

Study on the Promoting Effect of Digital Transformation on Consumer Behavior

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Abstract:

This paper investigates how digital transformation enhances consumer behavior by improving convenience and delivering personalized recommendations. Two core hypotheses are discussed (for further understanding and analysis) and further analyzed with empirical data. The first hypothesis posits that the digital transformation enhances convenience, thereby promoting consumer spending; The second hypothesis is that the digital consumption mode promotes household consumption by calculating and pushing consumer preferences. Through data analysis, This study concludes the following: digital payment methods significantly enhance the convenience of consumer spending, thereby stimulating it; Data indicates according to consumer's willingness and tendencies. Data indicates that the consumption amount and consumption times of the products have been significantly increased. Future research should explore potential Limitations and further possibilities of digital consumption.

Keywords: digital transformation; consumption promotion; payment method; payment convenience; consumer preference

1. Introduction

In the context of increasingly fierce global economic competition, digital transformation has become a key means for companies to enhance competitiveness and achieve sustainable development. Digital transformation not only involves the updating of technologies and tools, but more importantly, it redefines business models, optimizes operational processes, and enhances customer experience through digital means. With

the rapid development of information technology, especially the widespread adoption of emerging technologies such as artificial intelligence, big data, cloud computing, and the Internet of Things, the process of digital transformation has significantly accelerated, bringing profound economic and social impacts. The "14th Five-Year Plan" released on March 14, 2021, proposed accelerating the development of the digital economy, promoting the digitalization of industries,

implementing the national big data strategy, and enhancing the value of data resources. Simultaneously, the plan promotes the construction of smart cities and digital villages, facilitating the digital transformation of public services and improving digital governance capabilities. This move marks the further elevation of digital transformation's strategic importance in China, impacting all aspects of the economy and society. Moreover, the notification on the "Intelligent Manufacturing Development Plan" released on December 21, 2021, clearly stated that intelligent manufacturing is the main direction for building a strong manufacturing nation, and its development level directly concerns the quality of the country's manufacturing industry. Developing intelligent manufacturing is crucial for consolidating the foundation of the real economy, establishing a modern industrial system, and realizing new industrialization. Achieving intelligent transformation in manufacturing through digital means can significantly improve production efficiency and product quality, driving high-quality economic development.

2. Research Design

2.1 Research Hypotheses

Digital transformation refers to the widespread application of information technology and its profound impact on various fields of the economy and society. In the consumption domain, digital transformation is primarily manifested through the proliferation of e-commerce, the widespread use of mobile payments, and advancements in big data analytics. These technologies not only change traditional consumption methods but also enhance the convenience and efficiency of the consumption process, thereby driving the growth of consumption demand.

Payment Tools and Consumption Promotion

Payment tools are a crucial link in the consumption process. Traditional payment methods, such as cash and bank card payments, have certain limitations in terms of convenience and efficiency. Digital transformation has brought about innovations in payment tools, such as mobile payments and electronic wallets, which not only simplify payment processes but also offer a safer and more efficient payment experience. According to the Technology Acceptance Model (TAM), consumers' acceptance and willingness to use new technology are mainly influenced by perceived ease of use and perceived usefulness. Mobile payments, as a new type of payment tool, have significantly enhanced consumers' payment experience due to their convenience and efficiency, thereby increasing consumers' purchasing intentions and frequency of consumption.

H1: Digital transformation significantly promotes urban

residents' consumption behavior through changes in payment tools.

2.2 Big data analysis and consumption preference measurement

The development of big data technology enables merchants to gain insights into consumers' consumption preferences and needs by collecting and analyzing consumers' behavioral data. Intelligent recommendation system, as a typical application of big data technology, provides personalized product recommendations by analyzing consumers' historical purchase records, browsing habits and other data, thus increasing consumers' satisfaction and purchase intention. Consumer behavior theory suggests that a personalized shopping experience can enhance consumer engagement and loyalty, thus promoting consumption. Big data analytics not only helps merchants optimize marketing strategies and increase sales, but also improves consumer shopping efficiency and satisfaction through accurate recommendations, which in turn promotes consumption growth.

H2: Digital change significantly promotes the consumption behavior of urban residents by measuring consumption preferences through big data.

In summary, through the theoretical analysis and hypotheses of payment tools and big data technology, this study will further empirically test the promotion effect of digital change on the consumption behavior of urban residents, and provide a theoretical basis and empirical support for relevant policy making and corporate marketing strategies.

3. Literature review

With the rapid development of information technology, digital transformation has gradually permeated various fields of social life, especially in the field of consumption, where the application of digital tools is becoming increasingly widespread. This section reviews the literature on payment tools, big data estimation, and consumer behavior to lay a solid theoretical foundation for subsequent research.

The development trajectory of payment tools can be traced back to the evolution from traditional cash transactions to electronic payments and then to mobile payments. In recent years, mobile payments have rapidly gained popularity due to their convenience, safety, and efficiency, becoming one of the primary payment methods for urban residents. Literature indicates that the widespread application of mobile payments has not only improved transaction efficiency but also significantly increased residents' willingness and capacity to consume (Dahlberg, T., Guo, J.,

& Ondrus, J., 2015). Mobile payments promote changes in consumer behavior by reducing transaction costs, increasing payment convenience, and enhancing user experience. Studies have shown that mobile payments make shopping more convenient and efficient for consumers, thereby enhancing their willingness to consume. For example, research by Hasan, I., & De Renzis, T. (2017) found that mobile payments significantly increase consumers' shopping frequency and per-transaction spending. Furthermore, Zhou, T. (2013) demonstrated that mobile payment technology improves consumers' payment efficiency, thereby encouraging them to engage more frequently in consumption activities. The widespread application of mobile payments in various consumption scenarios further drives residents' consumer behavior. In sectors such as retail, dining, and entertainment, the application of mobile payments not only enhances the shopping experience but also increases merchants' sales. According to Garrett, R. K., & Danziger, J. N. (2008), mobile payments, while improving consumer shopping experiences, also significantly promote the occurrence of consumption behavior.

The application of big data technology enables merchants to more accurately understand and predict consumer needs and preferences. By analyzing consumer behavior data, merchants can develop marketing strategies that better align with consumer needs, thereby enhancing conversion rates. Literature suggests that big data technology, through personalized recommendations and precision marketing, effectively promotes changes in consumer behavior (Chen, H., Chiang, R. H. L., & Storey, V. C., 2012). Currently, there is still considerable room for research on the impact of online shopping on residents' consumption. The mechanism by which online shopping affects residents' consumption can be divided into direct and indirect effects. Zhang, H. W., & Xiang, Y. B. (2016) believe that online shopping breaks time and space limitations, reduces transaction costs, and creates price advantages, thereby replacing traditional shopping methods and driving consumption growth. Zhang, Y. L., et al. (2022) proposed that online shopping changes residents' consumption expectations, consumption concepts, and consumption behaviors. Consumers can obtain product information through multiple channels, increasing search times and reducing transaction costs, which in turn affects product prices. Wang, Q., et al. (2022) pointed out that the development of online shopping indirectly affects residents' consumption by increasing household income, promoting the development of the tertiary industry and small and micro enterprises, increasing young people's entrepreneurial opportunities, and lowering the threshold for entrepreneurship.

4. Discussion and analysis

4.1 Convenience of Digital Payment and Consumption Promotion

With the rapid development of digital technology, digital payment has become an essential part of modern residents' consumption behavior. From traditional credit card payments to today's mobile payments, the continuous evolution of payment methods has significantly changed consumers' consumption habits. Particularly in the past decade, mobile payment methods represented by Alipay, WeChat Pay, and Apple Pay have rapidly gained popularity, making the payment process faster and safer. The rise of digital payment has not only facilitated consumers but also enabled merchants to absorb more diversified funds more efficiently. Through digital payments, merchants can better manage sales data, inventory, and customer information, thereby improving operational efficiency and service quality. These changes have significantly promoted the growth of total consumption. Analyzing the data related to the first hypothesis, we can observe that digital payments have a significant impact on consumer behavior. Specifically, digital payments influence consumer behavior in the following aspects:

Convenience: Digital payments, such as mobile payments and online payments, reduce transaction time and complexity. Consumers can quickly complete payments without carrying cash or going to the bank, thus enhancing the overall shopping experience. Digital payment technology allows consumers to complete transactions anytime, anywhere, breaking the time and space limitations of traditional payments. This convenience encourages impulsive and instant purchases.

Management: Many digital payment platforms provide consumption records and analysis tools, helping consumers better understand and manage their spending. This transparency can increase consumers' confidence in their financial situation, thereby promoting consumption.

Incentives: Digital payment platforms often offer various discounts, vouchers, and reward points, attracting consumers to use these payment methods more frequently, thereby increasing consumption frequency and amount.

Security: Modern digital payment systems employ advanced security technologies such as encryption, fingerprint unlocking, and facial recognition, ensuring transaction security. Consumers need not worry about losing cash or having their bank cards stolen, reducing their concerns about payment risks and promoting consumption.

Transparency: Digital payment records every transaction, allowing consumers to check their spending records at any time, facilitating personal financial management. This

transparency helps consumers plan their spending and income more reasonably.

The results of the data validation of hypothesis one

showed significant differences between groups, indicating that the convenience of digital payment has a significant impact on residents' consumption, as follows.

Table 1 Results of one-way variance data of payment method

Difference source	SS	df	MS	F	P-value	F crit
interclass	4.3915E+13	3	1.4638E+13	3066.66759	0	2.60496144
intra-class	8.1266E+14	170248	4773390305			
total	8.5658E+14	170251				

As can be seen from the above data, both F-value and P-value of the differences between groups indicate that digital payment significantly improves residents' consumption intention and actual consumption. This result is consistent with previous literature studies and further validates the important role of digital payments in promoting consumption. In order to better understand the real-world representation of the consumption promotion effect of digital payments, several typical cases can be analyzed. Take China as an example, the reason why China's Alipay can become the Alipay that is widely used in the world is that its convenience is widely recognized by residents. In daily life, Alipay provides a simple and fast way of payment. Consumers can use smart phones, smart watches and other electronic devices for consumption. Compared with cash, mobile payment and electronic banking are much safer. Consumers not only do not have to worry about the loss of funds, but also can clearly check the amount and destination of each expenditure. It has improved the consumption mode of residents and promoted the consumption ability of residents. Through cooperation with government agencies, mobile payments are also tied to residents' transportation and medical care. In China, Alipay can bind medical insurance cards and transportation cards, effectively improving the quality of life and convenience of residents. At the same time, various enterprises continue to innovate and break through payment technology, improve payment experience, and meet the diversified payment needs of consumers.

4.2 Recommendation system and consumption behavior

The concept of intelligent recommendation systems can be traced back to the 1990s. With the popularization of the Internet and the development of big data technology, the recommendation system has gradually become the core component of the e-commerce platform. The intelligent recommendation system provides personalized product recommendations by analyzing users' historical attention

behaviors, consumption records, social networks and other data to improve user experience and consumption intention. The development of intelligent recommendation system can be divided into several key stages: the initial rule-based recommendation system, then evolved into collaborative filtering recommendation system, and then to content-based recommendation system and hybrid recommendation system. With the progress of deep learning and artificial intelligence technology, the accuracy and intelligence of the recommendation system continue to improve, providing consumers with more accurate and personalized recommendation services. The working principle of intelligent recommendation system mainly includes the following aspects:

Personalized recommendation: Intelligent recommendation systems utilize big data and machine learning technologies to provide personalized product or service recommendations based on the user's historical behavior, interests and preferences, increasing the chances that consumers will discover products that meet their needs and interests. Thus, it improves the relevance and satisfaction of shopping and further promotes consumer behavior.

Improve user engagement: The recommendation system extends the user's stay on the platform and increases the frequency of interaction by displaying content that users may be interested in. Higher user engagement means more browsing and clicking, which increases the likelihood of consumption.

Emotional consumption: Through accurate recommendation, the intelligent recommendation system can push highly relevant products when users browse, and induce users to produce impulsive purchase behavior. This immediate buying emotion, especially in the case of discounts or limited-time offers, is more likely to lead to a purchase.

Enhance user experience: The intelligent recommendation system simplifies the shopping process and optimizes the shopping experience by saving users time and effort in sifting through a large number of products. Better user experience makes users more willing to reuse the plat-

form, increase the potential consumption probability, and achieve long-term stability of consumption.

Customer loyalty and stickiness: Personalized recommendations increase user loyalty and make users automatically turn into “tap water” to promote the platform and products. Highly engaged users tend to have a stronger

willingness to spend and a higher amount of money.

The data verification results of hypothesis 2 show that there is a significant difference between groups, indicating that the measurement of consumption preferences has a significant role in promoting the consumption behavior of urban residents. Specific data are as follows:

Table 2 measures the effect of consumption preference on urban residents’ consumption behavior data

Difference source	SS	df	MS	F	P-value	F crit
interclass	1.461E+18	21	6.9571E+16	65535	#NUM!	#NUM!
intra-class	0	0	65535			
total	1.461E+18	21				

It can be seen from the above data that the intelligent recommendation system significantly improves the consumption frequency and consumption amount of consumers. This result is consistent with previous literature studies and further validates the important role of intelligent recommendation systems in promoting consumption. For example, Tiktok is a global large-scale short video platform. Based on users’ daily likes and comments, and even the number and frequency of viewing, it calculates the video style, category and specific content that users like, and then recommends relevant products to users. When you watch a type of video, open the search page, you can see that the recommended search of several hot words are basically based on the topic triggered by the video content just viewed, these operational methods attract more users, so that they rely more on short videos in life. With the rapid development of Tiktok, now Tiktok also has its own Tiktok mall function, which will push the same category of products according to the types of goods users usually buy, and will also calculate the products users may be interested in and need based on the video content they usually watch. These marketing methods are calculated with large data to increase user stickiness, so as to promote consumer consumption.

5. Conclusion

This study systematically explored the promoting effect of digital transformation on urban residents’ consumption behavior, primarily focusing on the changes in payment tools and big data estimation of consumer preferences. Through theoretical analysis and empirical data verification, the study draws the following main conclusions: First, the widespread adoption of digital payments has changed residents’ consumption habits. Convenient consumption methods allow residents to consume anytime and anywhere, significantly increasing their willingness

to consume and the total amount spent. The specific data analysis demonstrated the changes and promotion brought about by digital payments, confirming the validity of the first hypothesis. With the evolution of digital payment tools, along with various promotional activities and processes, a scenario has formed where “old customers stay, and new customers keep coming in.” Moreover, systems utilize big data technology to estimate and infer consumers’ preferences, consumption capacity, and types of needs. Each user account receives unique push notifications, even though certain groups may have consistent consumption habits, there may still be subtle differences in specific needs. Such intelligent payment systems effectively improve the actual consumption level of residents, confirming the correctness of the second hypothesis.

In summary, the development and impact of digital transformation in the two areas of payment tools and intelligent recommendations are rapidly growing. It also better meets the needs of merchants, who can more accurately find target groups and promote and attract users more conveniently. Digital transformation comprehensively drives economic development, benefiting both merchants and consumers in the process. However, there are also drawbacks; no event or policy is absolutely perfect. The impact of digital transformation, especially in terms of the leakage of user personal information through payment tools, poses a significant risk to residents’ information security. Such potential risks should not be underestimated. In the future, how to solve this important issue in the rapid development of digital technology will be a common test for both consumers and merchants. As technology continues to advance, the application scenarios of payment tools and big data technology will become more diverse and extensive. Future research can further explore the specific mechanisms by which emerging technologies affect consumer behavior, providing more scientific evidence

and empirical support for policy-making and corporate marketing strategies. Overall, the importance of digital transformation in the context of the times and the field of consumer behavior is beyond doubt. With the advent and advancement of payment tools and big data systems, residents' consumption has been further improved, and consumption methods, experiences, and feedback are better guaranteed, promoting high-quality economic development. In this process, governments and enterprises should closely collaborate to jointly promote the deepening development of digital transformation to achieve coordinated economic and social progress.

6. References

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