

**FACTORS INFLUENCING INNOVATIVE WORK
BEHAVIOR AMONG EMPLOYEES IN THE ICT
SECTORS IN GUANGDONG, CHINA: THE ROLE
OF WORK ENGAGEMENT AS A MEDIATOR
AND AUTHENTIC LEADERSHIP AS A
MODERATOR**

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UNIVERSITI SAINS MALAYSIA

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by

ZHOU YIFAN

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LIST OF ABBREVIATIONS

AB	Absorption
AVE	Average Variance Extracted
ALQ	Authentic Leadership Questionnaire
BCS	Brief Calling Scale
BP	Balanced Processing
CB-SEM	Covariance-based structural equation modeling
CC	Career Calling
CEO	Chief Executive Officer
CFA	Confirmatory Factor Analysis
CMV	Common Method Variance
CPC	Communist Party of China
CR	Composite Reliability
CVQ	Calling and Vocation Questionnaire
DE	Dedication
DJ	Distributive Justice
f^2	Effect Size
GDP	Gross Domestic Product
GII	Global Innovation Index
GPT	General-Purpose Technology
HTMT	Heterotrait-Monotrait
ICT	Information and Communication Technology
IJ	Interactional Justice
IMP	Internalized Moral Perspective

IWB	Innovative Work Behavior
MBA	Master of Business Administration
OECD	The Organization for Economic Co-operation and Development
OJ	Organizational Justice
PJ	Procedural Justice
PLS-SEM	Partial Least Squares Structural Equation Modeling
Q^2	Predictive Relevance
R^2	Coefficient of Determination
R&D	Research and Development
RT	Relational Transparency
SA	Self-Awareness
SDT	Self-determination Theory
SEM	Structural Equation Modeling
SET	Social Exchange Theory
SMEs	Small and Medium-sized Enterprises
TP	Talent Policy
US	United States
VIF	Variance Inflation Factor
VI	Vigor
WE	Work Engagement

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**FAKTOR YANG MEMPENGARUHI PERILAKU KERJA INOVATIF
DALAM KALANGAN PEKERJA DALAM SEKTOR ICT DI GUANGDONG,
CHINA: PERANAN KETERLIBATAN KERJA SEBAGAI PENGANTARA
DAN KEPIMPINAN AUTENTIK SEBAGAI MODERATOR**

ABSTRAK

Signifikansi perilaku kerja inovatif telah ditetapkan dengan jelas dalam literatur tentang sumber manusia dan pengurusan organisasi, terutamanya dalam sektor teknologi maklumat dan komunikasi (ICT) di China. Berdasarkan teori penentuan diri dan teori pertukaran sosial, kajian ini membangunkan model penyelidikan untuk meneliti panggilan kerjaya, keadilan distributif, keadilan prosedural, keadilan interaksional, dan polisi bakat; keterlibatan kerja juga dimasukkan sebagai pembolehubah perantaraan. Selain itu, kepemimpinan autentik dimasukkan sebagai moderator kerana kemampuannya untuk mengukuhkan hubungan antara keterlibatan kerja dan perilaku inovatif. Menggunakan metodologi penyelidikan kuantitatif, kajian ini menggunakan pemodelan persamaan struktur (SEM) dan Smart PLS 4.0 untuk menjalankan analisis data. Seramai 364 pengurus dan jurutera, yang direkrut dari syarikat ICT di Provinsi Guangdong, China, telah mengambil bahagian dalam penyelidikan ini. Hasil analisis pemodelan persamaan berstruktur kuasa dua terkecil separa yang dilakukan untuk menyokong kajian ini menunjukkan bahawa panggilan kerjaya, keadilan distributif, keadilan prosedural, keadilan interaksional, dan polisi bakat berkaitan secara positif signifikan dengan keterlibatan kerja. Penyelidikan ini juga menunjukkan penglibatan kerja memediasi hubungan antara pembolehubah bebas dan perilaku kerja inovatif dan kepemimpinan autentik berperanan sebagai moderator dalam konteks ini dengan mengukuhkan

hubungan antara penglibatan kerja dan perilaku kerja inovatif secara positif. Penemuan kajian ini berguna untuk para akademik dan praktisi yang berusaha memahami penentu perilaku inovatif dengan tujuan meningkatkan perilaku kerja inovatif dalam kalangan pengurus dan jurutera, sehingga mempromosikan kejayaan syarikat. Akhirnya, batasan penyelidikan ini dan cadangan untuk kajian masa depan dibincangkan.

**FACTORS INFLUENCING INNOVATIVE WORK BEHAVIOR AMONG
EMPLOYEES IN THE ICT SECTORS IN GUANGDONG, CHINA: THE
ROLE OF WORK ENGAGEMENT AS A MEDIATOR AND AUTHENTIC
LEADERSHIP AS A MODERATOR**

ABSTRACT

The significance of innovative work behavior has been clearly established in the literature on human resources and organizational management, especially in the Chinese information and communication technology (ICT) sector. Based on self-determination theory and social exchange theory, this study developed a research model to examine career calling, distributive justice, procedural justice, interactional justice, and talent policy; work engagement was also included as a mediating variable. In addition, authentic leadership was included as a moderator due to its ability to strengthen the relationship between work engagement and innovative behavior. Employing a quantitative research methodology, this study utilizes structural equation modeling (SEM) and Smart PLS 4.0 to conduct the data analysis. A total of 364 managers and engineers, who were recruited from ICT companies in Guangdong Province, China, participated in this research. The results of a partial least squares structural equation modeling analysis conducted to support this study revealed that career calling, distributive justice, procedural justice, interactional justice, and talent policy are positively significantly related to work engagement. This research also revealed that work engagement mediates the relationships between independent variables and innovative work behavior and that authentic leadership plays a moderating role in this context by positively strengthening the relationship

between work engagement and innovative work behavior. The findings of this study are useful for academics and practitioners seeking to understand the predictors of innovative behavior with the goal of enhancing innovative work behavior among managers and engineers, thus promoting the success of companies. Finally, the limitations of this research and recommendations for future studies are discussed.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter explores how innovative work behavior can benefit the Chinese information and communication technology (ICT) industry and provides context for the study, which focuses on the current conditions faced by employees in China. The subsequent section describes the problems addressed by this study. Next, the objectives of this research and its significance are described. This section also includes definitions of the key concepts employed in the study. This chapter concludes with a brief description of the organizations discussed in the subsequent sections of the thesis.

1.2 Background of the Study

Innovation is the lifeblood of an organization (Ahn & Kim, 2017; Montani et al., 2014). The constant stream of innovations resulting from technological progress has driven all companies to remain alert (Khan et al., 2021a). Therefore, continuous innovation is vital to the survival of organizations in market-based economies (Akram et al., 2016). China is quickly transitioning from a planned economy to a market economy and becoming a global business hub for innovation (Akram et al., 2020; Dychtwald, 2021). According to Harvard Business Review (Dychtwald, 2021), China's economic success since the country's reform initially relied on imitation, but innovation is key to China's economic future. Thus, the report of the 20th National Congress of the Communist Party of China (CPC) clearly indicated that innovation is the first driving force (Xi, 2022). According to the national "14th Five-Year Plan" outline, by 2025, the number of high-value invention patents nationwide will reach

12 per 10,000 people. The 2021 Chinese Talent Work Conference emphasized the fact that talent is the fundamental basis for innovation, and it is crucial to take advantage of the potential of individuals with diverse talents for innovation (Shi et al., 2022). Furthermore, the Chinese government issued the document Made in China 2025, which represents a comprehensive, modern, and smart strategic blueprint for advancing the economy and industry, in May 2015 (Wübbecke et al., 2016). The goals of Made in China 2025 include expanding the proportion of items manufactured in China to 40% by 2020 and to 70% by 2025 (Hsu, 2017).

China has embarked on a new era of high-quality, innovation-driven economic and social development, which requires robust support from highly qualified employees (Shi et al., 2022). To overcome these critical challenges associated with innovation, innovative work behavior, a key factor in the process of enhancing organizational innovation capabilities (Amabile & Pratt, 2016; Carmeli et al., 2006; Shin et al., 2017), has been identified as a fundamental pillar of successful organizations (Choi et al., 2016), especially in the Chinese ICT sector, where rapid innovation is increasing on a daily basis (Van Zyl et al., 2021). In the past, the benefits of stability enabled leaders to acquire knowledge that might guide their organizations toward the development of novel ideas (Khan et al., 2021b). However, this stability has now disappeared. The complexity of the new era has driven organizations to alter their mechanisms significantly. Instead of relying on a limited number of leaders to drive innovation, as was previously the case, employees are now also expected to engage in innovative practices (Hansen et al., 2017). Organizations can enter a new era of transformation by encouraging innovative work behavior in employees (Scott & Bruce, 1994). Hitherto, researchers have focused

more on the antecedents of and motivational factors underlying innovativeness in their investigations of innovativeness at the individual level.

Individual factors, including intrinsic motivation and individual personality, substantially impact employees' innovative work behavior (Grant & Berry, 2011). Intrinsic motivation enables employees to experience a sense of autonomy, purpose, capacity, and responsiveness when engaging in innovative work behavior (Deci & Ryan, 2013; Ryan & Deci, 2000a), thereby influencing their innovative performance (Chen & Hou, 2016; Javed et al., 2017). Career calling is a psychological state that indicates an individual's passion for a job and is viewed as the meaning of the individual's life (Duffy & Dik, 2013). Career calling thus expresses the views and attitudes of individuals concerning their current work (Dobrow & Tosti-Kharas, 2012). Recently, employees' expectations regarding work have changed, not merely because of salaries and job promotions but also because of employees' spiritual and psychological goals (Cai et al., 2022; Tian & Tina, 2019), such as the meaning and purpose of work as well as the ability to express their personal core values, exhibit self-social values, and serve others in line with their career calling (Berg et al., 2010; Gu et al., 2018). Employees who exhibit a strong career calling generally perceive the value of their job to the firm, thereby strengthening their intrinsic motivation to innovate. Therefore, Lv et al. (2021) reported that career calling motivates employees to absorb new knowledge and acquire advanced skills, thereby likely helping them better address challenges more effectively and enhance their innovative work behavior.

The advancement of the economy and society has led to the progressive fulfillment of individuals' material needs in China, the enrichment of social, political, and cultural existence, and the intensification of the pursuit of spiritual fulfillment

(Yang, 2017). The disparity between wealthy and impoverished individuals in China has gradually increased, social class distinctions have become more apparent, social unrest and other factors pertaining to instability have continually increased, and public concern regarding justice has increased substantially, particularly in recent years. The significance of organizations' views of their employees has increased dramatically over the past few decades (Ali et al., 2022). Akram et al. (2020) proposed that organizations should serve as platforms for individuals rather than solely relying on individuals as resources. The logic underlying this proposition is based on the finding that individuals react to the manner in which they are treated (Ali et al., 2022). Recently, many studies have identified the relationships between organizational justice and job satisfaction, positive work attitudes, and behaviors (Chen et al., 2015; Silva & Caetano, 2014). Organizational justice is defined primarily in terms of employees' perceptions of the degree of fairness with which authority figures treat them (Dundar & Tabancali, 2012; Whitman et al., 2012). Agarwal (2014a) claimed that organizational justice influences innovative work behavior. Similarly, Akram et al. (2020) reported that promoting the fair treatment of employees is crucial for firms' attempts to foster an environment that stimulates innovation and ingenuity with regard to the development of new goods, services, and procedures (Choi et al., 2022). Another study examined the impact of organizational justice on innovative work behavior in the hospitality industry in Taiwan; by integrating a three-dimensional model, these authors identified a strong relationship between organizational justice and innovative work behavior (Hsu & Wang, 2015). Moreover, employees feel more motivated to be enthusiastic about, devoted to, and fully engaged in their work if they perceive that the organization treats them fairly (Lyu, 2016).

Factors that are external to enterprises, notably government- and national-level variables, also have significant impacts on innovative work behavior and thus merit further consideration (Sanders et al., 2018). During the 2021 Central Talent Work Conference, Xi Jinping highlighted the criticality of implementing the process of national strengthening by adopting a talent strategy in the new era and thus accelerated the development of the country into a global innovation and talent hub (MacLachlan & Gong, 2022). This event demonstrated that talent remains an enduring policy priority in this context. According to Zhang et al. (2023), talent policy has the potential to promote innovation substantially within China's solar photovoltaic sector. At present, governments, particularly the Chinese government, use a variety of support policies to encourage innovation (Lee & Cin, 2010; Tsui-Auch & Möllering, 2010; Zhang et al., 2023), such as the Thousand Talents Program, the Chang Jiang Scholars Program, and The National Science Fund for Distinguished Young Scholars (Wang et al., 2022). However, scholarly understanding of the relationship between talent policy and employees' innovative work behavior is limited. Therefore, talent policy is an external factor affecting organizations, and it can be examined for its possible influence on employees' innovative work behavior (Zhang, Wei, et al., 2021).

Work engagement refers to a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption (Schaufeli et al., 2002). A considerable body of research on work engagement has highlighted the positive relationship between work engagement and innovative work behavior (Park et al., 2022). Employees who experience higher levels of energy, exhibit passion for their employment and demonstrate deep engagement in their work tend to report positive attitudinal and behavioral outcomes (Ibrahim et al., 2019; Wan et al., 2023). On the

basis of an examination of 381 employees recruited from international companies in Saudi Arabia, Afsar et al. (2020) suggested that employees who exhibit high levels of work engagement are more inclined to engage in innovative work behavior, which consists of presenting and implementing ideas that have the potential to enhance established procedures and generate novel, unexplored perspectives (Verweij et al., 2017). Similarly, Nazir and Islam (2020) revealed that work engagement significantly impacts employees' innovative work behavior within the framework of Indian luxury hotel services. Although an increasing amount of scholarly work has highlighted the significance of work engagement and innovative behavior in the workplace, sufficient investigations of these concepts within the Chinese ICT sector remain lacking.

A growing body of empirical research has specifically examined the relationship between leadership styles and the emergence of innovative behaviors in the workplace (Dhar, 2016; Yamak & Eyupoglu, 2021). Numerous Chinese ICT companies face notable obstacles in the transition from a hierarchical leadership approach to more employee-centric leadership styles, as these approaches have distinct impacts on employees' innovative work behavior (Cai et al., 2018). Recently, authentic leadership (AL) has received a great deal of attention from leadership scholars, who have asserted that this type of leadership is highly advantageous to organizations and leads to positive outcomes (Elrehail et al., 2018; Jang, 2022). According to Walumbwa et al. (2008), authentic leaders exhibit qualities such as ethical behavior, transparency, openness to change, the tendency to involve subordinates in decision-making, and a tendency to promote positive attitudes and behaviors. These features have been found to contribute to the improvement of organizational performance. Rather than identifying mistakes (Peterson & Luthans,

2003), the emphasis of such leadership is on the process of acknowledging advantageous accomplishments and fostering employee trust, thereby increasing positive emotions and innovative ideas (Yamak & Eyupoglu, 2021). Employees engage in innovative behaviors due to authentic leaders' tolerance for ambiguity and openness to change (Yamak & Eyupoglu, 2021).

In the context of the ICT sector in China, this research aims to explore whether the key factors influencing work engagement can impact employees' innovative work behavior and how authentic leadership can strengthen this relationship with the goal of stimulating innovative work behavior. According to self-determination theory and social exchange theory, the foundational theories used for this study, these critical factors are identified as variables that impact innovative work behavior and can be utilized by the organization to make suitable policy and regulatory decisions with the goal of promoting innovative work behavior among employees.

1.2.1 The Information and Communication Technology (ICT) Sector in China

In May 2016, the Outline of the National Innovation-Driven Development Strategy was issued by the Communist Party of China (CPC) Central Committee and the State Council. This conference highlighted the critical role of technological innovation in attempts to enhance social productivity and national strength across all sectors, asserting that such innovation should represent the core of the nation's comprehensive development. ICT integrates the industries of information technology and communication technology, thereby encompassing all communication equipment and application software. In China, the ICT sector is divided into ICT manufacturing

and ICT services (see Table 1.1). The ICT sector is a knowledge-intensive and scientific-based industry that is driven by ICT (Min et al., 2020; Zhu et al., 2023). Similarly, the ICT industry is a significant catalyst for innovation, economic expansion, and globalization in China.

Table 1.1 Structure of the ICT Industry in China

Sectors	Sub-sectors	Example of Products
ICT Manufacturing	Information Technology	Hardware, Software, Data Storage, Data Governance
	Telecommunications	Wired Communication, Wireless Communication, Voice over Internet Protocol (VoIP), Unified Communication
ICT Services	ICT Services	Internet/ Cloud Computing, Social Networking, Artificial Intelligence (AI) and Machine Learning (ML), Internet of Things (IoT)

Source: Xu, 2021

In recent years, the ICT sector has contributed to the strong development of the global digital economy (Zhu et al., 2023). The increasing integration of the ICT sector with traditional sectors has enhanced China's digital transformation. Digital transformation is a crucial economic target that is mentioned in the 14th Five-Year Plan (2021–2025). The mid-term and long-term targets of this process are to enhance China's global competitiveness in the contexts of advanced semiconductors and artificial intelligence technologies. Furthermore, according to the China Academy of Information and Communications Technology (2022), the digital economy accounted for 39.8% of the gross domestic product (GDP) of China in 2021, up from 14% in 2005 (see Figure 1.1).

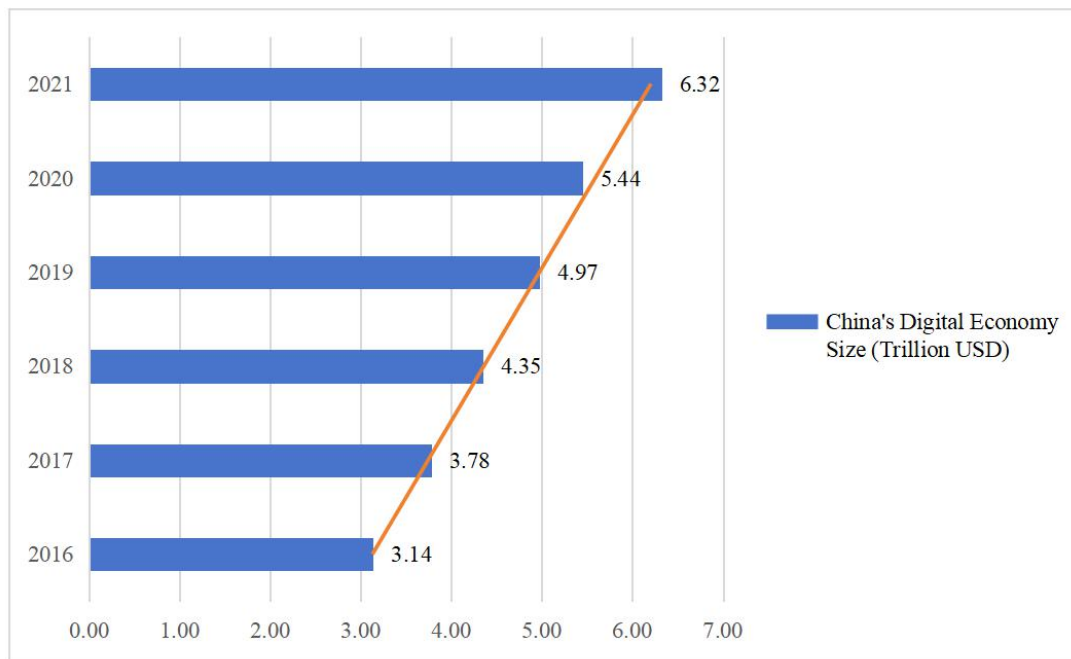


Figure 1.1 China's Digital Economy Size in 2017–2021

Source: China Academy of Information and Communications Technology, 2022

Moreover, the ICT industry in China has grown significantly in recent years, and the corresponding market size has increased dramatically over the past five years (China Academy of Information and Communications Technology, 2022). As Figure 1.2 illustrates, the scale of China's ICT market increased from 4.4 trillion Chinese Yuan (\$ 0.61 trillion) in 2017 to 4.94 trillion Chinese Yuan (\$ 0.69 trillion) in 2021 (National Bureau of Statistics of China, 2022), representing a year-on-year increase of 13.3% in 2020. ICT is considered to be an advanced industry and a general purpose technology (GPT) with regard to China's transformation from a manufacturing economy to a knowledge-based, innovation-driven economy. Given the significant contribution of the ICT industry to the expansion of the Chinese economy, it is critical to examine the behavioral and psychological determinants that influence the engagement and innovative work behavior of ICT employees with regard to their work and organization.

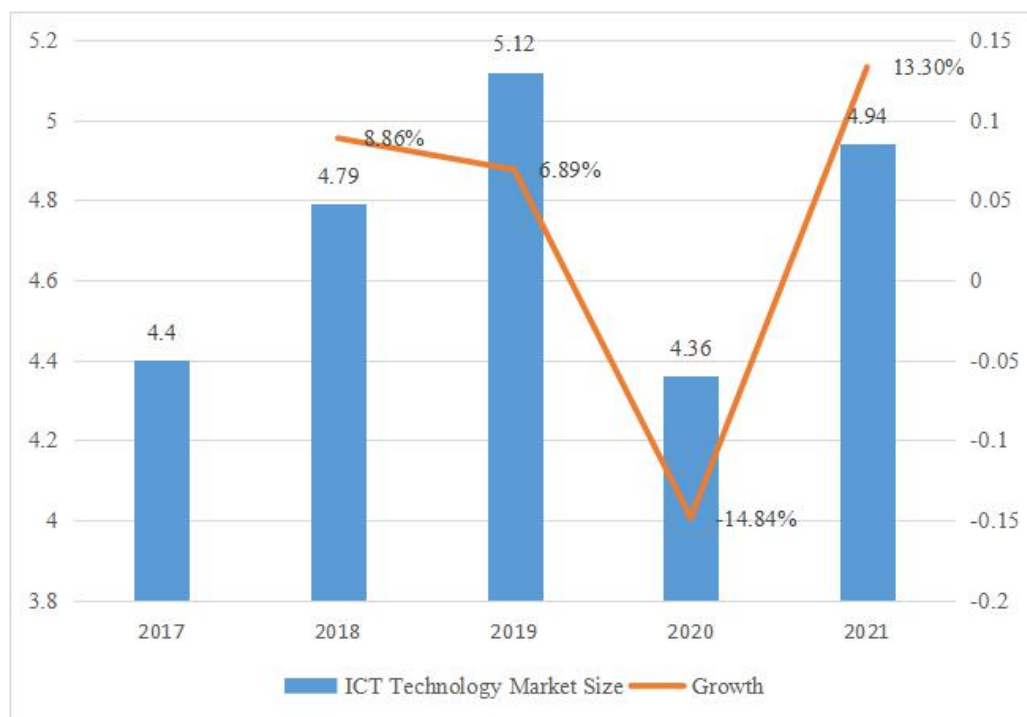


Figure 1.2 Changes in the Market Size of China's ICT Industry in 2017–2021

Source: National Bureau of Statistics, 2022

At present, the Global Innovation Index (GII) is used as a key indicator to measure the innovation status of an economy. According to the data (Figure 1.3), the GII of developed countries in the information technology industry, such as the United States, the United Kingdom, Japan, Germany, and Singapore, remained at the top of global rankings from 2018 to 2022. China's rating in the index jumped from 34th in 2012 to 11th in 2022 (World Intellectual Property Organization, 2022), thus highlighting the country's substantial advancements in the field of innovation. The country's rapid and prodigious capacity for innovation are receiving worldwide attention. However, particular areas require improvement, thus highlighting the importance of innovative work behavior in China's ICT sector.

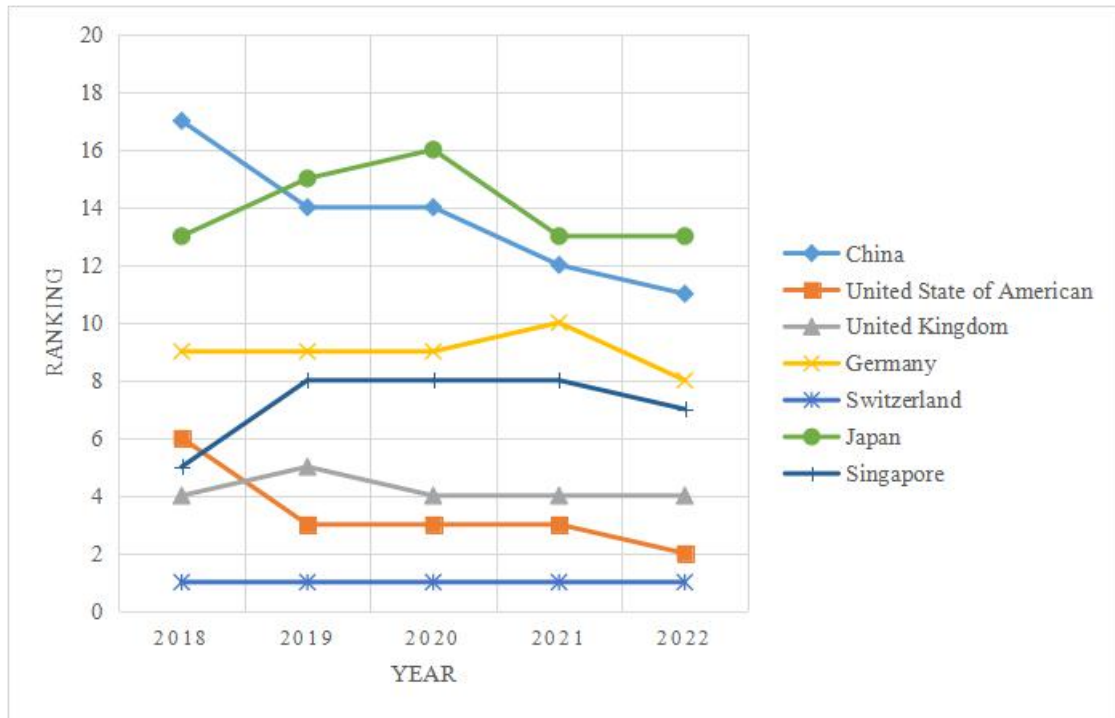


Figure 1.3 GII Innovation Index Ranking in 2018-2022

Source: Global Innovation Index Database and World Intellectual Property Organization (WIPO), 2022

The development of the ICT sector is inseparable from the presence of innovative employees. Due to the accelerated growth of the digital economy and the ICT sector in China, the demand for ICT professionals continues to increase (Huang, 2018). China is advancing to the forefront of global science and technology as it accelerates the establishment of a digitally intelligent, high-quality society. The digital transformation of the ICT sector relies heavily on high-level innovation and entrepreneurial talent. Furthermore, since the 18th National Congress of the CPC, the Party Central Committee, led by General Secretary Xi Jinping, has also strongly emphasized the work of talented individuals, emphasizing a strategic position that maintains that "talents are the first resource" and firmly implementing the Talent Power Strategy, which was included in the party constitution at the 17th National

Congress of the CPC in 2007. Similarly, as part of China's 14th Five-Year Plan, which covers the years 2021 to 2025, various national departments have formulated relevant business indicators for the ICT sector, including expected goals such as increasing the scale of the industry as a whole, the enhancement of the scale of enterprises, and the popularization and empowerment of ICT applications; these goals require an increase in the number of innovative employees.

Unfortunately, the current supply of these highly skilled individuals is insufficient to satisfy global demand, and higher education institutions cannot generate such individuals at the necessary rates (Brooks et al., 2018). Consequently, worldwide competition among ICT firms for skilled IT professionals has increased significantly over the past ten years (Syrek et al., 2013). The Chinese ICT sector lacks innovative employees with superior professional skills (Chen et al., 2022). The number of employees in China with skills in the fields of technological or application innovation is limited, and the barriers to entry are substantial (Xu, 2021; Zhang, Wang et al., 2021). For example, the rapidly increasing demand observed in the integrated circuit sector has highlighted the shortage of innovative talent. The White Paper on Talent in China's Integrated Circuit Industry 2019-2020 predicted that China would still exhibit a shortage of approximately 250,000 innovative specialists in 2022 (Chen & Wang, 2022). The term “innovative specialists” refers broadly to highly skilled professionals who integrate expertise with creativity to contribute to new product development, process improvements, or novel technological applications in ICT industries (Cai et al., 2018; Wang et al., 2015). For example, Huawei has provided specific projections regarding the scale of the innovation talent shortage as part of its contribution to national industry assessments (Huawei, 2018; Huawei, 2022). By 2025, the talent gap in the ICT sector is estimated to reach 21.35

million (Huawei, 2022) (see Figure 1.4). Compared with the predicted innovative employee gap of 12.46 million in 2020 (Huawei, 2018), the innovative employee gap in 2025 is anticipated to nearly double (Huawei, 2022), and the situation is thus grim (Zhang, Wang et al., 2021).

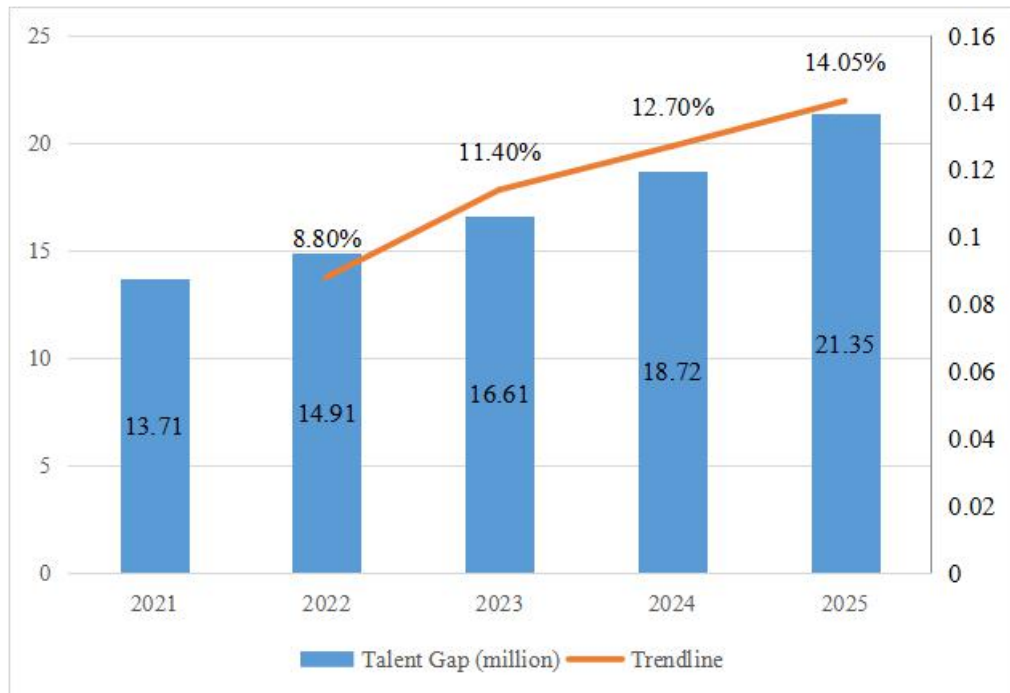


Figure 1.4 Chinese ICT Sector Talent Gap Forecast

Source: National Bureau of Statistics, 2022

To enable the ICT sector in China to maintain technological advantages in the global market, Chinese policymakers and business leaders have sought to develop practices that can encourage employees to engage in innovative work behavior and integrate innovation more deeply into the core of ICT companies (Cai et al., 2018; Tian et al., 2021). As a result, scholars have studied ways of promoting employee' innovative work behavior in the Chinese context (Akram et al., 2018; Leung et al., 2014; Ren & Zhang, 2015; Wang et al., 2015).

In sum, the Chinese ICT sector presents a uniquely relevant context for this study. First, ICT is a strategic industry emphasized in national policies such as the

"14th Five-Year Plan" and "Made in China 2025", and it serves as a core driver of China's transition to an innovation-led economy. Second, the ICT sector is inherently innovation-intensive, characterized by rapid technological change, high R&D investment, and dynamic competition, where employee innovative work behavior (IWB) directly affects firm success (Van Zyl et al., 2021). Third, the industry is undergoing significant organizational transformation, moving from traditional hierarchical models to more employee-centered management styles that place greater emphasis on fostering innovation at the individual level (Cai et al., 2018). Finally, despite the increasing attention paid to IWB globally, empirical investigations into its mechanisms in China's ICT sector remain limited, presenting both theoretical value and practical urgency. Therefore, focusing on the ICT sector not only aligns with national development priorities but also allows for a deeper understanding of how internal and external factors—including leadership style, work engagement, and talent policy—jointly influence employees' IWB in a critical high-impact industry.

This study specifically selects Guangdong Province as the research setting due to its strategic importance in China's ICT development. Guangdong consistently ranks at the top nationwide in terms of ICT output, innovation capability, and digital infrastructure. As the core region of the Guangdong-Hong Kong-Macao Greater Bay Area, it is home to numerous national high-tech zones and leading ICT enterprises. The province's robust ICT ecosystem, active government innovation policies, and large talent pool provide an ideal environment to study innovative work behavior in depth. Therefore, selecting Guangdong enhances the contextual relevance and practical applicability of the research findings.

1.3 Problem Statement

Over the past decade, China has significantly emphasized ICT sector innovation with the goal of encouraging ICT companies to contribute to the country's sustainable development (Guo, 2019). China's digital economy is one of the largest in the world, a fact which is closely tied to the rapid growth of the country's ICT industry (Zhang, Liu et al., 2021). The State Council of the People's Republic of China proposed a comprehensive strategy for advancing the digital economy, which was a core economic target mentioned in the 14th Five-Year Plan (2021–2025) in January 2022. By 2025, the contribution of core digital industries to the country's GDP is intended to reach 10%, and the government plans to ensure that 70% of semiconductors are manufactured domestically. Moreover, the ICT sector is expected to increase its contributions to the growth and expansion of the digital economy progressively (Zhu et al. 2023). According to the National Bureau of Statistics of China (2021), the value added of the ICT sector expanded rapidly from 490.41 billion Chinese Yuan (\$68.79 billion) in 2005 to 3339.18 billion Chinese Yuan (\$468.39 billion) in 2019. Furthermore, the five major projects and ten fields proposed by "Made in China 2025" all mention the new era of the ICT industry, including integrated circuits, information and communication equipment, operating systems, and industrial software, in their first columns.

The ICT sector in China encompasses a variety of information and communication-related technological services and is regarded as the major driver of development and competitiveness due to the transformation into an innovation-driven economy that it facilitates (Xu, 2021). According to Guo (2019), the ICT industry is at the forefront in terms of innovation, new product offerings, and innovative solutions.

However, the Chinese ICT sector has recently faced increasingly tough international competition, especially during the Sino-US trade war in 2019 (Song, 2020). In particular, a technology gap emerged between China and foreign countries, and the foundations of technological development in foreign countries are also advancing rapidly (Song et al., 2020). Although the ICT sector is talent intensive, the Chinese ICT sector lacks innovative employees with superior professional skills (Chen et al., 2022). According to Huawei (2022), the innovative talent gap is expected to exceed 20 million in 2025. This growing talent gap directly hinders the innovative capacity of firms and calls for an in-depth investigation of employee innovative work behavior (IWB) in high-demand regions like Guangdong Province. Without enough well-trained, adaptable, and intrinsically motivated employees, it becomes difficult for firms to foster bottom-up innovation.

Under these conditions, business scholars and practitioners have been interested in ways of helping ICT companies improve their innovativeness with the goal of obtaining competitive advantages. To obtain or maintain competitive advantages, organizations, especially those in the ICT sector, must increasingly optimize the innovative abilities of their employees (Lv et al., 2021; Van Zyl et al., 2021). Due to the strategic and economic significance of the ICT sector with respect to the Chinese economy, it is critical to examine the interrelationships among the variables measured in this context. Thus, this study aims to identify all the factors that can enhance employees' innovative work behavior (Agarwal, 2014a; Akram et al., 2016), particularly in the ICT sector due to the intense need for innovation associated with this sector and the dynamic environment in which such organizations operate.

This research specifically focuses on Guangdong Province, which plays a central role in China's innovation agenda as part of the Guangdong-Hong Kong-Macao Greater Bay Area. Guangdong is home to a dense cluster of ICT firms and accounts for a major portion of China's digital output. However, the mechanisms that stimulate IWB among employees in this critical region remain under-researched.

Employee innovative work behavior is essential regarding the organization's ability to attain the desired level of organizational innovation capacity and its attempts to establish an environment that is conducive to innovation. Instead of being the sole responsibility of a few knowledgeable individuals, innovation has developed into a social and psychological process in which all employees must participate (Amabile & Pillemer, 2012; Eid & Agag, 2020; Khan et al., 2021b). Several researchers have commented on the significance of innovative ideas and the individuals who, whether individually or in groups, generate, promote, discuss, modify, and implement them (Abstein & Spieth, 2014; De Clercq & Pereira, 2020; De Jong & Den Hartog, 2007; Kör et al., 2021). Many factors, including individual, organizational, and external factors, significantly affect employees' innovative work behavior (Srirahayu et al. 2023).

At the individual level, scholars have demonstrated that employees are more motivated to achieve their career goals and participate in practical efforts when they perceive meaning in their work (Martela & Pessi, 2018). Similarly, due to the increasing diversity and complexity of individual tasks, the significance of career calling in workplace adaptation and problem solving has also increased (Ji & Yoon, 2021). Career calling is an internal motivator (Duffy & Dik, 2013), and in the context of work, it takes the form of an altruistic orientation as a motivating factor, which is associated with a strong sense of purpose and meaning in the career context (Dalla et

al., 2020; Song, 2020). Hall and Chandler (2005) emphasized the fact that individuals with a career calling exhibit positive attitudes and are more accepting of and able to adapt to career changes (De Cooman et al., 2009). Individuals with a career calling engage in self-directed learning and innovative work behavior based on their sense of psychological ownership (Ji & Yoon, 2021). During this process of engagement, the individual develops the expertise or abilities required to increase his or her adaptability independently (Hall & Chandler, 2005). As employees working in the ICT sector possess more professional expertise and personal qualities than other employees, they generally pay greater attention to the significance of their work (Pei, 2015). Due to their relatively high professional standing, such employees exhibit a higher level of career calling in their particular fields. However, the influence of career calling on innovative work behavior in the Chinese ICT sector, particularly in Guangdong Province, remains underexplored in the current literature. Thus, the question of whether the career calling of employees in the ICT sector inspires their innovative work behavior remains to be answered.

As Chinese ICT firms must shorten the cycle of technological iteration to seize advantages in the market with the goal of attaining a high level of competitiveness and the right to express their voice in the context of critical technologies (Tang, 2021), employees of ICT enterprises currently face severe technological innovation pressure, which requires them to produce complicated innovation results relatively quickly (Zhang, 2014). Thus, it is essential to establish an atmosphere in which employees feel respected by the organization and perceive the system as fair and transparent. Specifically, when employees feel that the company rewards their efforts fairly, they are motivated to transform greater work engagement and job demands into innovative work behavior to cope with their heavy

workloads. Otherwise, they prefer to restrict their work engagement when they perceive that their efforts are inadequately rewarded (Janssen, 2000). For this reason, organizational justice is necessary to encourage employees to exhibit innovative work behavior. Similarly, Agarwal (2014b) analyzed interactional justice and procedural justice and emphasized the fact that psychological safety, which is based on an organization's predictability and consistency, is a prerequisite for innovative work behavior. Thus, organizational justice is a factor that influences work engagement and participation in innovation (Kwon & Kim, 2020). Although many studies have investigated the role of organizational justice in innovation-related behaviors in Western contexts, its effect on innovative work behavior in the Eastern, high-tech context of Guangdong Province remains insufficiently studied (Akram et al., 2020).

On the other hand, it is necessary to acknowledge the significance of external antecedents, notably variables pertaining to the government and national levels, which require extra attention (Nguyen et al., 2023). As an essential component of public policy, talent policy has emerged as an important indicator that is used by governments within all sectors to foster, enhance, and expand the pool of talented individuals (Zhang et al., 2023). The Central Leading Group for Education evaluated and approved the Action Plan (2021–2025) for Accelerating the Training of Urgent High-Level Talents. Since the 2008 economic crisis, both central and local governments in China have provided government support for talent policies, including the "Thousand Talents Program" and "The National Science Fund for Distinguished Young Scholars" (Zhou et al., 2018). The primary aim of government support in the context of talent policies is to foster human resource development while encouraging talent innovation (Zhang, Liu et al., 2021). Externally, talent

policy is widely discussed at the national level, but there is a lack of empirical research on how such government-led policies affect innovation at the employee level. In regions like Guangdong, where talent competition is fierce and national policy support is concentrated, this gap is especially relevant.

Furthermore, previous research has indicated that work engagement represents an organizational-wide attitude factor that can promote innovative work behavior (Jung & Yoon, 2018; Song, 2020; Su & Lin, 2018; Tang, 2021). Work engagement is considered to be an essential driver of an individual's attitudes, behavior, and performance as well as of organizational performance and productivity (Albrecht et al., 2018; Khoreva & van Zalk, 2016; Sharma & Kumra, 2020). For individuals to generate and implement novel ideas in organizations (Ali et al., 2019), they must have invested substantial and valuable personal resources and effort in this task, which also requires them to be actively engaged in their work (Wang et al., 2019; Yang, Yang et al., 2019). However, according to the trend revealed by the literature, research on this topic has been fragmented; namely, it has examined the determinants of work engagement at the individual, organizational, and institutional levels separately. A more integrated understanding of its mediating role within the dynamic ICT ecosystem in Guangdong Province is still lacking.

Although leadership has been identified as a significant determinant of employee innovative work behavior (Kafeel et al., 2023), previous research has not investigated how work engagement predicts innovative work behavior through the impact of leaders' actions (Newman et al., 2018). Chinese companies frequently employ a dominant and authoritative leadership style, which has been shown to hinder innovative outcomes among employees (Tian & Sanchez, 2017). As a result,

scholars in the field of leadership have suggested a focus on authentic leadership, which emphasizes beneficial achievements and can establish trust among employees, thus eliciting more positive emotions and innovative ideas (Yamak & Eyupoglu, 2021). Employees engage in more innovative behaviors when they are led by individuals who exhibit authentic leadership qualities, such as tolerance for uncertainty and openness to change (Yamak & Eyupoglu, 2021). Although an increasing body of evidence has connected work engagement with innovative work behavior (Afsar et al., 2020; Nazir & Islam, 2020; Uppathampracha & Liu, 2022), little is known about the contextual factors that could strengthen or weaken this relationship, especially in the Chinese ICT sector in Guangdong.

If innovative work behavior is not properly managed or allowed to thrive, there are serious consequences at multiple levels. At the individual level, it may reduce job satisfaction, burnout, or turnover intentions due to a lack of autonomy and creative freedom (Shalley et al., 2004; Hakanen et al., 2008). At the organizational level, failing to harness IWB can limit adaptability, reduce innovation output, and weaken competitive advantage (Yuan & Woodman, 2010). At the societal level, insufficient innovation in strategic industries like ICT may hinder national technological independence and economic development, which is particularly concerning in the current era of global competition (Liu & Zhang, 2019). Therefore, the urgency to understand and enhance IWB within the ICT sector is not merely academic but a practical necessity.

In sum, existing literature on innovative work behavior is growing, with scholars identifying various influencing factors. Past research has classified these factors broadly into three domains: individual (e.g., personality traits, motivation, emotional states, psychological capital), organizational (e.g., leadership styles,

organizational climate, justice), and external (e.g., family or government support) (Song, 2020; Agarwal, 2014; Farrukh et al., 2022). However, innovative work behavior remains poorly understood. IWB is often context-sensitive—it can vary significantly depending on the industry, organizational culture, or leadership environment. Much of the existing research has been conducted in Western settings, leaving a gap in understanding how IWB operates in non-Western cultures, such as China’s ICT sector. Furthermore, while many studies have identified important correlations, few have integrated individual, organizational, and external factors into a single model or examined how these factors interact in specific national or industrial contexts. Therefore, this study contributes to filling that gap by examining how internal (career calling), organizational (organizational justice dimensions, leadership), and external support (talent policy) jointly influence IWB in the Chinese ICT sector—providing a more holistic and contextually grounded understanding of the phenomenon.

1.4 Research Questions

The problems discussed in the preceding section raise several vital questions outlined below:

1. Does career calling, distributive justice, procedural justice, interactional justice, and talent policy have a positive relationship with work engagement?
2. Does work engagement have a positive relationship with innovative work behavior?

3. Does work engagement positively mediate the relationship between career calling, distributive justice, procedural justice, interactional justice, talent policy, and innovative work behavior?
4. Does authentic leadership moderate the relationship between work engagement and innovative work behavior?

1.5 Research Objectives

The objectives of this study are to examine the following relationships between variables:

1. To examine whether there is a positive relationship between the career calling, distributive justice, procedural justice, interactional justice, and talent policy, and work engagement.
2. To examine whether there is a positive relationship between work engagement and innovative work behavior.
3. To examine whether work engagement positively mediates the relationship between career calling, distributive justice, procedural justice, interactional justice), talent policy, and innovative work behavior.
4. To examine whether authentic leadership moderate the relationship between work engagement and innovative work behavior.

1.6 Scope of the Study

In light of the problem statement, research questions, and research objectives, this study focuses on employees working in the ICT sector in Guangdong Province, China. Guangdong was selected as the specific research location due to its leading

role in China's digital economy and its concentration of ICT enterprises and employees. The data referenced in this study were obtained via a survey questionnaire that was distributed electronically to ICT companies operating within Guangdong Province. The ICT industry relies heavily on knowledge and expertise due to its need for highly trained employees and well-established organizational frameworks. This study examines the influence of career calling, distributive justice, procedural justice, interactional justice, and talent policy on work engagement, the impact of work engagement on innovative work behavior, the role of work engagement as a mediator in the relationship between the independent variable and dependent variable, and the role of authentic leadership as a moderator in the relationship between work engagement and innovative work behavior.

The sample population consisted of full-time employees, specifically engineers and managers, who had been working in their respective firms for more than one year and had obtained at least a diploma-level education. The selection of employees from ICT companies in Guangdong Province as the main targets for this study is based on the region's significant contribution to China's GDP, its dominant position in the ICT industry, and the relatively limited number of prior empirical studies in this setting. The researcher sent survey questionnaires electronically to officer engineers and managers. Additionally, employees are key actors in ICT firms, and success in innovation is closely correlated with employee innovative work behavior. The unit of analysis in this study is the employee, consistent with Sekaran and Bougie's (2016) definition, as each survey response represents a unique data point collected from a single respondent. A purposive sampling method, using judgment sampling based on specific eligibility criteria, was employed to select participants.