retail business environment, guided by the Technology Acceptance Model (TAM). It adopts a quantitative approach, focusing on the correlations between digital transformation aspects and customer experience changes in efficiency, customer service communication, and aftersales support. The research objectives include exploring the relationships between digital transformation benefits, perceived usefulness, and ease of use with changes in customer experience. Data is collected via structured surveys using a Likert scale from retail business customers, examining three independent variables (digital transformation benefits, perceived usefulness, ease of use) against changes in customer experience as the dependent variable. Anticipated findings suggest a positive correlation between digital transformation improvements and customer satisfaction, particularly in efficiency and communication. These results provide actionable insights for retail businesses to enhance their digital strategies and improve customer relations. Academically, the study offers a practical application of TAM in understanding the effect of digital transformation on customer experience in the retail sector, contributing to both commercial and scholarly knowledge.

Keywords—Technology Acceptance Model, Efficiency, Customer Service Communication, After-Sales Support, Customer Satisfaction

INTRODUCTION

The digital era has ushered in a transformative wave across various sectors, with the retail industry being one of the most significantly affected. This transformation has not only revolutionized retail business operations but has also dramatically altered the way customers interact with and experience retail services (Ngo et al., 2023). Digital transformation in retail encompasses integrating digital technologies into all

business areas, fundamentally changing how they operate and deliver value to customers. It is an ongoing process that involves a shift from traditional to new digital methods, impacting everything from the supply chain to customer service (Pan et al., 2022).

The core of this digital shift lies in improving various aspects of customer experience. Efficiency in service delivery, customer service communication, and after-sales support are key areas where digital transformation is expected to make a significant impact (Cao et al., 2022). Efficiency, in the context of digital transformation, often translates to quicker service delivery and streamlined operations, which are anticipated to enhance customer satisfaction.

Digital communication channels promise more responsive and personalized interactions to elevate the customer service experience (Xie et al., 2022). Meanwhile, digital after-sales support is expected to offer more efficient problem resolution and ongoing engagement, potentially increasing customer loyalty.

However, the real-world impact of digital transformation on these aspects of customer experience in the retail sector is still a subject of exploration. While digitalization offers numerous potential benefits, its effectiveness in enhancing customer satisfaction still needs to be fully understood (Foo & Abdul Jalil, 2021). This gap in understanding forms the crux of the research problem. The primary research problem centres around understanding the true impact of digital transformation on customer experience in the retail industry. This involves investigating the extent to which digital transformation benefits, perceived usefulness, and ease of use correlate with changes in customer experience, specifically in terms of efficiency, customer service communication, and after-sales support (Adam & Hikmah, 2020).

The study seeks to answer whether the efficiencies brought about by digital transformation translate into higher customer satisfaction. Do the quickness and accuracy afforded by digital tools genuinely meet customer expectations in a retail setting (Adam & Hikmah, 2020). Additionally, the research aims to explore the effectiveness of digital channels in customer service communication. Are these digital methods perceived as more efficient and personalized by customers, and do they contribute to higher satisfaction levels than traditional methods (Bae et al., 2022).

Furthermore, the study will examine the role of digital transformation in after-sales support. It aims to evaluate whether digital platforms are effective in maintaining customer relationships and resolving issues compared to traditional after-sales services (Desikan & Jayanthila Devi, 2021). Are digital after-sales services capable of providing a level of personal touch and satisfaction that customers expect (Bae et al., 2022). By addressing these questions, the study aims to provide a comprehensive understanding of the impact of digital transformation on customer experience in the retail sector, offering valuable insights for businesses navigating the digital landscape (Yu et al., 2022).

LITERATURE REVIEW

A. Technology Acceptance Model (TAM) Theory

The Technology Acceptance Model (TAM) and its extensions have been widely used in library and information science research to understand user perceptions and acceptance of new technologies. These models and frameworks, which identify factors influencing technology acceptance, are crucial for predicting the level of technology adoption . TAM, in particular, has been found to be a robust model for understanding end-user adoption of technology (Corneli et al., 2022). The Unified Theory of Acceptance and Use of Technology (UTAUT) is an extension of TAM that further explores technology acceptance and use (Dissanayake et al., 2022).

The Technology Acceptance Model (TAM), is a widely recognized theoretical model within the field of information systems. This model primarily focuses on understanding how users accept and use technology (Yusoff et al., 2022). According to the TAM, user acceptance is determined by two specific factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which a person believes using a particular system would enhance their job performance. On the other hand, perceived ease of use denotes the degree to which a person believes using a system would be free of effort (Manandhar, 2021). The central notion of TAM is that perceived ease of use and perceived usefulness influence an individual's intention to use a system, affecting their actual usage behavior. Over the years, TAM has been empirically tested and validated through numerous studies across different technologies and contexts, making it a fundamental model for understanding user acceptance of information systems (Ahmed et al., 2020).

B. Digital Transformation

Digital transformation has been found to significantly improve efficiency in the banking sector, with benefits including cost and time savings, and a more sustainable environment. This transformation also plays a crucial role in enhancing customer experience, with critical success factors identified as a key driver of this improvement (Sahu, 2018). The linkage between digital transformation and customer experience is further emphasized, with the former being a key enabler of the latter (Shabani Shojaei, 2022). The positive impact of digital transformation on firm performance is underscored, with customer experience and IT innovation identified as key drivers (Masoud & Basahel, 2023).

Digital transformation has been identified as a critical factor in improving customer experience, with a focus on the value propositions delivered to end customers (Sahu, 2018). This transformation is driven by the need to personalize marketing tools and embrace all interactions between sellers and customers. The

use of multiple communication channels and the ability to start their journey anywhere, anytime, and from any device are key aspects of this transformation.

RESEARCH METHODOLOGY

This study adopts a quantitative research approach to systematically evaluate the influence of digital transformation on customer experience enhancements within a retail business organization. The guiding theoretical framework for this research is the Technology Acceptance Model (TAM), a robust foundation for assessing key facets such as efficiency, customer service communication, and after-sales support concerning customer satisfaction. To fulfil the study's objectives, data will be gathered through structured surveys distributed among customers affiliated with the selected retail business company.

The survey questionnaire has been designed to gauge the following pivotal variables: Digital transformation benefits (independent variable); Perceived Usefulness of digital transformation (independent variable); Perceived ease of use of digital transformation (independent variable); Customer experience changes, encompassing efficiency, customer service communication, and after-sales support (dependent variables)

The data collection will employ a Likert scale, allowing respondents to articulate their perceptions and opinions accurately. The survey will be administered via electronic means, and respondents will be selected randomly from the company's extensive customer database, ensuring a diverse and representative sample.

After data collection, comprehensive statistical analyses will be conducted, including correlation and regression analyses. These analytical tools will be used to scrutinize the intricate relationships between digital transformation benefits, perceived usefulness, perceived ease of use, and customer experience alterations. Furthermore, this investigation will extend its purview to comprehend how these interrelated factors collectively influence customer satisfaction within the dynamic landscape of the retail business context.

C. Theoretical Framework

The theoretical framework of the study is presented in Fig.1.

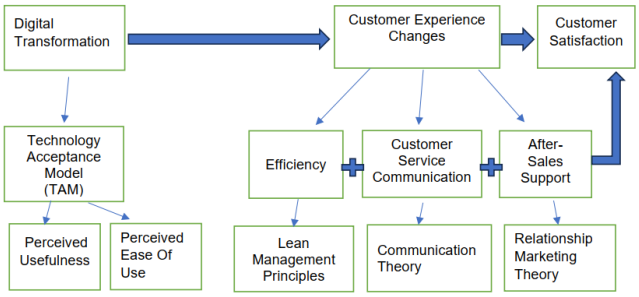

Fig. 1. Theoretical Framework

D. Data Analysis Method

For the data analysis in this study, SmartPLS 4 (Partial Least Squares Structural Equation Modeling - PLS-SEM) software will be used. This method is particularly suitable for complex model testing in research with multiple constructs, as is the case in this study, where we examine the relationships between digital transformation benefits, perceived usefulness, ease of use, and customer experience changes (Bansal et al., 2023). SmartPLS 4 is chosen for its ability to handle both small and large sample sizes and its effectiveness in managing complex models with multiple mediator and moderator variables. It provides robust outcomes even with non-normally distributed data, making it highly applicable to this study's quantitative approach.

RESULTS

By using SmartPLS 4 Software to compute the data, descriptive analysis of the final result will be presented in this section.

E. Structural Model

The PLS-SEM Model is presented in Fig. 2.

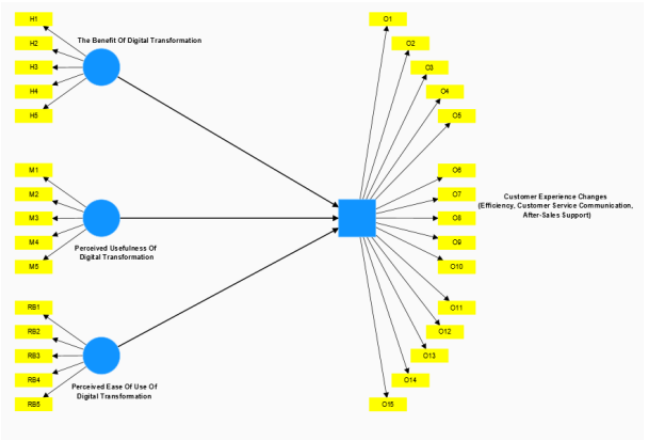

Fig. 2. PLS-SEM Model

F. Outer Loading

The provided data reflects the outer loadings from a structural equation model, revealing the relationship strength between observed items and their respective latent constructs in digital transformation.

TABLE I. OUTER LOADING

	Outer loadings
H1 <- The Benefit of Digital Transformation	0.84
H2 <- The Benefit of Digital Transformation	0.825
H3 <- The Benefit of Digital Transformation	0.858
H4 <- The Benefit of Digital Transformation	0.759
H5 <- The Benefit of Digital Transformation	0.751
M1 <- Perceived Usefulness of Digital Transformation	0.814
M2 <- Perceived Usefulness of Digital Transformation	0.897
M3 <- Perceived Usefulness of Digital Transformation	0.825
M4 <- Perceived Usefulness of Digital Transformation	0.894
M5 <- Perceived Usefulness of Digital Transformation	0.894
O1 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.718
O10 <- Customer Experience Changes (Efficiency, Customer Service Communication, After -Sales Support	0.698
O11 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.852
O12 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.763
O13 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.86
O14 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.863
O15 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.838
O2 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.737
O3 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.797
O4 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.777
O5 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.721
O6 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.825
O7 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.83
O8 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.808
O9 <- Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.683
RB1 <- Perceived Ease of Use of Digital Transformation	0.871
RB2 <- Perceived Ease of Use of Digital Transformation	0.708
RB3 <- Perceived Ease of Use of Digital Transformation	0.932
RB4 <- Perceived Ease of Use of Digital Transformation	0.901
RB5 <- Perceived Ease of Use of Digital Transformation	0.754

The provided data reflects the outer loadings from a structural equation model, revealing the relationship strength between observed items and their respective latent constructs in digital transformation. Specifically, items H1 through H5 measure the construct "The Benefit Of Digital Transformation," with loadings ranging from 0.751 to 0.858. These figures suggest a robust association between the items and the construct, indicating that these items are reliable indicators of the benefits derived from digital transformation initiatives.

Items M1 through M5 pertain to "Perceived Usefulness Of Digital Transformation," displaying high outer loadings between 0.814 and 0.897. Such strong loadings suggest these items are very effective measures of the construct, signifying that these items consistently and strongly capture respondents' perceptions of the usefulness of digital transformation.

The items labeled O1, O10 through O15, and O2 through O9 are linked to "Customer Experience Changes," including efficiency, customer service communication, and after-sales support. The outer loadings for these items show more variation, ranging from 0.683 to 0.863. While most of these loadings indicate a strong relationship with the customer experience changes construct, a few are on the lower end, which could imply a weaker relationship for some items within this domain.

Lastly, items RB1 through RB5 are associated with "Perceived Ease Of Use Of Digital Transformation," where the loadings vary from 0.708 to 0.932. The high loadings of items RB3 and RB4 underscore their representational solid quality for the ease of use construct.

In structural equation modeling, outer loadings above 0.7 generally indicate a solid indicator-construct relationship, suggesting these items are robust measures of their respective constructs. The collected data here, therefore, presents a model where most items are valid indicators, and consequently, the latent constructs are well-represented by the observed variables, affirming the soundness of the model in capturing the nuances of digital transformation.

G. Coefficient Of Determination

The dataset incorporates R-squared and adjusted R-squared metrics for a construct termed "Customer Experience Changes," encompassing aspects like "Efficiency, Customer Service Communication, and After-Sales Support."

TABLE II. R SQUARE

	R-square	R-square adjusted
Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support)	0.756	0.752

R-squared (R^2) is a statistical measure in regression analysis, signifying the variance proportion in the dependent variable (DV) accounted for by independent variables (IVs) in the model. For instance, an R-squared value of 0.756 implies that about 75.6% of the variance in "Customer Experience Changes" is explained by the model's efficiency, customer service communication, and after-sales support variables.

Adjusted R-squared compensates for the number of predictors relative to the observation count, offering a more nuanced model fit assessment by considering model complexity (i.e., predictor count). An adjusted R-squared of 0.752, closely aligning with the R-squared value, indicates the relevance of the independent variables and suggests a lack of extraneous predictors. This high figure denotes a robust model fit, affirming the selected variables as effective predictors for variations in customer experience.

The robustness of the R-squared and adjusted R-squared values highlights the model's efficacy in elucidating the variance in "Customer Experience Changes." This emphasizes efficiency, customer service communication, and after-sales support in influencing customer experience. Moreover, the marginal discrepancy between R-squared and adjusted R-squared values underscores the appropriateness of the predictor count concerning the observation volume, indicating that the model is balanced.

H. F-square

The data presented shows f-square values, which are effect size measures used in structural equation modeling to evaluate the impact of independent variables on dependent variables. Here, the independent variables are different aspects of digital transformation, and the dependent variable is customer experience changes, which include efficiency, customer service communication, and after-sales support.

TABLE III. F SQUARE

	f-square
Perceived Ease Of Use Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.955
Perceived Usefulness Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.001
The Benefit Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.049

Perceived Ease Of Use Of Digital Transformation: The f-square value of 0.955 suggests that the perceived ease of use of digital transformation significantly affects the changes in customer experience. This implies that improvements or variations in how easily digital transformation is perceived can significantly influence customer experience efficiency, service communication, and after-sales support.

Perceived Usefulness Of Digital Transformation: An f-square value of 0.001 indicates a negligible effect of the perceived usefulness of digital transformation on customer experience changes. This suggests that even if digital transformation is perceived as useful, it does not necessarily result in noticeable changes in customer experience regarding efficiency, communication, or support.

The Benefit Of Digital Transformation: With an f-square value of 0.049, the benefit of digital transformation has a small but potentially meaningful effect on customer experience changes. This indicates that recognizing the benefits of digital transformation can positively impact how customers perceive their experiences with efficiency, communication, and aftersales support.

In summary, among the factors examined, perceived ease of use is a critical driver of customer experience changes following digital transformation, while perceived usefulness has little to no effect, and the benefits recognized have a small effect (Guo et al., 2020). This information can be precious for businesses as they strategize on which aspects of digital transformation to prioritize to enhance customer experience.

I. Path Coefficient

The data provided includes path coefficients from a structural equation model, which quantify the strength and direction of the relationship between independent variables (related to digital transformation)

and a dependent variable (customer experience changes, encompassing efficiency, customer service communication, and after-sales support).

TABLE IV. PATH COEFFICIENTS

	Path coefficients
Perceived Ease Of Use Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support)	0.733
Perceived Usefulness Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support)	0.032
The Benefit Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support)	0.163

Perceived Ease of Use of Digital Transformation: A path coefficient of 0.733 is relatively high, suggesting a strong positive relationship between the perceived ease of use of digital transformation and improvements in customer experience. This means that if the ease of use of digital transformation is perceived to be higher, it is strongly associated with significant positive changes in customer experience related to efficiency, customer service communication, and after-sales support.

Perceived Usefulness of Digital Transformation: The path coefficient here is 0.032, which is relatively low, indicating a fragile positive relationship between the perceived usefulness of digital transformation and customer experience changes. While there is a positive connection, it is not strong enough to suggest that perceived usefulness significantly influences customer experience changes.

The Benefit Of Digital Transformation: With a path coefficient of 0.163, there is a modest positive relationship between recognizing the benefits of digital transformation and customer experience changes. This suggests that seeing the benefits of digital transformation has a positive but not strong impact on customer experience regarding efficiency, communication, and support.

In essence, these path coefficients suggest that the perceived ease of use has the most substantial positive impact on customer experience changes among the three digital transformation aspects considered. In contrast, perceived usefulness has a minimal impact, and the benefits of digital transformation have a moderate positive effect. This information could be instrumental for organizations prioritizing aspects of digital transformation that could lead to the most significant improvements in customer experience.

J. *P Values*

The provided data shows p-values linked to the statistical importance of path coefficients in a model. This model examines how different digital transformation elements impact customer experience changes.

TABLE V. SUMMARY OF P VALUES

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Perceived Ease Of Use Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.733	0.727	0.064	11.506	0
Perceived Usefulness Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.032	0.036	0.053	0.604	0.546
The Benefit Of Digital Transformation -> Customer Experience Changes (Efficiency, Customer Service Communication, After-Sales Support	0.163	0.167	0.053	3.052	0.002

For the "Perceived Ease Of Use Of Digital Transformation," the p-value is reported as 0. This extremely low p-value suggests that the path coefficient of 0.733 is statistically important. It implies that a strong positive link between perceived ease of use and changes in customer experience is not likely due to chance. The T statistic 11.506 significantly exceeds the usual significance threshold, typically T values above 2 for a two-tailed test at a 0.05 significance level.

The "Perceived Usefulness Of Digital Transformation" shows a path coefficient of 0.032 with a p-value of 0.546. This p-value exceeds the standard alpha level of 0.05, indicating no statistical proof that perceived usefulness notably impacts customer experience changes. The T statistic of 0.604 is below the necessary threshold for statistical significance.

For "The Benefit Of Digital Transformation," the path coefficient is 0.163 with a p-value of 0.002. This low p-value indicates a significant relationship between the benefits of digital transformation and changes in customer experience. The T statistic 3.052 surpasses the standard threshold, suggesting this relationship is not due to chance.

In summary, p-values help determine whether to accept or reject the hypothesis of no relationship (the null hypothesis). Here, the hypothesis that perceived ease of use and benefits of digital transformation do not influence customer experience changes would be rejected, as the p-values are below 0.05, showing significant relationships. However, the hypothesis would be accepted for perceived usefulness since the p-value does not fall under the 0.05 threshold, indicating that the observed relationship might be due to random data variation.

CONCLUSION

The research aimed to explore the correlations between digital transformation and its impact on customer experience changes in retail businesses, focusing on efficiency, customer service communication, and after-sales support. The findings were then compared with existing literature to determine similarities or differences. The research revealed a strong positive link between the perceived ease of use of digital transformation tools and improvements in customer experience, as indicated by a p-

value of 0. This finding aligns with the Technology Acceptance Model (TAM), which emphasizes the importance of ease of use for technology adoption.

However, in contrast to TAM's assertions, the research did not find a significant impact of perceived usefulness on customer experience changes, indicated by a p-value of 0.546. This suggests a possible deviation from existing theories, or the presence of other influential factors not captured in the model.

The study also highlighted the significant benefits of digital transformation in enhancing customer experience, as evidenced by a path coefficient of 0.163 and a p-value of 0.002. This finding resonates with previous research on MSEs in customer experience and innovation, emphasizing the positive impact of digital transformation in business operations and customer relations. Additionally, the principles of Lean Management, which focus on creating value for customers, further support the current research's emphasis on the benefits of digital transformation.

In the research aligns with several aspects of the existing literature, particularly in recognizing the significant role of digital transformation in improving customer experiences in retail businesses. The emphasis on the perceived ease of use is consistent with existing theories, highlighting its importance in technology adoption and its impact on customer experience. However, the lack of significant impact from perceived usefulness suggests a potential gap in understanding what aspects of digital transformation customers find beneficial. This discrepancy underscores the complexity of customer experiences in the digital age and opens avenues for future research to explore these dynamics more comprehensively.

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