Frontiers in Business, Economics and Management
ISSN: 2766-824X | Vol. 22, No. 3, 2026

Mechanism Analysis Based on an Extended TAM: How Advanced Technology Drives the Strategic Upgrade of Enterprise Products

-- A Case Study of China Telecom's OA System

Shan Guan

School of Business, Macau University of Science and Technology, Macao SAR, China
3220006194@student.must.edu.mo

Abstract: Traditional telecom operators have a lot of problems in their daily operations and need new technologies to support organizational transformation. This paper presents a qualitative case study approach to analyze the office automation system applied at China Telecom. With a new extended Technology Acceptance Model, this research finds out three main ways in which influencing factors can affect the user's perceptions on effectiveness and efficiency through adopting the technologies, thus increasing the intention to adopt, as well as facilitating organizational change initiatives. Our results add to knowledge on digital innovation in organizations, providing also practical implications for communication service providers.

Keywords: Telecom operator, OA, TAM.

1. Introduction

The telecommunication sector is experiencing dramatic changes that force operators to update their technology stack and re-orientate their business model. In China, this shift in strategy has been an objective for operators over the last decade aiming at innovation and improvement of services, network architecture, and business models [1]. The development of information and communication technology (ICT) has led them to seek out new avenues for expansion outside traditional communications services. The promise of artificial intelligence (AI) is that it could provide major gains for operations, making them faster, increasing production, and tying it into main line business activities. This will help organizations to build stronger strategies and tactics by enhancing core business functions such as human resource management (HRM) through AI [2, 3]. An example for this trend would be introducing office automation (OA) systems. These efforts enable China Telecom to shift from providing network access to offering full-scale business solutions.

The rapidly expanding power of ICT including AI, wireless, and the Internet is changing how operators compete, how they make money or at least what their traditional sources of income are. It will require them to find new ways to monetize services outside of traditional products. The above literature mainly focuses on technology research, but it cannot fully explain how technology change affects firm's strategic change. Some scholars try to fill the gap in exploring relationship between technology change and firms' strategic change, such as how digitization efforts may simplify processes or change organizational structures [4]. Other research confirms that it is necessary to have technology, structures and people all aligned [5]. However, these studies are still lacking an overarching theory which can map out how technology attributes translate into strategic change. An interesting case study was an empirical investigation of the use of business ecosystem theory in analyzing China Mobile's position and strategy over the course of its 3G era, emphasizing the importance of ecosystem development. Shared platforms and value-sharing mechanisms which allow service and content providers to share the creation were already studied before [6]. However, these studies did not integrate the mental constructs which link technology components and decisions. As a result, our work provides an alternative approach to understanding the effect of technology on strategic change in organizations, on an extended Technology Acceptance Model (TAM). This model implies that both perceived usefulness (PU) and perceived ease of use (PEOU) are important determinants for user behavior.

This gap is addressed through a case study of China Telecom's OA system in this paper. The conceptual model combines the original TAM [7–11] and technology development (TD) concept (Figure 1). Porter originally described TD as part of the overall value chain process [12]. Later, Christensen refined such a view with the notion of "sustaining technologies" versus "disruptive technologies" [13]. In that framework, this study concludes that the most important extraneous variables used in this OA system are mobility, and AI which represent different types of technology. TD is found to have a direct effect on both the constructs of PU and PEOU, as well as an indirect effect on PU via PEOU in the proposed model, finally determining the behavioral intention to use (BI). With this addition, we enrich the classical individual acceptance model with organizational aspects of decision-making, providing a theoretical foundation for identifying and describing three different ways in which technology can contribute to firms' strategic change.

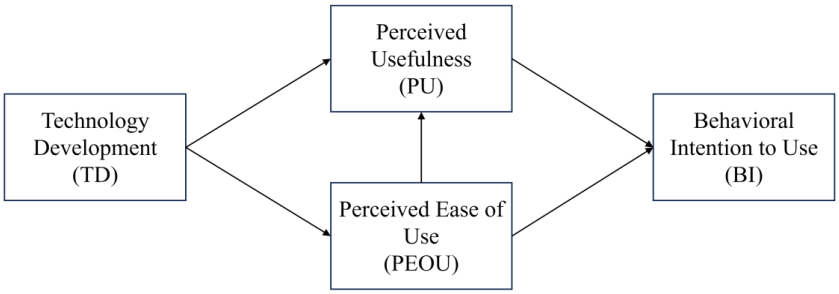


Figure 1. An extended TAM for this research

Figure 1 depicts the conceptual model for the extended TAM and the definitions of each variable can be seen on Table 1.

Table 1. Definition of the Constructs

Variable	Definition	Source
Technology Development (TD)	Technology development consists of a range of activities that can be broadly grouped into efforts to improve the product and the process.	Porter (1985)
Perceived Usefulness (PU)	The degree to which a person believes that using a particular system would enhance his or her job performance.	Davis (1989), Davis, Bagozzi & Warshaw (1989)
Perceived Ease of Use (PEOU)	The degree to which a person believes that using a particular system would be free of effort.	
Behavioral Intention to Use (BI)	A measure of the strength of one's intention to perform a specified behavior.	

Source: Summarized by the author.

The research question that this study intends to address is as follows: How does the extended TAM explain the organizational change strategies due to innovative technology? In order to investigate such situation, we take China Telecom's OA system as an instance of exploring the three hypothesized relations.

The organization of the paper is as follows: In section 2 after the introduction we give the context, summarizing the evolution path of China Telecom's business strategy, as well as explaining how it implemented an OA system; and section 3 applying our extended TAM model for investigating the role of mobile technology and AI in enabling organizational transformation through three potential pathways with a discussion of the results. Last but not least, we summarize our contributions and show their relevance to previous work while also discussing limitations, and suggests possible directions of further researches.

2. Case Background: China Telecom and Its OA System

From 1994 through 2001, there were major structural changes taking place in China's economy and industry. Before 1994, telephone service was directly controlled by the government, but there was an appropriate period (1994 to 1998), after which it was possible to distinguish clearly between regulatory authority on one hand, and market activity on the other. By 1999 to 2001, several competitors had emerged in the telecommunications service sector.

The period between 2002 and 2003 was one of transition, with the dominance of fixed line services and initial steps towards deregulation. Since it became incorporated and publicly traded, China Telecom concentrated on competing more effectively with existing providers of fixed lines, but also began to move into broadband service. During this time, the agency instituted free-market reforms as it transitioned from a government agency into a privately owned corporation.

During 2004 to 2010, with difficulty managing its traditional landline business, China Telecom began to pursue an aggressive transformation strategy, from simple provision of networks services to a wide range of digital applications and business ICT offerings. This was enabled through its purchase of 3G mobile operating rights, which allowed the company to mix wireline with wireless offerings.

In 2011 to 2015, the company also pursued a strategy of investing in broadband and wireless services to meet growing demand from its customers' desire to use the Internet via their mobile devices. In this period, it has followed the government's "Internet Plus" strategy by launching its business ecosystem, began to offer Internet bundles, and created new services such as "Smart Home". Furthermore, it entered new markets such as cloud services and big-data services.

From 2016 to 2019, China Telecom has changed its strategy to focus on building up smart information networks with "smarter connection", "ecological operation" and "intelligent management". This shift not only expanded its traditional 4G and fibre broadband offerings but also branched out into other technology areas such as the high-definition videos based on Tianyi HD service, online payments based on BestPay and Internet of Things (IoT) as well as cloud computing and data analytics solution. Furthermore, AI was also slowly introduced into the organization's own processes at that stage.

From 2020 onward, the company is pursuing an integrated cloud-network offering along with AI-driven innovation. It started to adopt a holistic strategy integrating clouds and networks accelerating AI-based smart modernization. In line with national 5G construction plans and digitalization strategies, the company built an integrated intelligent technology platform. Highlights in that era included the explosive growth of Tianyi Cloud, the widespread application of AI, the analysis of large quantities of data, and investments in new fields such as quantum information technology and cyber defense technologies.

Figure 2 depicts the progression through the phases of technological capability evolution.

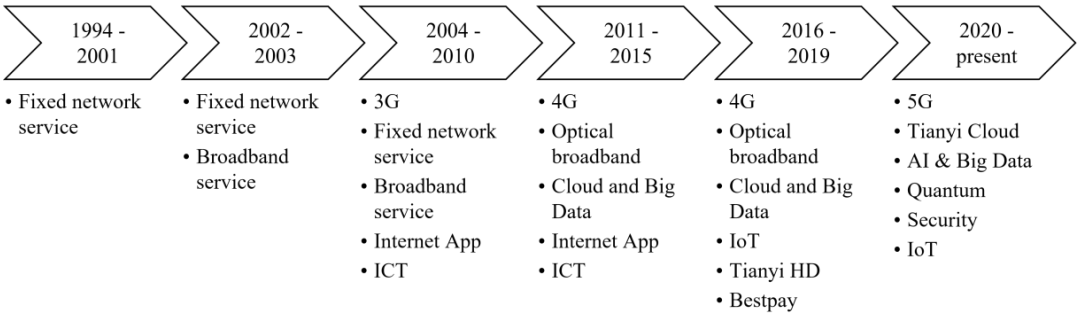


Figure 2. Evaluation of China Telecom's technologies and products

Source: Compiled from China Telecom's official website (Home > Investor > Financial Reports).

In this case, China Telecom's OA system was first used internally for its own operation. Then it became one of its main products to provide services externally. The OA is an enterprise application service that helps enterprises improve their work efficiency through informatization, consultations, and board practices.

The development history of this product line can be seen in Figure. 3. In 2003, an E-Government system was developed based on the client-server (C/S) model for the grassroots level. Between 2010 and 2015, a "Comprehensive Office" system that included mobility through Java enabled client computers. In 2015, they released an online office service based on the Tianyi Cloud platform, providing flexible, extensible resources and a combined deployment mode. The latest version, developed since 2023, is the "AI Cloud Computer". It incorporates intelligent technologies, such as integration with large language model (LLM) tools.

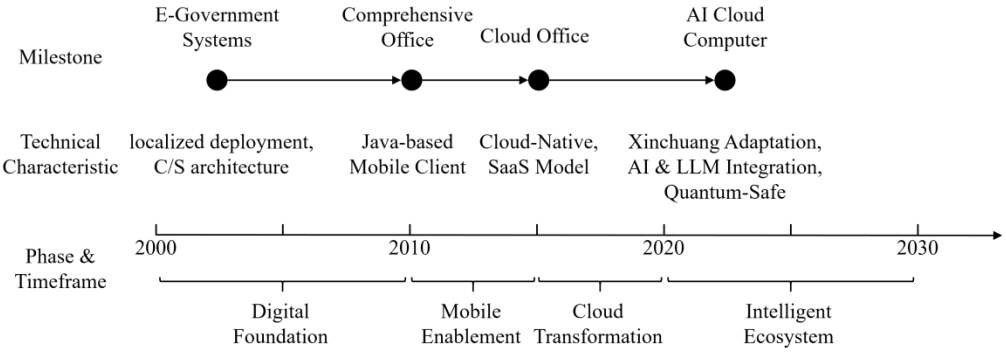


Figure 3. Evolution of China Telecom's OA system

Source: Summarized by the author.

The OA system has been upgraded in terms of technology, realizing the transformation of cloud-native systems, and moving it into Tianyi Cloud for more flexible resources and joint deployment. It has also adopted AI, featuring advanced language models like DeepSeek to enable smart document processing, automatic content generation, and conversational interfaces. It ensured security with various mechanisms such as the encryption in Tianyi Cloud, VPNs, endpoints, zero-trust architecture and quantum key exchange. Since 2020, the system is domesticated to meet the requirements of Xinchuang, certified to run on domestically developed computer systems and software platforms. These amendments are to make sure that they conform with the independence and confidentiality requirements for government departments or government companies.

China Telecom requires each department of the enterprise to use the OA system, which can improve work efficiency. It will bring higher value to the enterprise itself in terms of market competition ability after upgrading the enterprise architecture. Government agencies and small and medium-sized enterprises are using it as Software as a Service (SaaS) model or self-hosted version.

3. Case Study: Analyzing Mechanisms with the Extended TAM

This part takes the extended TAM as a framework for investigating the China Telecom OA system, which aims at exploring how AI technology or mobile technology influence basic components in the model or users' decisions, which eventually led to it becoming a core product.

3.1. Pathway 1: TD → PU → BI

The development of portable computers and other computer technologies, as well as advances in the field of AI have increased expectations for productivity applications: Which facilitate their general adoption in companies. With the integration of mobility, these systems have surpassed the constraints imposed by work place position and time, allowing clients access to OA services wherever they may be located. The system eliminates typical delays in obtaining clearance for a trip or accessing relevant data while traveling, among other things, thus also improving manager decision-making efficiency as well as process standardization across the enterprise.

AI such as a chatbot or a virtual assistant answers employee's question instantly, data analytic application can analyze the performance indicator and produce report automatically without any human involvement. Hence, it helps employees to escape from mundane tasks, allowing them to spend more time on planning activities. AI has been used for transforming traditional OA software from basic document processing applications into advanced productivity solutions that drive organizational efficiency towards enterprise success.

The improvement of decision-making is positively

correlated with PU, which has led China Telecom's management to make OA an important growth area. Research on the adoption of AI-based HRM systems confirms this direction since technology is also a way to increase PU, thus also increasing the users' attitude towards adoption [14–16]. Similar conclusions derived from TAM research further confirm that PU is an important determinant of BI [7, 8, 10, 15, 16].

3.2. Pathway 2: TD → PEOU → BI

The advancement in ICT has enabled higher PEOU which promotes strategic adoption. As more people are using mobile devices, employees are able to use OA systems through mobile Apps instead of being limited to their desktop computers. This makes it easier for them to adopt a new system and reduces training requirements.

AI helps to simplify the process for users, by means of natural language processing. Users can input requests via straightforward voice/text command, as well as smart form filling functionality that populates relevant fields automatically. This makes it easy-to-use. The PU reduces the barrier/costs from a deployment and training perspective on the user-side. This lack of friction also makes workers more receptive to adopting the system. Studies on user adoption show that PEOU is a common factor influencing BI in TAM-based research as well as studies related to IT technologies [7, 8, 15]. The literature on the use of AI for HRM shows how PEOU is one of the variables with a strong influence over employee acceptance [14].

3.3. Pathway 3: TD → PEOU → PU → BI

The other interpretation focuses on the mediating role of PEOU. If work AI systems are easy to use, then workers begin to feel comfortable exploring more advanced features than basic approval requests or messaging functionality. This could take the form of using visualizations for analysis, or heeding automated advice when making decisions.

During such exploration process, workers and managers are better aware about how important is to invest in that system. The OA application becomes not only an electronic office tool but can be considered as a "co-worker" helping us make smarter decisions and optimize our resources allocation. That is how PEOU leads to and maintains PU. This positive feedback loop leads to dependency among users, as well as creates other opportunities beyond initial expectations. This further consolidates the status of OA platform in China Telecom's IT ecosystem.

These effects can be found in many existing TAM studies. PEOU has indirect effect on BI through its influence over PU [7, 8]. Furthermore, studies have also shown the positive impact of PEOU on PU which in turn increases intention to try as well as continuance usage [10, 15].

3.4. Discussion: Advantages, Challenges, and Implications

Background information and company advantages: China Telecom's end-to-end cloud-network infrastructure provides powerful computing resources as well as built-in security, providing robust, reliable foundation for development and deployment of OA systems.

Issues and Challenges for Deployment: For China Telecom, one challenge involves competition with technology firms that are driving up both product quality and speed of delivery in relation to telecommunications providers like China Telecom. Some challenges to widespread deployment of AI involve unpredictability of results, information security concerns, and high operating costs. All of these conditions necessitate a strong regulatory environment as well as advanced technology management capability. Thus, the Chinese telecom and other industry players need to leverage upon its strengths in the telecom network, cloud-based resources, and information security in order to gain sustainable competitive advantage over its online products. At the same time, carriers should be able to offer fundamental services such as wireless Internet access, converged cloud-network architectures, and AI into its portfolio of services in order to increase customers' satisfaction with products and their attractiveness. Also, they need to implement robust risk management practices in the application of such disruptive technologies as AI, in conjunction with vigorous enforcement of relevant law and regulation.

Conceptual Contributions: Whilst this paper expands TAM from a behavioral theory at the individual level towards a theory for organizational decision-making, we find that our contributions are aligned with those studies within the field of strategic management investigating how disruptive market dynamics drive changes in various aspects of the business which can guide strategy evolution [17]. This confirms our findings with regard to previous studies on regulation and innovation in telecommunications: Where the policies affect how firms innovate, by changing expectations or perceived risks of innovations [18]. Our study shows how in fast-paced technology environments, the inclusion of mobility and AI as "context factors" to a modified TAM model can help explain how they influence PU and PEOU by organizations, and thus influencing the intention to make a particular choice. We provides an illuminating framework to think about how technological change affects business strategy.

4. Conclusion and Implications

This paper selects the OA system of China Telecom as the study object. Based on the extended TAM model, it studies the strategy transformation for telecom operators based on technology innovation and system integration. Our results indicate that using mobile and AI technology as external factor affects strategy implementation through three pathways: Increasing PU, increasing PEOU, and therefore indirectly increasing PU by enhancing PEOU. These explain how TD can influence strategic decision-making.

This paper contributes theoretically to TAM, which has been used primarily for assessing individuals' acceptance of a particular technology or system, and extends its use to predicting an organization's trajectory through innovation. In dynamic environments with constant changes in technologies the research recommends treating new technology as "exogenous variables" in a extended TAM model. This method provides insight on firm strategy decisions and proposes a novel perspective of how technology change affects strategies via decision-making mechanism in firms.

This study has some limitations to be taken into account. It is a single-case study: How several situations could be considered in this work like compare some carriers or products, to test for generalizability. The other limitation is that only qualitative analysis methods were employed. The use of quantitative methods such as large scale survey research can be suggested to confirm the postulated relationships in TAM. Future researchers may follow this study to explore a broader spectrum of IT acceptance models

and its effects on strategic management practices at organizational levels.

References

[1] Teng, Y. (2010). Review and reflection on telecommunications transformation [Chinese]. Telecommunications Science, 26(1), 7-9.

[2] Malik, A., Budhwar, P., & Kazmi, B. A. (2023). Artificial intelligence (AI)-assisted HRM: Towards an extended strategic framework. Human Resource Management Review, 33(1), 100940.

[3] Pan, Y., & Froese, F. J. (2023). An interdisciplinary review of AI and HRM: Challenges and future directions. Human Resource Management Review, 33(1), 100924.

[4] da Silva, L. B. P., Soltovski, R., Pontes, J., Treinta, F. T., Leitão, P., Mosconi, E., ... & Yoshino, R. T. (2022). Human resources management 4.0: Literature review and trends. Computers & Industrial Engineering, 168, 108111.

[5] Fregnan, E., Ivaldi, S., & Scaratti, G. (2020). HRM 4.0 and new managerial competences profile: The COMAU case. Frontiers in Psychology, 11, 578251.

[6] Zhang, J., & Liang, X. J. (2011). Business ecosystem strategies of mobile network operators in the 3G era: The case of China Mobile. Telecommunications Policy, 35(2), 156-171.

[7] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340.

[8] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. Management Science, 35(8), 982-1003.

[9] Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. Decision Sciences, 27(3), 451-481.

[10] Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2), 186-204.

[11] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425-478.

[12] Porter, M. E. (1985). Competitive advantage: Creating and sustaining superior performance (Chapter 2). Free Press.

[13] Christensen, C. M. (1997). The innovator's dilemma: When new technologies cause great firms to fail (Chapter 1). Harvard Business Review Press.

[14] Prikshat, V., Islam, M., Patel, P., Malik, A., Budhwar, P., & Gupta, S. (2023). AI-Augmented HRM: Literature review and a proposed multilevel framework for future research. Technological Forecasting and Social Change, 193, 122645.

[15] Bagozzi, R. P., Davis, F. D., & Warshaw, P. R. (1992). Development and test of a theory of technological learning and usage. Human Relations, 45(7), 659-686.

[16] Zhou, Y., Cheng, Y., Zou, Y., & Liu, G. (2022). e-HRM: A meta-analysis of the antecedents, consequences, and cross-national moderators. Human Resource Management Review, 32(4), 100862.

[17] Ghezzi, A., Cortimiglia, M. N., & Frank, A. G. (2015). Strategy and business model design in dynamic telecommunications industries: A study on Italian mobile network operators. Technological Forecasting and Social Change, 90, 346-354.

[18] Bourreau, M., & Doğan, P. (2001). Regulation and innovation in the telecommunications industry. Telecommunications Policy, 25(3), 167-184.