THE EFFECT OF AUTHENTIC LEADERSHIP AND INNOVATION ADOPTION ON INNOVATIVE WORK BEHAVIOR IN THAI CONTEXT

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ABSTRACT

Title of Dissertation	THE EFFECT OF AUTHENTIC LEADERSHIP AND INNOVATION ADOPTION ON INNOVATIVE WORK BEHAVIOR IN THAI CONTEXT
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The objective of this study was to examine the effect of Authentic Leadership (AL) on Innovative Work Behavior (IWB) with a consideration on the moderating effect of Innovation Adoption (IA) on that effect. Four questionnaires were used to collect data, aimed at measuring demographic information, authentic leadership, innovative work behavior, and innovation adoption of the respondents who were employees working in a private Thai company. The authentic leadership and innovative work behavior questionnaires were derived from previous research, and the innovation adoption questionnaire was newly developed for this study. A pilot study was conducted with 120 employees who were not in the sample pool. All three adjusted measurement models presented goodness of fit with the collected data and demonstrated high validities and reliabilities. Following the pilot study, 1000 questionnaires were then distributed, of which 754 (75.4%) were returned, and only 700 were completely filled. Data analysis using structural equation modeling (SEM) supported the hypothesis that authentic leadership and innovation adoption had positive effects on innovative work behavior. However, the results did not demonstrate the moderating effect of innovation adoption, rather indicating the interrelated effect of innovation adoption and authentic leadership on innovative work behavior. The size of the corporation and corporate core values (such as creativity and innovation) might undermine the moderating effect of innovation adoption. Future research should study small or diverse business companies with and without innovation embedded in their corporate core values. The innovation adoption questionnaire should also be used in other sectors or countries to test the generality of the questionnaire.

Keywords: Innovation adoption, authentic leadership, innovative work behavior, moderating effect, structural equation modeling, private Thai company

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CHAPTER 1

INTRODUCTION

Innovation matters for development, as well as achieving national goals. Countries members in the Organization for Economic Co-operation and Development (OECD) have adopted national roadmaps to foster innovation and enhance their economic impacts (OECD, 2012). To move beyond labor-intensive part production and assembly, firms in Thailand's manufacturing sector will need to strengthen collaborative innovation linkages (Koen, Asada, Rahuman, & Bogiatzis, 2018). It has been shown that the authenticity of a leader improved organizational performance, briefly, by stimulating higher levels of engagement (Avolio, Gardner, Walumbwa, Luthans, & May, 2004), fostering business performance, and by developing innovative solutions to internal problems and marketing challenges (Avolio & Gardner, 2005). The fostering and monitoring of authentic behavior in organizations might also prevent unethical decisions and actions (Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008).

In 1999, a questionnaire on artificial intelligence (AI) technology in Thailand was conducted by Boonserm Kijsirikul (Department of Computer Engineering, Chulalongkorn University) and Thanaruk Theeramunkong (Sirinthorn International Institute of Technology, Thammasat University). The questionnaire, supported by the Center of the International Cooperation for Computerization of Japan (CICC) and the National Electronics and Computer Technology Center (NECTEC), revealed the status of artificial intelligence (AI) technology in Thailand. In the country-level policies, there were no specific issues about the development of AI, even including the Eighth National Economic and Social Development Plan (1997- 2001). However, the Ministry of Science, Technology, and Environment (MOSTE) had created a plan for the research and development (R&D) of science and technology (S&T). The percentage of companies that had adopted AI technology was approximately 20%, whereas the

percentage of companies not using AI was about 62%. Some companies (about 7%) conducted research on AI technology. Compared to that of universities in Section 3, the number of companies that use or research AI was lower. Like many other countries worldwide, Thailand has been witnessing a growth in data traffic. The volume of Thailand's data services in 2017 was six times as much as 2014, with the average bandwidth per user at 4.11GBs per month. The high adoption rate of 3G and 4G, along with high mobile penetration in Thailand, have encouraged people to use more online services such as mobile banking, PromptPay, and e-commerce. With 5G, Thailand was expected to see an exponential growth of data traffic, especially from IoT devices.

In 2016, Thailand 4.0, a crucial new policy of the Thai government, was officially launched. It was a national roadmap designed to deal with the middle-income trap, and to transform Thailand into a high-income nation, all in five years. The plan to transform the current economy to a value-based economy emphasized three things: (1) Innovation, (2) Technology & Creativity, and (3) Trade in Services (AIT, 2016). The national roadmap movement impacted traditional small and medium enterprises (SMEs). It caused them to become smarter enterprises and startup businesses, which were more advantageous in many sectors of industry. The sectors in which this change was emphasized were food, agriculture and biotech, health/wellness and bio-medical, digital/internet of Things (IoT) and embedded technology, and finally, a creative culture and high-value services. The national human capital development aimed to support the national policy to make Thailand's national workforce self-directed learners and active citizens that make in-depth contributions to society (AIT, 2016).

Furthermore, employees' innovative work behavior of engaging with new creative ideas, processes, procedures, and products (Farr & Ford, 1990) became one of the critical factors driving the efficiency of an organization. The more employees developed new ideas, the more they could generate solutions to problems (Farr & Ford, 1990). In order to encourage the employees to have more innovative work behavior, authentic leadership could be introduced, which would directly influence team members' creativity and team innovation (Černe, Jaklič, & Škerlavaj, 2013). The creative performance of employees was quite often dependent on leadership, as several conceptualizations and empirical studies had shown (Oke, Munshi, & Walumbwa, 2009; Oldham & Cummings, 1996; Scott & Bruce, 1994). Employees who had

innovation accepting attitudes would benefit their businesses not face critical issues like lack of new technology or novelty to compete in the market (Talukder, Harris, & Mapunda, 2008). In conclusion, the innovation adoption process depended on the individual and whether or not they would embrace new knowledge and the implementation of new innovations, processes, or products (Rogers, 1995).

In 2019, a report called "Thailand Digital Technology Foresight 2035" was done by the Digital Economy Promotion Agency (DEPA). This organization established under the Digital Development for Economy and Society Act B.E. 2560 (A.D. 2017). It emphasized stakeholders in Thailand to take actions to maximize the value of unexplored data. These actions included doing things like researching and adopting innovative technologies like big data and data analytics. Although SMEs in Thailand have not yet adopted big data analytics, 70% of them plan to soon, according to a questionnaire done by the Siam Commercial Bank in 2017. The components driving the big data industry include digital transformation, the huge and vast amounts of data created by citizens, and the demand for data analysis. Big data was one of the key components supporting 4.0 industries in Thailand, as well. It was critical for redefining consumer experiences, reinventing new models for products and businesses, driving operational excellence, empowering talent, building teamwork within corporations, and connecting enterprises. Seven important technologies that would be focused on were the Internet of Things (IoT), Data Analytics, Automation & Robotics, Next Generation Telecoms, Quantum Computing, Distributed Ledger Technology (DLT), and Artificial Intelligence (AI). Across all major industries, those that have adopted AI technology earlier achieved higher profits with fewer costs. The major sectors benefiting from AI were the manufacturing, financial, transportation, and logistics sectors (DEPA, 2019).

Therefore, exploring the effect of leadership style and innovation adoption on innovative work behavior of employees, in the Thai private sector, is quite significant.

1.1 Statement of Research Problem

Identifying the effect of a leadership style has on the innovative work behavior of Thai employees may prove to be quite useful towards implementing Thailand 4.0 policies. The researcher chose to focus on the Authentic Leadership style for this study,

because in the Thai context, harmonious relationships are already of importance, and are also an aspect of authentic leadership (Amornpipat & McLean, 2016). Meanwhile, the attitudes of individual employees towards accepting and adopting innovation were also indicated as being crucial towards innovativeness in an organization (Rogers, 1995). Therefore, finding the effect individual innovation adoption has directly or indirectly (i.e., moderately) effect on innovative work behavior would benefit for human resource development in Thai organizations, especially in the private sector, to accelerate performance and business growth under the Thailand 4.0 policy.

1.2 Purposes of the Study

There are three main purposes of this study. Firstly, this study aims to ascertain the factors behind innovation adoption among Thai private sector employees. Secondly, this study intends to examine if a leadership style affects the innovative work behavior of Thai employees. Thirdly, the study will explore if innovation adoption has a direct and/or indirect effect on the innovative work behavior of employees.

1.3 Research Questions

This study explores three research questions:

1) What are the factors that involve in innovation adoption of employees in private Thai company?
2) How does authentic leadership affect innovative work behavior of Thai employees in a positive or negative way?
3) Does individual innovation adoption help to increase or moderate the effect of authentic leadership on innovative work behavior?

1.4 Significance of the Study

The results will provide empirical evidence for whether: (1) authentic leadership affects innovative work behavior, (2) innovation adoption affects innovative work behavior, and (3) innovation adoption moderates the effect of authentic leadership on innovative work behavior.

The validation of the new tool for innovation adoption measurement, as well as those of the previous tools to measure authentic leadership and innovative work behaviors, will be verified. As a result of the study, the scales will be more reliable for future usages, particularly in private Thai organizations.

Executives and HR personnel of organizations can apply the results as well to design intervention activities that help promote innovation among work behaviors employees.

Hence, the study will contribute great benefits as the following:

For Thai companies in the private sector:

1) To use the innovation adoption questionnaire to check and investigate the employee's innovative work behavior.
2) To examine a leadership style, authentic leadership of the employees as well as managers as a baseline for promotion or else as appropriateness.
3) To use the results or findings as a resource for improving innovation adoption and innovative work behavior such as in intervention strategy design for achieving business innovation goals.

For Human Resources Management:

1) To develop and manage strategic plans to promote employee innovative work behaviors based on the results of the study.
2) To design individual development plans for managers to increase and exert their authentic leadership and for employees to improve their innovation adoption.
3) To use the findings to benchmark employees' innovation adoption and innovative work behaviors as goals to achieve in accordance with innovative policies of the organization

For Academics:

1) To use the tools to gather more data for examining the generality of the measurement and to validate the results with other companies
2) To apply the results as a basic resource for further exploration and development in other Thai workplaces or environments.

1.5 Scope of the Study

The scope of the study will be limited to Thai employees working for a private Thai company, which has declared policies and organized activities to promote an innovative atmosphere within its organization.

CHAPTER 2

LITERATURE REVIEW

This chapter contains the reviews of related literature describing innovative work behavior (IWB), authentic leadership (AL), and innovation adoption (IA). It also provides the theories of authentic leadership and individual innovation adoption with consideration of their effects on innovative work behavior, which have led to the hypotheses and framework of this study.

2.1 Innovative Work Behavior (IWB)

2.1.1 Definition of Innovation and Innovativeness

There are many different definitions of innovation. They are all related to novel ideas, processes, products, and services that drive change in organizations. The word was defined half a century ago as the process of creating, accepting, and implementing new ideas, processes, products, or services (Thompson, 1965). Later, success would be added to the definitions of innovation, as well (Rowe & Boise, 1974). In the 1980s, a study of innovation was conducted and gave a more comprehensible meaning to it. It separated innovation into three components: innovation as a process, innovation as a detached item (including products, programs, or services), and innovation as a component of organizations (Kimberly & Evanisko, 1981). Innovation was defined as any novel idea, even ones based on previous ideas (Van de Ven, 1986).

However, an innovation's level of novelty was not clearly defined (Dewar & Dutton, 1986). Nord and Tucker (1987) made explicit the connection between innovation and technology. They pointed out the importance and impact of innovation and why it should be implemented and commercialized by companies (Nord & Tucker, 1987). It was shown that innovation positively impacted employment and profit for whole conglomerates (Urabe, 1988), and those other organizations could use innovation as a tool to design beneficial products and processes for a competitive advantage

(Damanpour, 1996). Recently, another study defined innovation as the creation of new knowledge and ideas that affect business outcomes and noted that new knowledge could directly improve and transform organizations (Du Plessis, 2007).

Innovativeness was also described as the level of innovation adoption of an individual compared to others in the same system (Rogers & Shoemaker, 1971). Innovativeness was defined as a general personality trait, described as "willingness-to-change" (Hurt, Joseph, & Cook, 1977). Therefore, the innovativeness of employees can be defined as a willingness to engage in innovative behaviors and practices related to the innovation process. These included idea generation, idea promotion, and idea realization, to produce innovations (Kanter, 1988; Ramamoorthy, Flood, Slattery, & Sardessai, 2005; Scott & Bruce, 1994).

Innovation can be seen as a successful implementation of creativity that produces economic value, whereas creativity has more to do with idea production (Scott & Bruce, 1994). Among others things, innovation involves: (1) the search for and testing of new technologies, (2) the creation and use of new paths to reach companies' goals, (3) the use of new work-methods, and (4) the acquisition of resources to realize ideas (Yuan & Woodman, 2010). Based on these four aspects, however, employees can only be innovative if they are supported by their companies' culture (Miron, Erez, & Naveh, 2004).

2.1.2 Definition of Innovative Work Behavior

Innovative Work Behavior (IWB) was a complex behavior linked to the generation, introduction, and application of ideas. Innovative work behavior was demonstrated by three actions: (1) understanding problems and suggesting ideas for solutions; (2) coming up with solutions; and (3) implementing new ideas for the benefit of the organization (Scott & Bruce, 1994). IWB could also promote an employee's ability to come up with novel creative ideas, processes, procedures, and products (Farr & Ford, 1990). Innovative work behavior could be referred to simply as "everyday innovation" (Janssen, 2000). However, IWB was different from general employee creativity, which only focused on generating ideas (N. King & Anderson, 2002). So, increasing employee innovation was one of many approaches that helped to drive the success of an organization (Mytelka & Smith, 2002; Van de Ven, 1986). Furthermore,

many studies had also shown that the behavior of talented and hardworking employees appeared to be more innovative (Parker, Williams, & Turner, 2006). Another study stated that IWB occurred once an employee acknowledges issues within the company and attempted to generate new and useful ideas to solve them. At the same time, IWB not only boosted company performance but the personal and business performance of employees as well (J. P. De Jong & Den Hartog, 2007; Farr & Ford, 1990). Innovative work behavior (IWB) was also found in employees that display proactive work behavior (Parker et al., 2006) and personal initiative (Frese, Kring, Soose, & Zempel, 1996), which both had effects on employees' preference to implement ideas proactively.

2.1.3 Theoretical Development of Innovative Work Behavior Constructs

Farr and Ford (1990) defined IWB as an individual's behavior that aimed to achieve the initiation and implementation of new and useful ideas, processes, products, or procedures (within a work role, group, or organization). IWB differed from general employee creativity – the production of new and useful ideas concerning products, services, processes, and procedures (Amabile, 1988) because it also included the implementation of ideas. Unlike creativity, IWB aimed to provide some benefit by applying the generated ideas and achieving innovative output. Creativity could be seen as a crucial component of IWB, most evident at the beginning of the innovation process when problems are recognized, and ideas were generated in response to a perceived need for innovation (West, 2002). Here, the studies addressed a broad range of IWBs encompassing both the initiation and implementation of ideas.

Many of the works on IWB split it into multiple dimensions, often linked to different stages of the innovation process. For example, Scott and Bruce (1994) described IWB as a multi-stage process. Drawing on Kanter (1988), they outlined three stages relevant to IWB: idea generation, coalition building, and implementation of ideas. However, the term 'idea generation' was rather broad, as it included both the exploration and generation of ideas. Research on creativity had indicated that these two behaviors rely on distinct cognitive abilities, as well (Basadur, 2004; Runco & Chand, 1995).

Similarly, in entrepreneurial literature, exploration of opportunities was regarded to precede idea generation. Both behaviors had distinct traits and environmental determinants (Shane, 2003). The four dimensions of innovative work behavior were summarized as an exploration of opportunities, idea generation, championing, and implementation.

Exploration of opportunities had to do with the discovery of troubling situations or problems. Opportunity provided individuals a chance to improve conditions or handle threats requiring an immediate response. Drucker (1985) identified seven of these opportunities: unexpected successes, failures or problematic events; incongruity between ‘what is' and ‘what should be'; innovations based on needs; changes in industry or market structure; changes in demographics (such as labor force composition); changes in perception; and lastly, new knowledge. Idea exploration included looking for ways to improve current products, services, or processes (Basadur, 2004; Farr & Ford, 1990; Kanter, 1988).

Idea generation was the next proposed component of IWB. The production of ideas was related to the creation of new products, services or processes, entry into new markets, improvements in current work processes, and solutions to identified problems (Amabile, 1988; Kanter, 1988; Van de Ven, 1986). The key to idea generation appeared to be the utilization and reorganization of information and existing concepts, to solve problems or improve performance. Suitable idea generators could approach problems or performance gaps from multiple angles. For example, Kanter (1988) stated that ‘kaleidoscopic thinking’ was one of these methods for idea generation, which involved rearranging already existing pieces into a new whole.

Championing was another component, which involved the promotion and support of new, perhaps radical ideas that might seem to be unsuitable for the workgroup or organization. Even if the ideas were beneficial or appear to fill performance gaps, it could be the case that there might be some uncertainty. As to whether their benefits would exceed the cost of developing and implementing them, or perhaps, there would be some occurrences of resistance to change as well (Kanter, 1988). In this respect, champions, in innovation literature, were those in informal roles who push creative ideas beyond roadblocks in their organizations and help innovative ideas to be realized (Shane, 1994). Championing involved finding support and building coalitions by

expressing enthusiasm and confidence in the success of innovations. Champions had to be persistent and get the support of the right people (Howell, Shea, & Higgins, 2005).

Lastly, the implementation of innovative ideas was essential. Considerable effort and result-oriented attitudes were needed to make ideas a reality. Idea implementation also included making innovation part of the normal work process (Kleysen & Street, 2001) and the behaviors of individuals, for developing and testing new products or work processes (Kanter, 1988).

For the measurement of IWB, many studies, with differing perspectives, had been conducted. One study, developed by Scott and Bruce (1994), ran an experiment using a one-dimensional six-item scale covering idea generation, combination building, and idea realization. However, they did not attempt to separate these dimensions empirically. Since then, others had classified IWB using similar, one-dimensional measures with limited items (Bunce & West, 1995; Scott & Bruce, 1994; Spreitzer, 1995). (Janssen, 2000) was first to try and develop a multi-dimensional measure. He formulated items related explicitly to idea generation, idea promotion, and idea implementation, and found strong correlations between them. He concluded that his items could be best utilized when combined and used as a single additive scale. Similar results were found by Kleysen and Street (2001). Krause (2004) and Dorenbosch, Engen, and Verhagen (2005) were among the first to present IWB measures with two dimensions, idea generation, and idea implementation. Both studies could be regarded as progress in the evolving measurement system of IWB.

However, previous measures had some issues. First, they were mostly one-dimensional (Reuvers, Van Engen, Vinkenburg, & Wilson-Evered, 2008; Scott & Bruce, 1994). Second, previous studies were barely concerned with validity, and only a few cases provided some form of validation. For example, Scott and Bruce (1994) correlated their IWB measure with scientific innovation outcomes, while Janssen (2000) analyzed the connection between leaders' and subordinates' reports of innovativeness. Measurements of IWB were used as outcome measures in studies where other constructs (e.g., empowerment) were the focal variables and received full attention. Thirdly, many studies only collected data from a single source, i.e., employees' self-ratings or supervisors' ratings of employees' innovativeness. This table

below shows the summary of IWB measurement studies from Measuring Innovative Work Behavior by De Jong and Den Hartog (2010).

Table 2.1 Summary of IWB measuring studies from measuring innovative work behavior by De Jong and Den Hartog (2010)

Study	Items and dimensions	Sample and self or other ratings	Reliability and validity
Scott and Bruce (1994)	6 items; one dimension	Managers of 172 engineers, scientists, and technicians in an R&D department; other ratings, single source	α=0.89; significant correlation with an objective measure of filed invention disclosures (r=0.33)
Bunce and West (1995)	5 items; one dimension	Sample 1: 495 employees from a national health service; self-ratings, single source Sample 2: 281 employees from a national health service; self-ratings	Sample 1 α=0.75; no validity reported Sample 2 α=0.80; no validity reported
Spreitzer (1995)	4 items; one dimension	Subordinates of 393 managers of an industrial company; other ratings, multiple sources	α=0.91; no validity reported
Basu and Green (1997)	4 items; one dimension	Supervisors of 225 employees of printing manufacturer; other ratings, single source	α=0.93; no validity reported
Scott and Bruce (1998)	4 items; one dimension	Sample 1: Leaders of 100 professionals in an R&D Facility; other ratings, multiple sources Sample 2: Leaders of R&D engineers working at 4 locations of manufacturer of electronic equipment; other ratings, multiple sources	Sample 1 α=0.86; significant correlation with an objective measure of individual innovation (number of invention disclosures) Sample 2 α=0.84; no validity reported
Janssen (2000)	9 items; one dimension	Self-ratings of 170 employees of a food	α=0.95 (self-ratings) and 0.96

Study	Items and dimensions	Sample and self or other ratings	Reliability and validity
		manufacturer and 110 supervisors (other) ratings of innovative behavior, multiple sources	(supervisor ratings); significant correlation between both scales (r=0.35)
Kleysen and Street (2001)	14 items; one dimension	225 employees from different organizations; self-rating, single source	α=0.97; no support of validity (inadequate fit of structural equation model)
Krause (2004)	8 items related to two dimensions (5 items of creativity and 3 on implementation)	339 middle managers from different German organizations; Self-ratings, single source	α=0.78 and 0.81 are reported; exploratory factor analysis shows the 2 factors are factorially distinct
Dorenbosch, van Engen and Verhagen (2005)	16 items related to 2 dimensions (10 items on creativity and 6 on implementation)	132 non-managerial employees in Dutch local government organization; self-ratings, single source	α=0.90 and 0.88 are reported; the additive scale of both dimensions had α=0.92; no validity reported
Reuvers et al. (2008)	4 items; one dimension	335 respondents in 4 Australian hospitals; self-rating, single source	α=0.86; no validity reported

As seen in the table, most studies measured IWB with single dimensions, but different items. The samples were varied, as were the type of sources. The studies had items ranging in number from 4 to 16, different sources from both managers and employees, high reliabilities ($\alpha > .74$), with validity and no validity reports. The studies in the table can act as a baseline for further research in the future.

2.1.4 Innovative Work Behavior in Thai Context

Recently, the Thai government had made an effort to raise the quality of community products to a level that matches global standards, and to expand markets to international levels through innovation development activities (Tongboonrawd & Sukpradit, 2007). Thus, the ‘community product project’ became one of the Thai

government's mega-projects, expected to encourage rural Thai entrepreneurs to develop innovative items using their unique knowledge and resources, and to raise prices and earn a living for themselves (Thanathikom, 2005). In an organizational context, however, the innovation of Thai employees might be hindered due to the culture's low acceptance of failure (Wongtada & Rice, 2008).

Most definitions for innovative work behavior were based on studies from western literature (Sutthawart & Pasunon, 2015). In Thai research studies, IWB had been described as a combination of creativity and the implementation of ideas, which leads to idea generation, idea promotion, and idea implementation, benefiting organizations (Boonyam, Chuawanlee, Supparerkchaisakul, & Anurit, 2011; Proyanont, 2011; Sivapitak, 2012). So, exploring innovative work behavior of private-sector employees in the Thai context will prove valuable to businesses.

2.2 Authentic Leadership (AL)

Leadership in organizations was also outstanding, as good leaders can come up with new approaches to current business issues (Arbhasil, 2016). There have been many studies done on leadership, in which researchers proposed various styles of leadership. These styles included Traits; Power and Influence; Behavioral Leadership; Situational Leadership; Transactional Leadership; Charismatic Leadership; and Transformational Leadership (McCleskey, 2014). Many studies later added more concepts related to modernized leadership and introduced Servant Leadership, Spiritual Leadership, Ethical Leadership, Super-Leadership, Self-Leadership, and, more recently, Authentic Leadership (AL) (Yukl, 1998). It was apparent that leadership styles were becoming increasingly focused on 'inner-spiritual' aspects. These new concepts showed that people were more interested in the effects of emotional and psychological responses towards individual behavior and team performance (Houston, 2019). This study, therefore, focused on Authentic Leadership, a style recognized as an excellent approach to organizational leadership that can meet the challenges of the present. AL served as a positive, genuine, transparent, and ethical form of leadership (Avolio & Luthans, 2003; Avolio & Gardner, 2005; Avolio et al., 2004; George, 2003; Walumbwa et al., 2008).

2.2.1 Definition of Authentic Leadership

There are various definitions of AL, mostly refer to positive characteristics as responsibilities, good relationship, professional effectiveness, being consistent and self-disciplined, and the like, as shown in Table 2.2. In the early 21st century, studies of AL uncovered four important factors: (1) Self-awareness: a degree of how well leaders demonstrate awareness of their strengths, limitations, and impact on others (Kernis, 2003; Walumbwa et al., 2008); (2) Balanced processing: a degree of the leaders' ability to analyze data before finalizing a decision, and of how well they could keep their minds clear in tough situations (Gardner, Avolio, Luthans, May, & Walumbwa, 2005; Walumbwa et al., 2008); (3) Internalized moral perspective: the leaders' standards for moral and ethical conduct. Their actions would be based on these internal ethics and values (including group, organizational, and societal pressures); therefore, the leaders' decisions would reflect, and depended on internalized values (Avolio & Gardner, 2005; Gardner et al., 2005; Walumbwa et al., 2008). (4) Relational Transparency: the degree of the leaders' authenticity and honesty to others, how open they were with information, and how well they welcomed new ideas, changes, and opinions. (Avolio & Gardner, 2005; Gardner et al., 2005; Walumbwa et al., 2008)

Table 2.2 Summary of the definition of authentic leadership (AL)

Source	Definition
Rome and Rome (1967) p. 185	"A hierarchical organization, in short, like an individual person, is 'authentic' to the extent that, throughout its leadership, it accepts finitude, uncertainty, and contingency; realizes its capacity for responsibility and choice; acknowledges guilt and errors; fulfills its creative, managerial potential for flexible planning, growth, and charter or policy formation; and responsibly participates in the wider community."
Henderson and Hoy (1982) p. 67–68	"Leadership authenticity is therefore defined as the extent to which subordinates perceive their leader to demonstrate the acceptance of organizational and personal responsibility for actions, outcomes, and mistakes; to be non-manipulating of subordinates; and to exhibit salience of self over role. Leadership inauthenticity is defined as the extent to which subordinates perceive their leader to be 'passing the buck' and blaming others and circumstances for errors and outcomes; to be manipulative of subordinates; and to be demonstrating a salience of role over self."

Source	Definition
Bhindi and Duignan (1997) p. 119	"In this article, the authors argue for authentic leadership based on authenticity, which entails the discovery of the authentic self through meaningful relationships within organizational structures and processes that support core, significant values; intentionality, which implies visionary leadership that takes its energy and direction from the good intentions of current organizational members who put their intellects, hearts, and souls into shaping a vision for the future; a renewed commitment to spirituality, which calls for the rediscovery of the spirit within each person and celebration of the shared meaning, with the purpose of relationship; a sensibility to the feelings, aspirations, and needs of others, with special reference to the multicultural settings in which many leaders operate in the light of the increasing globalizing trends in life and work."
Begley (2001) p. 353	"Authentic leadership may be thought of as a metaphor for professionally effective, ethically sound, and consciously reflective practices in educational administration. This is knowledge-based leadership, values informed, and skillfully executed."
George (2003) p. 12	"Authentic leaders use their natural abilities, but they also recognize their shortcomings and work hard to overcome them. They lead with purpose, meaning, and values. They build enduring relationships with people. Others follow them because they know where they stand. They are consistent and self-disciplined. When their principles are tested, they refuse to compromise. Authentic leaders are dedicated to developing themselves because they know that becoming a leader takes a lifetime of personal growth."
Avolio and Luthans (2003) p. 243	"We define authentic leadership in organizations as a process that draws from both positive psychological capacities and a highly developed organizational context, which results in both greater self-awareness and self-regulated positive behaviors on the part of leaders and associates, fostering positive self-development. The authentic leader is confident, hopeful, optimistic, resilient, transparent, moral/ethical future-oriented, and gives priority to developing associates into leaders themselves. The authentic leader does not try to coerce or even rationally persuade associates, but rather the leader's authentic values, beliefs, and behaviors serve to model the development of associates."
Avolio et al. (2004) p. 4 as cited in Avolio, Gardner et al. (2004, pp. 802, 803)	Authentic leaders are "those individuals who know who they are, what they think and behave and are perceived by others as being aware of their own and others' values/moral perspective, knowledge, and strengths; aware of the context

Source	Definition
	in which they operate; and who are confident, hopeful, resilient, and of high moral character."
Begley Begley (2001) p. 5	Authentic leadership is a function of self-knowledge, sensitivity to the orientations of others, and technical sophistication that leads to a synergy of leadership action."
Ilies, Morgeson, and Nahrgang (2005) p. 374	"Authentic leaders are deeply aware of their values and beliefs, they are self-confident, genuine, reliable, and trustworthy, and they focus on building followers' strengths, broadening their thinking and creating a positive and engaging organizational context."
Shamir and Eilam (2005) p. 399	"Our definition of authentic leaders implies that authentic leaders can be distinguished from less authentic or inauthentic leaders by four self-related characteristics: 1) the degree of person role merger, i.e. the salience of the leadership role in their self-concept, 2) the level of self-concept clarity and the extent to which this clarity centers around strongly held values and convictions, 3) the extent to which their goals are self-concordant, and 4) the degree to which their behavior is consistent with their self-concept."
Shamir and Eilam (2005) p. xxxi	Authentic leaders are "genuine people who are true to themselves and to what they believe in. They engender trust and develop genuine connections with others. Because people trust them, they are able to motivate others to high levels of performance. Rather than letting the expectations of other people guide them, they are prepared to be their own person and go their own way. As they develop as authentic leaders, they are more concerned about serving others than they are about their own success or recognition."
Walumbwa et al. (2008) p. 94	"[W]e define authentic leadership as a pattern of leader behavior that draws upon and promotes both positive psychological capacities and a positive ethical climate, to foster greater self-awareness, an internalized moral perspective, balanced processing of information, and relational transparency on the part of leaders working with followers, fostering positive self-development."
Whitehead (2009) p. 850	"In this article, a definition of an authentic leader is adopted as one who: (1) is self-aware, humble, always seeking improvement, aware of those being led and looks out for the welfare of others; (2) fosters high degrees of trust by building an ethical and moral framework; and (3) is committed to organizational success within the construct of social values."

Source: Gardner, Cogliser, Davis, and Dickens (2011) p. 1122.

Ladkin and Taylor (2010) pointed out that the existing definitions of authentic leadership were not yet unified, but that three common themes could be identified in all

of them. They defined that authentic leadership was seemingly informed by honesty and integrity. Second, self-awareness was a crucial component of authentic leadership. The last common one was that researchers associated authentic leadership with morality and charisma.

2.2.2 Theoretical Development of Authentic Leadership Constructs

Authentic leaders could influence many aspects of their followers' behavior (e.g., see the special issue edited by Avolio and Gardner (2005); see also, Avolio and Luthans (2003), and Avolio and Walumbwa (2014). Many studies had explored the development of AL and the behaviors of followers (Avolio et al., 2004; Gardner, Avolio, Luthans, May, & Walumbwa, 2005; George, 2003; Ilies et al., 2005).

Mainly, Avolio et al. (2004), who extracted the critical portraits of positive organizational behavior, such as keeping employees engaged, making them feel important or treating them equally (Luthans, 2002; Luthans & Avolio, 2009; Luthans & Youssef, 2007) and identified theories to describe authentic leaders who influence follower attitudes, behaviors, and performance. Among the mentioned studies above, an Authentic Leadership questionnaire by Walumbwa et al. (2008) was developed using 16 items and 4 subscales: self-awareness (4 items), relational transparency (5 items), internalized moral perspective (4 items), and balanced processing (3 items). The four-dimension model of Walumbwa et al. (2008) authentic leadership had subsequently been operationalized and validated through this study's Authentic Leadership Questionnaire (ALQ). In Table 2.3, the conceptual definitions and measures of authentic leadership used in published research were summarized and explained the development of AL measurement tools.

Studies were done, which also showed that authentic leadership directly influenced team members' creativity and innovation (Černe et al., 2013). The creative performance of employees was quite often dependent on leadership, demonstrated by several conceptualizations and empirical studies (Oke et al., 2009; Oldham & Cummings, 1996; Scott & Bruce, 1994). Although leadership that stimulated innovation had been a subject of much research, its effect on creativity and implementation of creative ideas (Amabile, 1988) had not been studied in enough detail (Crossan & Apaydin, 2010). Only some research findings had reported particular

leadership styles having effects on levels of creativity in organizations. Although the evidence for what styles of leadership are most beneficial for creative groups or teams was still lacking (Paulus & Dzindolet, 2008). This study, therefore, focused on authentic leadership, an emerging field of research (Avolio & Luthans, 2003; Gardner et al., 2005; George, 2003; Walumbwa, Wang, Wang, Schaubroeck, & Avolio, 2010), and its influences on creativity and innovation. This study developed a multilevel model to explain how authentic leadership was related to creativity at the individual level and innovation at the team level. Also, in line with a proposal by Gumusluoglu and Ilsev (2009), it examines how leadership and creativity could be affected by support for innovation.

Table 2.3 Summary of conceptual definitions and measures of authentic leadership used in published research

Study and Construct Label	Reported Conceptual Definition of Authentic Leadership	Operationalized Dimensionality and Measure Used
Henderson and Hoy (1982) pp. 67–68; authentic leadership	"The extent to which subordinates perceive their leader to demonstrate the acceptance of organizational and personal responsibility for actions, outcomes, and mistakes.; to be non-manipulating of subordinates; and to exhibit salience of self over role. Leadership inauthenticity is defined as the extent to which subordinates perceive their leader to be "passing the buck" and blaming others and circumstances for errors and outcomes; to be manipulative of subordinates; and to be demonstrating a salience of role over self"	Leader Authenticity Scale (LAS); developed for this study; 32 items
Eigel and Kuhnert (2005); LDL	"As leaders move from lower to higher LDLs, there is a transition in the knowing self-realm (intrapersonal) from an externally defined understanding of self to an internally defined understanding of self, in the	LDL (Leadership Development Level) semi-structured interview (no citation provided); interview coded into 20 scores (5 distinctions for each of the four LDLs)

Study and Construct Label	Reported Conceptual Definition of Authentic Leadership	Operationalized Dimensionality and Measure Used
	knowing others realm (interpersonal) from self-focus to other-focus, and in the knowing our world realm (cognitive) from simplicity to complexity … The highest LDLs exhibit … a more authentic way to lead"	
Jensen and Luthans (2006a); authentic leadership	"A process that draws from both positive psychological capacities and a highly developed organizational context, which results in both greater self-awareness and self-regulated positive behavior on the part of leaders and employees, fostering positive self-development." "The authentic leader is confident, hopeful, optimistic, resilient, transparent, moral/ethical, future-oriented, and gives priority to developing employees to be leaders' (p. 647; cited in Luthans & Avolio, 2003, p. 243)."	Authentic leadership (Jensen & Luthans, 2006b); summed scores from the following three measures: 30 items from the MLQ (Form 5X) (Bass & Avolio, 1993); 8 items from the ENTRESCALE (Entrepreneurial Orientation) (Knight, 1997); and 7 items from the caring and reverse-scored items of the ECQ (Victor & Cullen,1988)
Jensen and Luthans (2006b); authentic entrepreneurial leadership	"An authentic leader is one who is not only true to him/herself but behaves in such a way that followers are also able to gain self-awareness and psychological strength (Jensen & Luthans, 2006b, p. 256; cited in Luthans & Avolio, 2003)." "An authentic leader knows him/herself, and acts in accordance with those beliefs, creating a future-oriented ethical, follower-building climate' (Jensen & Luthans, 2006b, p. 263; Avolio, Gardner et al., 2004; Avolio, Luthans, et al., 2004; Luthans & Avolio, 2003)."	Authentic leadership (Jensen & Luthans, 2006b); summed scores from the following 3 measures: 30 items from the MLQ (Form 5X) (Bass & Avolio, 1993); 8 items from the ENTRESCALE (Entrepreneurial Orientation (Knight, 1997), and 7 items from the caring and reverse-scored items of the ECQ (Victor & Cullen, 1988)
Brown and Gardner	"A process that draws from both positive psychological capabilities and a highly	Examining the positive role-modeling component of the authentic leadership

Study and Construct Label	Reported Conceptual Definition of Authentic Leadership	Operationalized Dimensionality and Measure Used
(2007); authentic leadership	developed organizational context, which results in both greater self-awareness and self-regulated positive behaviors on the part of both leaders and associates, fostering positive self-development. (Brown & Gardner, p. 56, cited in Luthans & Avolio, p. 243)."	process (Gardner, Avolio, Luthans et al., 2005), including leader integrity, through structured and open-ended questions.
Tate (2008); authentic leadership	"This research describes authentic leadership as 'a form of leadership concerned with developing positive leader-follower relationships (May et al., 2003), high moral standards, and integrity (Avolio, Gardner et al., 2004)" (Tate, 2008, p. 18). "The authentic leadership measure is based on George's (2003) five dimensions of authentic leadership: demonstrating self-discipline, leading with heart, establishing enduring relationships, practicing solid values, and passion for purpose."	Authentic leadership measure (developed for this study) uses 17 items based on George's (2003) conceptual dimensions of authentic leadership. 3 subscales: self-discipline and ethical standards (9 items), establishing positive relationships (4 items), and passion for purpose (4 items). 17 items are summed to form a composite authentic leadership score.
Walumbwa et al. (2008); authentic leadership	"A pattern of leader behavior that draws upon and promotes both positive psychological capacities and a positive ethical climate to foster greater self-awareness, an internalized moral perspective, balanced processing of information, and relational transparency on the part of leaders working with followers, fostering positive self-development." (Walumbwa et al., 2008, p. 94).	The ALQ was developed for this study) using 16 items and 4 subscales: self-awareness (4 items), relational transparency (4 items), internalized moral perspective 4 items), and balanced processing (3 items). 4 dimensions form a higher-order authentic leadership factor.
Clapp-Smith, Vogelgesang, and Avey (2009);	"A process by which leaders are deeply aware of how they think and behave, of the context in which they operate, and are	This ALQ used in Clapp-Smith et al. (2009) was developed by Walumbwa et al. (2008). It uses 16

Study and Construct Label	Reported Conceptual Definition of Authentic Leadership	Operationalized Dimensionality and Measure Used
authentic leadership	perceived by others as being aware of their own and others' values/moral perspectives, knowledge, and strengths' (Clapp-Smith et al., 2009, p. 229; cited in Avolio, Gardner et al., 2004; Avolio, Luthans et al., 2004)."	items and 4 subscales: self-awareness (12 items), unbiased processing (10 items), behaviour (11 items), and relational orientation (12 items). These are summed to form a composite authenticity score.
Toor and Ofori (2009); authentic leadership	"[A] pattern of leader behavior that draws upon and promotes both positive psychological capacities and a positive ethical climate, to foster greater self-awareness, an internalized moral perspective, balanced processing of information, and relational transparency on the part of leaders working with followers, fostering positive self-development' (Toor & Ofori, 2009, p.301, cited in Walumbwa et al., 2008, p. 94)."	Toor and Ofori (2009) use the 45-item Authenticity Inventory or AI:3 created by Kernis and Goldman (2005, 2006), which uses 4 subscales: self-awareness (12 items), unbiased processing (10 items), behaviour (11 items), and relational orientation (12 items). These are summed to form a composite authenticity score.
Wong and Cummings (2009a, 2009b); authentic leadership	"Authentic leadership is 'a process that draws from both positive psychological capacities and a highly developed organizational context, which results in both greater self-awareness and self-regulated positive, behaviors on the part of leaders and associates, fostering positive self-development' (p. 7, cited in Avolio & Gardner, 2005, p. 321)."	This study uses single items reflecting 7 leadership behaviors (self-awareness, relational transparency, balanced processing, ethical behavior, trustworthiness, supportiveness, and empowering) selected from the LPI created by Kouzes and Posner (2003). The items are used as single indicators for the latent leadership concepts in an SEM analysis.
Giallonardo, Wong, and Iwasiw (2010); authentic leadership	"A process that draws from both psychological capacities and a highly developed organizational context, which results in both greater self-awareness and self-regulated positive behaviors on	Giallonardo et al. (2010) use the ALQ's 16 items (Walumbwa et al., 2008). The items are summed to form a composite authentic leadership score.

Study and Construct Label	Reported Conceptual Definition of Authentic Leadership	Operationalized Dimensionality and Measure Used
	the part of leaders and associates, fostering positive self-development' (Giallonardo et al., 2010, p. 993, cited in Luthans & Avolio, 2003, p. 243)."	
Spitzmuller and Ilies (2010); authentic leadership	Goldman and Kernis (2002) described relational authenticity as "involving valuing and achieving openness and truthfulness in one's close relationships …and the development of mutual intimacy and trust" (p. 19). Based on this definition, Ilies et al. (2005) propose that leaders with a relational authenticity will strive for open and truthful relationships with their followers, and such orientation will have a number of positive outcomes' (Spitzmuller & Ilies, 2010, p. 307).	Authentic leadership is measured with 45 items from the Authenticity Inventory (Goldman & Kernis, 2001). Four subscales are used: self-awareness (12 items), unbiased processing (10 items), and authentic behavior (11 items), and authentic relational orientation (12 items). These are summed to form a composite authenticity score
Walumbwa, Hartnell, and Oke (2010); authentic leadership	"Authentic leaders display four types of behaviors. These include balanced processing, internalized moral perspective, relational transparency, and self-awareness" (Walumbwa et al., 2010, p. 902, cited in Gardner, Avolio, Luthans, et al., 2005; Gardner et al., 2005a, 2005b; Ilies et al., 2005; Walumbwa et al., 2008).	Walumbwa et al. (2008) use their ALQ, which has 16 items with four subscales: self-awareness (4 items), relational transparency (5 items), internalized moral perspective (4 items), and balanced processing (three items). The 16 items are summed to form a composite authentic leadership score.
Wong, SPENCE LASCHINGER, and Cummings (2010); Authentic leadership	Authentic leadership 'focuses on the positive role modeling of honesty, integrity and high ethical standards in the development of leader-follower relationships' (Wong et al., 2010, p. 890).	Wong et al. (2010) use the ALQ (Walumbwa et al., 2008), which has 16 items and 4 subscales: self-awareness (4 items), relational transparency (5 items), internalized moral perspective (4 items), and balanced processing (3

Study and Construct Label	Reported Conceptual Definition of Authentic Leadership	Operationalized Dimensionality and Measure Used
		items). The 16 items summed to form a composite authentic leadership score.
Neider and Schriesheim (2011); authentic leadership	'Using the Walumbwa et al. four-dimension definitions as guides' (p.1148). Thus, there are four dimensions of authentic leadership: self-awareness; relational transparency, balanced processing, and internalized moral perspective.	The ALI (developed for this study) is used; it consists of four dimensions with 14 items: self-awareness (3 items); relational transparency (3 items); balanced processing (3 items); and internalized moral perspective (3 items).
Sangmookda (2011); authentic leadership	Authentic leaders are leaders who 'are aware of their strengths and weaknesses and act accordingly to their self-moral standard' (Sangmookda, 2011, p.85)	The measurement, developed in the Thai context consists of 5 dimensions with twenty-one items: self-awareness (5 items); relational transparency (5 items); balanced processing (4 items); internalized moral perspective (4 items); and learning from the future (3 items).

Source: Gardner et al. (2011), pp. 1135-1136.

2.2.3 Authentic Leadership in Thai Context

Thai employees were likely to dedicate themselves to leaders they respected (Baczek, 2013), usually those with traits such as proper decision making based on kindness, and non-aggressiveness (Selvarajah, Meyer, & Donovan, 2013). Leaders with straightforward, ambitious, and aggressive personalities, such as those in Western settings, were less accepted by and unlikely to succeed in Thai organizations (Komin, 1990). National culture, organizational culture, personal religious beliefs, and economic pressures usually influenced performance (Sorod, 1992) and moral perspectives (Franke & Nadler, 2008), as well. Buddhism, the main religion of Thailand, significantly influenced Thai values and moral attitudes (Thakur & Walsh,

2013). Therefore, authentic leadership in the Thai context focused more on ensuring leaders were harmonizing with their followers. Amornpipat and McLean (2016) study declared that Thai authentic leadership consisted of five distinct components: self-awareness, balanced processing, relational transparency, internalized moral perspectives and relational harmony. Boonsathorn (2007) also demonstrated that smooth interpersonal relationships between leaders and followers were important, as Thai culture considered conflict as negative behavior. Thai people had a collectivistic culture (Sorod, 1992), which resulted in citizens who tried their best to avoid confrontations (Boonsathorn, 2007; Gupta, Surie, Javidan, & Chhokar, 2002; Quek, Knudson-Martin, Rue, & Alabiso, 2010). Therefore, encouraging harmonious relationships between leaders and followers was considered a significant aspect of authentic leadership in the Thai context (Amornpipat & McLean, 2016).

2.3 Innovation Adoption (IA)

2.3.1 Definition of Innovation Adoption of Individuals in an Organization

Different theoretical models had been used to explain consumer innovation adoption. Many studies had built upon Rogers (2003) innovation diffusion theory, for example, the Technology Acceptance Model (Davis, 1989), the Theory of Reasoned Action (Ajzen & Fishbein, 1980), or the Theory of Planned Behavior (Ajzen, 1991). Innovation adoption was defined as a consumer's decision to make full use of an innovation Rogers (2003). Consumers' 'adoption intention' and 'adoption behavior' were explained using different variables, while 'innovation adoption' reflected both concepts. In studies on innovation adoption, the characteristics of potential adopters and the perceived characteristics of innovations were factors that significantly affected innovation adoption (Gatignon & Robertson, 1985; Meuter, Bitner, Ostrom, & Brown, 2005; Rogers, 2003; Tornatzky & Klein, 1982). Also, the research on innovation adoption began focusing on other perspectives besides socio-demographic characteristics.

Innovation adoption referred to individuals' acceptance of new ideas, which generated outcomes such as new products, processes, or services (Daft, 1978; Damanpour & Wischnevsky, 2006). Rogers (1995) defined the adoption process as

> "the process through which an individual or other decision-making unit passes from first knowledge of innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and confirmation of this decision."

The adoption of innovation was one of the outcomes of integrating new products, processes, or practices in a company (Damanpour & Wischnevsky, 2006; Kimberly & Evanisko, 1981; Walker, 2008). The innovation adoption process was separated into two steps: (1) having a creative idea and (2) executing that idea (Nystrom, Ramamurthy, & Wilson, 2002; Zaltman, Duncan, & Holbek, 1973). These two processes mainly affected whether the idea would be adopted. The study also included the pre- and post-adoption decisions in the innovation adoption process.

Innovation adoption was defined as an individual process, willingness, and new technology acceptance, as described in Table 2.4. One of the most prominent definitions was the acceptance and implementation of procedures, practices, processes, systems, products, technologies, or services that were new to the adopting organization (Rogers, 1995). Innovation adoption in a company also pointed out that adoption occurred inside the business at a personal level among employees and departments. If a company implemented an idea while employees were still uncertain about adopting it, it was called a 'depending innovation-decision' or a "forced adoption" (Ram & Jung, 1991).

Table 2.4 The definition of individual innovation adoption

Rogers and Shoemaker (1971)	Innovation adoption is an individual process affected by user psychological characteristics, personal traits, and individual perceptions.
Agarwal and Prasad (1998) p. 206	Innovativeness is "the willingness of an individual to try out any new information technology."
Wells, J. D., Campbell, D. E., Valacich, J. S., & Featherman, M. (2010)	Innovation adoption is the individual perceptions of the degree of novelty that impacts the likelihood of technology acceptance.

The critical factors of influencing individual innovation adoption were identified in the studies that needed to examine the magnitude and strength of relevant factors, especially relating to technology acceptance. Moreover, Information Technology (IT) related innovation adoption had become established in research studies (Venkatesh, Morris, Davis, & Davis, 2003). Reviews and re-evaluation of existing literature on IT innovation adoption discovered the strengths, weaknesses, and limitations of existing IT innovation studies. They might provide new research methods for other studies to explore (Venkatesh, Davis, & Morris, 2007). The re-examining and summarizing past innovation adoption research indicated that the main attributes affecting innovation adoption were related to the relative advantage, complexity, compatibility, cost, trialability, and observability of the innovation. However, the relative advantage was identified as one of the most significant factors driving the adoption and use of IT innovations in organizations (Iacovou, Benbasat, & Dexter, 1995). Besides, relative advantage, compatibility, and complexity were also found to be key predictors of IT adoption in organizations (Jeyaraj, Rottman, & Lacity, 2006).

Recent developments in technology acceptance theories had shown that several factors might moderate the effect of acceptance of influencing factors. For example, the Technology Acceptance Model (TAM) proposed that user experiences and voluntariness of use were critical factors affecting whether employees would accept technology (Venkatesh & Bala, 2008). Furthermore, the Unified Theory of Acceptance and Use of Technology (UTAUT) added users' age, gender, and experiences as additional moderators on technology acceptance (Venkatesh, Thong, & Xu, 2012). Empirical studies on the Technology Acceptance Model also investigated moderators of employee's performance. For instance, in their meta-analysis of TAM, W. R. King and He (2006) examined the types of moderators such as gender culture and technology characteristics. Sun and Zhang (2006) proposed that perceived usefulness was more relevant for work-oriented technologies and that ease of use had greater relevance for entertainment-oriented technologies. In a study of hedonic and utilitarian technologies, Van der Heijden (2004) found that enjoyment was a more significant predictor of user acceptance for hedonic technologies than utilitarian ones. A culture-based meta-study on TAM concluded that usefulness was more prominent in Western cultures, but that ease of use mattered more in Eastern cultures (Schepers & Wetzels, 2007). However,

in a study on technology acceptance, Cardon and Marshall (2008) observed mixed results for the moderating effect of uncertainty avoidance as a specific cultural dimension, especially for national culture.

Acceptance of a technology depends on its type, users, and country's culture for Self-Service Technologies (SST). At the same time, moderator analysis had only recently become more focused on individual differences, such as an individual's decision to adopt or reject innovations (Blut, Wang, & Schoefer, 2016). Public perceptions of Self-Service Technologies (SSTs) also differ in different countries (Collier, Sherrell, Babakus, & Horky, 2014). For example, an SST model that had been tested in Australia and Thailand found that the acceptance of the model differed in the two countries (Mortimer, Neale, Hasan, & Dunphy, 2015). Therefore, national culture was found to impact critical factors that lead to the adoption of technology.

By examining two moderators—technology type and national culture—this study differs from prior studies on moderators in a few ways. First, rather than focusing on one specific cultural dimension or highlighting the 'West versus East,' the study examines all of Hofstede (2001) cultural dimensions. This study also looks at the moderating effects of cultural dimensions that had not yet been tested in technology acceptance studies. Second, the study further explores hedonic and utilitarian technology, as well as public and private technology, with investigations contrasting kiosk and Internet technology, and transaction and self-help technology. Third, the study also moves beyond the predictors of perceived usefulness and ease of use targeted in TAM studies. Finally, building on TAM meta-studies, this meta-study examined the moderating effects in the specific context of SST.

This study focuses on the latter process of innovation adoption when ideas were executed in a company. It examines the organization's innovation incubation policies intended to raise their level of competitive performance and effectiveness through the innovative work behavior of employees.

2.3.2 Theoretical Development of Individual Innovation Adoption Constructs

Two terms arise in many innovation adoption theories: adoption: any individual or organization accepting change, and diffusion: the number of users of innovation in a particular market (Rogers, 1995). The adoption process was a "process of an individual or other decision-maker which engaged the fundamental innovative knowledge, transformed it to the innovation, made a decision to adopt or reject, implemented the new idea, and confirmed of this decision" (Rogers, 1995).

Rogers' Diffusion of Innovation Theory explained how new ideas or innovations were adopted based on five attributes: (1) relative advantages, (2) compatibility, (3) complexity, (4) trialability, and (5) observability (Rogers, 1995).

Relative advantages refer to the advantages a new product has, compared to an older product that was being replaced. Rogers' theory also suggested that innovations that had clear, unambiguous advantages over previous technologies would be more easily adopted and implemented. Current research evidence indicated that if potential users realized no relative advantage in using new innovations, they would not adopt them. *Compatibility* was the degree of the suitability of innovations with current values, past experiences, and needs of potential adopters. There was robust research evidence suggesting that the more compatible the innovation, the higher the likelihood of adoption. *Complexity* referred to the degree of acceptance of innovations that are perceived as challenging to understand and use. When employees perceive innovations as being simple to use, they were more likely to adopt them. *Trialability* referred to the degree of which an innovation can be experimented with and tested. Since developing innovations consumed time, energy, and resources, trial procedures would promote the full implementation of innovations. Finally, *observability* referred to how easy it was for potential adopters to see the results of innovations. Any observable positive outcomes from the implementation of new innovations would make them more adoptable (Rogers, 1995).

For innovations to be adopted, employees generally needed to realize their benefits. If they do not, the technology would likely be eventually abandoned. People, by nature, resist change unless they believed that they could directly acquire some benefit from it (Ajzen, 1991). Frambach, Barkema, Nooteboom, and Wedel (1998) noted that changing situations require organizations to keep producing new products and to innovate. Therefore, understanding the innovation adoption process was

extremely significant. Their study also had some relations to a study by Bhattacherjee and Sanford (2006) on the crucial components of IT acceptance, as it helped companies gain performance in efficiency and productivity. Therefore, the factors influencing the acceptance of information technology in the workplace became a concern of scholars and practitioners (Sherif, Zmud, & Browne, 2006; Venkatesh & Davis, 2000). A study on the acceptance of information technology was conducted again by Frambach and Schillewaert (2002). This study revealed that using novel technology significantly improves organizations, therefore offering new approaches or techniques could help employees with adopting them into their daily work habits (Frambach & Schillewaert, 2002). New technologies rapidly replaced old ones due to their novelty and efficiency. Therefore, in summary, understanding the factors and processes that facilitated encourage employees to adopt or accept new technologies with minimal resistance benefits organizational effectiveness (Lee, Park, Yoon, & Park, 2010).

The "Adoption of Innovations by individuals within Organizations: An Australian Study" study conducted by Talukder et al. (2008) explored the determinants of innovation adoption and designed a new theoretical framework that addresses employees' adoption decisions within an organization. The first emphasized the three factors that influenced innovation adoption: (1) organizational factors, (2) individual factors, and (3) social factors. Organizational factors included training, managerial support, and incentives. Individual factors included perceived usefulness, personal innovativeness, prior experience, image, and enjoyment of innovations. Social factors involved peers and social networks. The demographic diversity in the organization (such as gender, age) was classified accordingly. This study focused on individuals' adoption by considering the five aspects of individual factors, as mentioned above.

Lewis, Agarwal, and Sambamurthy (2003) said that individual factors were vital factors of each person's adoption or non-adoption of technological innovations. Many studies had indicated that an individual's perceptions of an innovation's usefulness, innovative personal behavior, past experiences, and perceived challenges of using an innovation impact their willingness to adopt a technological innovation (Davis, 1989; Lewis et al., 2003). Perception of an innovation's usefulness was, in fact, one of the most influential and most significant factors at all points of measurement (Venkatesh et al., 2003). Employees adopted new technologies if they believed they would enhance

their productivity or be beneficial to them (Lee, 2004). Most companies invigorated their employees to be more adopting new technologies through policies and activities. Some employees might be ready to adopt new technologies, while others were not. It was up to the innate tendencies of each person (Frambach & Schillewaert, 2002). Innovative inspirations could occur even if new technologies are not involved (Yi, Fiedler, & Park, 2006). Prior or past technology experience would help to minimize worry while also promoting employee confidence, as well (Fuller et al., 2007). According to Hill, Smith, and Mann (1987), previous experiences could surely change the perceptions of individuals as well. Employees might adopt new technologies that could lead them to improve their job performance, as well as their image, status, and importance within a group (Venkatesh & Davis, 2000). Finally, enjoyable outcomes also influenced employees' adoption decisions (Venkatesh & Brown, 2001). Altogether, the five factors that influenced innovation adoption of employees in a company were (1) perception of usefulness, (2) employee innovativeness, (3) past experiences, (4) image, and (5) enjoyable outcomes.

Table 2.5 Summary of dimensions in innovation adoption/construct definition and theoretical roots.

Category	**Construct**	**Definition**	**Theoretical Roots**		
				UTAU	
			TAM	**T**	**Other**
Outcomes	Usage Behavior	Actual system uses in the context of technology acceptance (Davis, Bagozzi, & Warshaw, 1989)	x	x	x (IDT)
	Usage intention	The strength of one's intention to perform a specified behavior (e.g., using an SST; (Davis et al., 1989)	x	x	
Mediators	Attitude toward using	An individual's positive or negative feelings (evaluative affect) about performing the targeted behavior (Venkatesh et al., 2003)	x		

Category	Construct	Definition	Theoretical Roots		
			TAM	UTAUT	Other
	Usefulness	The subjective probability that using a technology would improve the way a user could complete a given task (Davis et al., 1989)	x	x (Performance Expectancy)	x (IDT; relative advantage)
	Ease of use	The degree to which a user would find the use of a technology to be free from effort (Davis et al., 1989)	x	x (Effort Expectancy)	x (IDT; complexity)
Determinants	Subjective norm	A person's perception that most people who are important to him or her think he or she should or should not perform the behavior in question (Venkatesh et al., 2003)	x	x (Social Influence)	
	External Control	The degree to which an individual believes that organizational and technical resources exist to support the use of the system (Venkatesh et al., 2003)	x	x (Facilitating Conditions)	
	Enjoyment	The extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use (Venkatesh, 2000)	x	x (Hedonic Motivation)	
	Image	The degree to which an individual perceives that use of an innovation will enhance his or her status in his or her	x		X (IDT)

Category	Construct	Definition	Theoretical Roots		
			TAM	UTAUT	Other
		social system (Moore & Benbasat, 1991)			
	Result demonstrability	The degree to which an individual believes that the results of using a system are tangible, observable, and communicable (Moore & Benbasat, 1991)	x		X (IDT; Observability)
	Self-efficacy	The degree to which an individual believes that he or she has the ability to perform a specific task/job using the computer (Venkatesh, 2000)	x		
	Anxiety	The degree of an individual's apprehension, or even fear, when he or she is faced with the possibility of using computers (Venkatesh, 2000)	x		
	Computer playfulness	The degree of cognitive spontaneity in microcomputer interactions (Venkatesh, 2000)	x		
	Habit	The extent to which people tend to carry out behavior (e.g., using SSTs) automatically because of learning (Venkatesh et al., 2012)		x	
	Age	Customer age		x	
	Gender	Customer gender		x	
	Experience	A customer's prior experience using technology in general (Meuter et al., 2005)		x	

Category	Construct	Definition	Theoretical Roots		
			TAM	UTAUT	Other
	Compatibility	The degree to which an innovation is perceived as being consistent with existing values, needs, and experiences of potential adopters (Moore & Benbasat, 1991)			x (IDT)
	Trialability	The degree to which an innovation may be experimented with before adoption (Moore & Benbasat, 1991)			x (IDT)
	Risk	Customer concerns about security, system failure, reliability, and other personal, psychological, or financial risks associated with using technology (Walker, 2008)			x (SST)
	Technology readiness	People's propensity to embrace and use new technologies to accomplish goals in home life and at work (Parasuraman & Colby, 2015)			x (SST)
	Need for interaction	The desire to retain personal contact with others (particularly frontline service employees) during a service encounter (Dabholkar, 1996)			x (SST)

Note. SST represents constructs outside TAM, UTAUT, and IDT, but relevant in SST research. Constructs in brackets are synonyms in respective theories. UTAUT = unified theory of acceptance and use of technology; SSTs = self-service technologies; IDT = innovation diffusion theory; TAM = technology acceptance model.

2.3.3 Individual Innovation Adoption in the Thai Context

Techakittheerapong (2015), from the Faculty of Commerce and Accountancy at Thammasat University, conducted a study on "Factors Affecting Employee Adoption of Collaboration Technology in Thai Organizations." The study was based on a theory called the "Unified Theory of Acceptance and Use of Technology or UTAUT," based on the research of Venkatesh et al. (2003). Her study explained the factors affecting technology acceptance in many different situations (Techakittheerapong, 2015). The model used to describe the adoption of collaborative technology contained five aspects: (1) Performance Expectancy, (2) Effort Expectancy, (3) Social Influence, (4) Facilitating Conditions, and (5) Compatibility. The outcome of this research study showed that these five factors were significantly related to IT acceptance organizations, with performance expectancy having the most significant impact and effort expectancy having the least.

2.4 Authentic Leadership (AL) and Innovative Work Behavior (IWB)

The creative performance of employees was quite often dependent on leadership, as shown in many conceptualizations and empirical studies (Oke et al., 2009; Oldham & Cummings, 1996; Scott & Bruce, 1994). Although leadership that promoted innovation has been a subject of much research, its connection with innovation processes, creativity, and the implementation of creative ideas (Amabile, 1988), had not been studied in enough detail (Crossan & Apaydin, 2010). Some research findings had reported the effects of particular leadership styles on creativity in organizations, however. Still, the evidence for what combination of leadership behaviors were most appropriate for creative groups or teams was lacking (Paulus & Dzindolet, 2008).

Authentic Leadership (AL) was a style of leadership that focuses on emphasizing positive achievements rather than flaws (Jensen & Luthans, 2006; Peterson & Luthans, 2003). It promoted employees' trust, resulting in higher emotional safety and comfort, which might lead to propositions of novel ideas (Avolio et al., 2004). AL appeared to be suitable for stimulating creativity and innovation. More research in the mechanisms of AL found that employee behaviors could now be better understood (Walumbwa et

al., 2011; Yammarino, Dionne, Schriesheim, & Dansereau, 2008). This study was also consistent with a recent review by Gardner et al. (2011), who theorized about and empirically tested the effects of authentic leadership on creativity and innovation.

Multilevel research was found on the determinants of innovation and creativity, including leadership intentions (Crossan & Apaydin, 2010). Both creativity and innovation were complex phenomena, subject to several contextual and social influences (Agars, Kaufman, & Locke, 2008). Cross-level influences were critical in identifying and understanding factors that could facilitate or stifle creative behavior in complex social systems (Amabile & Mueller, 2008; Shalley & Zhou, 2008). Published work had tended to take place ‘in level' (Tierney, 2008), and has been primarily leader-focused and based on differences between individuals (Yammarino et al., 2008). Authentic leaders enhanced employees' innovative behaviors and created attitudes that were beneficial to innovative activities (Oke et al., 2009).

Furthermore, the factors that affected creativity might not have the same impact on innovation (Agars et al., 2008). Even though creativity and innovation might be different and could not be stimulated in the same way by the same factors (West, 2002), the literature on innovation could be based on creativity research (Runco, 2008). Creativity was one of the most critical determinants of innovation (Amabile, 1988), and most studies on them had isolated both (Agars et al., 2008). Researchers still mostly avoided investigating the complexity of creativity and innovation together, as the gap caused by the segregation of creativity and innovation research was just beginning to be addressed (Baer, 2012). In the past studies, it was confirmed that AL had a positive relationship with employees' creativity and innovativeness. Per employees' creativity, it was also reinforcing the innovativeness as well (Müceldili, Turan, & Erdil, 2013).

Even if both creativity and innovation could be practiced at different levels in organizations (Agars et al., 2008), several researchers argued that creativity should be investigated at the individual level, and innovation at the team or organizational level (Amabile, 1996; Nijstad & De Dreu, 2002). Group factors and leadership had received the most attention in the literature as two areas of social influence that had the most impact on creativity and innovation (Agars et al., 2008).

Therefore, the core purpose of authentic leadership was to boost employees’ innovative work behavior by bolstering employee confidence and by assisting

employees in complex situations to support novel idea generation and implementation. This study focuses on leaders in organizations intending to investigate similar effects in the Thai context.

Hypothesis 1: Authentic leadership has a positive effect on innovative work behavior.

2.5 Innovation Adoption (IA) and Innovative Work Behavior (IWB)

Categorizing and assessing employee innovativeness could impact organizational policies and competitive advantages (McGuirk, Lenihan, & Hart, 2015). It has been shown that organizational situations and attitudes do influence the motivation and intentions of employees (Le Bon & Merunka, 1998). A study revealed that beneficial effects would occur when innovative employees experience an atmosphere of organizational support, feelings of freedom, feedback, and feel positively challenged by their work (Amabile & Gryskiewicz, 1989; Jaskyte & Kisieliene, 2006; Oldham & Cummings, 1996). Therefore, employees had to utilize innovation to gain advantages in an organization. If employees did not have innovation accepting attitudes, organizations might be confronted with business challenges due to a lack of new technologies or novelty to compete with other companies (Talukder et al., 2008). It was natural for employees to resist change; however, if they received benefits from the said change, it was likely that they would cooperate (Ajzen, 1991). New technologies were quickly replacing old ones with better implementation (Talukder et al., 2008). Adoption of innovation would succeed when employees both accepted and effectively used the innovation they have adopted (Lee & Xia, 2006). Therefore, the effect of innovation adoption on innovative work behavior in Thai working environments should be explored, as stated in the following hypothesis.

Hypothesis 2: Innovation adoption has a positive effect on innovative work behavior.

2.6 Innovation Adoption (IA) as a Moderator

Creativity was well-defined as the ability to come up with new and useful ideas concerning products, services, processes, and procedures (Amabile, 1988; Oldham & Cummings, 1996). In the era of the knowledge economy, the growth of innovations was becoming increasingly significant for an organization's competitive advantage. However, some countries do not understand the significance of innovation, leading to declining support for it (Prokop, Stejskal, & Kuvíková, 2017). The decision to accept innovations was one of the employees, not the organization. Therefore, innovation turns out to be a crucial factor in the growth and recovery of nations (Buesa, Heijs, & Baumert, 2010). Many studies on innovation and human capital have widely explored levels of innovation at both regional and national levels (McGuirk et al., 2015). One study revealed the determinants of firm-level innovation across different firm sizes. The evidence from the results showed that innovation relating to human capital might be more valuable to small firms (less than 50 employees), especially for training and promoting a willingness to change (McGuirk et al., 2015). Small firms with managers who participated in training and were willing to adopt change, were also more likely to innovate. The same study also found that small firms that have innovative employees were also more likely to engage in service, product, or process innovations. In the case of larger-sized firms (more than 50 employees), the findings supported that firms with managers that participated in the training were more likely to innovate in terms of new ideas or behaviors that lead to significant workplace improvements (McGuirk et al., 2015). Therefore, innovation adoption of managers also plays a vital role in the link between leadership and work behavior.

The target company of this study has innovation in its core values, as well as creativity and innovation embedded in the company's culture. The company intends to nurture innovation through inventive processes, creative work environments, and unique solutions in order to challenge itself and benefit company stakeholders continually. Most employees are encouraged to get involved in the company's innovation exhibition activities, which have been sponsored for more than 5 years. A corporate innovation committee also accepts and welcomes personal initiatives of innovation or personal innovativeness. New technologies relating to robotics, artificial

intelligence, cloud systems, automation, and computer applications are incubated, introduced, and implemented in working environments. The latest company engagement questionnaire, conducted in 2018, showed that more than 80% of employees were satisfied with innovation in the workplace. Therefore, the level of innovation adoption among employees would be considered to be a significant moderator of innovative work behavior in the company. The moderating effect should be further explored and studied in a Thai working environment, as stated in the following hypothesis.

Hypothesis 3: Innovation adoption moderates the effect of authentic leadership on innovative work behavior.

2.7 Research Framework and Hypotheses

The research framework was designed using a quantitative approach. Figure 1 shows the conceptual framework portraying the effects of authentic leadership (AL) and individual innovation adoption (IA) on innovative work behavior (IWB), along with the components of each variable proposed in this study.

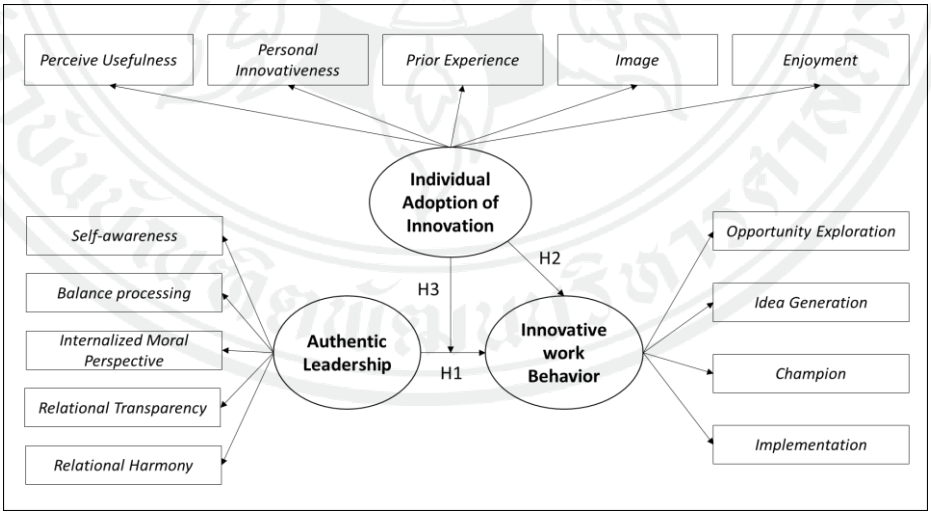

Figure 2.1 The conceptual framework portraying the overall effects among authentic leadership (AL), innovation adoption (IA), and innovative work behavior (IWB).

In summary, the study aims to prove three significant hypotheses, which are as follows:

Hypothesis 1: Authentic leadership (AL) has a positive effect on innovative work behavior (IWB).

Hypothesis 2: Innovation adoption (IA) has a positive effect on innovative work behavior (IWB).

Hypothesis 3: Innovation adoption (IA) moderates the effect of authentic leadership (AL) on innovative work behavior (IWB).

CHAPTER 3

METHODOLOGY

The research methodology utilizes quantitative analysis, and aims to study (1) the effects of authentic leadership (AL) on innovative work behavior (IWB), (2) the effects of innovation adoption (IA) on innovative work behavior, and (3) if innovation adoption (IA) moderates the effect of authentic leadership (AL) on innovative work behavior (IWB), in the Thai context. Questions on AL and IWB were reviewed based on Amornpipat's study (2016) to meet one of the objectives of this study: employee self-assessment. The IA question items were newly constructed for this study and based on the individual innovation adoption variables suggested by Talukder et al. (2008). Using the Index of Item – Objective Congruence Method (IOC), the IA question items were run through a procedure used in test development for evaluating content validity at the item development stage with Exploratory Factor Analysis (EFA) and Confirmation Factor Analysis (CFA). The samples, instruments, and data collection/analysis utilized in this study are described in detail in this chapter.

3.1 Population and Sample

The sample population focuses on employees with positions from staff to middle management level in a Thai agricultural and food company that operates businesses, mainly in the agricultural and food industry, in more than 13 countries. This Thai conglomerate has embedded and integrated innovation adoption directly into their corporate values. The selected company has also launched many innovative programs, such as their innovation strategies/policies or exhibitions for different innovative projects, arranged and promoted by the company for more than five years. The purposive sampling method was selected as an approach. Since the multiple regression analysis and factor analysis were used to conduct this study, the pilot sample should be at least 100 (Wongwanich & Wiratchai, 2003). So, the pilot study was estimated at

around 200. According to Crazy and Morgan's Table, if the number of white-collar employees in the affiliated business units in this conglomerate population was about 25,000 employees, the appropriate samples for the study would be 379 (Krejcie & Morgan, 1970). However, this study had its focus on 1,000 samples to cover both genders and various ages, positions, business functions, and years of service.

3.2 Variables Studied and Their Operational Definitions

3.2.1 Innovative work behavior (IWB) variable

Innovative work behavior was defined as the integration of a set of behaviors that could initiate the development of new and useful ideas. Such ideas can be used to create new products, improve work routines, or organizational processes, with the focus being to gain a competitive advantage and to maximize organizational performance. Therefore, this study, based on work by J. P. De Jong and Den Hartog (2007), explores the four perspectives of innovative work behavior; (1) opportunity exploration, (2) idea generation, (3) championing, and (4) implementation. Opportunity exploration refers to an employee's exploration of opportunities to improve things like products, services, or work procedures. Employees should be informed about the change, stay up to date with recent events, and look for any opportunities for professional career improvement. Idea generation refers to employees generating new ideas, approaches, or policies. These could be any concepts for improving processes, products, and services. Championing would more be focused on an employee's efforts to encourage the development of ideas and to look for support for new projects. The employees must be able to provide detailed information and resource-based evidence. They must also ensure that their peers, bosses, and related executives understood and were willing to give them a hand. Implementation emphasized on the employees freely created a detailed work plan and took action to push out all the deliverables to develop a new idea or launch a new product. The actions included the creation of the virtual or physical prototype to examine and improve the integration of the innovation into an existing environment of the company.

3.2.2 Authentic leadership (AL) variable

The Authentic Leadership variable was based on Avolio et al. (2007) and another recent study (Amornpipat, 2016). The five traits/factors were (1) self-awareness, (2) relational transparency, (3) balanced processing of relevant information, (4) internalized moral perspective, and (5) relational harmony, with the fifth trait being a factor exclusive to Thai authentic leadership. Self-awareness was a trait of leaders who express mindfulness and self-acceptance of their values, feelings, identity, and goals. Understanding themselves, as well as others, meant they would also consider the feelings, values, strengths, and weaknesses of others. Balanced processing referred to when authentic leaders use analytical thinking to ensure that information was factual and without bias before acting on it. All the information entering his or her mind would be considered in detail, even if they might not be feasible for further action. Relational transparency referred to leaders that were open-minded and willing to provide any data, information, or related details directly while being polite. Their honest, optimistic intentions were expressed to others with trust, respectfulness, and authority. An internalized moral perspective referred to leaders who have a good understanding of ethics and expresses actions with honesty and truthfulness, reflecting their values. Their actions would reflect self-restraint and confidence. Relational harmony was a trait of leaders who used their cultural knowledge, as well as knowledge of their relationships with others, to express themselves with kindness and respectfulness towards other employees. Creating balance and harmony in a work atmosphere would decrease levels of stress and lift spirits.

3.2.3 Innovation adoption (IA) variable

Individual innovation adoption referred to the behavior of employees who accepted new innovations and participated, collaborated, and engaged in promoting innovation in a company. The factors that influenced employees into adopting this behavior could be grouped into three different categories: (1) organizational factors, which include training, managerial support, and incentives; (2) individual factors, which include perceived usefulness, personal innovativeness, prior experience, image and enjoyment; and (3) social influence, which included peers and social networks. However, this study would focus on individuals who had to face innovations that caused drastic changes in their organizations. Acceptance of innovation by employees

significantly depended on the factors at the individual level. These factors included, as stated above: perceived usefulness, an employee's perception of the benefits or advantages an innovation has. If an employee felt that a new product, service, or process would be a benefit to their job, then it was likely he or she would adopt the innovation and attempt to cooperate in any related activities to support it. Personal innovativeness was the innate instinct of a person to adopt new innovations. Innovativeness might influence one's perception of new technology. Prior experience referred to what employees had faced, worked with, or been involved with. If employees had had some past experiences related to innovation, they might feel some familiarity once new innovations were introduced to their company, which could influence innovation adoption. Image referred to employees' desires to improve their image and others' impressions of them. If employees felt that using new technology or being involved in innovative adoption would help them achieve those desires, it could influence them to adopt new innovations, as well. Enjoyment referred to employees' positive feelings and thoughts after they engaged with or adopted an innovation. Feelings of pleasure might cause employees to be more willing to accept new innovations.

3.3 Instruments

Questionnaires were used as an instrument to collect data in this study. These questionnaires aimed to measure demographic information, authentic leadership, innovative work behavior, and individual innovation adoption. Details about the questionnaires are described below.

3.3.1 Demographic Information Questionnaire

The demographic information questionnaire aimed to collect personal information about the participants, which included gender, age, position, business unit, years of service, and level of education. Gender could be specified as male or female. Age was separated into 5 ranges: 20-30, 31-40, 41-50, 51-60, and 60 and up. Positions ranged from staff to the mid-career management of the company, such as Staff, Section Manager (SM), Division Manager (DM), General Manager (GM), and Assistant Vice President up (AVP up). Business units could be specified as one of three areas: Sales,

Production, and Support. Years of service were separated into six ranges: less than five years, 5 to 10 years, 11-15 years, 16-20 years, 21-25 years, and 26 years up. Finally, educational levels were categorized into four categories: below bachelor's, bachelor's degree, master's degree, and doctoral degree.

3.3.2 Innovative Work Behavior Questionnaire

The study had chosen the measuring tool of employee innovative work behavior recently developed by Amornpipat (2016), which was based on a study by De Jong and Den Hartog (2008). The 10 items ($\alpha = 0.93$, Amornpipat, 2016) were measured on 5-point Likert scale, ranging from mostly disagree to mostly agree, on four dimensions: opportunity exploration, idea generation, championing, and implementation. Because the initial scale was in English, back-translation procedures had been conducted in a prior study by (Amornpipat, 2016) to ensure the accuracy of the translation from the original English to the Thai version of each item.

3.3.3 Authentic Leadership Questionnaire

The Authentic Leadership questionnaire, based on Walumbwa et al. (2008) and (Amornpipat, 2016), consists of 5 subsections: self-awareness, balanced processing, relational transparency, individual moral perspective, and relational harmony. The overall Cronbach alpha of this questionnaire was 0.94. The questions were answered using self-rating on 5-point Likert scale with values ranging from not-at-all true (1) to mostly true (5). Since this study focuses on self-assessment of individual employees, the questions were modified and reconstructed based on the final 19 items of Amornpipat (2016).

3.3.4 Innovation Adoption Questionnaire

The individual innovation adoption questionnaire was newly developed for this study, based on the definition suggested by Talukder et al. (2008). It consisted of five factors: (1) perceived usefulness, (2) personal innovativeness, (3) prior experiences, (4) image, and (5) enjoyment. Similarly, to the above 2 questionnaires, the questions were answered using self-rating on 5-point Likert scale ranging from not-at-all true (1) to mostly true (5). Details on the development of this questionnaire was described below.

3.3.4.1 Questionnaire Development

The definitions of the 5 dimensions in the individual innovation adoption questionnaire were developed in the Thai language. Then items were generated from the dimension definitions in accordance with the study by Talukder et al. (2008). Each of the dimensions, including perceived usefulness, personal innovativeness, prior experience, image, and enjoyment, employed five questions. At least five new questions were constructed for each factor. So, altogether, the first set of questions consisted of 25 items. A five-point Likert scale was used with the following range: 5 was strongly agree; 4 was agree; 3 was neutral; 2 was disagree; 1 was strongly disagree.

3.3.4.2 Item Generation

The 25 items had been presented, discussed, and reviewed by 4 experts to investigate the clarity and quality of the questions. Then, using the IOC (Index of Item) Objective Congruence Method to indexing item-objective congruence, which was a procedure developed by Turner and Carlson (2003)Turner and Carlson (2003), in order to test development for evaluating content validity at the item development stage. Each item had three scores (-1, 0, and 1) assessed by a specialist. Any items rated below 0 were deleted. After collecting all comments and assessments, the scores of each item were summed up and divided by the number of specialists to get the average score. All items with scores above 0.5 were valid for use. The consistency index value required was 0.50 and up. All 25 items were accepted by the experts, and the average of IOC value of IA questionnaire was 0.85. Therefore, after the item-generation processed, the individual innovation adoption scale consisted of 25 items, segregated into 5 dimensions; perceived usefulness (IAPU01-IAPU05) 5 items, employee innovativeness (IAIN06-IAIN10) 5 items, prior experience (IAPE11-IAPE15) 5 items, image (IAIM16-IAIM20) 5 items, and enjoyment (IAEJ21-IAEJ25) 5 items. These items were used together with the other questionnaires in the pilot study.

3.4 Data Collection

Empirical data was collected from employees of a Thai, leading food sector organization that has corporate values directly related to innovation adoption. Due to the vast locations of the demography of participants characteristics, the online application was selected as a channel to distribute the 4-section questionnaires via pre-registration emails and personal social networks. All of the 4-section questionnaires were prepared in electronic form using google survey form application. All of the answers were configured as mandatory fields, and the system would not accept if the participants did not complete the questionnaires.

For the pilot study, 200-employee sample group was aimedly conducted to test the quality and reliability of the AL and IA measurement tools. Emails were sent out to the group and some gentle reminding emails for non-response participants were resubmitted. The questionnaires attached to the e-mails included of 1) 6-item demographic information questionnaire; 2) 30-item authentic leadership questionnaire; 3) 25-item innovation adoption questionnaire; and 4) 10-item innovative work behaviour questionnaire. Participants were asked to complete the questionnaires. There were altogether 65 items distributed via on-line systematic tracking within 2 weeks. 134 returned and the qualified 116 questionnaires or 58% response rate could be used for further studies in exploratory factor analysis (EFA) and Confirmation Factor Analysis (CFA).

For the hypothesis study, 1,000 samples were proceeded with the same approach, by emailing the 4 questionnaires revised from the pilot study. They were also included of 1) demographic information questionnaire (6 items); 2) authentic leadership questionnaires (29 items); 3) innovation adoption questionnaire (21 items); and 4) innovative work behaviour questionnaire (10 items). There were altogether 60 items distributed via on-line systematic tracking within 8 weeks. From 1,000 samples, 734 returned (or 73.4%) with 700 qualified cases for further hypothesis testing and analysis.

3.5 Questionnaire Analyses

The four questionnaires were at first used to collect data in pilot study in order to analyze the qualities of the questionnaires. The questionnaire analyses included (1) descriptive statistics of respondents characteristics, (2) item analysis of each questionnaire via discriminant t-test and item-total correlations with Cronbach's alpha reliability of each questionnaires, and (3) validation of questionnaire model via EFA and CFA. Results from the analyses on data from pilot study were described below. After the questionnaires were readjusted according to the results, the new version of the questionnaires was then used to collect data from the sample pool. The qualities of the questionnaires were analyzed again with the same procedure to find the qualities of the questionnaires before performing hypothesis analyses.

3.5.1 Result of Questionnaire Analyses in Pilot Study

200 questionnaires on AL, IWB, and IA were distributed to the pilot group. 116 filled questionnaires (or 58%) were returned and used in questionnaire analysis. Results were described as following:

3.5.1.1 Descriptive statistics of respondent's characteristics

As shown in Table 3.1, the results of the pilot study on demographic information questionnaire revealed that men constituted 44.8% of respondents, whereas women made up 55.2% of respondents. This distribution of gender reflected the company's total employee gender distribution, as female employees outnumber male employees. 19.8% of all employees belonged to the 20-30 age group, while 45.7% belonged to the 31-40 age group. Those aged 41-50 made up 22% of the respondents, whereas respondents aged 51 to 60 constituted only 12%.

For positions in the company, the data revealed that 14.7% of the respondents were staff, 20.7% were in section manager positions, 21.6% were department managers, and 25.9% were general managers. Respondents in the position of Assistant Vice President and up numbered 17.2%. The majority of the respondents (>65%) were in middle management positions (section manager, department manager, and general manager). In contrast, a minority (<32%) were in staff and higher management positions (Assistant Vice President and up). Most of the respondents

(83.6%) were from support units/positions, whereas 12.9% were from production, and 3.4% were from the sales & marketing unit.

As for the educational background, the majority of respondents (73.3%) held bachelor's degrees, while 20.7% of respondents held master's degrees. 4.3% of the respondents did not have bachelor's degrees, and only 1.7% of respondents were Ph.D. holders. Also, most of the respondents were middle-aged, in middle-level support positions, with moderate to high levels of education.

Table 3.1 Participants demographic characteristics for the pilot study (n=116)

Variables	Number	%
Gender		
Male	52	44.8
Female	64	55.2
Age		
20-30	23	19.8
31-40	53	45.7
41-50	26	22.4
51-60	14	12.1
Position		
Staff	17	14.7
Section Manager	24	20.7
Department Manager	25	21.6
General Manager	30	25.9
Assistant Vice President and Up	20	17.2
Business Unit		
Sales & Marketing	4	3.4
Production	15	12.9
Support	97	83.6
Service Year		
<5 years	14	12.1
5-10 years	21	18.1
11-15 years	30	25.9
16-20 years	20	17.2
21-25 years	15	12.9
>26 years	16	13.8
Education		
Below BA	5	4.3
BA	85	73.3
MA	24	20.7
Ph.D.	2	1.7
Total	**116**	

3.5.1.2 Item analysis of each questionnaire

A t-test was used to examine item-discrimination by analyzing the difference of the item mean values between high and low groups, and significant t-values were acceptable. Then item-total correlation was verified by checking to see if each item in the scale was consistent with the average values of all other items. The coefficient value (r) less than 0.3 or above 0.8 indicated that the corresponding items did not correlate well, or correlated too well as being redundant (Everitt, 2002; Field, 2009).

(a) Authentic Leadership (AL) Item Analysis

In the item analysis of Authentic Leadership (AL), one item (SA06) was found nonsignificant t-value and had a coefficient value (r) under 0.2, so it was removed from the AL questionnaire. All of the other 29 items remained and were used for the study, as shown in Table 3.2.

Table 3.2 Item analysis of authentic leadership (AL) (n=116)

Dimensions	Items[1]	Mean	SD	*r*	*t*	Selection
1. Self-Awareness (AL) (6 items)	SA01	3.84	0.80	0.59	5.67**	✓
	SA02	3.81	0.79	0.67	7.64**	✓
	SA03	4.14	0.72	0.79	8.51**	✓
	SA04	3.84	0.82	0.67	6.71**	✓
	SA05	4.15	0.77	0.78	7.83**	✓
	SA06	2.79	1.01	0.09	1.76	Removed
Balance Processing (BP) (6 items)	BP07	3.99	0.80	0.69	6.54**	✓
	BP08	4.09	0.79	0.76	7.80**	✓
	BP09	3.93	0.84	0.73	7.23**	✓
	BP10	4.11	0.77	0.79	8.10**	✓
	BP11	3.69	0.82	0.75	8.77**	✓
	BP12	3.82	0.85	0.77	8.71**	✓
Rational Transparency (RT) (6 items)	RT13	3.93	0.84	0.72	7.23**	✓
	RT14	3.78	0.74	0.74	8.77**	✓
	RT15	3.81	0.82	0.77	7.62**	✓
	RT16	4.22	0.88	0.82	8.33**	✓
	RT17	3.74	0.79	0.71	7.95**	✓
	RT18	3.84	0.87	0.81	9.17**	✓
Individualized Moral Perspective (IM) (6 items)	IM19	3.93	0.83	0.81	8.69**	✓
	IM20	3.76	0.85	0.77	8.32**	✓
	IM21	3.85	0.81	0.78	7.45**	✓

Dimensions	Items[1]	Mean	SD	*r*	*t*	Selection
	IM22	4.25	1.00	0.73	9.04**	✓
	IM23	4.32	0.83	0.75	8.35**	✓
	IM24	3.97	0.90	0.61	5.34**	✓
Relational Harmony (RH) (6 items)	RH25	4.11	0.87	0.85	8.71**	✓
	RH26	4.22	0.81	0.84	7.80**	✓
	RH27	4.09	0.83	0.81	8.39**	✓
	RH28	4.15	0.88	0.82	8.46**	✓
	RH29	4.14	0.83	0.76	7.23**	✓
	RH30	4.09	0.79	0.79	8.76**	✓

Reliability (Cronbach's Alpha) = 0.97
** Significant at the 0.01 level

[1] Authentic Leadership (AL) Code and Questionnaires

SA01 You clearly communicate your needs and goals.

SA02 You behave as a role model towards your colleagues and subordinates.

SA03 You treat your colleagues and subordinates with kindness.

SA04 You understand your colleagues' and subordinates'' shortcomings and limitations.

SA05 You understand and accept the diversity of your colleagues and subordinates.

SA06 When making any decisions, you focus on the job, not its impact on your subordinates.

BP07 You listen to relevant information before making decisions.

BP08 You consider and contemplate wrongdoers before deciding punishment.

BP09 In a working environment, you encourage others to freely share opinions and ideas.

BP10 You openly take into account ideas from colleagues and subordinates to make decisions or conclusions.

BP11 You are good at analyzing and considering facts.

BP12 You thoroughly consider information before making decisions or conclusions.

RT13 You are open about sharing your opinion and facts.

RT14 Your subordinates rely on and trust you.

RT15	You are always open about exchanging information with your subordinates.
RT16	You work with transparency and can be traced from your work logs.
RT17	When facing problematic situations, you can control your emotions and manage the situation well.
RT18	You politely communicate with your subordinates.
IM19	Your practices are aligned with the company's core values and ethics.
IM20	You are self-disciplined.
IM21	You are strict about the company rules and regulations in your working approach.
IM22	If you have a chance to take any advantages for yourself, you will not do it.
IM23	You are afraid of consequences or any negative impacts when you choose to perform wrongly, such as conflicting company policy.
IM24	You will not act on the needs of your boss or others' if they are not appropriate.
RH25	You encourage harmony and collaboration among people and working units.
RH26	You respect and befriend colleagues no matter their positions, in both internal and external working units.
RH27	In a working environment, you encourage harmonization among people, groups, and units.
RH28	You emphasize teamwork and mutual success.
RH29	You perform work with flexibility to help subordinates achieve success and their goals.
RH30	You always create a good work atmosphere.

(b) Innovative Work Behavior (IWB) Item Analysis

For the item analysis of the innovative work behavior (IWB) questionnaire, all of the item found significant t-value and their coefficient values (r)

were between 0.2 and 0.8, which were respectable enough for further usage in the study. The results are shown in Table 3.3.

Table 3.3 Item analysis of innovative work behavior (IWB) (n=116)

Dimensions	Items[2]	Mean	SD	*r*	*t*	Selection
Opportunity Exploration (OE)	OE01	3.76	0.80	0.75	7.94**	✓
	OE02	3.82	0.84	0.73	9.31**	✓
Idea generation (IG)	IG03	3.77	0.83	0.80	8.15**	✓
	IG04	3.67	0.82	0.77	10.15**	✓
	IG05	3.86	0.80	0.83	9.25**	✓
Championing (CP)	CP06	3.48	0.73	0.72	8.97**	✓
	CP07	3.74	0.81	0.76	9.65**	✓
Application (AP)	AP08	3.78	0.70	0.75	9.66**	✓
	AP09	3.73	0.80	0.84	11.80**	✓
	AP10	3.91	0.80	0.78	9.83**	✓

Reliability (Cronbach's Alpha) = 0.95
** Significant at the 0.01 level

[2] Innovative Work Behavior (IWB) Code and Questionnaires

OE01 I pay attention to issues that are not part of my daily job.

OE02 I wonder how I can improve things.

IG03 I actively seek out new working methods, techniques, or instruments to improve my jobs.

IG04 I come up with original solutions for problems I encounter.

IG05 I come up with new approaches for executing tasks.

CP06 I make important organizational members enthusiastic about innovative ideas.

CP07 I attempt to convince others to support my innovative ideas.

AP08 I systematically introduce innovative ideas to work practices.

AP09 I contribute to the implementation of new ideas.

AP10 I put effort into the development of new technologies.

OE01 I pay attention to issues that are no part of my daily work.

OE02 I wonder how I can improve things.

IG03 I search out new working methods, techniques, or instruments to improve my jobs.

IG04 I generate original solutions for problems.

IG05 I find new approaches to execute tasks.

CP06 I make important organizational members enthusiastic about innovative ideas.

CP07 I attempt to convince people to support my innovative ideas.

AP08 I systematically introduce innovative ideas to work practices.

AP09 I contribute to the implementation of new ideas.

AP10 I put effort into the development of new things.

(C) Innovation Adoption (IA) Item Analysis

For the item analysis of the Innovation Adoption (IA) questionnaire, 2 items were found nonsignificant t-values and had coefficient values (r) under 0.2, so they were removed from the questionnaire. These items were IM20 and EJ25. The 23 items remained, as shown in Table 3.4.

Table 3.4 Item analysis of innovation adoption (IA) (n=116)

Dimensions	Items[3]	Mean	SD	*r*	*t*	Selection
Perception of Usefulness (PU) (5 items)	PU01	4.34	0.75	0.65	7.10**	✓
	PU02	4.17	0.81	0.69	8.36**	✓
	PU03	4.29	0.76	0.75	8.59**	✓
	PU04	4.20	0.78	0.71	7.56**	✓
	PU05	*2.78*	*1.39*	*0.33*	*3.34***	*Removed*
Employee Innovativeness (IN) (5 items)	IN06	4.16	0.82	0.71	7.71**	✓
	IN07	4.06	0.83	0.79	9.32**	✓
	IN08	3.79	0.84	0.72	7.73**	✓
	IN09	3.67	0.82	0.71	7.67**	✓
	IN10	3.43	0.94	0.65	7.09**	✓
Past Experience (PE) (5 items)	PE11	3.54	0.89	0.74	7.87**	✓
	PE12	3.80	0.87	0.73	7.96**	✓
	PE13	3.66	0.88	0.70	7.44**	✓
	PE14	3.61	0.92	0.65	5.77**	✓
	PE15	*2.59*	*1.17*	*0.24*	*2.67***	*Removed*
Image (IM) (5 items)	IM16	4.21	0.85	0.71	8.52**	✓
	IM17	3.77	0.93	0.71	7.96**	✓
	IM18	3.95	0.96	0.69	7.26**	✓
	IM19	4.03	0.89	0.71	7.87**	✓
	IM20	*2.53*	*1.28*	*0.17*	*1.45*	*Removed*
	EJ21	3.75	0.96	0.64	6.89**	✓

Dimensions	Items[3]	Mean	SD	*r*	*t*	Selection
Enjoyment (EJ) (5 items)	EJ22	3.80	0.89	0.66	7.30**	✓
	EJ23	3.90	0.84	0.73	8.09**	✓
	EJ24	4.00	0.82	0.71	6.60**	✓
	EJ25	*2.15*	*1.19*	*0.05*	*0.50*	*Removed*

Reliability (Cronbach's Alpha) = 0.94
** Significant at the 0.01 level

[3] Innovation Adoption (IA) Code and Questionnaires

PU01 You agree that new innovations - such as Cloud Computing, AI, IoT, etc. - are useful to your job.

PU02 You agree that new working methods that your company has implemented - such as new computer programs, Cloud Computing, AI, IoT, etc. - help you to be more efficient.

PU03 You agree to promote and support the implementation of new innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - in the company.

PU04 You cooperate with the company's ongoing attempts to implement innovations - such as new computer programs, Cloud Computing, AI, IoT, etc.

PU05 You see innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - as something that creates more problems than benefits for your organization.

IN06 You are interested and impressed by new technologies - such as new computer programs, Cloud Computing, AI, IoT, etc.

IN07 You are eager to experiment with new innovations- such as new computer programs, Cloud Computing, AI, IoT, etc. - at work.

IN08 You always follow and are eager to engage in innovation-related projects in the company - such as those related to new computer programs, Cloud Computing, AI, IoT, etc.

IN09 You like to study and stay up to date with advances in sciences and technology - such as new computer programs, Cloud Computing, AI, IoT, etc.

IN10 You always join company project development processes - for things like new computer programs, Cloud Computing, AI, IoT, etc.

PE11 You have experience with using new innovations or new advanced digital projects.

PE12 You feel that you can easily implement new innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - in your current job.

PE13 You are familiar with technology testing - for things like new computer programs, Cloud Computing, AI, IoT, etc. - in your current job.

PE14 You feel like you have a good foundation for learning about and implementing innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - in your current job.

PE15 You feel that it is hard to understand new innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - when they are being implemented in your organization.

IM16 You agree with the idea of adopting new technology - such as new computer programs, Cloud Computing, AI, IoT, etc. - for a better company image.

IM17 You always engage in technology implementation for the betterment of the company, for example, new technology assessments or advances in robotics, AI, or IoT.

IM18 You feel that the company has developed when using a new technique or new computer program in your job.

IM19 You think that utilizing new technology - such as new computer programs, Cloud Computing, AI, IoT, etc. - and assisting in their implementation in the company will gain more credit and acceptance.

IM20 You think that new innovative tools or computer applications cannot promote better organization image.

EJ21 You agree that utilizing new innovations - related to robotics, AI, IoT, etc. - in the company increases employees' enjoyment while working.

EJ22 You think that new innovative projects excite and drive employees to work more.

EJ23 You engage in new innovation related projects or new technology because of your enjoyment and willingness to.

EJ24 You feel prompted to learn new working approaches - related to robotics, AI, IoT, etc.

EJ25 You are tired of learning or trying new technologies - such as new computer programs, Cloud Computing, AI, IoT, etc.

3.5.1.3 Validation of questionnaire model

In the first stage, 29 items in the Authentic Leadership (AL) questionnaire, 10 items in the Innovative Work Behavior (IWB) questionnaire, and 21 items in the Innovation Adoption (IA) questionnaire were subjected to a factor analysis procedure. The purpose of this initial analysis was to confirm the factor structure to identify items adequate for further use in the study. Then a principal component factor analysis was separately run on every factor. The factor analysis was used to determine the appropriate assignment of individual items to a factor, based on the factor loading score. Therefore, the factors that contribute significantly were valid to construct. Following factor analysis, LISREL was used to prepare a measurement model. The results for each factor analysis model are explained below.

(a) Authentic Leadership (AL) Questionnaire Validation

First of all, the questionnaire was examined using a factor analysis technique (FA) to determine whether the five-factor structure of the Authentic Leadership (AL) questionnaire was good fit for the data of the current study and to discover latent factors. The questionnaire comprised 29 items, and five constructs termed Self-awareness (5 items), Balanced Processing (6 items), Relational Transparency (6 items), Internalized Moral Perspective (6 items), and Relational Harmony (6 items).

The results of factor analysis for the Authentic Leadership (AL) questionnaire indicated a KMO value of 0.947, which was acceptable for factor analysis, as shown in Table 3.5.

Table 3.5 KMO and Bartlett's Test of Authentic Leadership (AL) Factor (n=116)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.947

Bartlett's Test of Sphericity	Approx. Chi-Square	3165.609
	df	406.000
	Sig.	0.000

As shown in Table 3.6, the results revealed that all factor loadings were significant at a level of 0.05. The factor loading values range from 0.633 - 0.920, with standard errors of 0.057 - 0.179 and squared multiple correlations (SMC) of 0.401 - 0.846. The construct reliability (ρ_c = 0.980), which indicated convergent validity, the ratio of observed variable covariance in the same latent variables (which should be higher than 0.60 (Hair et al. 2010: 680)), meaning that the reliability of the model was very high (98.00%). The average variance that was extracted (ρ_v = 0.635) indicated that the Authentic Leadership (AL) model could explain 63.50% of the observed variable variance. (Diamantopoulos & Siguaw.2000: 91). The results are shown in Figure 3.1.

Table 3.6 Factor loading (λ_i), Standard Error (SE^{λ_i}), Significant test (t), Squared multiple correlations (SMC) of the Authentic Leadership (AL) measurement model

Authentic Leadership (AL)	**Factor loading (λ_i)**	**Standard Error (SE^{λ_i})**	**Significant test (t)**	**(SMC)**
SA01	0.633**	-	-	0.401
SA02	0.722**	0.173	6.578	0.521
SA03	0.842**	0.179	7.438	0.709
SA04	0.708**	0.163	6.877	0.501
SA05	0.841**	0.178	7.460	0.707
BP01	0.730**	-	-	0.533
BP02	0.817**	0.126	8.871	0.667
BP03	0.772**	0.124	8.491	0.596
BP04	0.860**	0.126	9.356	0.740
BP05	0.746**	0.127	8.030	0.557
BP06	0.765**	0.124	8.409	0.585
RT01	0.732**	-	-	0.536
RT02	0.753**	0.123	8.347	0.567
RT03	0.801**	0.124	8.856	0.642
RT04	0.839**	0.121	9.471	0.704
RT05	0.699**	0.124	7.701	0.489
RT06	0.841**	0.121	9.513	0.707
IM01	0.860**	-	-	0.740
IM02	0.792**	0.082	11.219	0.627
IM03	0.795**	0.084	11.052	0.632
IM04	0.759**	0.088	10.004	0.576

Authentic Leadership (AL)	Factor loading (λ_i)	Standard Error (SE^{λ_i})	Significant test (t)	(SMC)
IM05	0.807**	0.095	9.879	0.651
IM06	0.642**	0.095	7.893	0.412
RH01	0.920**	-	-	0.846
RH02	0.907**	0.057	17.323	0.823
RH03	0.901**	0.061	16.114	0.812
RH04	0.887**	0.064	15.134	0.787
RH05	0.821**	0.073	12.171	0.674
RH06	0.814**	0.071	12.511	0.663

Construct reliability (ρ_c) = 0.980

Average variance extracted (ρ_v) = 0.635

** Significant at the 0.01 level

SA=Self-Awareness, BP=Balance Processing, RT=Rational Transparency, IM=Individualized Moral Perspective, RH=Rational Harmony

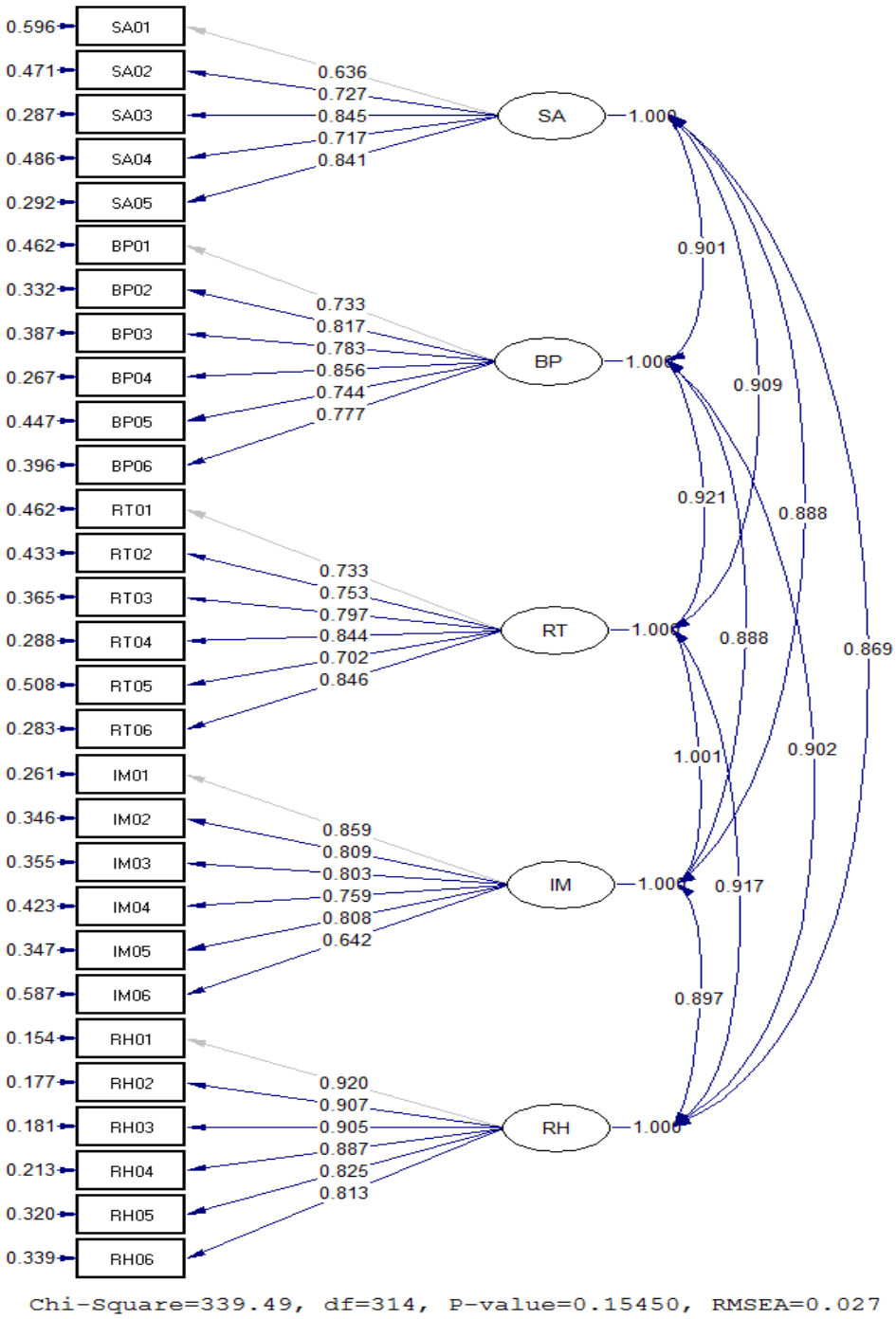

Figure 3.1 Authentic Leadership (AL) measurement model

The validation of the Authentic Leadership (AL) measurement model was also presented in the goodness of fit indices, as shown in Table 3.7. Results of the Confirmatory Factor Analysis (CFA) for the Authentic Leadership (AL) measurement model indicated good fit between the conceptual model and the observed data with the goodness of fit statistics: χ^2 was 339.419, *df* was 314, *p* was 0.154, χ^2/df was 1.081,

RMSEA was 0.027, NFI was 0.977, NNFI was 0.995, CFI was 0.996, RMR was 0.040, SRMR was 0.040, GFI was 0.931 and AGFI was 0.906. The CFA model results indicated that the Authentic Leadership (AL) sample data would support the five latent variable structure. Self-awareness (SA) was measured with five observed variables, and Balanced Processing (BP), Relational Transparency (RT), Internalized Moral Perspective (IM) and Relational Harmony (RH) were measured with six observed variables.

Table 3.7 Goodness of fit indices of Authentic Leadership (AL) measurement model

Fit indices	Value	Criterion	Meaning
1. χ^2	339.419	-	-
2. *df*	314.000	-	-
3. *p*	0.154	$p > 0.050$	Accurate
4. χ^2/df	1.081	$\chi^2/df < 2.000$	Accurate
5. RMSEA	0.027	RMSEA < 0.050	Accurate
6. NFI	0.977	NFI > 0.900	Accurate
7. NNFI	0.995	NNFI > 0.900	Accurate
8. CFI	0.996	CFI > 0.900	Accurate
9. RMR	0.040	RMR < 0.050	Accurate
10. SRMR	0.040	SRMR < 0.050	Accurate
11. GFI	0.931	GFI > 0.900	Accurate
12. AGFI	0.906	AGFI > 0.900	Accurate

(b) Innovative Work Behavior (IWB) Questionnaire Validation

First, the questionnaire was examined using a factor analysis technique (FA) to determine whether the hypothesized four-factor structure of the Innovative Work Behavior (IWB) questionnaire fit the data of the current study, and to discover any latent factors. The questionnaire consists of 10 items spanning four constructs termed: Opportunity Exploration (2 items), Idea Generation (3 items), Championing (2 items), and Implementation (3 items).

Results of factor analysis for the Innovative Work Behavior (IWB) questionnaire indicated a KMO value of 0.921, which was acceptable for factor analysis, as shown in Table 3.8.

Table 3.8 KMO and Bartlett's Test of innovative work behavior (IWB) Factor (n=116)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.921
Bartlett's Test of Sphericity	Approx. Chi-Square	935.933
	df	45.000
	Sig.	0.000

The results of all factor loadings significant at the 0.05 level. Factor loadings range from 0.796 - 0.926, with standard errors of 0.082 - 0.107 and squared multiple correlations of 0.634 - 0.821. The construct reliability (ρ_c = 0.964) indicated convergent validity, meaning the reliability of the model structure was very high (96.00%). The average variance extracted (ρ_v = 0.726) indicated that the Innovative Work Behavior (IWB) model could explain 72.60% of the observed variable variance. (Diamantopoulos & Siguaw, 2000: 91). The results were shown in Table 3.9 and Figure 3.2.

Table 3.9 Factor loading (λ_i), Standard Error (SE_{λ_i}), Significant test (t), Squared multiple correlations (SMC) of the Innovative Work Behavior (IWB) measurement model

Innovative Work Behavior (IWB)	**Factor loading (λ_i)**	**Standard Error (SE_{λ_i})**	**Significant test (t)**	**(SMC)**
OE01	0.796**	-	-	0.634
OE02	0.829**	0.105	9.930	0.687
IG01	0.856**	-	-	0.733
IG02	0.824**	0.086	11.217	0.679
IG03	0.880**	0.082	12.469	0.774
CP01	0.806**	-	-	0.650
CP02	0.906**	0.107	10.556	0.821
AP01	0.844**	-	-	0.712
AP02	0.926**	0.084	13.139	0.857
AP03	0.845**	0.088	11.427	0.714
Construct reliability (ρ_c) = 0.964				
Average variance extracted (ρ_v) = 0.726				

* Significant at the 0.01 level

OE=Opportunity Exploration, IG=Idea generation, CP=Championing, AP=Application

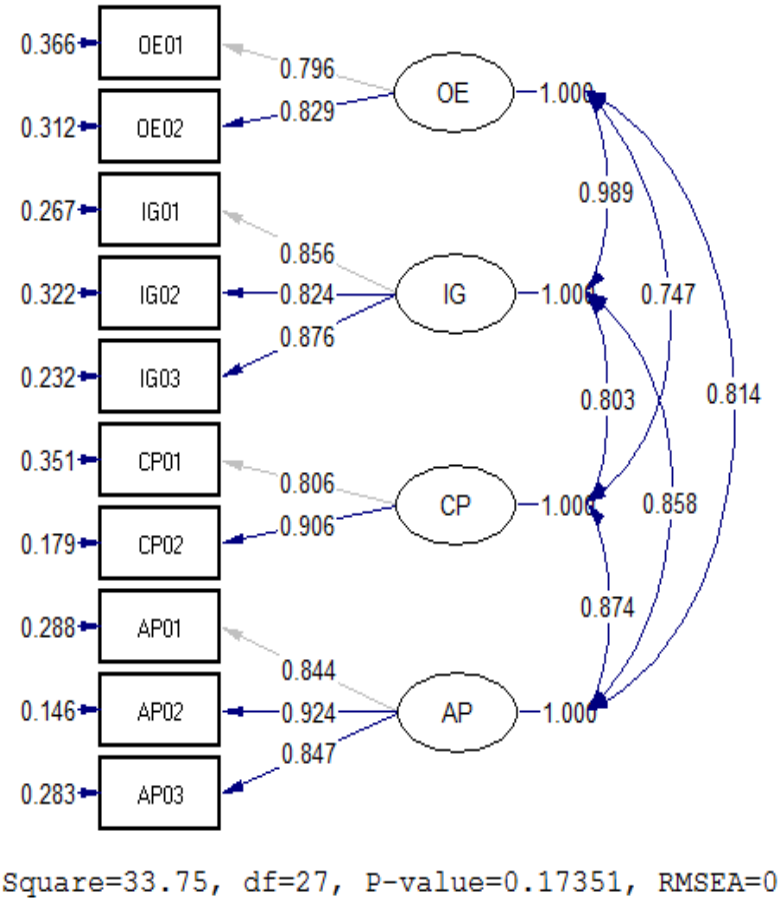

Figure 3.2 Innovative Work Behavior (IWB) measurement model

The validation of the Innovative Work Behavior (IWB) measurement model was demonstrated by the goodness of fit indices, as shown in Table 3.10. The results of the CFA for the innovative work behavior (IWB) measurement model indicated good fit between the conceptual model and the observed data, with goodness of fit statistics: χ^2 was 33.747, *df* was 27, *p* was 0.174, χ^2/df was 1.250, RMSEA was 0.047, NFI was 0.984, NNFI was 0.994, CFI was 0.996, RMR was 0.031, SRMR was 0.031, GFI was 0.945 and AGFI was 0.917. The CFA model results indicated that the Innovative Work Behavior (IWB) sample data would support the four latent variable structure. Opportunity Exploration (OE) and Championing (CP) were measured with two observed variables, and Idea Generation (IG) and Implementation (AP) were measured with three observed variables.

Table 3.10 Goodness of fit indices of innovative work behavior (IWB) measurement model

Fit indices	Value	Criterion	Meaning
1. χ^2	33.747	-	-
2. *df*	27.000	-	-
3. *p*	0.174	$p > 0.050$	Accurate
4. χ^2/df	1.250	$\chi^2/df < 2.000$	Accurate
5. RMSEA	0.047	RMSEA < 0.050	Accurate
6. NFI	0.984	NFI > 0.900	Accurate
7. NNFI	0.994	NNFI > 0.900	Accurate
8. CFI	0.996	CFI > 0.900	Accurate
9. RMR	0.031	RMR < 0.050	Accurate
10. SRMR	0.031	SRMR < 0.050	Accurate
11. GFI	0.945	GFI > 0.900	Accurate
12. AGFI	0.917	AGFI > 0.900	Accurate

(c) Innovation Adoption (IA) Questionnaire Validation

An EFA was conducted to examine the loading patterns of the Innovation Adoption (IA) items, as items were being newly developed. The 21 items were validated by examining the results of an EFA utilizing a forced five-factor solution. Principal component analysis and Varimax rotation tests were also utilized, as the number of variables was highly dependent on one factor, and the number of factors needed to explain one variable was minimized (Thompson, 2004). Table 3.11 demonstrates a KMO of 0.926, which was a satisfactory value, meaning factor analysis could be performed.

Table 3.11 KMO and Bartlett's Test of innovation adoption (IA) factor (n=116)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.926
Bartlett's Test of Sphericity	Approx. Chi-Square	2355.383
	df	210.000
	Sig.	0.000

After processing the rotated component matrix of the 21-items, there were five components to consider. The details were displayed in Table 3.12. The results demonstrated that each item was significant for further study. Items with diminished values or values less than 0.3 would be removed.

Table 3.12 EFA Rotated Component Matrix for the 21 items of innovation adoption scale

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Variance %	Cumulative %	Total	Variance%	Cumulative%
1	12.27	49.082	49.082	12.27	49.082	49.082
2	2.765	11.059	60.141	2.765	11.059	60.141
3	1.612	6.448	66.589	1.612	6.448	66.589
4	1.244	4.976	71.565	1.244	4.976	71.565
5	1.015	4.061	75.626	1.015	4.061	75.626

The Innovation Adoption (IA) factor components were grouped into four factors. There were another 2 questions (PE15 and PU05) with low significance that were also removed, as shown in Table 3.13.

Table 3.13 EFA Rotated Component Matrix for the 23 items of innovation adoption (IA) scale (Pilot Study)

Rotated Component Matrix					
Item	Component				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
PU03	0.794	0.502	0.147	0.090	0.007
PU02	0.792	0.340	0.149	0.154	0.014
IM16	0.728	0.154	0.493	0.221	-0.098
PU04	0.723	0.469	0.203	0.148	-0.090
PU01	0.678	0.506	0.175	0.062	-0.110
IM19	0.645	-0.007	0.511	0.403	0.047
IM18	0.645	-0.032	0.514	0.370	0.075
IM17	0.510	0.128	0.399	0.418	0.188
PE13	0.170	0.767	0.240	0.268	0.099
PE12	0.302	0.759	0.293	0.173	0.024
PE14	0.149	0.697	0.275	0.257	0.055
IN06	0.464	0.649	0.143	0.280	-0.045
IN07	0.374	0.645	0.276	0.355	0.040
EJ22	0.192	0.382	0.802	0.124	-0.043
EJ21	0.221	0.243	0.772	0.206	0.010
EJ24	0.292	0.485	0.698	0.071	-0.024
EJ23	0.391	0.345	0.655	0.227	-0.026
IN10	0.180	0.299	0.113	0.796	0.161
IN09	0.212	0.340	0.238	0.747	0.119
PE11	0.227	0.588	0.172	0.588	0.071
IN08	0.247	0.437	0.252	0.585	0.122
PE15	*0.090*	*0.044*	*-0.031*	*0.053*	*0.806*
PU05	*-0.040*	*.0844*	*0.146*	*0.254*	*0.690*

Remarks: PU = Personal Usefulness, IN = Innovativeness, PE = Prior Experience, IM = Image, and EJ = Enjoyment.

From the EFA results of the Innovation Adoption (IA) questionnaire, the factor components could be grouped into four factors with 21 observed variables/items, as shown in Table 3.14

Table 3.14 The observed variables of each factor of innovation adoption (IA)

Factor	Code	Items/ Observed variables
1. Perceived Usefulness (PU)	PU01	You agree that new innovations - such as Cloud Computing, AI, IoT, etc. - are useful to your job.
	PU02	You agree that new working methods that your company has implemented - such as new computer programs, Cloud Computing, AI, IoT, etc. - help you to be more efficient.
	PU03	You agree to promote and support the implementation of new innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - in the company.
	PU04	You cooperate with the company's ongoing attempts to implement innovations - such as new computer programs, Cloud Computing, AI, IoT, etc.
	PU05	You agree with the idea of adopting new technology - such as new computer programs, Cloud Computing, AI, IoT, etc. - for a better company image.
	PU06	You always engage in technology implementation for the betterment of the company, for example, new technology assessments or advances in robotics, AI, or IoT.
	PU07	You feel that the company has developed when using a new technique or new computer program in your job.
	PU08	You think that utilizing new technology - such as new computer programs, Cloud Computing, AI, IoT, etc. - and assisting in their implementation in the company will gain more credit and acceptance.
2. Past Experience (PE)	PE01	You are interested and impressed by new technologies - such as new computer programs, Cloud Computing, AI, IoT, etc.
	PE02	You are eager to experiment with new innovations- such as new computer programs, Cloud Computing, AI, IoT, etc. - at work.
	PE03	You feel that you can easily implement new innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - in your current job.
	PE04	You are familiar with technology testing - for things like new computer programs, Cloud Computing, AI, IoT, etc. - in your current job.

Factor	Code	Items/ Observed variables
	PE05	You feel like you have a good foundation for learning about and implementing innovations - such as new computer programs, Cloud Computing, AI, IoT, etc. - in your current job.
3. Enjoyment (EJ)	EJ01	You agree that utilizing new innovations - related to robotics, AI, IoT, etc. - in the company increases employees' enjoyment while working.
	EJ02	You think that new innovative projects excite and drive employees to work more.
	EJ03	You engage in new innovation related projects or new technology because of your enjoyment and willingness to.
	EJ04	You feel prompted to learn new working approaches - related to robotics, AI, IoT, etc.
4. Innovativeness (IN)	IN01	You always follow and are eager to engage in innovation-related projects in the company - such as those related to new computer programs, Cloud Computing, AI, IoT, etc.
	IN02	You like to study and stay up to date with advances in sciences and technology - such as new computer programs, Cloud Computing, AI, IoT, etc.
	IN03	You always join company project development processes - for things like new computer programs, Cloud Computing, AI, IoT, etc.
	IN04	You have experience with using new innovations or new advanced digital projects.

After EFA, the questionnaire was examined using a factor analysis technique (FA) to determine if the hypothesized four-factor structure of the Innovation Adoption (IA) model would fit the data for the current study and to discover any latent factors. The questionnaire consisted of 21 items measuring five constructs termed: Perceived Usefulness (8 items), Past Experiences (5 items), Enjoyment (4 items), and Innovativeness (4 items).

The results showed that all factor loadings were significant at the 0.05 level. Factor loadings range from 0.712 - 0.930, with standard errors of 0.085 - 0.143 and squared multiple correlations (SMC) of 0.507 - 0.865. The construct reliability (ρ_c = 0.977) indicated convergent validity, meaning that the reliability of the model structure was very high (97%). The average variance extracted (ρ_v) was 0.672, indicating that

the Innovation Adoption (IA) model could explain 67.20% of the observed variable variance (Diamantopoulos, Siguaw, & Siguaw, 2000, p. 91). The results were shown in Table 3.15 and Figure 3.3.

Table 3.15 Factor loading (λ_i), Standard Error (SE λ_i), Significant test (t), Squared multiple correlations (SMC) of the Innovation Adoption (IA) measurement model

Innovation Adoption (IA)	**Factor loading (λ_i)**	**Standard Error (SEλ_i)**	**Significant test (t)**	**(SMC)**
PU01	0.807**	-	-	0.651
PU02	0.801**	0.103	9.631	0.642
PU03	0.883**	0.087	12.429	0.780
PU04	0.889**	0.092	11.797	0.790
PU05	0.850**	0.101	10.416	0.723
PU06	0.730**	0.128	7.102	0.533
PU07	0.743**	0.120	7.668	0.552
PU08	0.770**	0.115	8.223	0.593
PE01	0.816**	-	-	0.666
PE02	0.873**	0.085	12.663	0.762
PE03	0.816**	0.107	9.432	0.666
PE04	0.772**	0.107	8.917	0.596
PE05	0.712**	0.112	7.874	0.507
EJ01	0.785**	-	-	0.616
EJ02	0.830**	0.102	10.520	0.689
EJ03	0.921**	0.143	8.213	0.848
EJ04	0.892**	0.133	8.512	0.796
IN01	0.813**	-	-	0.661
IN02	0.813**	0.111	9.066	0.661
IN03	0.721**	0.120	7.351	0.520
IN04	0.930**	0.120	9.578	0.865

Construct reliability (ρ_c) = 0.977

Average variance extracted (ρ_v) = 0.672

* Significant at the 0.01 level

PU = Personal Usefulness, IN = Innovativeness, PE = Prior Experience, IM = Image, and EJ = Enjoyment.

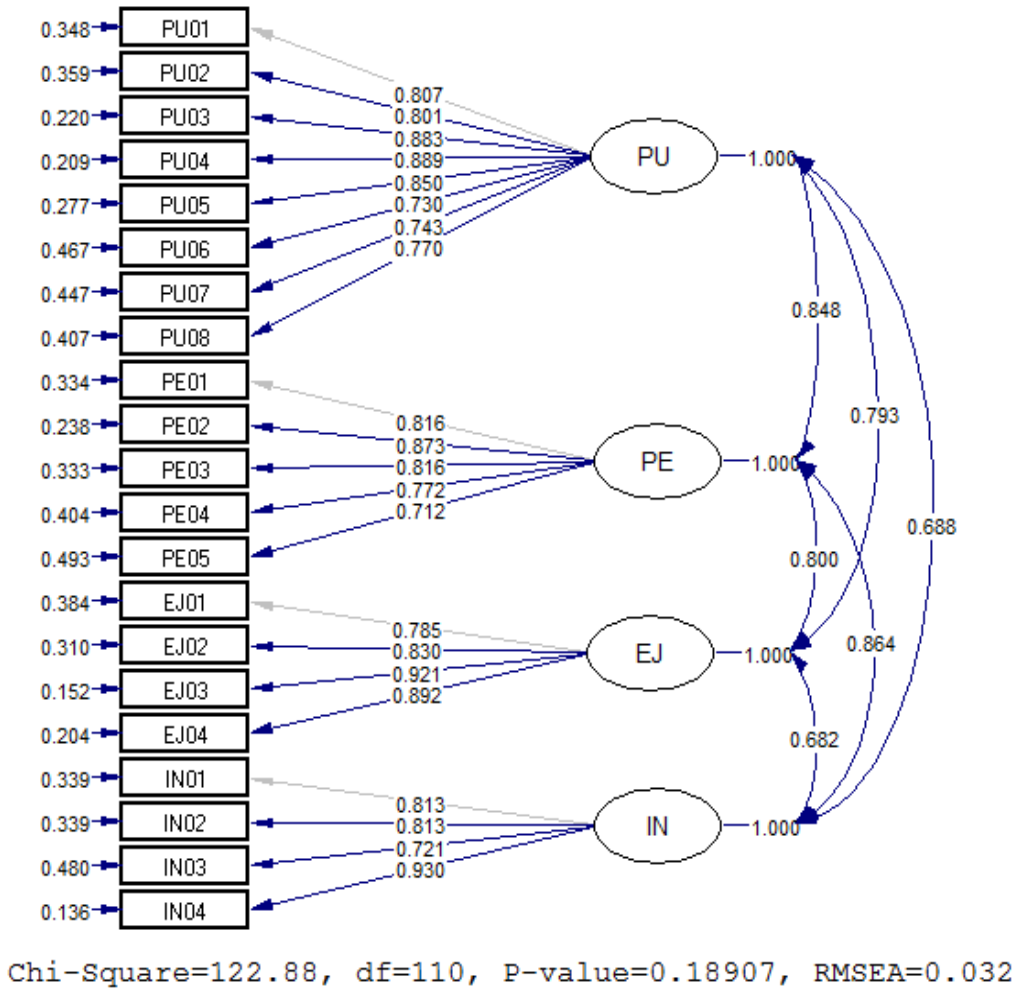

Figure 3.3 Innovation Adoption (IA) measurement model

The validation of the Innovation Adoption (IA) measurement model was demonstrated by the goodness of fit indices, shown in Table 3.16. Results of the CFA for the Innovation Adoption (IA) measurement model validation indicated good fit between the conceptual model and the observed data with goodness of fit statistics: χ^2 was 112.883, *df* was 110, *p* was 0.189, χ^2/df was 1.026, RMSEA was 0.032, NFI was 0.982, NNFI was 0.992, CFI was 0.996, RMR was 0.039, SRMR was 0.039, GFI was 0.928 and AGFI was 0.906. The CFA model results indicated that the Innovation Adoption (IA) sample data would support the 4 latent variable structure with 4 items dropped out. The variables for further study were following; Perceived Usefulness (PU) measured with 8 observed variables, Past Experiences (PE) with 5 observed variables,

Enjoyment (EJ) with 4 observed variables, and Innovativeness (IN) with 4 observed variables. The IA questionnaire would comprise of 21 items.

Table 3.16 Goodness of fit indices of the Innovation Adoption (IA) measurement model

Fit indices	Value	Criterion	Meaning
1. χ^2	112.883	-	-
2. *df*	110.000	-	-
3. *p*	0.189	$p > 0.050$	Accurate
4. χ^2/df	1.026	$\chi^2/df < 2.000$	Accurate
5. RMSEA	0.032	RMSEA < 0.050	Accurate
6. NFI	0.982	NFI > 0.900	Accurate
7. NNFI	0.992	NNFI > 0.900	Accurate
8. CFI	0.996	CFI > 0.900	Accurate
9. RMR	0.039	RMR < 0.050	Accurate
10. SRMR	0.039	SRMR < 0.050	Accurate
11. GFI	0.928	GFI > 0.900	Accurate
12. AGFI	0.906	AGFI > 0.900	Accurate

The results from pilot study demonstrated that the questionnaires possessed good qualities. The new version of questionnaires consisted of 60 questions: (1) the demographic characteristics of the participants (6 items), (2) authentic leadership (29 items), (3) innovative work behavior (10 items), and (4) innovation adoption (21 items). They were then used to collect data from the sample group to test the hypotheses.

3.6 Hypothesis Testing

This study had its focus to test 3 hypotheses as stated below

Hypothesis 1: Authentic leadership (AL) has a positive effect on innovative work behavior (IWB).

Hypothesis 2: Innovation adoption (IA) has a positive effect on innovative work behavior (IWB).

Hypothesis 3: Innovation adoption (IA) moderates the effect of authentic leadership (AL) on innovative work behavior (IWB).

To test Hypothesis 1 and Hypothesis 2, regression analysis was performed, then correlation coefficients were analyzed to examine the relationships between the variables and their factors. Lastly, path analysis was used to test Hypothesis 3.

CHAPTER 4

RESULTS

This chapter contains the results of quantitative analysis using SPSS descriptive statistics, which describes the demographic information of a sample in the form of frequency. Demographic characteristics include gender, age, position, business unit, years of service, and education. The following section had also focused on questionnaire analysis to re-declare the quality of the scales in measuring the sample in this study. The later section of the chapter described the findings, proving the hypotheses as stated to fulfill the objective of this dissertation, using regression analyses and path analysis in the LISREL program.

4.1 Descriptive Statistics of Participants

4.1.1 Participants Demographic Characteristics

The majority of the respondents, as shown in Table 4.1, were female (59.57%), with male respondents numbering 40.43%. Most participants were in the age category of 31-40 years old (42.71%), with the less than 31 years old category coming in second place (29.57%), 41-50 years old in third (20.71%) and over 50 years old containing the least number of participants (7.00%).

As for educational background, most participants held bachelor's degrees (67.71%), 16% held master's degrees, 15.14% had less than bachelor's degrees, and only 1.4% held doctoral degrees. For position, 31.43% of participants were in staff positions, followed by 29% in section manager positions, 19% in department manager positions, 12.57% in general manager positions, and 8% in assistant vice president and up positions.

Most of the participants were in support units (60.29%), followed by sales & marketing (20.00%) and production (19.71%.) As for service years, 26.86% fell into the less than 5-year category, 22.86% in the 5-10 years category, 22.14% in the 11-15

years category, 11.86% in the 16-20 years category, 10.14% in the 21-25 years category, 6.14% in the more than 25 years category.

Table 4.1 Participants demographic characteristics (n=700)

Demographic	Frequency	Percentage
Gender		
Male	283	40.43
Female	417	59.57
Total	**700**	**100.00**
Age		
Less than 31 year	207	29.57
31-40 year	299	42.71
41- 50 year	145	20.71
More than 50 year	49	7.00
Total	**700**	**100.00**
Education level		
Below bachelor's degree	106	15.14
Bachelor's degree	474	67.71
Master's degree	112	16.00
Ph.D.	8	1.14
Total	**700**	**100.00**
Position		
Staff	220	31.43
Section Manager	203	29.00
Department Manager	133	19.00
General Manager	88	12.57
Assistant Vice President and Up	56	8.00
Total	**700**	**100.00**
Business Unit		
Sales & Marketing	140	20.00
Production	138	19.71
Support	422	60.29
Total	**700**	**100.00**
Service Year		
Less than 5 years	188	26.86
5-10 years	160	22.86
11-15 years	155	22.14
16-20 years	83	11.86
21-25 years	71	10.14
More than 25 years	43	6.14
Total	**700**	**100.00**

4.2 Results of Questionnaire Analyses

To examine the validity of the questionnaires utilizing in this study, as to confirm the validity found in the pilot study, scale analysis was performed again with the participants.

4.2.1 Scale Validity and Reliability

Validation of the constructed model was done using second-order confirmatory factor analysis. The second-order CFA result indicated that all factors were most important and validated good fit between the conceptual model and the empirical data. Data analysis showed the values for factor loadings (λ_i), standard errors (SE^{λ_i}), significant tests (t), squared multiple correlations (SMC), the goodness of fit indices including χ^2, χ^2/df, RMSEA, RMR, SRMR, CFI, NFI, NNFI, GFI, AGFI, PGFI, the internal consistency: construct reliability (ρ_c) and average variance extracted (ρ_v) as described below.

4.2.1.1 The scale validity of Authentic Leadership

The Authentic Leadership model consisted of five factors, with 29 observed variables (questionnaire items). Data analysis revealed the factor loadings (λ_y), standard errors ($SE_{\lambda y}$), significant tests (t), and squared multiple correlations (SMC). The study found that the standard factor loadings of observed variables were significant at the 0.01 level. Factor loadings ranged from 0.623-0.903, with standard errors of 0.043-0.165, test values (t-value) of 7.787-18.532 and squared multiple correlations (SMC) of 0.388-0.815 (as shown in Table 4.2).

Table 4.2 Factor loading (λ_y), Standard Error ($SE_{\lambda y}$), Significant test (t), Squared multiple correlations (SMC) of observed variables of authentic leadership model

Latent Variables	Observed Variables	Factor Loading			SMC
		B (λ_y)	$SE_{\lambda y}$	T	
1. Self-awareness (ALSA)	ALSA01	0.623**	-	-	0.388
	ALSA02	0.730**	0.159	7.787	0.533
	ALSA03	0.894**	0.165	8.647	0.799
	ALSA04	0.714**	0.149	8.086	0.510
	ALSA05	0.866**	0.164	8.669	0.750

Latent Variables	Observed Variables	Factor Loading			SMC
		B (λ_y)	$SE_{\lambda y}$	T	
2. Balanced Processing (ALBP)	ALBP01	0.696**	-	-	0.484
	ALBP02	0.796**	0.112	10.080	0.634
	ALBP03	0.790**	0.110	9.700	0.624
	ALBP04	0.841**	0.112	10.565	0.707
	ALBP05	0.822**	0.113	9.239	0.676
	ALBP06	0.830**	0.110	9.618	0.689
3. Relational Transparence (ALRT)	ALRT01	0.746**	-	-	0.557
	ALRT02	0.768**	0.109	9.556	0.590
	ALRT03	0.789**	0.110	10.065	0.623
	ALRT04	0.856**	0.107	10.680	0.733
	ALRT05	0.710**	0.110	8.910	0.504
	ALRT06	0.833**	0.107	10.722	0.694
4. Internalized Moral Perspective (ALIM)	ALIM01	0.852**	-	-	0.726
	ALIM02	0.814**	0.068	12.428	0.663
	ALIM03	0.810**	0.070	12.261	0.656
	ALIM04	0.804**	0.074	11.213	0.646
	ALIM05	0.810**	0.081	11.088	0.656
	ALIM06	0.783**	0.081	9.102	0.613
5. Relational Harmony (ALRH)	ALRH01	0.903**	-	-	0.815
	ALRH02	0.881**	0.043	18.532	0.776
	ALRH03	0.840**	0.047	17.323	0.706
	ALRH04	0.887**	0.050	16.343	0.787
	ALRH05	0.861**	0.059	13.380	0.741
	ALRH06	0.832**	0.057	13.720	0.692

** Significant at the 0.01 level

Meanwhile, the standard factor loadings of the five latent variables were significant at the 0.01 level. Relational Transparency (ALRT) has the highest factor loading, which B(λ_y) was 0.989, $SE_{\lambda y}$ was 0.059, SMC was 0.987. Internalized Moral Perspective (ALIM) has values of B(λ_y) was 0.975, $SE_{\lambda y}$ was 0.054, SMC was 0.951, Balanced Processing (ALBP) of B(λ_y) was 0.957, $SE_{\lambda y}$ was 0.064, SMC was 0.916, Relational Harmony (ALRH) of B(λ_y) was 0.945, $SE_{\lambda y}$ was 0.082, SMC was 0.893 and Self-awareness (ALSA) of B(λ_y) was 0.934, $SE_{\lambda y}$ was 0.097, SMC was 0.872 (as shown in Table 4.3).

Table 4.3 Factor loading ($_{\lambda y}$), Standard Error ($SE_{\lambda y}$), Significant test (t), Squared multiple correlations (SMC) of latent variables of authentic leadership model

Latent Variables	Factor Loading			
	B (λy)	$SE_{\lambda y}$	t	SMC
Self-awareness (ALSA)	0.934**	0.097	9.782	0.872
Balanced Processing (ALBP)	0.957**	0.064	11.640	0.916
Relational Transparence (ALRT)	0.989**	0.059	15.081	0.978
Internalized Moral Perspective (ALIM)	0.975**	0.054	14.609	0.951
Relational Harmony (ALRH)	0.945**	0.082	10.114	0.893

** Significant at the 0.01 level

The construct reliability (ρ_c = 0.9820) indicated convergent validity, which was the ratio of observed variable covariance in the same latent variable (which should be higher than 0.60, (Hair et al. 2010: 680)), meaning that the reliability of model structure was very high (98.20%). The average variance extracted (ρ_v = 0.6542) indicated that the authentic leadership constructed model could explain 65.42% of the observed variable variance (Diamantopoulos et al., 2000, p. 91). The results were shown in Figure 4.1.

The results of the validation of the Authentic Leadership (AL) model using a second-order confirmatory factor indicated that the sample data would support the five latent variables structure. Self-awareness (ALSA) was measured with five observed variables. Balanced Processing (ALBP), Relational Transparency (ALRT), Internalized Moral Perspective (ALIM), and Relational Harmony (ALRH) were all measured with six observed variables.

The second-order CFA performed on the authentic leadership model validation indicated good fit between the conceptual model and the observed data. The standard factor loadings of observed variables and latent variables were significant at the 0.01 level.

In conclusion, the analysis of the authentic leadership model shows it has internal consistency, convergent validity, and construct validity.

Table 4.4 Goodness of fit indices of authentic leadership constructed model

Fit indices	Value	Criterion	Meaning
1. χ^2	138.495	-	-
2. df	105.000	-	-
3. p	0.056	p > 0.050	Accurate
4. χ^2/df	1.319	χ^2/df < 2.000	Accurate
5. RMSEA	0.036	RMSEA < 0.050	Accurate
6. NFI	0.996	NFI > 0.900	Accurate
7. NNFI	0.997	NNFI > 0.900	Accurate
8. CFI	0.999	CFI > 0.900	Accurate
9. RMR	0.023	RMR < 0.050	Accurate
10. SRMR	0.023	SRMR < 0.050	Accurate
11. GFI	0.963	GFI > 0.900	Accurate
12. AGFI	0.921	AGFI > 0.900	Accurate

Construct reliability (ρ_c) = 0.9820

Average variance extracted (ρ_v) = 0.6542

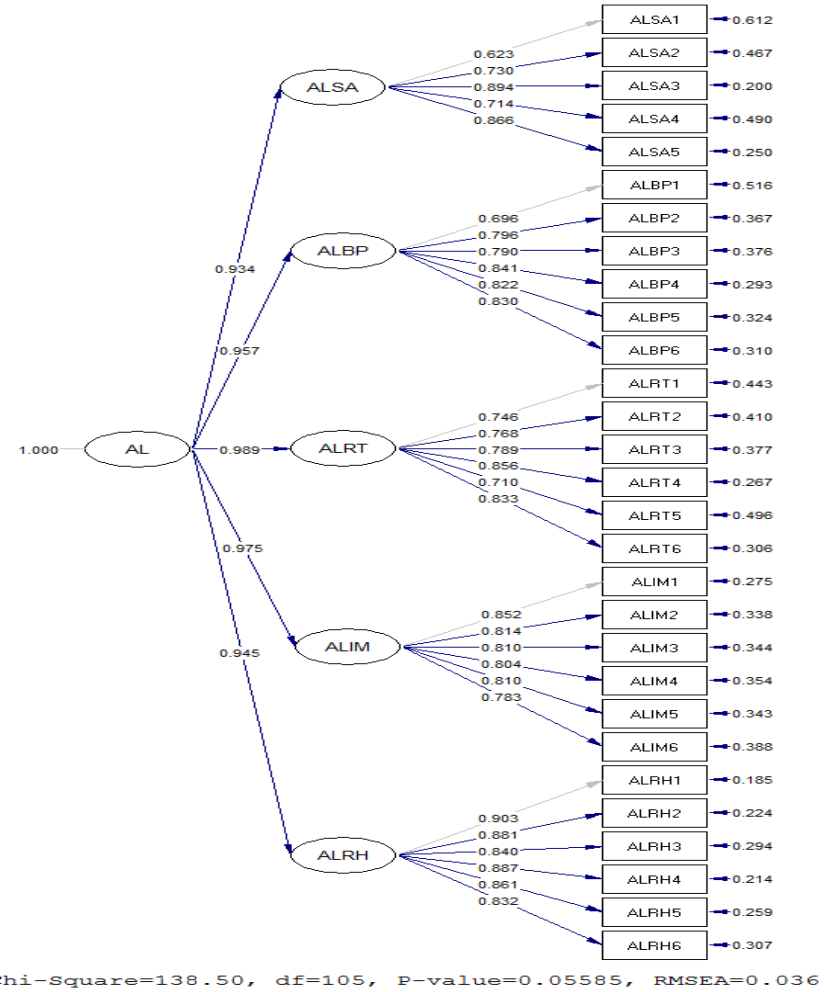

Figure 4.1 Authentic leadership constructed model.

4.2.1.2 The scale validity of Innovation Adoption

The Innovation Adoption model consists of 4 factors and 21 observed variables. Data analysis has shown the factor loadings (λy), standard errors ($SE_{\lambda y}$), significant tests (t), and squared multiple correlations (SMC).

The results showed that the standard factor loadings of observed variables were significant at the 0.01 level. Factor loadings ranged from 0.682-0.912, with standard errors of 0.097-0.155, statistics tests (t-value) of 9.424-14.985 and squared multiple correlations (SMC) of 0.465-0.832, (see Table 4.5).

Table 4.5 Factor loading (λy), Standard Error ($SE_{\lambda y}$), Significant test (t), Squared multiple correlations (SMC) of observed variables of innovation adoption model.

Latent Variables	Observed Variables	Factor Loading			
		B (λy)	$SE^{\lambda y}$	t	SMC
1. Perception of Usefulness (IAPU)	IAPU1	0.830**	-	-	0.689
	IAPU2	0.825**	0.115	11.953	0.681
	IAPU3	0.855**	0.099	14.751	0.731
	IAPU4	0.864**	0.104	14.119	0.746
	IAPU5	0.798**	0.113	12.738	0.637
	IAPU6	0.729**	0.140	9.424	0.531
	IAPU7	0.794**	0.132	9.990	0.630
	IAPU8	0.763**	0.127	10.545	0.582
2. Past Experiences (IAPE)	IAPE1	0.843**	-	-	0.711
	IAPE2	0.874**	0.097	14.985	0.764
	IAPE3	0.794**	0.119	11.754	0.630
	IAPE4	0.721**	0.119	11.239	0.520
	IAPE5	0.682**	0.124	10.196	0.465
3. Enjoyment (IAEJ)	IAEJ1	0.857**	-	-	0.734
	IAEJ2	0.849**	0.114	12.842	0.721
	IAEJ3	0.872**	0.155	10.535	0.760
	IAEJ4	0.898**	0.145	10.834	0.806
4. Employee Innovativeness (IAIN)	IAIN1	0.912**	-	-	0.832
	IAIN2	0.862**	0.123	11.388	0.743
	IAIN3	0.743**	0.132	9.673	0.552
	IAIN4	0.744**	0.132	11.900	0.554

** Significant at the 0.01 level

The standard factor loadings of the four latent variables were also significant at the 0.01 level, as shown in Table 4.6. Past Experiences (IAPE) has the highest factor

loading values: B(λy) was 0.964, $SE_{\lambda y}$ was 0.074, SMC was 0.929. Perception of Usefulness (IAPU) comes in second at B(λy) was 0.963, $SE_{\lambda y}$ was 0.099, SMC was 0.927, followed by Enjoyment (IAEJ) at B(λy) was 0.914, $SE_{\lambda y}$ was 0.098, SMC was 0.835 and Employee Innovativeness (IAIN) at B(λy) was 0.883, $SE_{\lambda y}$ was 0.105, SMC was 0.780.

Table 4.6 Factor loading (λy), Standard Error ($SE_{\lambda y}$), Significant test (t), Squared multiple correlations (SMC) of latent variables of innovation adoption model

Latent Variables	Factor Loading			
	B (λy)	$SE_{\lambda y}$	t	SMC
Perception of Usefulness (IAPU)	0.963**	0.099	13.219	0.927
Past Experiences (IAPE)	0.964**	0.074	14.052	0.929
Enjoyment (IAEJ)	0.914**	0.098	12.004	0.835
Employee Innovativeness (IAIN)	0.883**	0.105	9.687	0.780

** Significant at the 0.01 level

The validity of the innovation adoption model was demonstrated by goodness of fit indices, shown in Table 4.7. The results of the second order CFA performed on the innovation adoption model indicated good fit between the conceptual model and the observed data with goodness of fit statistics: χ^2 was 151.284, df was 127, p was 0.070, χ^2/df was 1.191, RMSEA was 0.031, NFI was 0.991, NNFI was 0.998, CFI was 0.999, RMR was 0.035, SRMR was 0.036, GFI was 0.934 and AGFI was 0.910. The CFA model tested that the assessing sample data would support the 21 observed variables' structure.

Table 4.7 Goodness of fit indices of innovation adoption constructed model

Fit indices	Value	Criterion	Meaning
1. χ^2	151.284	-	-
2. df	127.000	-	-
3. p	0.070	p > 0.050	Accurate
4. χ^2/df	1.191	χ^2/df < 2.000	Accurate
5. RMSEA	0.031	RMSEA < 0.050	Accurate
6. NFI	0.991	NFI > 0.900	Accurate
7. NNFI	0.998	NNFI > 0.900	Accurate
8. CFI	0.999	CFI > 0.900	Accurate
9. RMR	0.035	RMR < 0.050	Accurate
10. SRMR	0.036	SRMR < 0.050	Accurate

11. GFI	0.934	GFI > 0.900	Accurate
12. AGFI	0.910	AGFI > 0.900	Accurate

Construct reliability (ρ_C) = 0.9767

Average variance extracted (ρ_V) = 0.6676

As shown in Figure 4.2, the construct reliability (ρ_C = 0.9767) indicated convergent validity, which the ratio of observed variable covariance in the same latent variable (which should be higher than 0.60, (Hair et al. 2010: 680)), meaning the reliability of the model was very high (97.67%). The average variance extracted (ρ_V = 0.6676) indicated that the innovation adoption model could explain 66.76% of the observed variable variance (Diamantopoulos et al., 2000, p. 91). The resulting model, as shown in Figure 6, also revealed that the results of the validation of the construct validity of the innovation adoption (IA) model using secondary order confirmatory factor analysis indicated that the sample data would support the four latent variable structure. Perception of Usefulness (IAPU) was measured with eight observed variables; Past Experiences (IAPE) with five observed variables and Enjoyment (IAEJ) and Employee Innovativeness (IAIN) were measured with four observed variables.

The second-order CFA performed on the innovation adoption model indicated good fit between the conceptual model and the observed data. The standard factor loadings of each observed variable and latent variables were significant at the 0.01 level.

In conclusion, the innovation adoption model demonstrated good internal consistency, convergent validity, and construct validity.

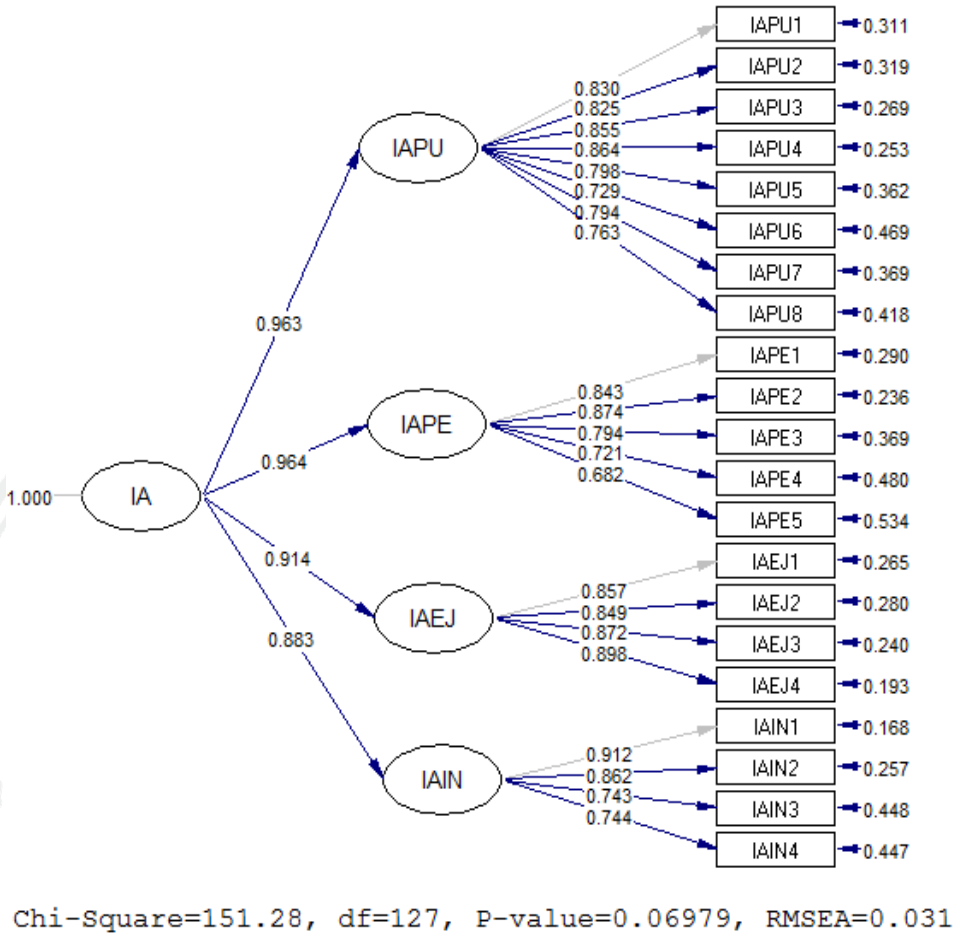

Figure 4.2 Innovation adoption constructed model

4.2.1.3 The scale validity of Innovative Work Behavior

The innovative work behavior model consists of 4 factors and 10 observed variables, as shown in Table 4.8. Data analysis revealed the factor loadings (λ_y), standard errors (SE_{λ_y}), significant tests (t), and squared multiple correlations (SMC).

The standard factor loadings of observed variables were significant at the 0.01 level. Factor loadings ranged from 0.803 - 0.907, with standard errors of 0.030 - 0.044, statistics test values (t-value) of 22.454 - 32.801 and squared multiple correlations (SMC) of 0.645 - 0.823.

Table 4.8 Factor loading (λ_y), Standard Error (SE λ_y), Significant test (t), Squared multiple correlations (SMC) of observed variables of Innovative Work Behavior Model

Latent Variables	Observed Variables	Factor Loading			
		B (λ_y)	SE λ_y	t	SMC
1. Opportunity Exploration (IWOE)	IWOE1	0.820**	-	-	0.672
	IWOE2	0.803**	0.044	22.454	0.645
2. Idea Generation (IWIG)	IWIG1	0.843**	-	-	0.711
	IWIG2	0.907**	0.035	30.972	0.823
	IWIG3	0.852**	0.037	27.015	0.726
3. Championing (IWCP)	IWCP1	0.853**	-	-	0.728
	IWCP2	0.902**	0.035	30.529	0.814
4. Implementation (IWAP)	IWAP1	0.894**	-	-	0.799
	IWAP2	0.885**	0.030	32.801	0.783
	IWAP3	0.878**	0.031	31.179	0.771

** Significant at the 0.01 level

The standard factor loadings of the 4 latent variables, as shown in Table 4.9, were significant at the 0.01 level. Championing (IWCP) has the highest factor loading values of B (λ_y) was 0.973, SE λ_y was 0.032, SMC was 0.947. It was followed by Idea Generation (IWIG) with B (λ_y) was 0.972, SE λ_y was 0.032, SMC was 0.945, Implementation (IWAP) with B (λ_y) was 0.951, SE λ_y was 0.031, SMC was 0.904 and Opportunity Exploration (IWOE) with B (λ_y) was 0.916, SE λ_y was 0.033, SMC was 0.839.

Table 4.9 Factor loading (λ_y), Standard Error (SE λ_y), Significant test (t), Squared multiple correlations (SMC) of latent variables of innovative work behavior model

Latent Variables	Factor Loading			
	B (λ_y)	SE λ_y	t	SMC
Opportunity Exploration (IWOE)	0.916**	0.033	22.817	0.839
Idea Generation (IWIG)	0.972**	0.032	25.432	0.945
Championing (IWCP)	0.973**	0.032	26.107	0.947
Implementation (IWAP)	0.951**	0.031	27.303	0.904

** Significant at the 0.01 level

The validity of the innovative work behavior model demonstrated by goodness of fit indices in Table 4.10. Results of the second order CFA for the innovative work

behavior constructed model validation also indicated good fit between the conceptual model and the observed data with goodness of fit statistics: χ^2 was 19.160, df was 13, p was 0.118, χ^2/df was 1.474, RMSEA was 0.026, NFI was 0.999, NNFI was 0.999, CFI was 0.999, RMR was 0.008, SRMR was 0.008, GFI was 0.995 and AGFI was 0.977. The CFA model also tested to see if the sample data would support the 10 observed variables.

Table 4.10 Goodness of fit indices of innovative work behavior constructed model

Fit indices	Value	Criterion	Meaning
1. χ^2	19.160	-	-
2. df	13.000	-	-
3. p	0.118	p > 0.050	Accurate
4. χ^2/df	1.474	χ^2/df < 2.000	Accurate
5. RMSEA	0.026	RMSEA < 0.050	Accurate
6. NFI	0.999	NFI > 0.900	Accurate
7. NNFI	0.999	NNFI > 0.900	Accurate
8. CFI	0.999	CFI > 0.900	Accurate
9. RMR	0.008	RMR < 0.050	Accurate
10. SRMR	0.008	SRMR < 0.050	Accurate
11. GFI	0.995	GFI > 0.900	Accurate
12. AGFI	0.977	AGFI > 0.900	Accurate

Construct reliability (ρ_c) = 0.9672
Average variance extracted (ρ_v) = 0.7471

The construct reliability, as shown in Figure 4.3, (ρ_C = 0.9672) indicated convergent validity, which was the ratio of observed variable covariance in the same latent variable (which should be higher than 0.60, (Hair et al. 2010: 680)), meaning the reliability of the model structure was very high (96.72%). The average variance extracted (ρ_V = 0.7471) indicated that the innovative work behavior model could explain 74.71% of the observed variable variance. (Diamantopoulos et al., 2000, p. 91). The results were shown in Figure 7.

Results of the validation of the constructed validity of the innovative work behavior (IWB) model using the second-order confirmatory factor analysis indicated that the sample data would support the four latent variable structure. Opportunity Exploration (IWOE) and Championing (IWCP) were measured with two observed

variables, and Idea Generation (IWIG) and Implementation (IWAP) were measured with three observed variables (see Figure 7 Innovative Work Behavior constructed model).

The second-order CFA for the innovative work behavior model validation indicated good fit between the conceptual model and the observed data. The standard factor loadings of each observed variable and latent variables were significant at the 0.01 level.

In conclusion, the innovative work behavior model demonstrates good internal consistency, convergent validity, and construct validity (see Table 4.11). Authentic leadership comprised of 19 items in 5 components: Self-awareness (ALSA), Balanced Processing (ALBP), Relational Transparence (ALRT), Internalized Moral Perspective (ALIM), and Relational Harmony (ALRH). Innovative Work Behavior comprised of 10 items in 4 components: Opportunity Exploration (IWOE), Idea Generation (IWIG), Championing (IWCP), and Implementation (IWAP). And the last one, Innovation Adoption comprised of 21 items with 4 components: Perception of Usefulness (IAPU), Past Experiences (IAPE), Enjoyment (IAEJ), and Employee Innovativeness (IAIN).

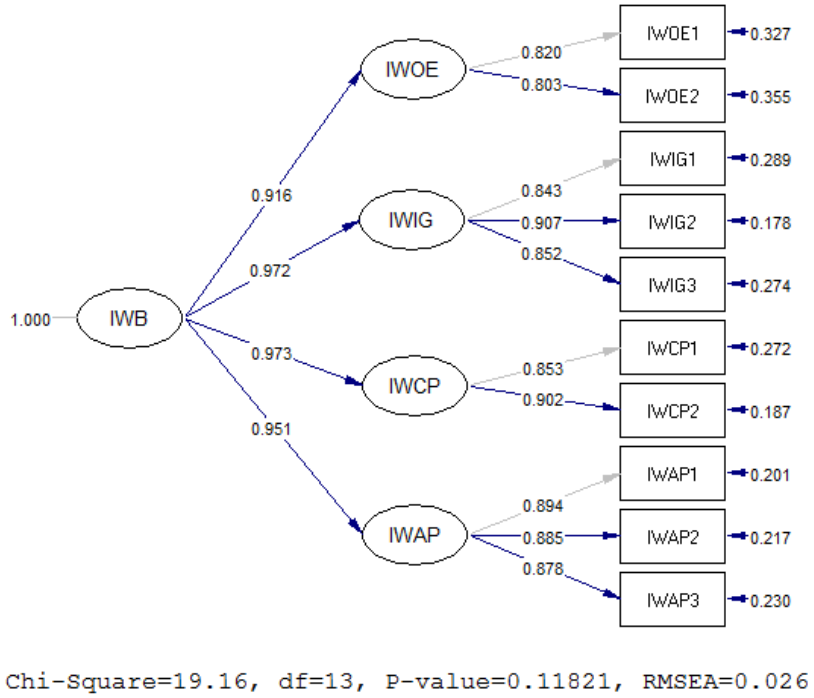

Figure 4.3 Innovative work behavior constructed model

Table 4.11 Summary of Factor loading (λ_y), Standard Error (SE λ_y), Significant test (t), Squared multiple correlations (SMC) of latent variables used in Scale-Validation Study

Scale	sub-dimensions	Factor Loading			
		B (λ_y)	SE λ_y	t	SMC
Authentic leadership (19 items)	Self-awareness (ALSA)	0.934**	0.097	9.782	0.872
	Balanced Processing (ALBP)	0.957**	0.064	11.640	0.916
	Relational Transparence (ALRT)	0.989**	0.059	15.081	0.978
	Internalized Moral Perspective (ALIM)	0.975**	0.054	14.609	0.951
	Relational Harmony (ALRH)	0.945**	0.082	10.114	0.893
Innovative Work Behavior (10 items)	Opportunity Exploration (IWOE)	0.916**	0.033	22.817	0.839
	Idea Generation (IWIG)	0.972**	0.032	25.432	0.945
	Championing (IWCP)	0.973**	0.032	26.107	0.947
	Implementation (IWAP)	0.951**	0.031	27.303	0.904
Innovation Adoption (21 items)	Perception of Usefulness (IAPU)	0.963**	0.099	13.219	0.927
	Past Experiences (IAPE)	0.964**	0.074	14.052	0.929
	Enjoyment (IAEJ)	0.914**	0.098	12.004	0.835
	Employee Innovativeness (IAIN)	0.883**	0.105	9.687	0.780

** Significant at the 0.01 level

4.3 Results of Hypothesis Analyses

Results of hypothesis testing in this study were reported as following:

4.3.1 The Effect of Authentic Leadership on Innovative Work Behavior

The results of the regression analysis were performed to test the hypothesized effect of AL on IWB and the correlations between AL and IWB, as a whole and their factors, were described below.

4.3.1.1 Results of Multiple Regression

Stepwise multiple regression analysis was used to analyze the predictive power on innovative work behavior (IWB) by authentic leadership (AL) as a whole and also by its 5 factors: Self-awareness (ALSA), Balanced Processing (ALBP), Relational

Transparency (ALRT), Internalized Moral Perspective (ALIM) and Relational Harmony (ALRH). The predictive power of AL was 50.9% (as shown in Table 4.12). The regression analysis on IWB by 5 factors reveals that the prediction power of Balance Processing was highest at 48.4%. Self-awareness and Relational Harmony add 2.9% and 0.8% respectively, of which the total predictive power of the 3 factors was 52.1% (see R^2 and R^2 change, as shown in Table 4.13).

Table 4.12 Stepwise multiple regression analysis of AL on IWB

Model Summary

Model		R	R^2	Adjusted R^2	Std. Error of the Estimate
dimension0	1	.713[a]	.509	.508	.51494

a. Predictors: (Constant), Authentic Leadership

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	191.540	1	191.540	722.343	.000[a]
	Residual	185.085	698	.265		
	Total	376.624	699			

a. Predictors: (Constant), Authentic Leadership
b. Dependent Variable: Innovative Work Behavior

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.875	.108		8.107	.000
	Authentic Leadership	.715	.027	.713	26.876	.000

a. Dependent Variable: Innovative Work Behavior

Table 4.13 Model summary of predicting innovative work behavior (IWB) from authentic leadership (AL)

Model	**R**	**R^2**	**Adjusted R^2**	**SE_{est}**	**R^2 Change**	**F**	**p**
1	0.696	0.484	0.483	0.528	0.484	654.528**	0.000
2	0.716	0.513	0.512	0.513	0.029	367.485**	0.000
3	0.722	0.521	0.519	0.509	0.008	252.588**	0.000

** Significant at the 0.01 level

Table 4.14 Coefficients of stepwise regression analysis of AL on IWB (n=700)

Model		Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE_B	β		
1	(Constant)	1.086	0.105	-	10.331**	0.000
	Balanced Processing	0.666	0.026	0.696	25.584**	0.000
2	(Constant)	0.928	0.105	-	8.828**	0.000
	Balanced Processing	0.387	0.050	0.404	7.752**	0.000
	Self-awareness	0.323	0.050	0.338	6.481**	0.000
3	(Constant)	0.864	0.106	-	8.158**	0.000
	Balanced Processing	0.291	0.057	0.304	5.104**	0.000
	Self-awareness	0.276	0.051	0.289	5.376**	0.000
	Relational Harmony	0.153	0.045	0.170	3.407**	0.001

** Significant at the 0.01 level

The regression analysis results support Hypothesis 1 which stated that Hypothesis 1: Authentic leadership (AL) has a positive effect on innovative work behavior (IWB). The coefficients in Table 4.14 can be used to develop a multiple regression equation as shown below:

IWB = 0.864 + 0.291(ALBP) + 0.276(ALSA) + 0.153(ALRH)

4.3.1.2 Results of Correlation Coefficients

The overall correlation between authentic leadership (AL) and innovative work behavior (IWB) was significant at the 0.01 level, with Pearson's correlation coefficient value between AL and IWB as a whole was 0.713, as shown in Table 4.15. The ordered values of Pearson's correlation coefficient for each factor found that Balanced Processing (ALBP) had the highest correlation with innovative work behavior (IWB) (r=0.696), followed by Self-awareness (ALSA) (r=0.687), Relational Transparency (ALRT) (r=0.674), Relational Harmony (ALRH) (r=0.655) and Internalized Moral Perspective (ALIM) (r=0.633), as shown in the last column.

All correlation coefficients between the 5 factors of AL and 4 factors of IWB were significant at the 0.01 level, with correlation coefficients ranging from 0.562-

0.656, as shown in columns 4 to 7, Table 4.15). The correlations demonstrated the appropriateness of furthering perform path analysis.

Table 4.15 The correlation coefficient between authentic leadership (AL) and innovative work behavior (IWB).

Authentic Leadership			**Innovative Work Behavior**				
			IWOE	**IWIG**	**IWCP**	**IWAP**	**Overall**
(AL)	**Mean**	**SD**	**3.77, 0.79**	**3.73, 0.80**	**3.64, 0.81**	**3.76, 0.79**	**3.73, 0.73**
ALSA	3.92	0.77	0.607**	0.642**	0.613**	0.656**	**0.687****
ALBP	3.97	0.77	0.634**	0.655**	0.616**	0.650**	**0.696****
ALRT	3.93	0.74	0.601**	0.630**	0.602**	0.642**	**0.674****
ALIM	4.03	0.81	0.562**	0.591**	0.570**	0.601**	**0.633****
ALRH	4.1	0.82	0.608**	0.606**	0.591**	0.609**	**0.655****
Overall	**3.99**	**0.73**	**0.643****	**0.666****	**0.638****	**0.673****	**0.713****

** Significant at the 0.01 level

4.3.2 The Effect of Innovation Adoption on Innovation Work Behavior

Results of regression analysis to test the hypothesized effect of IA on IWB and the correlations between IA and IWB, as a whole and their factors were described below.

4.3.2.1 Results of Multiple Regression

Stepwise multiple regression analysis was used to analyze predictive power on innovative work behavior (IWB) by innovation adoption (IA) and its 4 factors: Perception of Usefulness (IAPU), Past Experiences (IAPE), Enjoyment (IAEJ) and Employee Innovativeness (IAIN). Results indicated that the predictive power (R^2) of overall IA on IWB was 56.5%, (as shown in Table 4.16). The prediction power of the 4 factors of IA on IWB was at 56.8%, of which Perception of Usefulness (IAPU) made the highest predictive power at 51.6%. Enjoyment (IAEJ) and Employee Innovativeness (IAIN) could add 4.7% and 0.5%, respectively (as shown in Table 4.17).

Table 4.16 Stepwise multiple regression analysis of IA on IWB (n=700)

Model Summary

Model		R	R^2	Adjusted R^2	Std. Error of the Estimate
dimension0	1	.751[a]	.565	.564	.48475

a. Predictors: (Constant), Innovation Adoption

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	212.605	1	212.605	904.765	.000[a]
	Residual	164.019	698	.235		
	Total	376.624	699			

a. Predictors: (Constant), Innovation Adoption
b. Dependent Variable: Innovative Work Behavior

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.910	.095		9.533	.000
	Innovation Adoption	.753	.025	.751	30.079	.000

a. Dependent Variable: Innovative Work Behavior

Table 4.17 Model summary of predictive power on innovative work behavior (IWB) by innovation adoption (IA)

Model	**R**	**R^2**	**Adjusted R^2**	**SE_{est}**	**R^2 Change**	**F**	**p**
1	0.718	0.516	0.515	0.511	0.516	744.202**	0.000
2	0.751	0.564	0.562	0.486	0.047	449.904**	0.000
3	0.754	0.568	0.567	0.483	0.005	305.586**	0.000

** Significant at the 0.01 level

Table 4.18 Coefficients of Stepwise regression analysis of IA on IWB (n=700)

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE_B**	β		
1	(Constant)	1.067	0.099	-	10.727**	0.000
	Perception of Usefulness	0.686	0.025	0.718	27.280**	0.000
2	(Constant)	0.941	0.096	-	9.842**	0.000
	Perception of Usefulness	0.454	0.036	0.476	12.692**	0.000

	Employee Innovativeness	0.288	0.033	0.326	8.708**	0.000
3	(Constant)	0.905	0.096	-	9.429**	0.000
	Perception of Usefulness	0.374	0.046	0.391	8.202**	0.000
	Employee Innovativeness	0.261	0.034	0.296	7.625**	0.000
	Enjoyment	0.117	0.042	0.129	2.822**	0.005

** Significant at the 0.01 level

Therefore, the results indicate support to Hypothesis 2 which stated that Innovation adoption has a positive effect on innovative work behavior. The coefficients of the factors as shown in Table 4.18 can be used to develop multiple regression equation such as the one below:

IWB = 0.905 + 0.374(IAPU) + 0.261(IAIN) + 0.117(IAEJ)

4.3.2.2 Results of Correlation Coefficients

The correlation between innovation adoption (IA) and innovative work behavior (IWB) was found significant at the 0.01 level, with Pearson's correlation coefficient of 0.751. All correlation coefficients between their factors ranged from 0.602 to 0.683 were also significant at the 0.01 level (see details in Table 4.1).

Table 4.19 The correlation coefficient of the effect between innovation adoption (IA) and innovative work behavior (IWB)

Innovation Adoption (IA)	**Mean**	**SD**	**Innovative Work Behavior**				
			IWOE	**IWIG**	**IWCP**	**IWAP**	**Overall**
			3.77, 0.79	**3.73, 0.80**	**3.64, 0.81**	**3.76, 0.79**	**3.73, 0.73**
IAPU	3.88	0.77	0.683**	0.667**	0.622**	0.672**	**0.718****
IAPE	3.64	0.79	0.629**	0.651**	0.619**	0.628**	**0.687****
IAEJ	3.78	0.81	0.617**	0.609**	0.604**	0.621**	**0.665****
IAIN	3.56	0.83	0.602**	0.630**	0.636**	0.636**	**0.680****
Overall	**3.74**	**0.73**	**0.696****	**0.699****	**0.673****	**0.699****	**0.751****

** Significant at the 0.01 level

4.3.3 The Moderation Effect of Innovative Adoption

4.3.3.1 The Initial Model

Path analysis was performed to examine the path coefficients, direct effects, indirect effects, and total effects from the exogenous variables (AL or IA) to the endogenous variables (IWB). As shown in Figure 4.4, the results of the causal model below showed that the observed exogenous variables had Authentic Leadership (AL) as a single latent variable, with five observed variables (path analysis considers factors as variables): Self-awareness (ALSA), Balanced Processing (ALBP), Relational Transparency (ALRT), Internalized Moral Perspective (ALIM) and Relational Harmony (ALRH). All factor loadings were significant at the 0.01 level. Factor loadings ranged from 0.881-0.935, with standard errors of 0.040-0.043 and squared multiple correlations (SMC) of 0.776-0.874, as shown in Table 4.20.

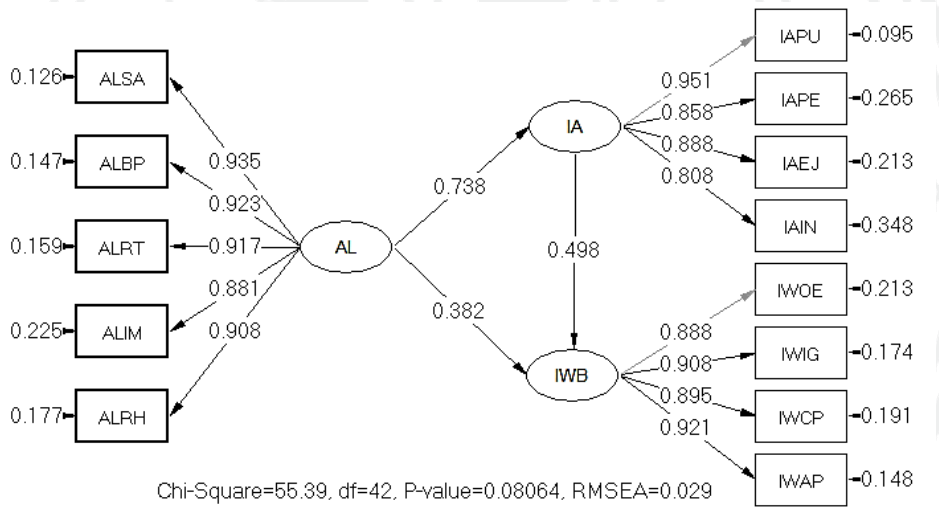

Figure 4.4 Causal model of authentic leadership (AL) and innovation adoption (IA) influencing innovative work behavior (IWB) (Empirical Data)

Table 4.20 Factor loading (λ_x), Standard Error ($SE\lambda_x$), Significant test (t), Squared multiple correlations (SMC) of the exogenous observed variables (Initial Model)

Exogenous Latent variables	**Exogenous observed variables**	**Factor loading (λ_x)**	**Standard Error ($SE\lambda_x$)**	**Significant test (t)**	**SMC**
Authentic Leadership (AL)	ALSA	0.935**	0.040	23.278	0.874
	ALBP	0.923**	0.040	22.918	0.852
	ALRT	0.917**	0.043	21.447	0.841
	ALIM	0.881**	0.042	20.958	0.776
	ALRH	0.907**	0.041	21.944	0.823

** Significant at the 0.01 level

The results of path analysis on the causal model demonstrated that:

1) Authentic Leadership (AL) directly and significantly affected Innovation Adoption (IA) at the 0.01 level with a path coefficient value of 0.738. The effect of the sub-variables was somewhere in between .560 and .660.

2) Innovation Adoption (IA) directly, and significantly, affected Innovative Work Behavior (IWB) at the 0.01 level with a path coefficient value of 0.498.

3) Authentic Leadership (AL) directly, and significantly, affected Innovative Work Behavior (IWB) at the 0.01 level with a path coefficient 0.382, and indirectly through Innovation Adoption (IA) with a path coefficient 0.368, so the total effect was 0.750.

4) The squared multiple correlations for structural equations of Innovation Adoption (IA) was 0.545.

5) The squared multiple correlations for structural equations of Innovative Work Behavior (IWB) was 0.675.

The results described above were shown in Table 4.21.

Table 4.21 Path coefficients, direct effects, indirect effects and total effect from the cause variables to the effect variables (Initial Model)

Cause Variables	**Effect Variables**					
	Innovation Adoption (IA)			**Innovative Work Behavior (IWB)**		
	DE	**IE**	**TE**	**DE**	**IE**	**TE**
Authentic Leadership (AL)	0.738**	-	0.738**	0.382**	0.368**	0.750**
Innovation Adoption (IA)				0.498**	-	0.498**
Squared Multiple Correlations for Structural Equations	**0.545**			**0.675**		

** Significant at the 0.01 level

The validity of the construct model was demonstrated by the goodness of fit indices, as seen in Table 4.22. Results of the structural equation modeling (SEM) for the causal model of “Authentic Leadership” and Innovation Adoption” influencing “Innovative Work Behavior” indicated congruence between the conceptual model and the empirical data with goodness of fit statistics: χ^2 was 55.393, df was 42, p was 0.081,

χ^2/df was 1.319, RMSEA was 0.029, NFI was 0.996, NNFI was 0.998, CFI was 0.999, RMR was 0.022, SRMR was 0.022, GFI was 0.977 and AGFI was 0.951.

Table 4.22 Goodness of fit indices of "Authentic Leadership" and Innovation Adoption" influencing "Innovative Work Behavior" (Empirical Data)

Fit indices	Value	Criterion	Meaning
1. χ^2	55.393	-	-
2. df	42.000	-	-
3. p	0.081	p > 0.050	Accurate
4. χ^2/df	1.319	$\chi^2/df < 2.000$	Accurate
5. RMSEA	0.029	RMSEA < 0.050	Accurate
6. NFI	0.996	NFI > 0.900	Accurate
7. NNFI	0.998	NNFI > 0.900	Accurate
8. CFI	0.999	CFI > 0.900	Accurate
9. RMR	0.022	RMR < 0.050	Accurate
10. SRMR	0.022	SRMR < 0.050	Accurate
11. GFI	0.977	GFI > 0.900	Accurate
12. AGFI	0.951	AGFI > 0.900	Accurate

In conclusion, from 4.3.1, 4.3.2, and 4.3.3, the result of the study supported the hypothesis 1 and 2:

1. Authentic leadership has a positive effect on innovative work behavior.
2. Innovation adoption has a positive effect on innovative work behavior.

4.3.3.2 The Moderating Model

The part of the study intended to test the moderating effect of IA (Innovation Adoption) on the effect of AL (Authentic Leadership) on IWB (Innovative Work Behavior) as shown in figure 4.5. The results would later compare this moderating model of AL x IA with the initial model reported above to test Hypothesis 3.

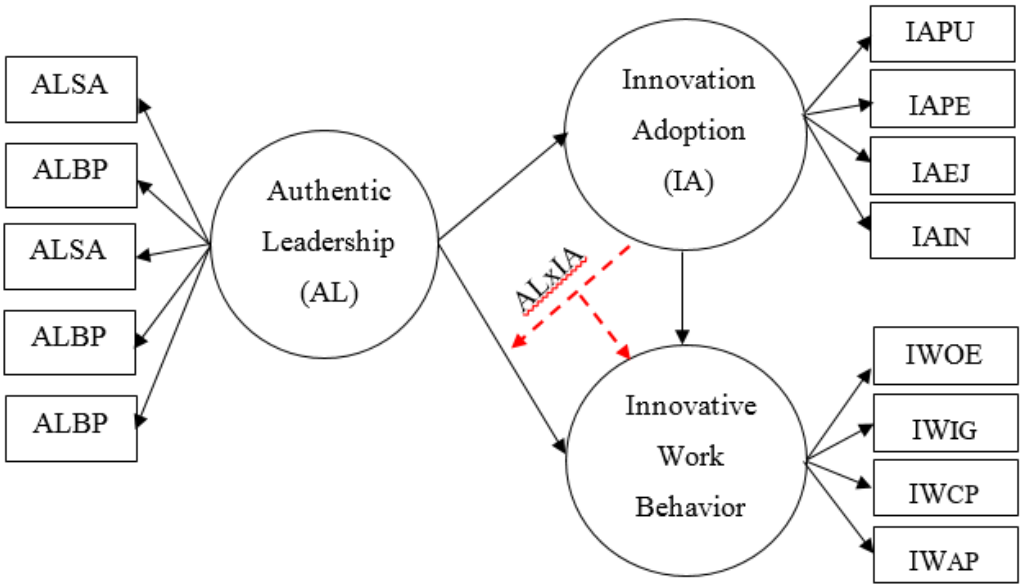

Figure 4.5 Hypothesis model of innovation adoption (IA) moderates the effect of authentic leadership (AL) on innovative work behavior (IWB).

The steps in path analysis were described in the following pages.

Fist, computing variables AL×IA interactions between Authentic Leadership (AL) and Innovation Adoption (IA) to 20 variables (5×4).

AL1×IA1 = ALSA×IAPU

AL1×IA2 = ALSA×IAPE

AL1×IA3 = ALSA×IAEJ

AL1×IA4 = ALSA×IAIN

AL2×IA1 = ALBP×IAPU

AL2×IA2 = ALBP×IAPE

AL2×IA3 = ALBP×IAEJ

AL2×IA4 = ALBP×IAIN

AL3×IA1 = ALRT×IAPU

AL3×IA2 = ALRT×IAPE

AL3×IA3 = ALRT×IAEJ

AL3×IA4 = ALRT×IAIN

AL4×IA1 = ALIM×IAPU

AL4×IA2 = ALIM×IAPE

AL4×IA3 = ALIM×IAEJ

AL4×IA4 = ALIM×IAIN

AL5×IA1 = ALRH×IAPU

AL5×IA2 = ALRH×IAPE

AL5×IA3 = ALRH×IAEJ

AL5×IA4 = ALRH×IAIN

Then, the study examines the effect of AL×IA directly on Innovative Work Behavior (IWB) and considers the effects from AL to IWB and from IA to IWB (as depicted in Fig 4.5).

4.3.3.3 Examining the factor loading (λ_1) in standardizing form, standard error (SE_{λ_1}), significant test (t), and squared multiple correlations (SMC) of the observed exogenous variables (Moderation Mode)

The results, as shown in table 4.23, show that all factor loadings were significant at the 0.01 level. Factor loadings ranged from 0.867-0.959, with standard errors of 0.039-0.046, and squared multiple correlations (SMC) of 0.752-0.920.

Table 4.23 Factor loading (λ_x), Standard Error (SE_{λ_x}), Significant test (t), Squared multiple correlations (SMC) of the observed exogenous variables (Moderation Model)

Exogenous Latent variables	**Exogenous observed variables**	**Factor loading (λ_x)**	**Standard Error (SE_{λ_x})**	**Significant test (t)**	**SMC**
Authentic Leadership (AL)	ALSA	0.935**	0.040	23.278	0.874
	ALBP	0.923**	0.040	22.918	0.852
	ALRT	0.917**	0.043	21.447	0.841
	ALIM	0.881**	0.042	20.958	0.776
	ALRH	0.907**	0.041	21.944	0.823
AL×IA	AL1×IA1	0.909**	0.042	21.561	0.826
	AL1×IA2	0.916**	0.042	21.735	0.839
	AL1×IA3	0.902**	0.043	21.103	0.814
	AL1×IA4	0.867**	0.045	19.679	0.752
	AL2×IA1	0.939**	0.043	21.856	0.882
	AL2×IA2	0.940**	0.043	21.842	0.884
	AL2×IA3	0.932**	0.044	21.583	0.869
	AL2×IA4	0.904**	0.045	20.440	0.817
	AL3×IA1	0.943**	0.043	22.050	0.889

Exogenous Latent variables	Exogenous observed variables	Factor loading (λ_x)	Standard Error (SE^{λ_x})	Significant test (t)	SMC
	AL3×IA2	0.955**	0.042	22.571	0.912
	AL3×IA3	0.918**	0.044	20.993	0.843
	AL3×IA4	0.891**	0.046	19.954	0.794
	AL4×IA1	0.933**	0.043	21.798	0.870
	AL4×IA2	0.934**	0.043	21.806	0.872
	AL4×IA3	0.928**	0.044	21.425	0.861
	AL4×IA4	0.910**	0.045	20.771	0.828
	AL5×IA1	0.922**	0.042	21.783	0.850
	AL5×IA2	0.914**	0.043	21.360	0.835
	AL5×IA3	0.913**	0.043	21.247	0.834
	AL5×IA4	0.886**	0.045	20.082	0.785

** Significant at the 0.01 level

4.3.3.4 Examining the factor loading (λ_y) in standardizing form, Standard Error ($SE\lambda_y$), Significant test (t), and Squared multiple correlations (SMC) of the observed endogenous variables (Moderation Model).

Results had shown in Table 4.24 that all factor loadings were significant at the 0.01 level. Factor loadings ranged from 0.806-0.945, with standard errors of 0.043-0.053, and squared multiple correlations (SMC) of 0.650-0.893.

Table 4.24 Factor loading (λ_y), Standard Error ($SE\lambda_y$), Significant test (t) and Squared multiple correlations (SMC) of the observed endogenous variables (Moderation Model)

Endogenous Latent variables	Endogenous observed variables	Factor loading (λ_y)	Standard Error ($SE\lambda_y$)	Significant test (t)	SMC
Innovation Adoption (IA)	IAPU	0.945**	-	-	0.893
	IAPE	0.848**	0.044	19.239	0.719
	IAEJ	0.875**	0.044	20.080	0.766
	IAIN	0.814**	0.051	16.045	0.663
Innovative Work Behavior (IWB)	IWOE	0.806**	-	-	0.650
	IWIG	0.904**	0.043	20.063	0.817
	IWCP	0.872**	0.053	15.603	0.760
	IWAP	0.891**	0.052	16.461	0.794

** Significant at the 0.01 level

4.3.3.5 Examining the path coefficients, direct effects, indirect effects, and total effect from the exogenous variables to the endogenous variables.

The result of the model, as shown in Table 4.25, demonstrated that:

1) Authentic Leadership (AL) directly and significantly affects Innovation Adoption (IA) at the 0.01 level with a path coefficient value of 0.708. The R-value was .751[a], R^2 was .565, and the F value was 904.765.

2) Authentic Leadership (AL) directly, and significantly, affects Innovative Work Behavior (IWB) at the 0.01 level with a path coefficient value of 0.334, and indirectly through Innovation Adoption (IA) with a path coefficient value of 0.373, so the total effect was 0.707.

3) The effect of AL×IA on Innovative Work Behavior (IWB) was not significant, as the direct effect, as well as the total effect, was 0.091.

4) Innovation Adoption (IA) directly, and significantly, affected Innovative Work Behavior (IWB) at the 0.01 level with a path coefficient value of 0.527.

5) The squared multiple correlations for structural equations of Innovation Adoption (IA) was 0.502.

6) The squared multiple correlations for structural equations of Innovative Work Behavior (IWB) was 0.646.

The results of the model were summarized in Figure 4.6.

Table 4.25 Path coefficients, direct effects, indirect effects and total effect from the cause variables to the effect variables (Moderation Model)

Cause Variables	**Effect Variables**					
	Innovation Adoption (IA)			**Innovative Work Behavior (IWB)**		
	DE	**IE**	**TE**	**DE**	**IE**	**TE**
Authentic Leadership (AL)	0.708**	-	0.708**	0.334**	0.373**	0.707**
AL×IA				0.091	-	0.091
Innovation Adoption (IA)				0.527**	-	0.527**
Squared Multiple Correlations for Structural Equations	**0.502**			**0.646**		

** Significant at the 0.01 level

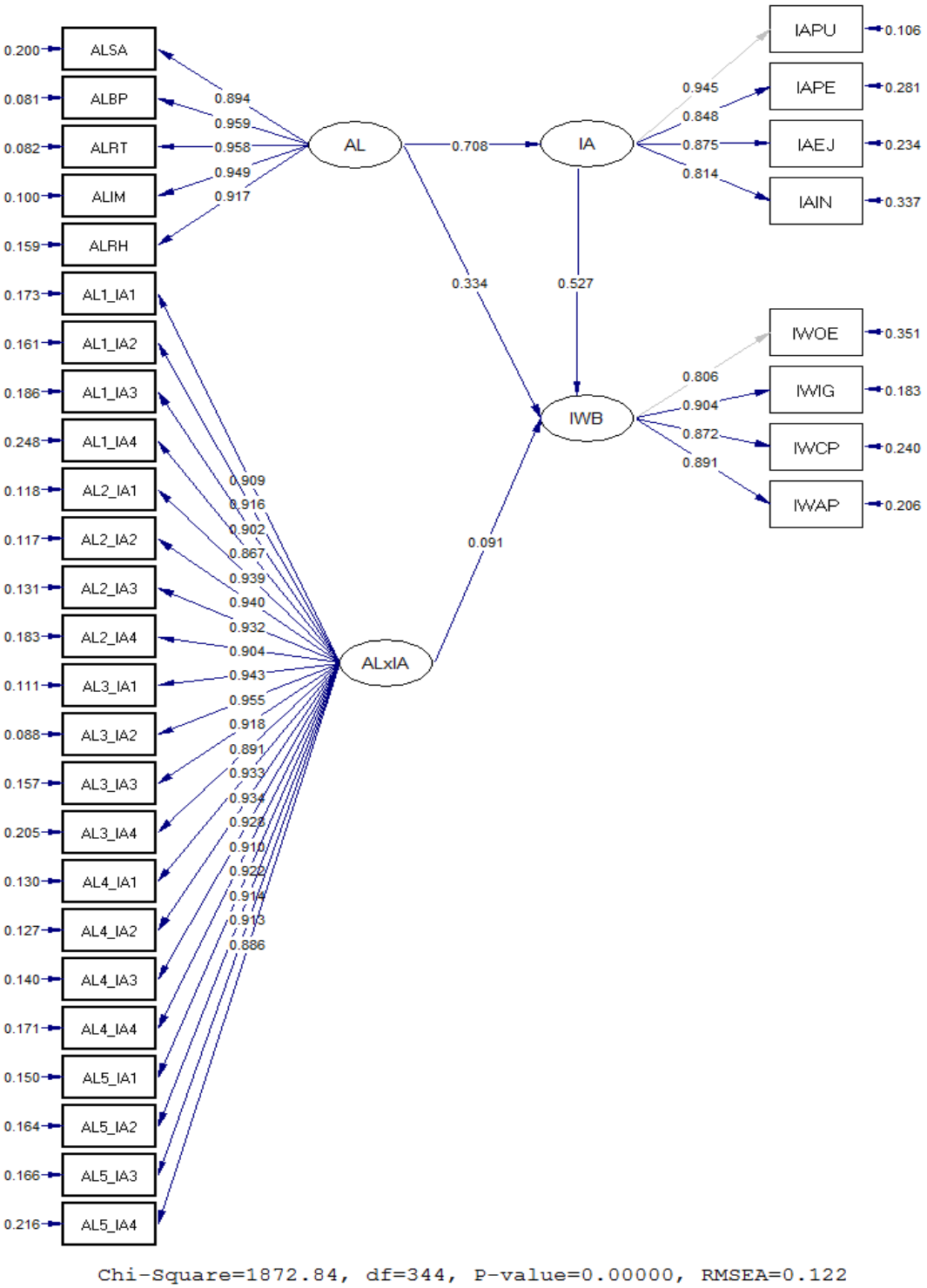

Figure 4.6 Innovation adoption (IA) moderates the effect of authentic leadership (AL) on innovative work behavior (IWB) (Empirical Data)

4.3.3.6 Comparison of the Initial Model and Moderation Model

The analysis was conducted for testing Hypothesis 3; Innovation adoption moderates the effect of authentic leadership on innovative work behavior. When comparing the factor loadings and path coefficient values of the initial model and moderation model, the two models were not that different, the change values ranged from -0.068 to 0.082, as shown in Table 4.26. The Squared Multiple Correlations (SMC) of the Innovative Work Behavior (IWB) in the initial model was equal to 0.675, while the moderation model was equal to 0.646, which were not drastically different (see more details in Table 4.27).

Table 4.26 Comparing the factor loading of the exogenous and endogenous observed variables between the initial model and moderation model.

Latent variables	Observed variables	Initial Model	Moderation Model	Change
Authentic Leadership (AL)	ALSA	0.935**	0.894**	0.041
	ALBP	0.923**	0.959**	-0.036
	ALRT	0.917**	0.958**	-0.041
	ALIM	0.881**	0.949**	-0.068
	ALRH	0.907**	0.917**	-0.010
Innovation Adoption (IA)	IAPU	0.951**	0.945**	0.006
	IAPE	0.858**	0.848**	0.010
	IAEJ	0.888**	0.875**	0.013
	IAIN	0.808**	0.814**	-0.006
Innovative Work Behavior (IWB)	IWOE	0.888**	0.806**	0.082
	IWIG	0.908**	0.904**	0.004
	IWCP	0.895**	0.872**	0.023
	IWAP	0.921**	0.891**	0.030

** Significant at the 0.01 level

Table 4.27 Comparing path coefficients, direct effects, indirect effects, and total effect between the initial model and moderation model.

Cause Variables	Effect Variables					
	Innovation Adoption (IA)			Innovative Work Behavior (IWB)		
	DE	IE	TE	DE	IE	TE
Authentic Leadership (AL)	[0.738**] (0.708**)	- -	[0.738**] (0.708**)	[0.382**] (0.334**)	[0.368**] (0.373**)	[0.750**] (0.707**)
Innovation Adoption (IA)				[0.498**] (0.527**)	- -	[0.498**] (0.527**)

Squared Multiple Correlations	**[0.545] (0.502)**	**[0.675] (0.646)**

** Significant at the 0.01 level
Values in [ ] = Initial model; Values in ( ) = Moderation model

Therefore, the results demonstrated that Authentic Leadership (AL) and Innovation Adoption (IA) independently affected Innovative Work Behavior (IWB). The Innovation adoption (IA) did not moderate the effect of authentic leadership (AL) on innovative work behavior (IWB), so Hypothesis 3 was not supported. However, the results did indicate the significant interrelated effects of innovation adoption and authentic leadership on innovative work behavior instead, as described in the analysis of the initial model at path coefficient as R^2 was 0.545.

CHAPTER 5

SUMMARY, DISCUSSION, AND RECOMMENDATION

This chapter provides a research summary of the study, which includes objectives, methodology, hypotheses, and results. Then the findings as the answers to research questions will be discussed. Lastly, recommendations for implications and future research studies will be addressed.

5.1 Summary

This study was aimed at ascertaining the factors behind innovation adoption among Thai private sector employees. In addition, it intended to examine if a leadership style, authentic leadership (AL), affected innovative work behavior (IWB) of Thai employees, and to explore if innovation adoption (IA) exerted direct and/or indirect effect on innovative work behavior of employees. The scope of this study covers Thai employees of a Thai conglomerate in the agricultural and food industry.

Each package of questionnaires used in the study included: (1) authentic leadership (AL) questionnaire (Amornpipat, 2016; following Avolio et al., 2007), (2) innovative work behavior (IWB) questionnaire (Amornpipat, 2016, based on De Jong and Hartog's study, 2008), (3) individual innovation adoption questionnaire which was newly developed for this study in accordance with the definition provided by Talukder and others (2008), and (4) demographic information questionnaire. A pilot study was conducted with 200 employees working in the target company, who were not in the sample pool. Scale analysis was performed with 116 completely filled and returned (58% return rate). Results from the pilot study revealed good qualities, validities, and reliabilities, of the first three questionnaires after dropping a few items with low inter-item correlations from each questionnaire. Factor analysis and innovation adoption model showed that the IA questionnaire which was developed for this study composed of 4 sub variables (or factors): Perceived Usefulness (PU), Past Experience (PE),

Enjoyment (EJ), and Innovativeness (IN Results of the CFA for the Innovation Adoption (IA). The measurement model validation indicated good fit between the conceptual model and the observed data with goodness of fit statistics. The four questionnaires were then rearranged before being used to collect data for this study.

The questionnaires were then distributed via the online questionnaire to 1,000 employees randomly selected from employees working in the target company. Within 2 months, 734 questionnaires were returned (73.4 % return rate), of which 700 were completely filled. Again, questionnaire analyses with 700 samples found the 3 questionnaires composing goodness of fit factors and each questionnaire possessed high validity and reliability.

Results from regression analysis demonstrated the predictive power of AL on IWB was 50.9% of which factor or sub-variable ALBP had the most prediction power (48.4%). This results support hypothesis 1 as "authentic leadership had positive effect on innovative work behavior". While the correlation between IA and IWB was found ($r = .751$, $p < 0.01$). Also, the predictive power of IA on IWB was 56.5% while its factor or sub-variable, IAPU, had the most power as 37.4%. The results supported hypothesis 2 which was stated that "innovation adoption had positive effect on innovative work behavior".

Result from the path analysis via the LISREL program indicated that AL had significant direct effect on IWB (path coefficient 0.382, $p < 0.01$), which confirmed support to Hypothesis 1. The path analysis also showed that IA displayed significant direct effect on IWB (path coefficient 0.498, $p < 0.01$), therefore Hypothesis 2 was confirmed as being supported. The path analysis to prove the moderating effect of IA on the effect of AL on IWB, found non-significant difference between of the effects of the innovative work behavior (IWB) in the moderating model and initial model (the squared multiple correlations (SMC) equaled to 0.646 and 0.675 respectively). Therefore, Hypothesis 3 was not support, indicating that IA did not moderate the effect of AL on IWB. Instead, the results demonstrated the interrelating effect of innovation adoption (IA) and authentic leadership (AL) on innovative work behavior (IWB), as shown in the analysis of the initial model at path coefficient as R^2 was 0.545.

5.2 Discussion

The results found the answer to the three questionnaire as following: To answer the first research question, “what are the factors that involve in innovation adoption of employees in private Thai company?”, the resulting study presented that the innovation adoption among Thai private sector employees comprised of 4 statistically proven factors, (1) perceive usefulness (PU), (2) prior experience (PE), (3) innovativeness (IN), and (4) enjoyment (EN) with good qualities.

The outcome of this study as a leading product was the individual innovation adoption measurement tool, which was reliable and valid for further study expansion. The IA tool was developed and constructed in the Thai context to assess which referenced factors of Thai employees bought-in or accept the innovation in the organization, due to the new idea acceptation would act as a motivating stimulus that enables innovative behavior (Scott & Bruce, 1994). In nature, employees might resist the changes, but if they received benefits from those changes, they would cooperate (Ajzen, 1991). Even though the organizational situations and attitudes influenced the motivation and intentions of employees (Le Bon & Merunka, 1998), the adoption would be successful when employees accept and effectively used what they had adopted (Lee & Xia, 2006). Therefore, if employees did not have innovation accepting attitudes, the organization might face with business challenges, such as the lack of new technology or any newness, to compete in the market (Talukder et al., 2008).

For research question 2; “how authentic leadership affects innovative work behavior of Thai employees, in a positive or negative way?” the study result demonstrated in the results from 2 types of statistical method; the regression analysis and the path analysis. First, using the regression analysis. The predictive power of AL on IWB was 50.9%, of which sub variable ALBP had the most power (48.4%) while path analysis revealed that AL had a significant direct effect on IWB both of which supported H1.

The finding supported previous studies, as mentioned in the literature review. As the creative performance of employees was quite often dependent on leadership (i.e., Oke et al., 2009; Oldham & Cummings, 1996; Scott and Bruce, 1994), leaders can enhance employees' innovative behaviors and create attitudes that were beneficial to

innovative activities (Oke et al., 2009). Since authentic leadership had a positive relationship with employees' creativity and innovativeness and employees' creativity also has a positive impact on innovativeness (Müceldili et al., 2013). In the Thai context, this study finding was confirmed and relevant to the study of Amornpipat (2016) that authentic leadership has a positive effect to innovative work behavior, no matter in the public sector (Royal Thai Military) or in the private sector (an agricultural & food industry).

AL also had indirect through IA and demonstrated a significant direct effect on IA. Since the finding was found and H1 was proven from the 2 types of measurement, therefore, AL has a positive effect on IWB, and H1 was accepted which was the answer of research question 2 on how authentic leadership affects innovative work behavior of Thai employees in a positive or negative way.

And finally, in order to explore the individual innovation adoption whether or not it helped to increase or moderate the effect of authentic leadership on innovative work behavior. The path analysis was conducted in 2. First, to investigate the impact effect of IA to IWB, the result demonstrated that IA displayed a significant direct effect on IWB; therefore, IA had a positive effect on IWB and H2 was accepted. Second, to investigate whether IA had any moderating effect to IWB, the result finding demonstrated that the squared multiple correlations (SMC) of the innovative work behavior (IWB) in the initial model equal to 0.675 while the moderation model equal to 0.646, which demonstrated without significant differences. Therefore, the statistical result rejected the H3 but demonstrated the interrelating effect of innovation adoption (IA) and authentic leadership (AL) on innovative work behavior (IWB) instead.

As many views of the empirical studies, this study intended to prove the authentic leadership and the innovation adoption could be powered up in the Thai environment as in the mentioned scope. Though the study did not demonstrate the moderating effect on innovative work behavior, it demonstrated an interrelated effect instead. Therefore, hypothesis 3 was rejected, but the innovation adoption presented itself as another cause-effect variable. In the post-investigation, after the results came out, the major rational finding was the corporate culture, which embedded the core value of “innovativeness” into an employee’s work life. The employees all easily accepted the new things the organization had introduced. The evidence was the

company engagement questionnaire in 2018; 80 % of employees' respondents replied that they satisfied with the new innovations that the company introduced to them. Therefore, the feeling stage of innovation adoption in the company employees might not have significantly affected the innovative work behavior since the Innovation project had been implemented in the company for more than 5 years. This incident was relevant to the article of Barriers to Adopting Technology in the journal of Educause Quarterly, number 2, 2002. Butler and Sellbom (2002) stated that "The rate of adoption usually starts low, accelerates until about 50% of the community has adopted the technology, then decelerates, eventually approaching zero, as nearly everyone in the community has adopted the technology."

However, the innovation-accepted decision belongs to the employee, not to an organization (Carayannis, Meissner, & Edelkina, 2017). Especially, managers, the innovation acceptation driver, would play an important role in the link between leadership and innovative work behavior (McGuirk et al., 2015). The firms which employ managers who participate in training were more likely to process innovation in terms of new ideas or behaviors that lead to significant improvements in the way work was carried out (McGuirk et al., 2015). Though, Talukder et al. (2008) urged to further his study to explore a moderating effect in some other aspects, this study collecting from employees with various levels of demographic characteristics, should be analyzed in terms of subcategories, as well, to find the factor that moderately effects towards the innovative work behavior.

5.3 Limitations

There are some limitations of the present research. First, the data was collected from various positions, who might have a different level of leadership or innovation adoption. This study has its aim to examining Thai employees in the private organization, without considering the differences between the levels of each characteristic subgroup, such as gender, position, etc.

Second, the core value in corporate culture, which embedded and encouraged employee to accept change and be innovative, the participants were required to have

innovation projects to compete among other business units. Therefore, the innovation adoption might not be so outstanding moderated.

Third, this study was conducted in only one conglomerate company of the agricultural and food industry in Thailand. So, the results may not apply to other type of organizations, particularly those with other products. Even though the total of employees were a lot more than others comparing in the same industry, the variation of the participants in other organizations might affect more impacts because the innovation project activities were different.

5.4 Recommendations for Practice

Since the authentic leadership assessment had been conducted with reliability and validity in both the Thai public sector and private sector, any programs for employee development, such as new leader preparation class, or individual development plan, the AL tool could provide the weakness and strength of leaders' trait so that the career development can be planned to manage pieces of training or programs accordingly. The organization can also conduct the authentic leadership assessment with the managers to see the holistic view of the leadership competency of the company and make a decision for any enhancement and encourage the employees to have better competition with other business competitors.

The innovative work behavior assessment tool can be used to measure and can use to evaluate and select employees for boost up competency and compare the level of innovativeness in different employee groups that might boost up the initiative of new ideas for corporate innovation programs and activities.

The innovation adoption measurement tool, a newly developed one, can apply with various categories of the employee in order to questionnaire the degree of acceptance in new technology, product, and process, introducing into their new operations, such as a robot, IoT, etc. Each factor result reflects the preferences of each person to decide to adopt an innovation or not adopt. The holistic view of the employees to adopt innovation can drive the company to have better strategic planning, such as how the company designs a benefit and reward package for a new idea or new product that is a benefit to the organization. Innovation that introduced in the company might

be resisted, but if the company can select the employee who has past or related experience with usefulness perception to handle the new project, then that innovation might be in-deed successful.

5.5 Recommendations for Future Research

The targets might be more specific, such as newly promoted positions vs. senior promoted positions or another point of view in order to find out more substantial effects of the AL and IA on IWB. The recommendation as future study with more employees in the target company or in the other types of business may focus to find the standard mean scores of AL, IA, and IWB for comparison when use AL, IA, IWB to evaluate.

The individual innovation adoption questionnaire should be tested for generality in other industrial sectors, other countries, or to compare IA across cultures.

Since the individual innovation adoption was just one part of Talukder's study, (the other two were the organization factor and the social factor), the future research can explore the effect of whole variables that might turn out in different results.

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APPENDICES

APPENDIX A

THE FINAL CONSOLIDATED VERSION OF ALL QUESTIONNAIRES

(IN THAI)

ชุดที่ ____ / ____
สำหรับผู้วิจัยกรอก

แบบสอบถามเพื่อการวิจัย

คำชี้แจง

1. แบบสอบถามนี้มีวัตถุประสงค์เพื่อสอบถามข้อมูลและความคิดเห็นที่แท้จริงของพนักงานที่ทำงานในองค์การ ซึ่งจะนำข้อมูลไปใช้เพื่อพัฒนางานด้านวิชาการและการประยุกต์ใช้ในการพัฒนาทรัพยากรมนุษย์และองค์การต่อไป
2. การวิจัยนี้ เป็นส่วนหนึ่งของการศึกษาในหลักสูตร Doctor of Philosophy in Human Resource and Organization Development (International Program) สถาบันบัณฑิตพัฒนบริหารศาสตร์
3. ขอความกรุณาท่านตอบคำถามในแบบสอบถามชุดนี้**ทุกข้อ**ตามความเป็นจริงของท่านมากที่สุด คำตอบของท่านที่จะนำมาใช้เพื่อวิเคราะห์และแสดงผลโดยรวมเท่านั้น ไม่แสดงผลเป็นรายบุคคล ดังนั้น จะไม่มีผลกระทบใดๆ ต่อตัวท่านหรือต่อหน่วยงานของท่าน
4. แบบสอบถามชุดนี้ประกอบด้วยแบบสอบถาม 4 ฉบับ ดังนี้

   ฉบับที่ 1 แบบสอบถามข้อมูลทั่วไปของผู้ตอบแบบสอบถาม (6 ข้อ)

   ฉบับที่ 2 แบบสอบถามภาวะผู้นำแบบแท้จริง (Authentic Leadership) (30 ข้อ)

   ฉบับที่ 3 แบบสอบถามพฤติกรรมสร้างนวัตกรรม (Innovative Work Behaviour) (10 ข้อ)

   ฉบับที่ 4 แบบสอบถามการรับนวัตกรรม (Individual Innovation Adoption) (25 ข้อ)

ขอขอบพระคุณท่าน ที่ท่านให้ความอนุเคราะห์ตอบแบบสอบถามมา ณ โอกาสนี้เป็นอย่างสูง คำตอบของท่านจะเป็นประโยชน์อย่างยิ่งต่อการศึกษาเพื่อการพัฒนาทรัพยากรมนุษย์และองค์การต่อไป

หมายเหตุ ขอความกรุณาตอบทุกข้อและส่งแบบสอบถามคืนให้ ภายใน 2 สัปดาห์ โดยส่งกลับมาได้ที่ charoon.prapai@gmail.com หรือรวบรวมส่งกลับมากับตัวแทนคณะผู้จัดทำ ชื่อ ..... โทร.....

ขอแสดงความนับถือ

ประไพ จรูญนารถ

นักศึกษาคณะทรัพยากรมนุษย์ สถาบันบัณฑิตพัฒนบริหารศาสตร์

แบบตอบรับการเข้าร่วมงานวิจัยโดยสมัครใจ

โปรดทราบว่า การเข้าร่วมงานวิจัยครั้งนี้ เป็นไปตามความสมัครใจของท่าน ดังนั้นผู้วิจัยขอให้ท่านทำเครื่องหมาย ✓ ในช่องด้านล่าง เพื่อแสดงว่า ท่านได้รับทราบข้อมูลแบบสอบถามข้างต้นแล้ว และแสดงเจตนาในการเข้าร่วมงานวิจัย

☐ ข้าพเจ้ารับทราบและยินดีที่จะเข้าร่วมงานวิจัย ☐ ข้าพเจ้ารับทราบแต่ไม่ยินดีที่จะเข้าร่วมงานวิจัย

ฉบับที่ 1 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

คำชี้แจง โปรดทำเครื่องหมาย √ ลงในช่อง ☐ ที่ตรงกับความเป็นจริงของท่านมากที่สุดเพียงคำตอบเดียว

1. เพศ	☐ 1. ชาย ☐ 2. หญิง
2. อายุ	☐1. 20-30 ปี ☐2. 31-40 ปี ☐3. 41-50 ปี ☐4. 51-60 ปี ☐5. 60 ปีขึ้นไป
3. ระดับตำแหน่ง	☐ 1. พนักงาน (Staff) ☐ 2. ผู้จัดการแผนก หรือเทียบเท่า (Section Manager) ☐ 3. ผู้จัดการฝ่าย หรือเทียบเท่า (Department Manager) ☐ 4. ผู้จัดการทั่วไป หรือเทียบเท่า (General Manager) ☐ 5. ผู้ช่วยกรรมการผู้จัดการ หรือเทียบเท่า (Assistant Vice President) ขึ้นไป
4. สังกัด/สายธุรกิจเกี่ยวกับ	☐ 1. การขาย ☐ 2. การผลิต ☐ 3. งานสนับสนุน
5. อายุการทำงาน	☐ 1. น้อยกว่า 5 ปี ☐ 2. 5-10 ปี ☐ 3. 11-15 ปี ☐ 4. 16-20 ปี ☐ 5. 21-25 ปี ☐ 6. 26 ปีขึ้นไป
6. ระดับการศึกษา	☐ 1. ต่ำกว่าปริญญาตรี ☐ 2. ปริญญาตรี ☐ 3. ปริญญาโท ☐ 4. ปริญญาเอก

ฉบับที่ 2 แบบสอบถามภาวะผู้นำแบบแท้จริง (Authentic Leadership)

วัตถุประสงค์ เพื่อสอบถามทัศนคติส่วนตัวเกี่ยวกับลักษณะของผู้นำที่สอดคล้องกับทฤษฎีผู้นำที่แท้จริง

คำชี้แจง โปรดอ่านข้อความแต่ละข้อ และทำเครื่องหมาย √ ลงในช่องทางขวามือที่ตรงกับระดับความคิดเห็นหรือความรู้สึกของท่านมากที่สุดเพียงคำตอบเดียว

❺ เห็นด้วยอย่างยิ่ง ❹ เห็นด้วย ❸ ค่อนข้างเห็นด้วย ❷ ไม่เห็นด้วย ❶ ไม่เห็นด้วยอย่างยิ่ง

ข้อ	ข้อความเกี่ยวกับลักษณะการทำงานของท่าน	❶	❷	❸	❹	❺
1.	ท่านบอกเล่าความต้องการหรือเป้าหมายของท่านได้ชัดเจน					
2.	ท่านทำตนเป็นแบบอย่างที่ดีของเพื่อนร่วมงานหรือลูกน้อง					
3.	ท่านปฏิบัติต่อเพื่อนร่วมงานหรือลูกน้องด้วยความเมตตา					
4.	ท่านรู้ดีว่า เพื่อนร่วมงานหรือลูกน้องคนใดมีความสามารถในงานใด					
5.	ท่านเข้าใจและยอมรับความแตกต่างของลูกน้องแต่ละคน					
6.	เมื่อต้องตัดสินใจอะไรบางอย่างที่หน่วยงาน ท่านเน้นงานเป็นสำคัญโดยไม่สนใจถึงผลกระทบที่จะเกิดขึ้นกับลูกน้องแต่ละคน					
7.	ท่านรับฟังข้อมูลที่ได้รับจากทุกฝ่ายก่อนดำเนินการตัดสินใจ					
8.	ท่านตั้งใจรับฟังและพิจารณาเหตุผลของผู้กระทำผิด ก่อนตัดสินใจลงโทษ					
9.	ในการทำงานนั้น ท่านจะกระตุ้นให้เกิดการแลกเปลี่ยนความคิดเห็นอย่างอิสระ					
10.	ท่านเปิดรับความคิดเห็นจากลูกน้องและผู้ร่วมงานเพื่อประกอบการตัดสินใจ หรือหาข้อสรุป					

ข้อ	ข้อความเกี่ยวกับลักษณะการทำงานของท่าน	❶	❷	❸	❹	❺
11.	ท่านมีวิธีการในการวิเคราะห์ที่มีมาตรฐานและพิจารณาข้อเท็จจริงต่าง ๆ					
12.	ท่านมีการตัดสินใจ หรือ หาข้อสรุปต่าง ๆ โดยผ่านการวิเคราะห์ข้อมูลจากฝ่ายต่าง ๆ อย่างถี่ถ้วน					
13.	ท่านแสดงความคิดเห็นของตนเองอย่างตรงไปตรงมาตามความเป็นจริง					
14.	ลูกน้องในหน่วยงานให้ความเชื่อถือและไว้วางใจต่อตัวท่าน					
15.	ท่านแลกเปลี่ยนข้อมูลข่าวสารกับลูกน้องอย่างสม่ำเสมอและเท่าเทียมกัน					
16.	การทำงานของท่านเป็นไปอย่างโปร่งใส และสามารถตรวจสอบได้					
17.	เมื่อเผชิญกับปัญหาหรือเหตุวิกฤต ท่านสามารถควบคุมอารมณ์และแก้ไขสถานการณ์ได้ดี					
18.	ท่านสื่อสารกับลูกน้องอย่างสุภาพและเหมาะสม					
19.	คำพูดและการปฏิบัติของท่านสอดคล้องกับค่านิยมที่ดีงาม และจริยธรรมขององค์กร					
20.	ท่านเป็นตัวอย่างของการมีระเบียบวินัยในตนเองอย่างยิ่ง					
21.	ท่านยึดระเบียบกฎเกณฑ์ขององค์กร เป็นแนวทางในการทำงาน					
22.	แม้มีโอกาสตักตวงผลประโยชน์ให้ตนเองได้ ท่านก็ไม่ทำ					
23.	ท่านเกรงกลัวต่อบาปหรือผลกระทบในทางลบหากต้องเลือกประพฤติปฏิบัติในทางที่ไม่ถูกต้อง					
24.	ท่านไม่ตัดสินตามความต้องการที่ไม่เหมาะควรของผู้บังคับบัญชาที่เหนือขึ้นไปหรือของคนส่วนใหญ่					
25.	ท่านพยายามทำให้เกิดความสามัคคี และสมานฉันท์ระหว่างบุคคลกลุ่ม และหน่วยงาน					
26.	ท่านให้เกียรติ และเป็นมิตรต่อเพื่อนร่วมงานในทุกระดับ ทั้งจากภายในและภายนอกองค์กร					
27.	ในการทำงานนั้น ท่านปลูกฝังเรื่องความปรองดองและสามัคคีระหว่างบุคคล กลุ่ม และหน่วยงาน					
28.	ท่านเน้นการทำงานเป็นทีม และความสำเร็จของทีมงานเป็นสำคัญ					
29.	ท่านมีการยืดหยุ่นในรูปแบบหรือวิธีการทำงาน เพื่อให้ลูกน้องทำงานสำเร็จตามเป้าหมาย					
30.	ท่านสร้างบรรยากาศที่ดี ในการทำงานเสมอๆ					

ฉบับที่ 3 แบบสอบถามพฤติกรรมสร้างนวัตกรรม (Innovative Work Behaviour)

วัตถุประสงค์ เพื่อสอบถามความเห็นส่วนตัวในเรื่องพฤติกรรมที่นำไปสู่การสร้างนวัตกรรมการทำงาน

คำชี้แจง โปรดอ่านข้อความแต่ละข้อ และทำเครื่องหมาย √ ลงในช่องทางขวามือที่ตรงกับระดับความถี่ตามความรู้สึกของท่านมากที่สุดเพียงคำตอบเดียว

❶ เห็นด้วยอย่างยิ่ง ❷ เห็นด้วย ❸ ค่อนข้างเห็นด้วย ❹ ไม่เห็นด้วย ❺ ไม่เห็นด้วยอย่างยิ่ง

ข้อ	ข้อความเกี่ยวกับพฤติกรรมของท่านที่หน่วยงาน	❶	❷	❸	❹	❺
1.	ท่านสนใจในการอ่านและเรียนรู้ แนวคิด ปัญหา หรือประเด็นต่าง ๆ ที่นอกเหนือจากงานประจำของตัวเอง					
2.	ท่านมักมีข้อสงสัยว่า วิธีการ เทคนิค และ/หรือเครื่องมือในการทำงานนั้นจะสามารถพัฒนาให้ดีขึ้นได้อย่างไร					
3.	ท่านมักจะค้นหาวิธีการ เทคนิค และ/หรือเครื่องมือใหม่ ๆ ในการทำงาน					
4.	ท่านมักจะคิดริเริ่มสร้างสรรค์วิธีการใหม่ ๆ เพื่อใช้ในการแก้ไขปัญหา					
5.	เมื่อได้รับมอบหมายให้ปฏิบัติภารกิจต่าง ๆ ท่านมักจะคิดหาหนทาง/แนวทางใหม่ในการทำงานดังกล่าว					
6.	ท่านสามารถทำให้บุคลากรที่สำคัญในหน่วยงานมีความสนอกสนใจ/ตื่นเต้น/ ต่อความริเริ่มสร้างสรรค์ใหม่ ๆ ที่เกิดขึ้นในหน่วยงาน					
7.	ในการทำงาน ท่านมักคิดหาหนทางให้บุคคลในหน่วยงาน/กลุ่มงานสนับสนุนความคิดสร้างสรรค์ที่เกิดขึ้น					
8.	ในการปฏิบัติงาน ท่านมักเสนอความคิดที่เป็นประโยชน์ต่อการทำงานต่อกลุ่มทำงานอย่างมีระบบ					
9.	ท่านมีส่วนร่วมที่ทำให้ความคิดสร้างสรรค์ต่าง ๆ เกิดขึ้นจริง					
10.	ท่านมีความใส่ใจและทุ่มเทที่จะพัฒนาสิ่งใหม่ๆ ให้เกิดขึ้นในหน่วยงาน					

ฉบับที่ 4 แบบสอบถามการรับนวัตกรรมในมุมมองส่วนบุคคล (Individual Innovation Adoption)

วัตถุประสงค์ เพื่อสอบถามความเห็นส่วนตัวในเรื่องการยอมรับนวัตกรรมใหม่ๆ ที่นำมาใช้กับองค์กร

คำชี้แจง โปรดอ่านข้อความแต่ละข้อ และทำเครื่องหมาย √ ลงในช่องทางขวามือที่ตรงกับระดับความถี่ตามความรู้สึกของท่านมากที่สุดเพียงคำตอบเดียว

❶ เห็นด้วยอย่างยิ่ง ❷ เห็นด้วย ❸ ค่อนข้างเห็นด้วย ❹ ไม่เห็นด้วย ❺ ไม่เห็นด้วยอย่างยิ่ง

ข้อ	ข้อความเกี่ยวกับการปรับรับนวัตกรรมในรายบุคคล ของท่านที่หน่วยงาน	❶	❷	❸	❹	❺
1.	ท่านยอมรับว่า นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT (Internet of Thing) เป็นต้น มีประโยชน์ต่อการทำงานของท่าน					
2.	ท่านเห็นด้วยว่า เทคนิควิธีทำงาน เช่น โปรแกรมคอมพิวเตอร์ใหม่ๆ AI Robot IoT เป็นต้น ที่องค์การนำมาใช้ ช่วยให้การทำงานมีประสิทธิภาพมากขึ้น					
3.	ท่านเห็นด้วยกับการที่องค์การส่งเสริมสนับสนุนการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น					
4.	ท่านให้ความร่วมมือในการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ที่องค์การดำเนินการอยู่					
5.	ท่านมองเห็นว่า นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น สร้างปัญหาให้กับองค์การมากกว่าประโยชน์					
6.	ท่านสนใจและชื่นชอบเทคโนโลยีใหม่ๆ เช่น Cloud Computing, AI, Robot, IoT เป็นต้น					
7.	ท่านกระตือรือร้นที่จะทดลองวิธีการใหม่ๆ ในการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ในการทำงาน					
8.	ท่านติดตามและอยากเข้าร่วมโครงการนวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ขององค์การ					
9.	ท่านชอบศึกษาค้นคว้าวิทยาการความก้าวหน้าของเทคโนโลยีเสมอๆ เช่น Cloud Computing, AI, Robot, IoT เป็นต้น					
10.	ท่านเข้าร่วมโครงการพัฒนาความก้าวหน้าของธุรกิจ เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ขององค์กรอย่างสม่ำเสมอ					
11.	ท่านมีประสบการณ์ที่ดีในการใช้นวัตกรรมหรือโปรแกรมด้าน Digital ใหม่ๆ ที่ล้ำสมัย					
12.	ท่านรู้สึกว่า ท่านสามารถใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ได้ง่าย					
13.	ท่านคุ้นเคยกับการทดลองใช้วิธีการทำงานกับด้านเทคโนโลยี เช่น Cloud Computing, AI, Robot, IoT เป็นต้น					

ข้อ	ข้อความเกี่ยวกับการปรับรับนวัตกรรมในรายบุคคล ของท่านที่หน่วยงาน	❶	❷	❸	❹	❺
14.	ท่านรู้สึกว่า ท่านมีพื้นฐานที่ดีในการเรียนรู้และการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น					
15.	เป็นเรื่องยากที่ท่านจะเข้าใจและใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ที่เกิดขึ้นในองค์การ (ข้อลบ)					
16.	ท่านเห็นด้วยว่า การนำเทคโนโลยี เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ที่นำมาใช้ในองค์การ ทำให้องค์การมีภาพลักษณ์ดีขึ้น					
17.	ท่านเข้าร่วมในการใช้เทคโนโลยีที่ทันสมัยเพื่อช่วยพัฒนาองค์การให้ดีขึ้น เช่น การเข้าร่วมการทดสอบโปรแกรมคอมพิวเตอร์ใหม่ๆ หรือการร่วมพัฒนา AI, Robot, หรือ IoT เป็นต้น					
18.	ท่านรู้สึกว่าองค์การมีการพัฒนาขึ้นมาก เมื่อใช้เทคนิควิธีหรือโปรแกรมคอมพิวเตอร์ใหม่ๆ ในการปฏิบัติงาน					
19.	การนำเทคโนโลยี เช่น Robot AI IoT หรือโปรแกรมคอมพิวเตอร์ใหม่ๆ มาใช้ในองค์การ ทำให้องค์การของท่านเป็นที่ยอมรับและน่าเชื่อถือมากขึ้น					
20.	การเปลี่ยนแปลงไปใช้เครื่องมือ หรือโปรแกรมคอมพิวเตอร์ใหม่ๆ ที่ทันสมัย ไม่สามารถส่งเสริมเรื่องภาพลักษณ์ขององค์กรแต่อย่างใด (ข้อลบ)					
21.	การใช้นวัตกรรม เช่น Robot AI IoT หรือโปรแกรมคอมพิวเตอร์ใหม่ๆ ทำให้พนักงานรู้สึกสนุกสนานในการทำงาน					
22.	การเข้าร่วมโครงการใช้เทคโนโลยีใหม่ๆ ทำให้พนักงานกระตือรือร้นที่จะทำงานมากขึ้น					
23.	ท่านเข้าร่วมโครงการสร้างสรรค์นวัตกรรมหรือใช้เทคโนโลยีใหม่ๆ ด้วยความยินดีและเต็มใจ					
24.	ท่านพร้อมที่จะเรียนรู้ความแปลกใหม่ของวิธีการทำงาน เช่น Robot AI IoT โปรแกรมคอมพิวเตอร์ใหม่ๆ ที่ทันสมัย					
25.	ท่านเบื่อหน่ายที่จะเรียนรู้และทดลองใช้เทคโนโลยี เช่น AI Robot IoT เป็นต้น (ข้อลบ)					

ขอขอบพระคุณในความอนุเคราะห์ของท่าน

APPENDIX B

THE ITEM CODES OF THE CONSOLIDATED VERSION OF QUESTIONNAIRE (IN THAI) FOR PILOT STUDY

ฉบับที่ 1 แบบสอบถามภาวะผู้นำแบบแท้จริง (AL-Authentic Leadership) **จำนวน 30 ข้อ**

SA = Self-Awareness, BP = Balance Processing, RT = Rational Transparency, IM = Individualized Moral Perspective, RH = Relational Harmony

ข้อคำถาม	Item Code
1. ท่านบอกเล่าความต้องการหรือเป้าหมายของท่านได้ชัดเจน	ALSA01
2. ท่านทำตนเป็นแบบอย่างที่ดีของเพื่อนร่วมงานหรือลูกน้อง	ALSA02
3. ท่านปฏิบัติต่อเพื่อนร่วมงานหรือลูกน้องด้วยความเมตตา	ALSA03
4. ท่านรู้ดีว่า เพื่อนร่วมงานหรือลูกน้องคนใดมีความสามารถในงานใด	ALSA04
5. ท่านเข้าใจและยอมรับความแตกต่างของลูกน้องแต่ละคน	ALSA05
6. เมื่อต้องตัดสินใจอะไรบางอย่างที่หน่วยงาน ท่านเน้นงานเป็นสำคัญโดยไม่สนใจถึงผลกระทบที่จะเกิดขึ้นกับลูกน้องแต่ละคน	ALSA06
7. ท่านรับฟังข้อมูลที่ได้รับจากทุกฝ่ายก่อนดำเนินการตัดสินใจ	ALBP07
8. ท่านตั้งใจรับฟังและพิจารณาเหตุผลของผู้กระทำผิด ก่อนตัดสินใจลงโทษ	ALBP08
9. ในการทำงานนั้น ท่านจะกระตุ้นให้เกิดการแลกเปลี่ยนความคิดเห็นอย่างอิสระ	ALBP09
10. ท่านเปิดรับความคิดเห็นจากลูกน้องและผู้ร่วมงานเพื่อประกอบการตัดสินใจหรือหาข้อสรุป	ALBP10
11. ท่านมีวิธีการในการวิเคราะห์ที่มีมาตรฐานและพิจารณาข้อเท็จจริงต่าง ๆ	ALBP11
12. ท่านมีการตัดสินใจ หรือ หาข้อสรุปต่าง ๆ โดยผ่านการวิเคราะห์ข้อมูลจากฝ่ายต่าง ๆ อย่างถี่ถ้วน	ALBP12
13. ท่านแสดงความคิดเห็นของตนเองอย่างตรงไปตรงมาตามความเป็นจริง	ALRT13
14. ลูกน้องในหน่วยงานให้ความเชื่อถือและไว้วางใจต่อตัวท่าน	ALRT14
15. ท่านแลกเปลี่ยนข้อมูลข่าวสารกับลูกน้องอย่างสม่ำเสมอและเท่าเทียมกัน	ALRT15
16. การทำงานของท่านเป็นไปอย่างโปร่งใส และสามารถตรวจสอบได้	ALRT16
17. เมื่อเผชิญกับปัญหาหรือเหตุวิกฤต ท่านสามารถควบคุมอารมณ์และแก้ไขสถานการณ์ได้ดี	ALRT17
18. ท่านสื่อสารกับลูกน้องอย่างสุภาพและเหมาะสม	ALRT18
19. คำพูดและการปฏิบัติของท่านสอดคล้องกับค่านิยมที่ดีงาม และจริยธรรมขององค์กร	ALIM19
20. ท่านเป็นตัวอย่างของการมีระเบียบวินัยในตนเองอย่างยิ่ง	ALIM20
21. ท่านยึดระเบียบกฎเกณฑ์ขององค์กร เป็นแนวทางในการทำงาน	ALIM21
22. แม้มีโอกาสตักตวงผลประโยชน์ให้ตนเองได้ ท่านก็ไม่ทำ	ALIM22
23. ท่านเกรงกลัวต่อบาปหรือผลกระทบในทางลบหากต้องเลือกประพฤติปฏิบัติในที่ทางที่ไม่ถูกต้อง	ALIM23

ข้อคำถาม	Item Code
24. ท่านไม่ตัดสินตามความต้องการที่ไม่เหมาะควรของผู้บังคับบัญชาที่เหนือขึ้นไป หรือของคนส่วนใหญ่	ALIM24
25. ท่านพยายามทำให้เกิดความสามัคคี และสมานฉันท์ระหว่างบุคคลกลุ่ม และหน่วยงาน	ALRH25
26. ท่านให้เกียรติ และเป็นมิตรต่อเพื่อนร่วมงานในทุกระดับ ทั้งจากภายในและภายนอกองค์กร	ALRH26
27. ในการทำงานนั้น ท่านปลูกฝังเรื่องความปรองดองและสามัคคีระหวางบุคคลกลุ่ม และหน่วยงาน	ALRH27
28. ท่านเน้นการทำงานเป็นทีม และความสำเร็จของทีมงานเป็นสำคัญ	ALRH28
29. ท่านมีการยืดหยุ่นในรูปแบบหรือวิธีการทำงาน เพื่อให้ลูกน้องทำงานสำเร็จตามเป้าหมาย	ALRH29
30. ท่านสร้างบรรยากาศที่ดี ในการทำงานเสมอๆ	ALRH30

ฉบับที่ 2 แบบสอบถามพฤติกรรมสร้างนวัตกรรม (IWB -Innovative Work Behaviour) **จำนวน 10 ข้อ**
OE = Opportunity Exploration, IG = Idea generation, CP = Championing, AP = Application

ข้อคำถาม	Item Code
1. ท่านสนใจในการอ่านและเรียนรู้ แนวคิด ปัญหา หรือประเด็นต่าง ๆ ที่นอกเหนือจากงานประจำของตัวเอง	IWOE01
2. ท่านมักมีข้อสงสัยว่า วิธีการ เทคนิค และ/หรือเครื่องมือในการทำงานนั้นจะสามารถพัฒนาให้ดีขึ้นได้อย่างไร	IWOE02
3. ท่านมักจะค้นหาวิธีการ เทคนิค และ/หรือเครื่องมือใหม่ ๆ ในการทำงาน	IWIG03
4. ท่านมักจะคิดริเริ่มสร้างสรรค์วิธีการใหม่ ๆ เพื่อใช้ในการแก้ไขปัญหา	IWIG04
5. เมื่อได้รับมอบหมายให้ปฏิบัติภารกิจต่าง ๆ ท่านมักจะคิดหาหนทาง/แนวทางใหม่ ในการทำงานดังกล่าว	IWIG05
6. ท่านสามารถทำให้บุคลากรที่สำคัญในหน่วยงานมีความสนอกสนใจ/ตื่นเต้น/ ต่อความริเริ่มสร้างสรรค์ใหม่ ๆ ที่เกิดขึ้นในหน่วยงาน	IWCP06
7. ในการทำงาน ท่านมักคิดหาหนทางให้บุคคลในหน่วยงาน/กลุ่มงานสนับสนุนความคิดสร้างสรรค์ที่เกิดขึ้น	IWCP07
8. ในการปฏิบัติงาน ท่านมักเสนอความคิดที่เป็นประโยชน์ต่อการทำงานต่อกลุ่มทำงานอย่างมีระบบ	IWAP08
9. ท่านมีส่วนร่วมที่ทำให้ความคิดสร้างสรรค์ต่าง ๆ เกิดขึ้นจริง	IWAP09
10. ท่านมีความใส่ใจและทุ่มเทที่จะพัฒนาสิ่งใหม่ๆ ให้เกิดขึ้นในหน่วยงาน	IWAP10

ฉบับที่ 3 แบบสอบถามการรับนวัตกรรม (IA - Individual Innovation Adoption) มี 25 ข้อ (for pilot study)

PU = Perceived Usefulness, IN = employee innovativeness PE = Prior Experience, IM = Image, EJ = Enjoyment

Questions	Item Code
1. ท่านยอมรับว่า นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT (Internet of Thing) เป็นต้น มีประโยชน์ต่อการทำงานของท่าน	IAPU01
2. ท่านเห็นด้วยว่า เทคนิควิธีทำงาน เช่น โปรแกรมคอมพิวเตอร์ใหม่ๆ AI Robot IoT เป็นต้น ที่องค์การนำมาใช้ ช่วยให้การทำงานมีประสิทธิภาพมากขึ้น	IAPU02
3. ท่านเห็นด้วยกับการที่องค์การส่งเสริมสนับสนุนการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น	IAPU03
4. ท่านให้ความร่วมมือในการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ที่องค์การดำเนินการอยู่	IAPU04
5. ท่านมองเห็นว่า นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น สร้างปัญหาให้กับองค์การมากกว่าประโยชน์	IAPU05
6. ท่านสนใจและชื่นชอบเทคโนโลยีใหม่ๆ เช่น Cloud Computing, AI, Robot, IoT เป็นต้น	IAIN06
7. ท่านกระตือรือร้นที่จะทดลองวิธีการใหม่ๆ ในการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ในการทำงาน	IAIN07
8. ท่านติดตามและอยากเข้าร่วมโครงการนวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ขององค์การ	IAIN08
9. ท่านชอบศึกษาค้นคว้าวิทยาการความก้าวหน้าของเทคโนโลยีเสมอๆ เช่น Cloud Computing, AI, Robot, IoT เป็นต้น	IAIN09
10. ท่านเข้าร่วมโครงการพัฒนาความก้าวหน้าของธุรกิจ เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ขององค์กรอย่างสม่ำเสมอ	IAIN10
11. ท่านมีประสบการณ์ที่ดีในการใช้นวัตกรรมหรือโปรแกรมด้าน Digital ใหม่ๆ ที่ล้ำสมัย	IAPE11
12. ท่านรู้สึกว่า ท่านสามารถใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ได้ง่าย	IAPE12
13. ท่านคุ้นเคยกับการทดลองใช้วิธีการทำงานกับด้านเทคโนโลยี เช่น Cloud Computing, AI, Robot, IoT เป็นต้น	IAPE13
14. ท่านรู้สึกว่า ท่านมีพื้นฐานที่ดีในการเรียนรู้และการใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น	IAPE14
15. เป็นเรื่องยากที่ท่านจะเข้าใจและใช้นวัตกรรม เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ที่เกิดขึ้นในองค์การ	IAPE15

Questions	Item Code
16. ท่านเห็นด้วยว่า การนำเทคโนโลยี เช่น Cloud Computing, AI, Robot, IoT เป็นต้น ทีนำมาใช้ในองค์การ ทำให้องค์การมีภาพลักษณ์ดีขึ้น	IAIM16
17. ท่านเข้าร่วมในการใช้เทคโนโลยีที่ทันสมัยเพื่อช่วยพัฒนาองค์การให้ดีขึ้น เช่น การเข้าร่วมการทดสอบโปรแกรมคอมพิวเตอร์ใหม่ๆ หรือการร่วมพัฒนา AI, Robot, หรือ IoT เป็นต้น	IAIM17
18. ท่านรู้สึกว่าองค์การมีการพัฒนาขึ้นมาก เมื่อใช้เทคนิควิธีหรือโปรแกรมคอมพิวเตอร์ใหม่ๆ ในการปฏิบัติงาน	IAIM18
19. การนำเทคโนโลยี เช่น Robot AI IoT หรือโปรแกรมคอมพิวเตอร์ใหม่ๆ มาใช้ในองค์การ ทำให้องค์การของท่า นเป็นที่ยอมรับและน่าเชื่อถือมากขึ้น	IAIM19
20. การเปลี่ยนแปลงไปใช้เครื่องมือ หรือโปรแกรมคอมพิวเตอร์ใหม่ๆ ที่ทันสมัย ไม่สามารถส่งเสริมเรื่องภาพลักษณ์ขององค์กรแต่อย่างใด	IAIM20
21. การใช้นวัตกรรม เช่น Robot AI IoT หรือโปรแกรมคอมพิวเตอร์ใหม่ๆ ทำให้พนักงานรู้สึกสนุกสนานในการทำงาน	IAEJ21
22. การเข้าร่วมโครงการใช้เทคโนโลยี่ใหม่ๆ ทำให้พนักงานกระตือรือร้นที่จะทำงานมากขึ้น	IAEJ22
23. ท่านเข้าร่วมโครงการสร้างสรรค์นวัตกรรมหรือใช้เทคโนโลยี่ใหม่ๆ ด้วยความยินดีและเต็มใจ	IAEJ23
24. ท่านพร้อมที่จะเรียนรู้ความแปลกใหม่ของวิธีการทำงาน เช่น Robot AI IoT โปรแกรมคอมพิวเตอร์ใหม่ๆ ที่ทันสมัย	IAEJ24
25. ท่านเบื่อหน่ายที่จะเรียนรู้และทดลองใช้เทคโนโลยี เช่น AI Robot IoT เป็นต้น	IAEJ25

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