

Analysis of Digital Transformation Problems of Alibaba E-commerce Platform and Countermeasures to Enhance Personalised Services

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Abstract. This study takes the e-commerce platform as the object of research and explores how to enhance its market competitiveness by optimising personalised services. First, the research background analyses the background of the global digital economy. Personalised service has become the key to enhancing user experience and market competitiveness. However, Alibaba still has room for improvement in its personalised service system. Through case studies, this paper explores data integration and sharing problems, the adaptability of personalised recommendation systems, and the data privacy and security compliance pressures that Alibaba faces in the process of digital transformation. In response to these issues, the paper proposes the introduction of real-time data analytics capabilities, and the enhancement of data protection technology research and development in order to improve the efficiency and accuracy of personalised services. The study shows that addressing these issues will help Alibaba consolidate its global market leadership and enhance user experience. This study both looks ahead to the strategic development of Alibaba and provides an important reference for the progress of other e-commerce platforms. In addition, this study highlights the importance of digital transformation in modern business.

1 Introduction

1.1 Background study

With the rapid development of the global digital economy, e-commerce platforms are playing an important role in the business ecosystem. As the largest e-commerce platform, Alibaba has a strong market presence in China and the world. However, Alibaba is facing new challenges as the market environment changes and consumer demands continue to escalate.

Li et al. showed that, from China's border Ecommerce Market Data Report 2023 & Korea's E-commerce Market reached RMB 8.2 trillion in the first half

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of 2023, up 15.49 percent year-year [1]. Among them, personalized services have become a key factor in improving user experience and enhancing market competitiveness. However, GHVSLWH \$OLEDED from which, there are still many areas for improvement in its personalized service system. This paper will focus on the digital transformation of \$OLEDED E-commerce platform and explore how to enhance its market competitiveness by optimizing personalised services. This research topic is not only of great significance to \$OLEDED V VWUDWHJLF GHYHORSPHQW EXW DOVR KDV helps to provide a reference for other e-commerce platforms and, at the same time, promotes service innovation in the whole industry.

1.2 Literature review

Sufficient literature has been accumulated on the research of personalized services on e-commerce platforms.

Sundararaj & Rejeesh explored a personalised recommendation system based on big data technology, pointing out that accurate user behaviour analysis can significantly improve consumer satisfaction and conversion rates [2].

The research of Gupta et al., on the other hand, focuses on the application of artificial intelligence in e-commerce. It is proposed that intelligent customer service and voice assistants can enhance the user interaction experience through natural language processing technology [3].

Cao et al. studied the balance between user privacy and personalized services. They emphasized the importance of data management and the impact of privacy protection policies on user trust. Their studies show that personalized services play an important role in enhancing the user experience and competitiveness of e-commerce platforms. They also reveal challenges in technology implementation and privacy management, providing theoretical and practical support for the research in this paper

ORQWHLUR study by Le Qiyi et al. on the application of user data in personalized marketing in e-commerce platforms. She finds that deep learning-based user profiling WHFKQRORJ\ FDQ DFFXUDWHO\ SUHGLFW XVHUV\ SXUF precise personalized marketing. Through deep mining of user behaviours and preferences, platforms can develop personalized marketing strategies to increase user conversion and OR\ DOW\ 7KLV UHVHDFK VKRZV WKDW WKH WHFKQRO service enhancement can better understand and serve users [5].

Zhang et al.'s study focuses on the personalized integration of omnichannel user experiences. They proposed that by integrating online and offline user data into a unified platform, e-commerce companies can achieve cross-channel personalized services. This integration not only enhances the seamless cross-channel user experience but also improves users' reliance on and satisfaction with the platform. Their research highlights the importance of data integration and omnichannel strategy, providing a valuable reference on how Alibaba can better integrate multiple user touchpoints during its digital transformation

1.3 Research gaps

Although existing research delves into the application of personalised services in e-commerce and their technical implementation. Most studies focus on specific technological tools such as recommendation algorithms and artificial intelligence. However, few scholars have explored the role of personalisation services in the overall strategy of the platform and how to improve the effectiveness of personalisation services through digital transformation comprehensively. The innovation of this study is to examine personalisation services in the FRQWH[W RI \$OLEDED E-commerce platform comprehensively

improves personalised services through strategic adjustments and technological optimisation to enhance market competitiveness.

1.4 Research Structure

The structure of this paper will be as follows. The paper will begin by analyzing the current status of Alibaba's personalized services and the challenges it faces in digital transformation. Following this, relevant literature and empirical data will be combined to explore potential optimization strategies in depth. The feasibility and effectiveness of these strategies will then be verified through case studies and data analysis. Finally, specific recommendations for enhancing personalized services on Alibaba's e-commerce platform will be provided, aiming to offer valuable insights for its future digital transformation.

2 Case description

As Wang said, Alibaba has always been committed to promoting digital transformation in response to rapidly changing market demands and technological advances. In the course of its development, Alibaba has successfully built a digital ecosystem covering a wide range of fields such as e-commerce, finance, logistics, cloud computing, etc [7]. Especially in the field of e-commerce, Alibaba has become a leader in e-commerce in China and even globally, thanks to the huge user base of Taobao, Tmall, and other platforms.

Firstly, technology has greatly improved the operational efficiency and user experience of its e-commerce platform through large-scale investments in cutting-edge technologies such as cloud computing, artificial intelligence, and big data [8]. Alibaba has not only built a huge e-commerce ecosystem within the group but also provides services to the global market, making it a leading cloud service provider. Through big data analysis, Alibaba is able to gain real-time insights into market trends and user needs, which allows it to optimise its product recommendations, inventory management, and other aspects to improve overall operational efficiency.

Secondly, in terms of personalised services, Alibaba continues to innovate and improve user experience. Through in-depth analysis of user behaviour data, Alibaba has built a highly personalized recommendation system that can customize a unique shopping experience for each user. In addition, Alibaba has applied artificial intelligence technology in the field of intelligent customer service and introduced a smarter and more efficient customer service system, which not only improves customer satisfaction but also significantly reduces labour costs.

Thirdly, in the field of logistics and supply chain management, Alibaba has promoted the digitisation and intelligence of the logistics system through the Cainiao Network. Falcone et al. found that by using IoT and AI technologies, the Cainiao Network optimises logistics paths and inventory management, improving logistics efficiency and shortening delivery time. This has significantly enhanced Alibaba's competitiveness in the e-commerce market [9].

However, despite its significant progress in digital transformation, Alibaba also faces many challenges. As market competition intensifies and consumer demands change rapidly, Alibaba must continue to innovate to maintain its leading position in the market. In addition, data privacy and security issues have become important topics that cannot be ignored in digital transformation, and Alibaba needs to strengthen its investment and management in this area.

2YHUDOO \$OLEDED¶V GLJLWDO WUDQVIRUPDWLRQ KD through technological innovation and service optimization, Alibaba has achieved significant results in improving user experience and operational efficiency. However, to face increasingly complex market environments and technological challenges, Alibaba still needs to continue to adapt and evolve to meet future competition and risks.

3 Problem Analysis

In the process of digital transformation, Alibaba has made remarkable achievements but still faces some core challenges, which not only affect its ability to enhance the user experience further but also have constrained its market competitiveness. The following is a detailed analysis of these problems and their causes.

3.1 Problem identified

3.1.1 Problems of data integration and sharing

\$V :DQJ VDLG \$OLEDED¶V GLJLWDO HFRV\WRUHPe,FRYHU finance, logistics and more [7]. Although it has accumulated a large amount of data in various fields, data integration and sharing still face challenges due to the strong independence between business lines. Data isolation between different platforms is a major obstacle in \$OLEDED¶V HIIRUWV WR SURYLGH XVHUV ZLWK FRPSUHK QRW RQO\ DIIHFWV WKH FRQVLVWHQF\ RI WKH XVHU H[SH big data for precision marketing and operational optimization.

3.1.2 Adaptability of personalized recommendation system

Although Alibaba has made remarkable progress in the development and application of personalized recommendation systems. However, with the increasing diversification and complexity of user needs, the existing recommendation system still faces certain limitations ZKHQ PHHWLQJ WKHVLQ LQGLYLGXDO QHHGV \$W SUHVHQ UHOLHV RQ XVHUV¶ KLVRULFD GDWD DQG EHKDYLRU reIOHFW XVHUV¶ SUHIHUHQFHV WR D FHUWDLQ H[WHQW WR FDSWXUH DQG UHVLQRQHV VXVJRUW¶ [DPSOH XVHU¶ over time or due to changes in external factors, and the system cannot adjust recommendations quickly enough to meet these changes. In addition, with the increasing amount of user data on the platform, the recommendation system faces the dual challenges of computational complexity and response speed when processing huge data sets. This makes it more difficult for the system to maintain efficient, personalized services in large user groups, affecting the accuracy of recommendations and the satisfaction of the user experience.

3.1.3 Pressure on data privacy and security compliance

As the global focus on data privacy and security issues increases, Alibaba faces increasing compliance pressure when handling user data. Lopez Smith said that, especially in the context of the rapid expansion of its cross-border e-commerce business, Alibaba must comply with increasingly stringent privacy protection regulations in different countries and regions, VXFK DV WKH (XURSHDQ 8QLRQ¶V *HQUDO 'DWD 3URWHF Consumer Privacy Act (CCPA) in the United States [10]. These regulations require

companies to adopt more stringent measures regarding data collection, storage, use, and data management, not only increasing compliance costs but also making its global operations more complex.

At the same time, consumers are attaching greater importance to the privacy of their personal data. Customers expect platforms to provide personalized services while ensuring the security and privacy of their personal data. This has forced Alibaba to strike a more reasonable balance between providing efficient, personalized services and strictly protecting user experience in order to win the trust of users and comply with legal requirements. These factors constitute the major challenges that Alibaba must face and solve in the process of advancing digital transformation.

3.2 Underlying Factors in Problem Analysis

3.2.1 Internal and external factors of data integration and sharing problems

internal business structure and the diversity of its technical architecture development mode has led to big differences in technical standards, data formats, and management methods among various business units, resulting in seamless integration of data between different platforms. For example, the data format and structure of e-commerce platforms may be very different from that of the logistics or financial sectors, making it difficult to interact and share effectively.

In addition, for business protection and security reasons. Business units tend to be conservative when it comes to data sharing, fearing that it could pose security risks or competitive pressures. This lack of willingness to share further exacerbates the problem of data isolation, making it difficult for Alibaba to build a unified view of user data, affecting the efficiency of cross-departmental collaboration and data-driven decision-making.

At the same time, the diversity of external compliance requirements also poses a barrier to data integration and sharing. Regulatory requirements for data privacy and security vary from country to country, and Alibaba must comply with these regulations as it operates globally, limiting its ability to integrate and share data freely across regions. This legal and compliance complexity not only increases the difficulty of data management but also limits the possibility of Alibaba further improving the efficiency of data utilization in the global market.

3.2.2 Technical and application challenges faced by personalized recommendation system

Personalized recommendation systems face the dual challenges of technology and application when dealing with changes in user needs. First of all, the current recommendation purchase history. However, and complex situations. The needs of users are often dynamic and changeable, relying on past data to make predictions. It may not accurately reflect the current interests and needs of users, resulting in a decline in the relevance of recommendation results and an impact on user experience.

amount of data and computational complexity that the recommendation system needs to

process have also increased significantly. This puts forward higher requirements for the V \ V W H P t t e r e s p o n s e speed and recommendation accuracy. Recommendation systems must analyze massive amounts of data in a very short p e r i o d s to generate highly personalized recommendations, which poses a huge challenge to the capabilities of existing technologies in big data processing and t r a c k computing. Although Alibaba has invested significant resources in these areas, the t e c h n o l o g y still needs to be further optimized to meet the growing needs of users and improve the accuracy and efficiency of recommendations.

3.2.3 Data privacy and security compliance challenges

Data privacy and security issues are caused by both the string e n t r e n c e s of external U H J X O D W L R Q V D Q G W K H F R P S O H [L W \ R I L Q W H U Q D O G D W globally, it needs to face data privacy regulations in different countries and regions, and these regulations often differ greatly, increasing t h e difficulty of compliance management. At the V D P H W L P H X V H U V \ H [S H F W D W L R Q V I R U G D W D S U L Y D F \ personalized services while ensuring that the security and privacy of user data are adequately protected. In addition, t h e upgrade of network security threats has also put forward higher U H T X L U H P H Q W V I R U \$ O L E D E D \ V W H F K Q R O R J \ D Q G P D Q D .

4 Suggestions

4.1 Suggestions for resolving data integration and sharing issues

' X H W R W K H V W U R Q J L Q G H S H U G E S Q I E s, data integration and s h a r i n g face challenges. To solve this problem, Alibaba can take the following measures:

Build a unified data middleware: Alibaba should build a unified data middleware to break the data isolation between busi n e s s e s. The data middleware can be used as a shared data resource base to integrate and standardise data from different business lines so as to achieve centralised data management and sharing. This not only helps to improve the consistency of user experie n c e but also enables better use of big data for precision marketing and operation optimisation.

Introducing data governance mechanisms: In order to ensure the effectiveness of data integration, Alibaba needs to introduce comprehensive data governance m e a s u r e s. This includes measures for data standardisation, data quality management, and data security management. Establishing clear data standards and specifications ensures that data from different lines of business can be seamlessly connected during i n t e g r a t i o n s improving the efficiency and accuracy of data sharing.

Promote crossplatform data sharing agreements: Alibaba can work with its different internal platforms and external partners to develop data sharing agreements. These agreements should s p e c i f y the scope and mode of data sharing as well as security measures. Under the premise of safeguarding data privacy and security, the efficient circulation of data should be promoted.

4.2 Personalised Recommendation System (PRS) adaptation problem Suggestions

Personalised recommendation system is an important tool for Alibaba to improve user experience, but the existing system still has some limitations in responding to diversified user needs and r e a l t i m e changes. To this point, Alibaba can make p r o v e m e n t s in the following aspects:

Introduce realtime data analysis capability: Alibaba should strengthen its UHFRPPHQGDWLRQ V\ VWHP\ V D E t i n e u s e r d a t a . T h i s c a n b e d o n e b y i n t r o d u c i n g a d v a n c e d s t r e a m i n g d a t a p r o c e s s i n g t e c h n o l o g y . R e a l t i m e a n a l y s i s o f t h e X V H U \ V F X U U H Q W E H K D Y L R X U H Q Y L U R Q P H Q W D Q G L Q V r e c o m m e n d a t i o n r e s u l t s c a n b e t t e r m e e t t h e i m m e d i a t e n e e d s o f u s e r s .

Application of multimodal data fusion technology: In order to improve the accuracy of the recommendation system, Alibaba can adopt multimodal data fusion technology to FRPSUHKHQVLYHO\ DQDO\ VH PXOWLSOH GDWD-t i m e X U F H V data, behavioural data, and environmental data. This enables the recommendation system to understand user needs more comprehensively and provide more personalised recommendation services.

Optimisation of recommendation algorithms: with the increase in the amount of user data, the computational complexity and response speed of the recommendation system are also facing challenges. Alibaba can optimise the recommendation algorithm, for example, by introducing deep learning-based algorithms or quantum computing technology to improve the computational efficiency and response speed of the recommendation system. Thus, it can still provide efficient and accurate personalised services in large user groups.

4.3 Suggestions for addressing data privacy and security compliance pressures

As global concerns about data privacy and security increase, Alibaba faces growing compliance pressures in handling user data. To address this challenge, Alibaba can take the following measures:

Strengthen the R & D and application of data protection technologies: Alibaba should increase its efforts in the R & D and application of data protection technologies such as data encryption, anonymisation processing, and privacy calculation. This can not only improve the security of the data processing process but also ensure the protection of privacy while PHHWLQJ WKH QHHGV RI XVHUV\ SHUVRQDOLVHG VHUYL F

Establishment of a globalised compliance management system: Alibaba needs to establish a globalised compliance management system to deal with privacy protection regulations in different countries and regions. The system should include compliance review, risk DVVHVVP HQW FRPSOLDQFH WUDLQLQJ HWF WR HQV behaviours in its global operations comply with local legal requirements.

Enhance User Privacy Protection Awareness and Transparency: Alibaba should VWUHQJWKHQ WKH SXEOLFLW\ DQG HGXF DWLRQ RQ XV awareness of privacy protection. At the same time, the platform should maintain a high degree of transparency in the process of data collection and use and clearly inform users of WKH XVH RI GDWD DQG SURWHFWLRQ PHDVXUHV VR DV V

5 Conclusion

5.1 Summary of key findings

7KLV SDSHU DQDO\ HV WKH F u n d a m e n t a l p l a t f o r m i n d e f i c i e n c y \ \$ O L E of digital transformation and proposes corresponding solutions. It shows that data integration and sharing issues are the main obstacles for Alibaba in providing seamless, personalised services across platforms. By building a unified data middle and introducing a data governance mechanism, the efficiency and accuracy of data sharing can be effectively enhanced, thus improving user experience and increasing market competitiveness.

In addition, personalised recommendation systems are deficient in responding to the diversity of user needs and their changes. By introducing real-time data analysis, multimodal data fusion technology, and optimised recommendation algorithms, it can better respond to user needs and their changes. As global concerns about data privacy increase, it is essential to continue to provide personalised services while protecting user privacy. Strengthening the R&D and application of data protection technologies, establishing a global compliance management system, and increasing user privacy awareness and transparency are key to meeting this challenge.

5.2 Research significance

The research in this paper has significant business value and not only provides effective development of the entire e-commerce service system, but also provides a reference for the development of other e-commerce platforms. Personalised service enhancement will help to strengthen its market competitiveness and user experience, thus consolidating its leadership position in the global market.

In addition, the findings of this study can provide references for other e-commerce platforms, especially the practical experience in data integration, recommendation system optimisation, and data privacy protection. These recommendations will not only help improve platform operational efficiency but also drive service innovation and technical advancement in the industry as a whole.

More broadly, this paper echoes the importance of digital transformation in modern business. Through a case study of Alibaba, it demonstrates how digital transformation affects e-commerce platforms to maintain a competitive edge in a rapidly changing market environment.

5.3 Limitations and future studies

Despite the valuable findings in this paper, there are still limitations in the research methodology. Firstly, the study mainly relies on secondary data and literature and lacks the support of primary data, which limits the depth and breadth of the study to some extent. Future research can obtain more primary data through questionnaires and interviews to more fully explore the challenges and solutions of digital transformation.

The study focuses on Alibaba's e-commerce platform and does not cover other business lines or enterprises of different sizes. Future research can be extended to other areas to explore the challenges and solutions of different types of enterprises in digital transformation.

With the rapid development of technology, research in the area of personalised services and data privacy protection needs to be constantly updated. Future research can further explore the application of emerging technologies (e.g., blockchain, quantum computing, etc.) in these areas to provide more forward-looking solutions. Through continuous research and exploration, scholars can better meet the challenges of the digital era and promote the continuous innovation and development of the e-commerce industry.

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