**YANGON UNIVERSITY OF ECONOMICS**
**DEPARTMENT OF COMMERCE**
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# SELF-EFFICACY, INNOVATIVE WORK BEHAVIOUR AND TASK PERFORMANCE OF SOFTWARE DEVELOPERS AT SOFTWARE DEVELOPMENT COMPANIES IN YANGON

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**MAY, 2024**

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**Submitted in Partial Fulfillment of the Requirements**
**for the Degree of Doctor of Philosophy (PhD) of Commerce,**
**Yangon University of Economics, Myanmar**

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# YANGON UNIVERSITY OF ECONOMICS
# DEPARTMENT OF COMMERCE
# PhD PROGRAMME

This is to certify that this dissertation entitled **"Self-Efficacy, Innovative Work Behaviour and Task Performance of Software Developers at Software Development Companies in Yangon"** submitted as the requirement for the Degree of Doctor of Philosophy in Commerce has been accepted by the Board of Examiners.

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# CERTIFICATION

I hereby certify that the content of this paper is solely from the writer, and appropriate citations have been acknowledged. Information from sources is referenced along with comments and ideas from the writer herself.

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# ABSTRACT

Software development companies play a crucial role in propelling economic growth and societal progress in Myanmar. The prosperity of these companies relies heavily on the task performance of software developers, which in turn depends on their innovative work behavior, which is influenced by their self-efficacy. Therefore, this study mainly focuses on identifying the antecedent factors of self-efficacy. Furthermore, it examines the role of creativity as a mediator between self-efficacy and innovative work behavior. The study also investigates the effect of innovative work behavior on task performance. Both qualitative and quantitative methods were employed. In the qualitative method, in-depth interviews were conducted with responsible persons and team leaders from four software development companies in Yangon. To ensure representative sampling, 242 software developers were chosen from each software development company by using the proportionate random sampling method. Primary data was collected through online surveys by using 5-point Likert scale questionnaire. The collected data was analyzed by using linear regression to examine the effect of variables, and the PROCESS macro was employed to assess mediation effects. The findings revealed that teamwork, creating change, transactional leadership, and ambidextrous leadership had a positive and significant effect on self-efficacy. However, organizational learning, transformational leadership, enactive learning, and vicarious learning did not contribute to the prediction of self-efficacy. The study also found that creativity mediated the relationship between self-efficacy and innovative work behavior. Furthermore, innovative work behavior was shown to have a significant influence on task performance. These findings provide valuable insights for software development companies seeking to enhance the self-efficacy of their developers, a critical factor in improving overall organizational performance. To capitalize these opportunities, software development companies in Myanmar should adopt ambidextrous and transactional leadership approaches, fostering teamwork and enhancing the self-efficacy of their developers through change initiatives. As a result, the software sector in Myanmar can provide significant opportunities for professional growth and advancement. Consequently, this study promotes precious understanding and benefits various stakeholders in Myanmar, including individual software developers, software companies, the ICT industry, and the national ICT development level.

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| | |
|---|---|
| ASEAN | Association of Southeast Asian Nations |
| BCCM | British Chamber of Commerce Myanmar |
| BSA | Business Software Alliance |
| CI | Confidence Interval |
| ERP | Enterprise Resource Planning |
| GPS | Global Positioning System |
| IBP | International Business Publications |
| ICT | Information and Communication Technology |
| IGWT | Innovative Global Wave Technology |
| IT | Information Technology |
| ITU | International Telecommunication Union |
| JICA | Japan International Cooperation Agency |
| KMO | Kaiser-Meyer-Olkin |
| LLCI | Lower Limit Confidence Interval |
| LMX | Leader-Member Exchange |
| MCEA | Myanmar Computer Enthusiasts Association |
| MCF | Myanmar Computer Federation |
| MCIA | Myanmar Computer Industry Association |
| MCPA | Myanmar Computer Professionals Association |
| MIT | Myanmar Information Technology |
| MLR | Multiple Linear Regression |
| POS | Point of Sale |
| SCM | Seattle Consulting Myanmar |
| SMEs | Small and Medium-Sized Enterprises |
| SOA | Service Oriented Architecture |
| SQA | Software Quality Assurance |
| UI | User Interface |
| ULCI | Upper Limit Confidence Interval |
| UNCTAD | United Nations Conference on Trade and Development |
| USAID | United States Agency for International Development |
| UX | User Experience |

# CHAPTER 1

# INTRODUCTION

Nowadays, technology plays an essential role in the survival and growth of companies worldwide, including Myanmar. The new technology advancements empower companies to exercise creativity and innovation in serving customer needs and expectations. In this regard, creativity and innovation are increasingly recognized as critical drivers for sustaining performance and competitive advantage of companies. This phenomenon is virtually true for companies in Information Technology (IT) industry, in which intense competition urges companies to accelerate radical and incremental innovations. Therefore, IT companies must constantly enhance their capacity to innovate and expedite their pace of innovations (Hilmersson et al., 2023).

The pivotal role of Information and Communication Technology (ICT) sector is highlighted by World Bank, by asserting its contribution to socio-economic growth of countries with different economic development levels, perhaps including Myanmar. According to World Bank, (2011), ICT sector signals a great potential to drive inclusive economic growth and foster human social development. A significant output of ICT companies is the creation of new software, which finds widespread applications in various domains across developed and developing nations. Particularly, the creative and innovative contributions of programmers and software developers, who are the key players in ICT companies, bears the success of the companies (Hegde & Walia, 2014), which in turn determines the economic growth of the countries. Hence, it is a fundamental requirement for many countries, such as Myanmar, to foster the creativity and innovation in software companies.

In achieving success through continuous innovations, the innovative work behavior of software developers is an important attribute of the companies, that is generated by their self-efficacy. The innovative work behavior benefits software developers, teams and companies by means of improving the quality of task performance, fostering performance of the teams and contributing long-term

organizational development. To amplify the innovative work behavior, companies need to support their employees to enhance the level of self-efficacy (Tierney & Farmer, 2002; Thurlings et al., 2015). Self-efficacy is a core attribute in contexts like software companies where the rate and pace of innovations determines the success of the company. Also, self-efficacy can support the discovery of new knowledge that facilitates the advancement of growth and development of software companies. For individual software developers, it helps in achieving goals and acquiring a sense of accomplishment in life (Khalique & Singh, 2019).

In terms of fostering a positive change in self-efficacy, companies can enhance individual creativity and motivate employees to explore and implement creative ideas that they believe will benefit their work. This heightened self-efficacy of employees could prove invaluable. Considering this, it is crucial for software development companies in Myanmar to understand the factors that affect the self-efficacy of software developers. While self-efficacy and creativity are traits (Kaufman & Sternberg, 2010), organizational and individual factors can drive improving self-efficacy for creativity, innovative work behavior, task performance, and organizational performance (Amabile, 1988; Stajkovic & Luthans, 1998; Akram et al., 2016).

Nonetheless, the constant innovation of the companies that is generated by the creativity and innovation of software developers hinges on the nature and quality of surrounding organizational environment (Bandura, 1997). Among various organizational contexts, culture, leadership styles, and learning orientation are to foster self-efficacy (Fattah, 2017). First, organizational culture, as a characteristic upheld by the organization, plays a pivotal role as an organization is a social unit that brings together people of diverse backgrounds to work towards a common defined goal (Yulianto et al., 2021). In the software development companies, the organizational culture is often characterized by teamwork, organizational learning, and creating change to enhance self-efficacy (Rehman, 2016). Additionally, companies need to adopt a proper leadership style because it can enhance cognitive ability of team members to work confidently at their full potentials (Yukl, 2013). Indeed, transactional, transformational and ambidextrous leadership are regarded as effective approaches that can boost employee self-efficacy and cultivate meaningful performance gains (Saeed et al., 2022). Furthermore, learning orientation is essential to nurture because learning has been linked to self-efficacy (Amabile & Gryskiewicz, 1989). In fact, enactive and

vicarious learning can cultivate a growth mindset, enabling individuals to view challenges as opportunities for learning and improvement, thus enhancing their confidence in their ability to succeed (Schunk, 2012; Li & Tsai, 2019). Therefore, investigation of whether proper orchestration of those organizational contexts factors by Myanmar software companies can contribute to self-efficacy and innovation of their software developers is an interesting agenda for improvement of task performance.

Myanmar software industry has become one of the fundamental areas of developing high technologies and the most profitable Myanmar economic sector (Aye, 2012; Nam et al., 2015). However, this sector encounters formidable challenges. The pace of technological change fosters a certain sense of urgency surrounding the need to innovate. In addition, software development companies are highly diverse, having very different innovation needs and styles because software is intangible and highly malleable and has a low market entry threshold (Pikkarainen et al., 2011). Success during software development in Myanmar software companies depends on the self-efficacy and creativity of software developers. As economics become more reliant on innovative, especially knowledge-intensive firms, like software development companies, understanding innovative work behavior and individual task performance is increasingly imperative.

Therefore, this study seeks to investigate the role of organizational context factors, as antecedents, to self-efficacy of software developers in the ICT industry in Myanmar. Furthermore, it is crucial to explore how self-efficacy influences the innovative behavior of software development team members, via creativity, and how the creativity of individuals affects their innovative work behavior, ultimately to the task performance. Understanding the antecedents to self-efficacy, mechanisms explaining self-efficacy and innovation can offer important implications for competitiveness of the software companies, the development of ICT sector and consequently, the economic growth and development of Myanmar indirectly.

## 1.1 Rationale of the Study

Countries around the world are dedicated and concreted efforts at ICT development for ever-increasing demand and innovative digital solutions. As such, software industry has emerged as a pivotal industry that influences various aspects of human existence, including business operations, communication, entertainment,

healthcare, education, and more (Japan International Cooperation Agency-JICA, 2013). This dynamic industry encompasses the creation, design, testing, and maintenance of software applications and systems. As a pivotal industry, the software industry holds significant importance in recent years for its potential to drive sustainable competition and economic development (The Business Software Alliance-BSA, 2016).

Myanmar, with its underdeveloped software industry, recognizes the importance of this industry in driving its economic growth and social advancement in a short period of time (Ei & Kim, 2016). As International Business Publications-(IBP) (2013) stated that software development and training are the most popular business activities in Myanmar. Also, the second and third most popular ICT businesses are hardware sales and system integration. This suggests that software-related businesses rather than hardware-related businesses are the key drivers of ICT development in Myanmar (Oo & Than, 2010).

As highlighted by BSA (2016), software development innovations play a crucial role in society, encompassing various domains such as economic growth, efficiency, education, communication, and community development. The United Nations Conference on Trade and Development emphasized the increasing importance of sustained innovation in software capabilities for businesses, citing affordability and memory storage capabilities as key factors (UNCTAD, 2012). Despite the critical role of innovation in driving economic growth, Soans and Abe (2015) acclaimed that Myanmar has low investment in research and development, leading to poor performance in international rankings of innovation capabilities. Even more, the creativity and innovation of software development companies in Myanmar have not received adequate attention from academic research (United States Agency for International Development-USAID, 2016).

With the growing exposure of software development companies in Myanmar to global competition, it is becoming increasingly vital for them to foster innovation and leverage technology more effectively. In order to thrive in a dynamic software industry characterized by evolving technology trends, the presence of creative software developers is crucial as valuable human capital for these companies (Ei & Kim, 2016). According to Karaboga et al. (2022), it is evident that software developers can enhance their creative potentials by exploring existing knowledge in unconventional ways, allowing them to identify alternative problems, solutions and opportunities. This

process enables the effective integration of their existing expertise with the exploration of fresh perspectives, thereby fostering the generation of innovative outcomes.

Hegde and Walia (2014) described that software development is a complex and cognitively demanding activity that relies on the collaboration of knowledge and the creativity of team members for its effectiveness. When individuals are allowed to be creative and think differently, their curiosity is sparked, fostering a desire to explore and enhancing their task performance by unlocking their true potential (Eschleman et al., 2014). However, it is noted that possessing strong self-efficacy is crucial as both a behavioral control mechanism and a cognitive process. Critically, self-efficacy is an indispensable prerequisite for undertaking creative tasks and cultivating innovative thinking. Self-efficacy is an individual belief in their own capacity to successfully accomplish specific tasks or achieve desired goals, focusing on the influence of self-belief on motivation, effort, and ultimately performance (Bandura, 1977).

Accordingly, managers and leaders must grasp the significance of self-efficacy in the workplace and strive to enhance these beliefs among employees to enhance their performance (Khalique & Singh, 2019). While the performance of software developers heavily relies on their self-efficacy and innovative work behavior, various organizational and personal factors can impact the outcome (Yang & Cheng, 2009). It is worth noting that among many organizational and personal factors, organizational culture, effective leadership styles and individual learning orientation have been identified as particularly influential on self-efficacy (Mumford & Hemlin, 2017). To undertake tasks successfully, creative thinking requires the integration of knowledge from both internal sources (stored within the mind) and external sources (stored in various artifacts and individuals).

It is important to open the black box of the self-efficacy to help uncover the process of its development among software developers in Myanmar. This involves acknowledging that companies must continually innovate to sustain competitiveness and long-term viability. The achievement of such innovation rests heavily on the inventive capabilities of individual employees. Consequently, organizations must foster self-efficacy of employees by actively cultivating and encouraging their innovative ideas (Tierney & Farmer, 2002). Self-efficacy stands as a central determinant for success and growth within the modern and ever-changing business environment (Malik, 2013).

## 1.2 Problem Statement of the Study

With the advancement of ICT nowadays, the software industry plays a vital role in developing a country economy (Rose & Furneaux, 2016). Software producing organizations are now commonplace, and most technology start-ups incorporate some form of software into their product offerings. In other words, digitalization, involving E-commerce, presents an opportunity for companies around the world, including Myanmar, to differentiate themselves from competitors and respond to the changing customer demands (Rose, 2010). Software development companies in Myanmar are presented with ample opportunities for growth and expansion, however, they are not able to realize such emerging opportunities due to external and internal issues (Htun, 2019). Macroeconomic issues regarding high inflation are an important uncontrollable limiting factor, the company themselves may have inherent internal weaknesses to stimulate creativity and innovation within them. Therefore, in the software industry, creativity and innovation must be prioritized as crucial factors. However, this industry in Myanmar still cannot leverage the potential of creativity and innovation due to various problems.

Firstly, the challenge for software development companies in Myanmar is to establish and sustain a unique team culture, ensure effective leadership for innovation-driven teams, and enhance developer proficiency in a creatively nurturing work environment. For software development, it is an attempt that increases collaboration and teamwork. In order to cultivate innovation, it is crucial for software developers to possess a creative and forward-thinking mindset, as emphasized by Benavides (2012). The extent to which developers believe in their own creative capabilities, known as self-efficacy, influences their capacity for innovation. It is worth noting, however, that team leaders at companies in Myanmar have significant challenges to establish and perpetuate an appropriate team culture that fosters creativity and innovation (Nam et al., 2015). This challenge is further complicated by the distinct nature of such a culture. Furthermore, effectively leading these teams, which serve as the wellspring of new products and ideas, presents an additional obstacle.

Secondly, software companies face the challenge of certain developers lacking confidence in their skills and innovative ideas during software implementation, while also being comfortable with the current system and relying on commercial software imported by other countries. In the context of Myanmar, where software development

is gaining traction, employee innovative work behavior becomes even more vital for organizational success. However, software companies face challenges including a shortage of skilled developers as ICT professionals migrate to countries like Australia, Japan, Singapore, or Thailand for better job prospects (Nam et al., 2015). This incident drives companies to be left with some software developers who may be experiencing a poor confidence in their abilities to new software implementation and resisting towards adopting new methodologies.

Thirdly, software development companies in Myanmar encounter challenges in meeting global standards for exporting high-quality software due to their limited experience in software development and a deficiency in knowledge, technology, or expertise transfer from other countries or industries. Additionally, while there may be advancements and innovations in specific areas of software development, it is challenging to achieve an overall enhancement of technological competitiveness. Remarkably, while software development continues to play a crucial role in promoting economic and social prosperity, a substantial disparity persists between developed and developing nations in this domain. Developed countries excel in software development (Hassan, 2002; UNCTAD, 2020), however, developing nations like Myanmar encounter obstacles when it comes to fully harnessing ICT and software capabilities, primarily due to resource constraints and insufficient activities by software companies. Hence, the utilization of IT remains in its infancy stage (Jhurree, 2005; Peeraer & Petegem, 2010). Pernia (2008) stated that Myanmar values technology but lags behind in technology adoption. Consequently, software development companies in Myanmar may struggle to meet global standards for exporting high-quality software.

Finally, the software industry in Myanmar faces the challenge of being underdeveloped compared to other ASEAN countries, primarily because of the limited number of operating companies. For example, Thailand, which is the nearest neighboring country, operates at 1524 software companies in 2024 (Smartscrapers, 2024). However, the number of operating company in Myanmar is far less than that of Thailand. As per available internal industry data, the number of software companies in Myanmar is only 426 (Smartscrapers, 2024). According to the 2017 ICT Development Index (IDI) report, the ICT development levels of ten ASEAN Member States and ten non-ASEAN countries were compared to measure the progress of ICT development in different countries (International Telecommunication Union-ITU, 2017). It is evident

that Myanmar ranks among the countries with the lowest level of connectivity. Ing and Markus (2023) stated that among ASEAN countries, such as Singapore, Thailand, Malaysia, Vietnam, Philippines, and Indonesia, Myanmar had the smallest growth of ICT goods' imports and exports (Ing & Markus, 2023), and its software industry is underdeveloped with a limited number of operating companies (ITU, 2017).

Therefore, by investigating the specific factors that enhance creativity and innovation of software industry, this study particularly strives to address the challenges to build self-efficacy among the software developers in Myanmar and make a substantial contribution to the advancement and success of software development industry in Myanmar.

## 1.3 Research Questions

According to the research problems, this study was guided by the following research questions:

1. What are the antecedents of self-efficacy of software developers?
2. How does creativity of software developers mediate the relationship between self-efficacy and innovative work behaviour?
3. What is the effect of innovative work behavior on task performance of software developers?

## 1.4 Objectives of the Study

The main objective of the study is to identify the mechanism behind the innovative work behaviors of software developers in Myanmar.

The specific objectives of the study are:

1. To identify the antecedents of self-efficacy of software developers.
2. To investigate the mediating effect of creativity on the relationship between self-efficacy and innovative work behaviour of software developers.
3. To analyze the effect of innovative work behavior on task performance of software developers.

## 1.5 Method of Study

Regarding the research method, quantitative research was used in this study. Both primary and secondary data were used to collect the required information. According to Myanmar Computer Industry Association (MCIA), (2022) data, there are 62 software development companies in Yangon that are registered in Yangon Region Computer Industry Association. However, four software companies, namely ACE Data Systems Co., Ltd, Myanmar Information Technology (MIT) Pte. Ltd, Innovative Global Wave Technology (IGWT) Co., Ltd., and Seattle Consulting Myanmar (SCM) Co., Ltd., were selected based on their clear organizational structure and established date. Pilot survey was conducted to test the validity and reliability of the questionnaire. There were 610 software developers working at the selected companies in 2022, according to data from MCIA. The sample size of 242 software developers was determined using Yamane formula (1967), and respondents were chosen proportionately from each software development company. These 242 software developers were selected by using a random number generator.

For the primary data, in-depth interviews were conducted with software team leaders/project managers via Zoom to learn the context of software development companies and the nature of work for software developers. In addition, online survey (using Google Survey) was carried out to collect data from a sample of 242 software developers by using structured questionnaire. For secondary data, various sources such as textbooks, articles, official reports, annual reports, libraries, Google Scholar, and academic journals were utilized. MCIA also provided data and information about software development companies. Furthermore, additional information was collected from the websites of the companies.

Descriptive statistical analysis was employed to show the demographic characteristics and perceptions of the respondents. The multiple regression analysis was used to examine the extent that the self-efficacy of software developers is affected by antecedent factors concerning individual and organizational context. In addition, simple regression analysis was performed for investigating the effect of innovative work behavior on task performance of software developers. To examine the mediation effect, Hayes's PROCESS macro was used in this study (Hayes, 2013), based on the 4-step mediation framework, proposed by Baron and Kenny (1986). The aim of using mediation analysis is to examine direct and indirect pathway though which the self-

efficacy of software developers transmits its effects on innovative work behavior though creativity.

## 1.6 Scope and Limitations of the Study

The scope of this study is to investigate the factors that affect self-efficacy, the role of creativity in the innovative work behavior of software developers, and the effect of innovative work behavior on task performance. The study assumes that software developers within organizations are key drivers of implementing new ideas and displaying innovative behaviors. It considers the effect of organizational culture, leadership styles, and individual learning orientation on self-efficacy and innovative work behavior. The study was carried out within four chosen software development companies situated in Yangon, with a primary objective of emphasizing the importance of task performance at individual, team, and organizational levels. The study specifically focuses on software developers employed by these selected companies in Yangon. The limitations of this study are that it does not consider all potential antecedents of self-efficacy and innovative work behavior, as there are various organizational and individual factors that can affect these constructs. Additionally, the study only focuses on software development companies in Yangon and may not be generalizable to other industries or locations. Moreover, the sample consists of established companies and experienced software developers, which may limit the applicability of the findings to newer companies in the software development field.

## 1.7 Organization of the Study

This study is composed of six chapters. Chapter one provides an introduction to the study, including the rationale of the study, statement of the problem, research questions, the objectives of the study, method of study, scope and limitations of the study, and organization of the study. Chapter two presents the literature on antecedents of self-efficacy, the mediating role of employee creativity in innovative work behavior, and its effect on task performance. It discusses existing theoretical frameworks and presents a new conceptual framework for the current study. Chapter three explores the antecedents of self-efficacy of software developers in selected companies in Yangon. Chapter four includes the methodology used in the study. Chapter five involves the analysis of the research findings. Chapter six describes conclusions, including findings and discussions, suggestions and recommendations for managing software companies from a leadership perspective in a developing country context.

# CHAPTER 2

# LITERATURE REVIEW

This chapter begins with a discussion of the theoretical background of the study, presenting the concepts of self-efficacy and its three antecedents: organizational culture, leadership styles, and individual learning orientation. Furthermore, empirical studies are presented, and the chapter concludes with the conceptual framework of the study.

## 2.1 Theoretical Background of the Study

This study is founded on the principles of social cognitive theory and leader-member exchange (LMX), which highlight the concepts of self-efficacy and the antecedent factors that influence it.

### 2.1.1 Social Cognitive Theory

According to Bandura (2002), an agentic viewpoint is the basis of social cognitive theory. To intentionally influence how one functions and the course of events by the actions of individual is to be an agent. It contributes to the interactional causal structure originated from the concept of reciprocal determinism. In this causation structure, an individual act is influenced by three factors: the individual, their environment, and the behavior itself. According to Bandura (1977), people have a hand in determining events and their own lives because self-influence is an interrelating part of the shaping conditions. According to social cognitive theory, individuals hold two types of expectations regarding their behavior. The first is self-efficacy, which relates to the individual belief in their ability to execute a certain behavior. The second involves the anticipated results of the particular behaviour. The notion that self-efficacy refers to the certain level at which an individual can perform (Bandura, 1986).

Research on the function of self-efficacy in the spread of innovation across large social networks has been facilitated by the integration of social network theory and

social cognitive theory (Bandura, 2002). The symbolic environment has a rising impact on the lives of individuals, enabling them to have an effect on daily activities, relationships, education, employment, and communication. This is recognized by social cognition theory. People use various agency mechanisms that are based on appropriate kinds of efficacy to exert their impact. When people engage in individual personal agency, they use their influence to affect the things they have direct control over (Bandura, 2000). Social cognitive theory acknowledges the growing effect of the symbolic environment on the individual lives, empowering them to influence communication, education, work, relationships, and daily activities. When people engage in individual personal agency, they use their influence to affect the things they have direct control over (Bandura, 2000). Additionally, social cognitive theory offers a framework for understanding learning and change, as well as predicting behavior, according to Bandura (2002). It outlines the attentional, representational, translational, and motivational processes that are foundational to learning methods and forms. A key element of this change model is the learning aspect, which explains how individuals acquire behavioral skills, cognitive, social, and emotional tendencies, and knowledge structures. This body of knowledge is a hallmark of social cognitive theory, essential for fostering social and personal transformation. Building on its foundational principles, the theory incorporates a broad array of factors that serve as both catalysts and moderators of behavior, grounded in a robust body of evidence (Bandura, 2002).

In many aspects of life, people have little direct influence over the circumstances that impact them. Thus, to achieve desired outcomes, it is crucial to enlist the aid of those who possess the necessary tools, skills, and expertise to take action on behalf of others. This realization highlights the importance of teamwork and the understanding that no one truly operates in isolation. Bandura (1997) defined collective efficacy as a shared conviction of a group in their capacity to organize and execute the courses of action required to achieve specific goals. By pooling their skills, people can overcome challenges and realize common aims. In this interconnected world, collaboration and cooperation play a vital role in influencing outcomes and fostering success (Salanova et al., 2022). They combine their resources, expertise, and knowledge to exert collective agency, working together to influence their future. In order to accomplish this, they must distribute and coordinate sub-functions among people with varying levels of competency and establish unity of effort for a shared goal

within varied self-interests. Collective efficacy contributes more to group productivity the more interdependent effort is necessary for group performance (Stajkovic & Luthans, 1998).

In the software industry, social cognitive theory is extensively applied to explore self-efficacy. It has provided researchers with invaluable information into individuals beliefs and perceptions regarding their capacity to successfully execute software development tasks (Compeau & Higgins, 1995a; Garbharran & Thatcher, 2011; Anwar et al., 2019). By utilizing social cognitive theory, researchers can investigate how mastery experiences, observational learning, social persuasion, and emotional states affect software developers sense of self-efficacy. In reality, the application of social cognition theory is extremely pertinent to the software industry since it offers insightful information by highlighting observational learning, self-efficacy, feedback, and consequences. By observing experienced colleagues and industry professionals, software developers can greatly improve their skills. They can learn coding practices, problem-solving techniques, and project management strategies.

### 2.1.2 Leader-Member Exchange (LMX) Theory

Leadership support is vital for employees to develop and implement innovative ideas. The concepts of traits, behavioral theory, LMX theory, situational or contingency approach, path-goal theory, and newer philosophies such as servant, authentic, and empowering leadership represent the most extensively studied leadership philosophies (Northouse, 2016; Hughes et al., 2018). Many studies have connected different leadership philosophies with employee innovation; a significant number of these studies have concentrated on participative or relational leadership styles, suggesting a particular set of leader behaviors to encourage creativity among staff (Amabile, 1988). In line with this belief, research on LMX indicates that it has varying effects on their job-related behaviors because employees differ in their perceptions and responses to circumstances (Hofmann et al., 2003).

The LMX theory has relied upon the social exchange theory (Cropanzano & Mitchell, 2005). It suggests that unique relationships between employees and supervisors evolve over time through negotiated role expectations and mutual fulfillment, as noted by Graen and Uhl-Bien (1995). Cropanzano and Mitchell (2005) focused their analysis on the LMX premise linked to innovative behaviors of

employees. Central to the LMX theory is the interaction between leaders and followers, suggesting that the dyadic relationship between the two is the core of the leadership process. Each follower that the leader works with has a unique working relationship. The dyadic relationship between a leader and follower is defined by the exchanges they have, both in terms of content and procedure (Northouse, 2016). According to the LMX theory, leaders develop distinct quality connections with their followers by treating them differently during numerous exchanges. According to Dansereau et al. (1975), LMX quality is linked to a number of favorable follower outcomes, including staff perceptions of authority and participation in creative or innovative work behavior (Atwater & Carmeli, 2009).

Software companies can leverage the insights from the LMX theory, which delves into the dynamics of leader-member interactions. Leaders evaluate their subordinates on a range of characteristics, including conscientiousness, agreeableness, competence, neuroticism, extraversion, openness, and positive and negative affectivity, according to LMX. As Aggarwal et al. (2020) stated, LMX theory examines the relationship between leaders and their team members, focusing on the ability of their interactions and exchanges, and acknowledges that leaders play a crucial role in directing and supporting their team members in the context of software development. Software development organizations may foster a culture of strong working connections between leaders and team members, which will boost innovation, improve performance, and foster a happy work environment by putting the ideas of LMX theory into practice.

In this study, LMX theory is chosen as the theoretical basis to find whether leadership styles can affect self-efficacy and innovative work behavior of employee in knowledge-intensive companies, e.g., software development companies. Based on the LMX theory, subordinates will have more outstanding resources and decision-making flexibility when they have superior-subordinate connections (Hughes et al., 2018). Moreover, according to van Breukelen et al. (2006), LMX theory illustrates how to make use of the inclusive process of manager-subordinate interaction. LMX theory is not directly associated with creativity, but it serves as a mechanism to nurture feelings, enhancing creativity and performance of individuals (Northouse, 2016). Therefore, instead of using other leadership theories, this study adopts the LMX theory as its theoretical foundation. The rationale behind this choice is that the LMX theory enables

the preservation of the leader-follower relationship while advancing corporate innovation (Schyns & Day, 2010). This study examines how leadership styles affect innovative work behavior and performance through self-efficacy, with a focus on the LMX leadership approach.

## 2.2 Self-Efficacy

As defined by Bandura (1977), self-efficacy is the unique set of beliefs a person possess that influences how successfully they can carry out a plan of action in potential scenarios. Indeed, self-efficacy is the conviction that one can succeed in a given circumstance, carry out specified actions, and attain intended results. The self-efficacy theory, which is based on social cognitive theory, was initially proposed by Bandura (1986). The concept that all human ideas and behaviors stem from what people learn from society is known as the social aspect of self-efficacy. The notion that cognitive processes may influence motivations, attitudes, and behaviors, on the other hand, is known as the cognitive aspect. Malik (2013) pointed out that self-efficacy is an individual belief or self-reliance about his or her competences to organize the inspiration, intellectual properties, or courses of action required to effectively accomplish a particular task within a certain context. In this way, individuals who possess a high level of self-efficacy will exert all efforts to achieve a goal. When they face difficulties or obstructions to attain the goal, they will try their best to maintain their effort long enough to achieve the objective or the expected performance (Sahertian & Soetjipto, 2011).

The idea of self-efficacy for creative performance has a lot of potential for explaining creative behavior in organizational contexts (Oldham & Cummings, 1996). Furthermore, Bandura (1977) proposed that a person might generalize from one efficacy belief to another based on experience and critical thought, indicating that efficacy beliefs are not isolated entities. Bandura (1977) identified four main sources that contributed to the formation of self-efficacy: enactive mastery, which is the individual experiences completing the task; verbal persuasion, which is the use of words to influence others or the other way around to accomplish a task; vicarious experience, which is the individual observations of the successes and failures of other individuals in completing similar tasks; and physiological state, which is the physical state of self that will influence the individual spirit in completing a task. Zhu et al.

(2004) had recognized that supervisors who educate staff members to deliberate over their own judgments contribute to the development of employee self-efficacy.

In the study of Stajkovic and Luthans (1998), people who believe they are very effective put forth enough effort to get successful results when done well, whereas those with lower self-efficacy tend to surrender easily and fail. In other words, a strong sense of self-efficacy may lead to more creative behaviors in the workplace. Hsiao et al. (2011) also found a link between self-efficacy and innovative work behavior of employees, which in turn affects job performance. Employees with greater self-efficacy are often seen displaying more innovative behaviors at work. Human behavior is highly motivated and regulated using self-influence (Bandura, 2009). Belief in the efficacy of oneself is one of the most central and pervasive strategies of self-influence. One of the most important personal resources is having confidence in oneself. They are based on the fundamental conviction that anyone has the ability to achieve desired outcomes, regardless of external variables that may act as mentors and motivators (Holden, 1991; Stajkovic & Luthans, 1998).

The content and level of specificity of efficacy measurement must be customized to the field under study (Bandura, 1977; Gist, 1987; Gist & Mitchell, 1992). Marakas et al. (1998) identified two types of computer self-efficacy: task-specific and generic. Consistent with IT and computer software, computer self-efficacy is a general trait aligned with computer software usage; task-specific self-efficacy is also known as software-specific or inventive self-efficacy (Agarwal et al., 2000). In fact, it is crucial to note the theoretical distinction between self-efficacy and general self-efficacy (GSE), which is a broad conviction in competence in a variety of contexts (Chen et al., 2004). Self-efficacy is special to innovation. On the other hand, GSE is a relatively enduring and trait-like conviction in the overall competence to handle a range of situations and tasks. It means that while self-efficacy can fluctuate depending on the task at hand, generalized self-efficacy remains relatively stable across various contexts (Chen et al., 2004).

Academics like Compeau (1995b) and Bandura (1997) had highlighted the important role of self-efficacy in the perspective of innovation. By expanding upon the definition of self-efficacy stated by Bandura (1986), it is considered as the confidence of a person in their capacity to produce innovative results, particularly in executing innovative work behaviors. Self-efficacy is predicted to have an effect on a number of

innovative work behavior features, according to social cognitive theory. This includes the decision made from the outset to participate in innovative work behavior, the degree of perseverance and effort exhibited in the face of difficulties, and the efficient application of abilities associated with innovative work behavior. According to Scott and Bruce (1994), employees who have greater self-efficacy tend to demonstrate enhanced creativity in their work, particularly when they perceive substantial support from their employers.

In the context of software development, self-efficacy is important since it has a direct effect on the productivity, drive, and perseverance of developers. Compeau (1995b) suggested that software developers are more motivated to take on difficult jobs, persevere in the face of setbacks, and have more creativity and problem-solving skills when they have high levels of self-efficacy. They are confident in their aptitude for learning new technologies and in their knowledge of programming languages and coding. Conversely, poor self-efficacy can limit the willingness of software developer to embark on challenging projects and impair their performance. It could cause them to mistrust their own talents, feel anxious, and lose confidence. As a result, it is imperative that software developers emphasize in the development of self-efficacy.

It is important to note that organizations may actively support the growth of self-efficacy in their workforce by praising and appreciating their achievements and offering insightful, helpful criticism. Understanding the role of self-efficacy in software development will greatly improve abilities, drive, and output of developers to obtain the higher success in the industry.

## 2.3 Antecedents of Self-Efficacy

The antecedents of self-efficacy in this study are organizational culture, leadership styles, and individual learning orientation because these three factors can shape an individual self-efficacy, affecting their motivation and performance within an organization (Sheng et al., 2003; Gong et al., 2009; Liu & Gumuh, 2020; Jiang et al., 2021).

### 2.3.1 Organizational Culture

Cultivating a motivated corporate culture is one of the strategies used by organizations to promote individual performance; research has demonstrated that this strategy improves individual performance (Tjosvold & Sun, 2006). Smircich (1983) mentioned that the organizational culture was a crucial and essential element of any organization and is shaped by the distinct interactions among its members. Schein (1999) defined organizational culture as a set of fundamental beliefs that a particular group creates, learns, or develops as a means of resolving issues related to both internal and external integration. This organizational culture, in turn, has a significant effect on self-efficacy and it had determined the antecedent of self-efficacy (Mardiana & Heriningsih, 2016; Jeon, 2018; Yulianto et al., 2021). They pointed out that empowering employees, having a team orientation, focusing on teamwork, and creating mutually agreed values and norms which adhered to members have an effect on employee self-efficacy. Organizational culture shapes self-efficacy by influencing beliefs, values, norms, and expectations. While positive, supportive cultures enhance self-efficacy through learning, growth, and collaboration, negative cultures weaken it with criticism and micromanagement.

In a software development company, according to Passos et al. (2014), organizational culture significantly influences management procedures and forms the software development context, affecting the selection and utilization of technologies and practices in the industry. Organizational culture, which has four elements, is relevant to the success of any organization, including software development companies. First, organizational culture is shared phenomena (Wilson, 2001). Second, there are degrees of organizational culture that has visible and invisible levels (Schein, 1999; Wilson, 2001). Third, every new organizational member learns the culture. The fourth one is that cultural tends occur gradually over time (Wilson, 2001).

In regard to organizational culture, the Denison model is a well-known framework for evaluating and comprehending the cultural traits of an organization. Dr. Daniel Denison and his associates created this model in 2006 to identify the essential aspects of organizational culture that affect performance and effectiveness. Four cultural traits-involvement, consistency, adaptability, and mission-are identified by the Denison Organizational Culture Model as having a major effect on individual and organizational growth and performance (Denison et al., 2006). The model is considered

a reliable tool for assessing organizational culture as it differentiates organizations based on their unique cultural profiles (Denison et al., 2014). According to Bagga et al. (2022), this method has been included across various sectors, including IT companies, and is reliable to evaluate corporate culture and its effect on self-efficacy.

Within the software development company, the specific cultural traits related to teamwork, organizational learning, and creating change indeed exist. Assessing these traits has shown the extent to which workplace culture influences employee abilities to cooperate, learn, and adapt to change that are key factors in the success and innovation within the software development industry (Niazi, 2009; Strode et al., 2022; Laato et al., 2023).

Rehman (2016) recommended the Denison organizational culture model, focusing on the involvement trait and adaptability trait, as an effective framework for assessing the influence of organizational culture and self-efficacy on employee performance. The high performing businesses excel in structuring their organizations around team members, recognizes their culture of involvement. This trait highlights the organization capacity for change and its adaptability in preparing for future advancements and trends. Besides, a culture of adaptability fosters a proactive, customer-centric, and responsive attitude towards analyzing the external business environment. This trait clusters together with the involvement culture, emphasizing adaptability and effective change management (Denison et al., 2014). To evaluate these traits, three aspects were considered: organizational learning, teamwork, and the ability to drive change (Rehman, 2016).

**(a) Teamwork**

According to Sheng et al. (2003), teamwork involves the coordination of efforts, interpersonal cooperation, and open communication about the effectiveness of problems. As stated by Pérez et al. (2015), there is a relationship between self-efficacy and teamwork because people who feel competent and capable in a group setting perceive their peer participation, which in turn increases a sense of social self-efficacy. In software development projects, teamwork plays a crucial role, particularly in cross-functional development teams where members actively cooperate, communicate, and share knowledge to produce software solutions that are coherent (Baker et al., 2005; Rehman, 2016; Strode et al., 2022). According to Dubinsky et al. (2010), effective

software development requires a development team including individuals with a diverse range of skills. Though, there is no general agreement on the allocation of these skills among team members. Furthermore, different management styles can result in varied role frameworks in software development. In consideration of this, Sudhakar (2010) highlights that software teams work in a networked environment, emphasizing cooperation and teamwork to fulfill client requirements. To increase effectiveness, productivity, and commitment to their job, these teams dynamically interact and apply teamwork techniques (Guzzo et al., 1996; Rehman, 2016).

Within a cooperative environment of software development, team members can learn from one another and get support and feedback, which enhances their required skills and, in turn, improve their self-efficacy (Gist et al., 1989). In such an environment, team members can discuss and resolve any difficulties they may be facing, hence strengthening relationship and trust (Locke et al., 1984). Moreover, teams are essential due to the pace, rate, intricacy, and diversity of changes required for contemporary software-rich methods (Skelton & Pais, 2019). Weimar et al. (2017) stated that a number of components, including communication, cohesiveness, cooperation, trust, and mutual support are necessary for creative projects to be successful.

Griffin and Hauser (1992) acknowledged that effective communication, which involves sharing information, is fundamental to teamwork and project success. Moreover, a strong sense of unity and belonging, or cohesion, is essential for developing excellent coordination in software development teams (Mullen & Copper, 1994). The link between coordination and expertise is crucial as it enables the team to use their knowledge more effectively. Another crucial component of cooperation is trust, which encourages open communication and information sharing among team members (Bandow, 2001). Finally, mutual support is indispensable in interdependent tasks like software development, as it empowers team members to well work together and attain team objectives (Hoegl, 2001). Therefore, it can be concluded that effective communication fosters cohesion, coordination, trust, and mutual support within a team, leading to increased self-efficacy and overall organizational effectiveness. These elements form a reinforcing cycle that enhances team performance (Kozlowski & Ilgen, 2006).

### (b) Organizational Learning

Organizational learning is a continuous process of expanding knowledge to enhance organizational performance, with individuals solving problems on behalf of the organization (Argyris & Schön, 1996; Rehman, 2016). This learning method is organized into three stages: the Deep Learning Cycle, Learning Infrastructure, and Results. The Deep Learning Cycle focuses on core organizational learning, both collectively and individually, whereas the Learning Infrastructure supports knowledge transfer from the deep learning cycle to create measurable outputs (Results). Additionally, Hong (1999) defined organizational learning as enhancing activities through increased knowledge and understanding, with individuals then sharing this information throughout the organization. In such organizations, team members behaviors is altered to promote transformation (Garvin, 1993).

Organizational learning is crucial in software development firms as the sector is always evolving and changing. A culture that encourages continual learning and improvement not only keeps employees up-to-date with the modern technologies and best practices, but also allows the firm to remain competitive in the market. Niazi (2009) emphasized the need of organizational learning in integrating better working methods and high-quality software solutions into standard organizational procedures. This means that organizational learning culture creates an environment that encourages learning at all levels, encouraging people to adopt a growth mindset, study independently, reflect, and share information. This culture incorporates learning into business strategy, allowing it to adapt and improve over time, thereby improving decision-making and overall organizational success (Niazi, 2009).

According to Erdem (2012), the quality of software heavily relies on the skills of developers. Consequently, the shared knowledge must be embedded within the organizational processes and practices, thereby allowing employees to decode and adopt this knowledge in their daily development tasks. By making knowledge accessible within the organization, learning processes help to improve software processes by making knowledge available throughout the organization and allowing individuals to truly comprehend and apply acquired topics. Thus, this process enables the improvement of software processes and practices. Rus et al. (2002) highlighted the importance of practical adjustments to improve the software development process, such as strengthening the knowledge base of individuals in relation to the software process

and disseminating that information throughout the organization.

Building upon the idea of Rus et al. (2002), Menolli et al. (2013) emphasized the role of organizational learning in software development companies. They argue that organizational learning is an adaptive change process that significantly improves processes by reusing experiences and making knowledge accessible to the entire organization. According to Tobin et al. (2006), there is evidence that organizational learning has a positive effect on an individual self-efficacy by providing opportunities for skill development, knowledge acquisition, and successfully handling new challenges. By actively promoting and leveraging organizational learning, software development firms may effectively adapt to the ever-evolving nature of the field and continuously upgrade their processes, resulting in greater outcomes and enhanced organizational success.

**(c) Creating Change**

In the software industry, creating change is a crucial aspect as the nature of this industry requires a proactive approach to adapt, innovate, and introduce transformative projects. For software development companies, creating change becomes essential to effectively accommodate evolving consumer needs, fluctuating markets, and advancing technologies (Mathiassen et al., 2005). In an environment that values innovation and creativity, employees are encouraged to suggest and implement new ideas. This enables companies to keep market trends, react quickly, and secure a competitive edge. This continuous change is known as organizational development practice (Vancouver & Day, 2005). Research had examined how organizations bring about change due to a combination of internal and external influences. Government rules, technological developments, consumers, and rivals are examples of external challenges, whereas advances in goods and services and the discovery of new market opportunities are examples of internal pressures. Organizations can bring about transformation through self-driven practices or external agents (Rehman, 2016).

In software development process, software developers need to look beyond the products they create and be able to respond to competition successfully (Mathiassen et al., 2005). It means that to implement software process improvement successfully, software managers, leaders, and team members must have a thorough awareness of the context, organizational elements, and tactics that facilitate change. They must also

appreciate the unique nature of each software process improvement project and skillfully negotiate the context of change. In fact, software practices reflect how developers adapt to the selected approach by reflecting the development method and process they follow in real-world scenarios (Ziemer, 2007).

Furthermore, there are significant changes taking place in the software industry that have an effect on professional practices as well as the sector itself. Alongside these changes, automation, adaptability, and scalability-enhancing technologies and methods have become more popular, empowering developers to provide scalable solutions, advance processes, and adjust to changing requirements (Laato et al., 2023). According to Cassidy and Eachus (2002), enhancing self-efficacy requires an understanding of the behaviors and experiences associated with adjusting to these changes. This holds special significance for those employed in organizations that are undergoing change, since they get used to new tools, procedures, policies, programs, and systems and grow adapted to change. Consequently, fostering creating change culture can improve self-efficacy by boosting effective behavior and adaptation (Tsalits & Kismono, 2019).

By considering the previously mentioned ideas, this study concentrates on exploring the influence of two organizational culture dimensions: teamwork (involving trait) and adaptability (organizational learning and creating change traits) on the self-efficacy of software developers.

### 2.3.2 Leadership Styles

Besides organizational culture, the literature highlights leadership styles as an additional factor influencing self-efficacy. The ability of a leader to inspire, motivate, and generate a dedication to a common purpose is vital for organizational outcomes, and previous research on leadership has identified many leadership styles that leaders utilize in managing organizations (Bass, 1990). Creative performance in groups has been linked to the strength of leader-follower relationships, according to Olsson et al. (2012). According to Diliello and Houghton (2008), leadership can affect the attitudes and behaviors of followers as well as their creative output and organizational success. When these factors are combined, however, the chances of survival of an organization are increased (Beekman et al., 2012). Thus, effective leadership that raises employee self-efficacy for inventive performance is crucial to the success of the creative effort that businesses want. When a person exercises leadership, they are attempting to

influence a group of people towards a shared objective (Northhouse, 2016). The leadership style refers to the approach used in providing guidance and inspiring team members. In the current competitive environment, leadership plays a crucial role in deciding the success of a company. According to Anit (2006), a team leader approach to enhancing output and productivity within the team is referred to as their leadership style.

The Ohio State Leadership Studies and the Michigan Leadership Studies are two pioneering schools that have had an effect on the categorization of leadership styles. Two primary leadership styles have been identified by Ohio State University researchers who examined leaders: initiating structure and consideration (Stogdill, 1963). At the same time, Michigan University researchers conducted surveys on the behavioral patterns of ineffective and effective leaders (job-centered leaders, employee-centered leaders, or relational leaders). According to Mehtap et al. (2011), it is discovered that the task-oriented leadership dimension is the same as that of "job-centered leaders" in Michigan Leadership Studies and "initiating structure" in Ohio State Leadership Studies; on the other hand, the relations-oriented leadership dimension is the same as that of "employee-centered leaders" in Michigan Studies and "consideration" in Ohio Studies. These days, as firms become more globally integrated and competitive, it is understood that change requires innovative and creative thinking (Anderson et al., 2004). Executives now prioritize change leadership when it comes to managing change and overseeing organizations (Kotter, 1990). Yukl (2013) presented a three-dimensional leadership model that deviated from the behavioral leadership approach. The components of the model are task-oriented leadership, relations-oriented leadership, and change-oriented leadership.

Bass (1985) developed the Full Range Theory of Leadership, which comprises three forms of leadership: transactional, transformational, and laissez-faire. (as cited in CemilÖrgev, 2013). However, for creating employee self-efficacy, laissez-faire leadership is not taken into consideration because it suggests a lack of direction, absence of support, and insufficient recognition and rewards (Barbuto, 2005; Skogstad et al., 2007; Hinkin & Schriesheim, 2008; Khan et al., 2012). In a competitive environment, Rost (1997) described leadership as an inspiration bond among collaborators and leaders who propose real changes that reflect their common purposes. Tushman and O'Reilly (1996) also argued that leaders must be ambidextrous. Effective

leadership styles that can influence employee self-efficacy, innovative work behavior, and task performance include transactional, transformational, and ambidextrous leadership (Saeed et al., 2022). These styles can help to construct actual creative performance.

**(a) Transactional Leadership**

The transactional leadership style was initially explored by Burns (1978), who noted that transactional leaders always seek to entice and appeal to personal reward in order to stimulate their subordinates (as cited in Naqvi et al., 2017). According to Bass, transactional leadership involves a leader outlining the duties and goals of their team members and monitoring how they are progressing with their tasks (Yukl, 2013). Task-oriented leader behaviors are the main emphasis of transactional leadership behavior (Bass & Bass, 2008; Hoogeboom & Wilderom, 2019). Transactional leadership describes behaviors that govern the leader-team dynamic (Stewart, 2006). The connection between a transactional leadership style and self-efficacy of employee has been studied before. The effectiveness of idea generating was found to be more strongly impacted by transactional leadership, for instance, by Sosik et al. (1998). Transactional leadership is a reciprocal process between a leader and a subordinate, where remuneration is tightly linked to the subordinate performance (Naqvi et al., 2017).

Three indicators can be used to measure the effectiveness of transactional leadership: contingent reward, which is the leader behavior that acknowledges employee achievement and clarifies expectations; management-by-exception-active, which is the leader, problem-solving immediately and pointing out mistakes made by followers; and management-by-exception-passive, which is the leader who waits until the issue becomes serious or persistent before acting to address it (Hughes et al., 2018). Benefits are given by transactional leaders to their followers in return for their good work. Promotions, pay increases, and positive evaluations are some of the benefits. They encourage workers to preserve the status quo and boost productivity in this way (Northouse, 2016). To ensure that adherents follow the rules, however, they also employ punishments. Transformative leadership can be thought of as having its roots in transactional leadership, according to Bass (1998). The relationship between transactional leadership and future orientation is hypothesized, given that it has been demonstrated to increase self-efficacy (Turner et al., 1997; Mehdinezhad & Mansouri, 2016).

### (b) Transformational Leadership

Employee innovation is essential for a firm to acquire and maintain a competitive edge (Janssen, 2000). Mumford (2000) asserted that transformational leaders possess the sort of competencies that encourage their team members to be creative. Many studies found a favorable relationship between employee innovative behavior and transformational leadership style (Naqvi et al., 2017). The goal of transformational leadership is to transcend self-interest. This calls for visionary, passionate transformational leaders to carry out their responsibilities in a way that reflects loop and adaptive learning (Kolb, 1984; Argyris & Schön, 1996) by fusing new and old ideas and knowledge, as well as by experimenting and encouraging others to follow suit (Bass & Avolio, 1990).

Likewise, according to Avolio and Bass (2004), the transformational leadership style seeks to foster commitment, emotional strength, cooperative relationships, and intrinsic drive. As seen by behaviors such as showing concern and respect for followers, creating and sharing a change vision, and fostering creative thinking, transformational leadership is defined by an emphasis on fostering relationships and advancing change. These attributes are consistent with the fundamental ideas of transformational leadership as first put forth by Bass (1990). Driven by respect and confidence in their surroundings, transformational leaders inspire and persuade their followers to push past their personal boundaries in the pursuit of organizational excellence. These four interrelated dimensions of transformational leadership are idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (CemilÖrgev, 2013). As a result, improvements in self-efficacy brought about by particular traits present in transformational leadership (Gassemi et al., 2021).

### (c) Ambidextrous Leadership

In a competitive environment, leadership and innovation are critical concepts in academic research (Bledow et al., 2009; Chen et al., 2014). In fact, Duncan (1976), credited with introducing the term “ambidextrous organization”, highlighted the ability of the organization to establish dual structures that successfully support the initiative and implementation stages of the innovation process (as cited in Wu et al., 2020). Exploratory and exploitative innovation are two subtypes of ambidextrous innovation that were first identified by March (1991) and brought to the field of innovation

management. Ambidextrous companies can gain sustaining advantages in a variety of ways (Grant, 1996), such as through exploitative and exploratory innovations (March, 1991; Benner & Tushman, 2003), change and preservation (Volberda, 1996), and responsiveness and efficiency (Hanssen-Bauer & Snow, 1996). They balance and coordinate the simultaneous investigation of new prospects and exploitation of current capabilities, as well as resolve competing demands from task settings.

Tushman and O'Reilly (1996) defined ambidexterity as the capacity to simultaneously practice both gradual and discontinuous transformative innovations. Leaders must have ambidexterity, which means they must be able to implement many courses of action at the same time, such as "exploration and exploitation, incremental and radical, and flexibility and control" (Vera & Crossan, 2004, p. 227). According to Deichmann and Stam (2015), ambidextrous leadership is a type of leadership that combines two distinct types (transformational leadership and transactional leadership), with the ambidextrous parts having a dialectical interaction with one another in the same direction. To pursue innovation, each employee must have a distinct leadership style. Zacher et al. (2016) proposed that the diverse nature of the employee activities needed innovation requires a complex leadership approach. It implies that a unique leadership style is required for each employee to pursue innovation.

According to Rosing et al. (2011), ambidexterity theory described such a leadership style for innovation. Wirtz and Lovelock (2022) defined contextual ambidexterity as employee ability to balance service quality and cost-effectiveness. It entails making judgments that will integrate both aims synergistically. These decisions are guided by an internalized dual culture. Therefore, ambidexterity leadership guides organizations to embrace conflicting demands with a "both/and" logic (rather than a "either/or" logic) because leaders create systems to energize the organization around these demands, serve as role models, and reinforce ambidextrous behaviors through communication, training, rewards, and recognition (Wirtz & Lovelock, 2022).

The fundamental concept of ambidextrous leadership is that the complexity of leadership strategies should correspond to the complexity of innovation activities (Bledow et al., 2009; Rosing et al., 2011). Ambidextrous leadership was defined as the talent to nurture both explorative and exploitative behaviours in groups by increasing or decreasing difference in their behaviours and flexibly switching between those behaviours (Rosing et al., 2011). Experimentation, divergent thinking, and the openness

to new knowledge implied by exploration all contribute to develop innovative and creative ideas (Mednick, 1962; Mumford, 2000). On the other hand, conforming to rules and standards, as implied by exploitation, is associated with successful concept implementation (Miron-Spektor et al., 2004; Miron-Spektor et al., 2011). Exploration and exploitation have been characterized as two distinct forms of organizational learning, as initially outlined by March (1991). Exploration is defined as increasing diversity in behavior, experimenting, taking risks, and seeking alternate answers. Exploitation, on the other hand, entails decreasing variation in behavior, following rules, aligning, and avoiding risks (March, 1991). This means that ambidextrous firms are actively engaged in both exploration and exploitation operations, which leads to enhanced company innovation.

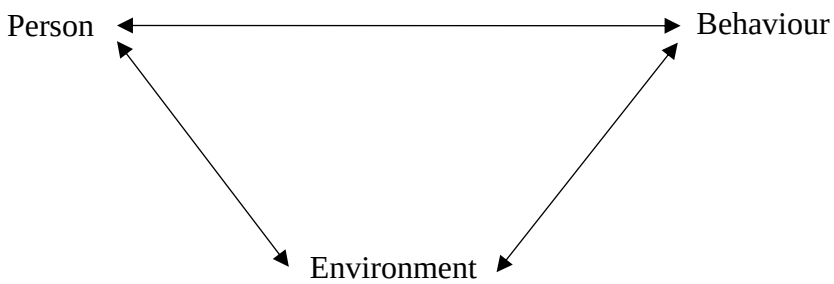
The integration of exploration and exploitation activities at both individual and team levels is fundamental for the complete adoption of ambidextrous leadership. This approach fosters the growth of employee self-efficacy and greatly improves innovation efficiency (Bledow et al., 2009; Rosing et al., 2011). Jiang et al. (2021) found that significant cognitive flexibility is a crucial intermediary between ambidextrous leadership and individual self-efficacy, leading to enhanced innovation efficiency. This suggests that leaders have an essential role in encouraging and supporting both exploration and exploitation behaviours among their followers, recognizing their significance in the self-efficacy and innovation process.

This study centers on the examination of transactional, transformational, and ambidextrous leadership styles, considering the concepts previously discussed. Transactional leadership is the establishing of explicit rules, conventions, and expectations inside an organization to ensure smooth and efficient operations. Transformational leadership styles are also necessary for promoting innovative task performance, presenting a compelling vision, instilling a sense of purpose, identifying external opportunities, and stimulating the creativity of team members. Ambidextrous leadership, with the “superposition effect,” refers to the combined effect of both transformational and transactional leadership styles (Alghamdi, 2018), allowing an organization to overcome traditional constraints and effectively address diverse challenges.

### 2.3.3 Individual Learning Orientation

A learning orientation, as defined by Gong et al. (2009), is an internal mindset that propels a person to advance their competence; as such, it is a crucial internal motivation for enactive mastery. Those who have a learning orientation look for challenges that present possibilities for learning (Ames & Archer, 1988). According to research, a learning orientation helps people acquire new information and abilities, as well as improve their work behaviours (Kozlowski et al., 2001; Gong et al., 2009). As stated in Schunk's (2012) study, social cognitive theory examined human behavior through the lens of triadic reciprocity, or reciprocal connections between behaviors, environmental factors, and personal elements such as cognitions. Figure (2.1) displays triadic reciprocality model of causality.

**Figure (2.1) Triadic Reciprocality Model of Causality**




Source: Schunk (2012)

In social cognitive theory, learning is primarily an information processing activity in which knowledge about the structure of behavior and environmental events is turned into symbolic representations that serve as guides for action. (Schunk; 2012). As Kohli et al. (1998) properly recognized, organizations eventually gain information through their individual members and are thus directly influenced by each individual learning. Porter and Tansky (1999) reinforced this idea, identifying individual learning orientation as the most "critical factor to success" (p. 48). Slåtten (2014) described that individual learning orientation is a key aspect in self-efficacy development. According to Schunk (2012), learning arises either actively via doing or vicariously through witnessing models perform (e.g., live, figurative, electronically depicted).

The present study investigates the link between self-related traits and employee self-efficacy through the lens of an individual learning orientation. This decision is

grounded in two key reasons. Primarily, learning is recognized as a vital contributor to self-efficacy, as established by Bandura (1977). Two types of learning have been proposed: enactive learning (learning through direct practicing) and vicarious learning (learning through observation and modeling) (Weiss, 1990). Second, some scholars have claimed that learning is an important and critical source of both creativeness and improvement (Mavondo et al., 2005; Hirst et al., 2009), as well as the ability of a firm to maintain its competitive edge in both the short and long run (Kohli et al., 1998).

In addition to the above stated reasons, the importance of learning orientation is stressed for software firms. In the study of Hakala (2013), the software sector aimed to highlight the importance of learning orientation in allowing profitable growth for software organizations. This study emphasizes the significance of creating a culture that values continual learning and adopts a learning-oriented strategy. Recognizing and encouraging the value of learning, as well as individual learning orientation, can help software firms achieve long-term growth and success in this continuously changing market. Individual learning orientation is examined in this study by taking into account the dimensions of vicarious learning and enactive learning.

**(a) Enactive Learning**

Research finding by Schunk (2012) confirmed that enactive learning entails taking lessons from the results of individual activities. According to Bruner (1961), enactive learning points out the significance of firsthand experience and learning through action, actively involving individuals with their surroundings, encountering consequences, and linking it to cognitive development and constructivism. Moreover, enactive learning closely aligns with the concept of learning by doing, as it necessitates active engagement, self-regulation, goal-directed behavior, and self-monitoring, as noted by Bandura (1997). Through active participation and experiencing consequences, learners gain valuable information and deeper understanding. Notably, people cognitive processes, rather than consequences alone, significantly influence the learning process.

**(b) Vicarious Learning**

A significant portion of human learning takes place vicariously, meaning it happens without the learner actively performing the task during the learning process. Observing or listening to live models (appear in person), symbolic or nonhuman (e.g., broadcast talking animals, cartoon characters), electronic (e.g., television, computer,

videotape, DVD), or printed (e.g., books, magazines) are all common forms of vicarious learning (Schunk, 2012). Vicarious sources enhance learning beyond the limits of direct experience by allowing individuals to learn without performing every action themselves. Additionally, they safeguard individuals from the negative consequences of direct experiences. Therefore, the acquisition of knowledge is influenced by observational learning.

## 2.4 Creativity, Innovative Work Behaviour, and Task Performance

The following section shows the literature review of previous studies on creativity, innovative work behaviour, and task performance.

### 2.4.1 Creativity

Creativity is diverse and dispersed among individuals within organizations (Elidemir et al., 2020). The concept of individual creativity highlights the idea that creativity is an innate personality trait or characteristic. It signifies that innovation is adaptable and dynamic; it differs from one employee to another. Mumford and Gustafson (1988) proposed that creativity entails the development of new and original ideas; thus, individual creativity refers to the ability to be creative. Moreover, many scholars approved that creativity in an organizational setting implies the creation of ideas that are not only fresh, novel, or original, but also valuable, practicable, or effective (Runco & Jaeger, 2012; Hussain & Wahab, 2021). A creative concept must meet both novelty and usefulness criteria. Individual creativity varies from organizational innovation in that creativity is the development of fresh and beneficial ideas by individual employees, whereas innovation is the successful execution of creative ideas by an organization (Oldham & Cummings, 1996). Thus, employee creativity is frequently used as a starting point for for organizational innovation.

Mohanani et al. (2017) found that individual creativity is critically important in the software development process and sector. Furthermore, because of its multidimensional character, subjective traits, illusive quantifiability, and imperfect comprehension, assessing creativity is difficult. As a result, when it comes to complex jobs like designing, developing, and maintaining software applications or systems, individual creative thinking becomes a vital contribution. Individual creativity, they concluded, considerably improves the value of the software development process by

encouraging innovation, problem-solving ability, user-centric design, and teamwork. This approach facilitates the creation of software that satisfies functional requirements while also delivering an enjoyable user experience, setting it apart in a fiercely competitive marketplace.

Henker (2013) stated that creativity is the process of identifying problems that allows employees to create a more accurate depiction of the problem and is positively associated to more unique ideas. Although employees might share these ideas with others, they will only be regarded innovative if they are successfully implemented at the organizational or unit level. As Shalley et al. (2004) described, individual creativity is defined as individual cognitive thoughts (relating to creative thinking) and potential associated behaviors such as (1) defining the problem to be solved, (2) gathering information, (3) producing ideas, and (4) assessing ideas. Slåtten and Mehmetoglu (2015) defined creativity as the generation of innovative ideas for an organization. Gilmartin (1999) demonstrated the importance of creativity by describing it as the power of innovation and the basis of innovative thoughts is creativity.

Amabile and Pratt (2016) acknowledged that self-efficacy and a sense of meaningful work are important factors in nurturing individual creativity. People with a high sense of personal accomplishment, defined as a sense of competence and effective achievement in their work with others, have higher self-efficacy beliefs (Bang & Reio Jr., 2016). Employee creativity is projected to improve, as are the innovative ideas and smart problem-solving solutions they generate. When people are permitted to be creative and think differently in the workplace, they both contribute to the performance of the company and do tasks more efficiently (Karaboga et al., 2022). Creativity, as a fundamental motivating component, stimulates people interest, inspires them to explore, and improves task performance by enlightening their full potential (Pattnaik & Sahoo, 2021). According to Bandura (1986), while task capacity is required for task completion, creativity necessitates domain experience and knowledge. Creative performance necessitates a set of talents that are unique to the creative process (Amabile, 1988). As a result, employee innovation is a valuable tool for firms seeking to meet performance goals. Individual creativity generates novel and practical approaches for tackling workplace difficulties, resulting in concrete and beneficial consequences for organizations (Karaboga et al., 2022).

### 2.4.2 Innovative Work Behavior

Innovative work behavior is the recognition of problems, the introduction of new and valuable ideas about products, services, and work methods, and the behaviors needed to improve, initiate, and execute those ideas (De Jong & Den Hartog, 2007). Nowadays, the innovative work behavior is the critical success factor of every business in a fast-changing business environment (Abstein & Spieth, 2014).

De Spiegelaere et al. (2014) noted that innovative work behavior shares similarities with concepts like workplace creativity. According to West and Farr (1990), innovative work behaviour varies from creativity in that it is concerned with promoting and executing ideas, whereas creativity is exclusively concerned with the development of new ideas (West & Farr, 1990). Besides, innovative work behavior is linked to very difficult and complicated jobs that encompass a wide range of cognitive and social activities, such as progressing, reviewing, modifying, and eventually implementing creative ideas. According to Khan et al. (2012), innovative workplace behavior is a dynamic phenomenon in complex networks that includes creativity. Nevertheless, innovative work behavior is distinct because it concentrates exclusively on various forms of innovation. Unlike broader innovation, which originates from a collective idea generation process leading to successful implementation and value creation, innovative work behavior arises from individual efforts (Monteiro et al., 2016). West and Farr (1990) acknowledged that innovations are intrinsically positive enhancements, offering a clear understanding of what constitutes innovation and what does not.

Innovation is, in fact, a critical element of an organization competitiveness (Agarwal, 2014); on the other hand, its achievement depends on the employee active participation (Abstein & Spieth, 2014), highlighting the employee crucial role in promoting innovation within the organization. The research has noted the importance of innovative work practices for the sustainability of organizations (Agarwal et al., 2012). Innovative work behavior, according to De Jong and Den Hartog (2007), is the conduct of an individual with the goal of initiating and purposefully introducing new and valuable ideas, processes, products, or procedures, as well as putting those ideas into practice. In brief, employee innovative activity is the cornerstone of improved organizational performance; hence, it is critical to determine what promotes or encourages this innovative behavior according to Scott and Bruce (1994).

Innovative businesses, like software development firms, view their staff as a valuable source of innovation and are always searching for new approaches to support employee-driven innovation. Given that change and innovation in a work role can entail both uncertainties about future outcomes and potential resistance from others affected by the change, Farr and Ford (1990) argued that the individual who lacks self-efficacy in their abilities will likely faces considerable barriers (as cited in Dörner, 2012). Self-efficacy, according to Karadeniz et al. (2021), is a critical component in encouraging innovative work behavior because it enables people to take advantage of their knowledge and skills, think creatively, and make contributions to the growth and ongoing improvement. Software firms that adopt innovative work practices can achieve breakthroughs, gain a competitive edge, and maintain an advantage in a highly competitive and dynamic market. By actively promoting and supporting innovations, software firms can keep up with the latest developments in the industry, efficiently meet the changing needs and demands of their stakeholders and users, and accelerate their own development

According to Bandura (1977), self-efficacy can influence innovative workplace behavior for two reasons. First, innovation research believes that innovation entails inherent risks and uncertainties, as well as complicated tasks in which inventive self-efficacy is critical in motivating individuals to actively participate. This implies that employees with high self-efficacy are more likely to actively engage in innovative work, whereas employees with low self-efficacy are hesitant or unwilling to participate due to uncertainties about their coping abilities and chances of success in innovative endeavors. Second, activities involving innovative work behaviour, such as software development procedures, can be incredibly demanding (Dorner, 2012). Thus, strong self-efficacy enhances the level of persistence and the coping efforts that individuals put into specific tasks when encountering challenging situations (Bandura, 1977).

De Jong and Den Hartog (2007) identified four aspects of innovative work behavior: idea exploration, idea generation, idea advocacy, and idea implementation. Idea exploration entails looking for methods to improve existing products, services, or processes, as well as considering them in new ways. The next recommended part of innovative work behavior is idea generation, which refers to new products, services, or processes, market entry, enhancements in present work processes, and problem-solving solutions. Finding support and forming coalitions through idea championing entails

exhibiting passion and confidence in the success of the invention, being persistent, and involving the relevant individuals. Finally, ideas must be turned into reality. Making ideas a reality demands significant effort and a goal-oriented mindset. De Jong and Den Hartog (2007) described that making innovations part of routine work processes was another aspect of idea implementation.

Yuan and Woodman (2010) found that innovative work behavior correlates with employee actions and their capacity to adopt and implement novel and efficacious ideas in the workplace. Innovative work behavior refers to the deployment of innovations that have the potential to improve individual performance. Innovative work behavior involves undertaking innovative actions that represent a shift in behavior or a break from the past patterns of conduct in organization. This suggests that, while innovative work behavior is recognized as a dynamic process, it is critical to acknowledge that it frequently involves discontinuity. Thus, the field of innovative work behavior is associated with routine employee actions, and these actions are inherently a result of learning and knowledge generation that is incorporated into routine work practices (Avby & Kjellstöm, 2019). Since the study focuses on understanding individual innovative work behavior rather than the precise processes involved, the concept of innovative work behavior covers a broad spectrum of changes that are pertinent to individual performance.

Since the software industry is constantly changing and requires workers who are not only technically skilled but also able to promote and implement new ideas, it is imperative that software organizations foster innovative work behaviors (Monteiro et al., 2016). This entails looking for chances to get better on a proactive basis, coming up with original ideas, and being willing to try new things and adapt. According to Battistelli et al. (2013), innovative work behavior is characterized by a particular type of change-oriented activity that is clearly demonstrated by employees implementing novel and helpful ideas in their assigned roles. Furthermore, many studies have continuously shown how innovative work behavior affects task performance, emphasizing how crucial it is to obtaining desired results (Prieto & Pérez-Santana, 2014; van Zyl et al., 2021).

Companies can obtain a competitive edge through innovative work behavior from their employees by encouraging and putting into practice creative ideas, such as thinking beyond the box, investigating alternative approaches, and coming up with

solutions to problems. Furthermore, as shown by Bastian and Widodo's findings (2022), these creative activities directly motivate others, aid in the acceptance of the newest developments, and lead to enhanced work performance. Because of this, the idea of innovative work behavior is intrinsically linked to a variety of changes that are very pertinent to improving task performance within the organization.

### 2.4.3 Task Performance

According to Motowildo et al. (1997), behaviors or actions connected to the objectives of an organization have been used to define task performance. Organizations can enhance task performance by managing employee behavior (Daryoush et al., 2013). The performance notion is accomplished with a few fundamental assumptions based on earlier research. The first presumption is that behavior, as opposed to outcomes or results, is used to measure performance. The second premise is that behavior is performed on a periodic basis. For example, a task can be started at one moment and completed at a different one. According to the third assumption, performance is context-dependent. This performance is caused by behaviours that support the workplace environment, helping other colleagues and accommodating (Borman & Motowidlo, 1997; Rotundo & Sackett, 2002). The fourth argument was that the personal-level outcomes studied were performance, organizational citizenship behaviour, proactive behaviour, innovative behaviour, and knowledge production practices (Gemeda and Lee, 2020). Thus, Gemeda and Lee (2020) recognized that innovative work behavior was regarded for work outcomes or employee task performance because of its relevance to organizational survival and advancement.

When the inputs, processes, or outputs of work systems are unpredictable with respect to task performance of an employee, this is known as uncertainty in an organizational context (Wall et al., 2002). According to Burns and Stalker (1961), factors that cause uncertainty include new competitors, developing technologies, and shifting consumer wants. It believes that each employee must play a certain part in enhancing the overall performance of the company. The requirement of an organization to stay adaptable and current is heavily influenced by the different obstacles and uncertainties that businesses must deal with. Therefore, the erratic nature of the working environment may have an impact on changes to job descriptions, product and service offerings, and human resource mobility. Similar to how conditions and expectations are

changing, work roles also need to adapt dynamically (Leong & Rasli, 2014).

According to Murphy and Jackson (1999), innovative work behavior improves individual performance through the development of creativity, adaptability, and problem-solving skills. It also fosters collaboration, knowledge sharing, and the generation of new ideas, all of which contribute to improved team performance and give organizations a competitive edge and increased efficiency in dynamic environments. A mindset that demonstrates self-motivation and personal dedication to creative ideas, as well as a desire and action to incorporate these ideas into actual work practices with renewal, are also results of innovative work behavior. Consequently, in the context of organizations, building links between individuals, teams, and organizations requires recognizing the effect of individual behaviors, abilities, and characteristics on team dynamics and output (Pudjiarti & Hutomo, 2020).

In the software development setting, there are high standards for individual software engineers to meet when it comes to producing quality work because IT solutions are demanding, (Brownell, 2006; Xiang et al., 2013). Customers demand top-notch work; therefore, software developers must come up with innovative concepts and make creative choices under strict deadlines (Colomo-Palacios et al., 2014; El-Sofany et al., 2014). Thus, it is imperative that software developers have the capacity to adjust to modifications with efficacy. To ensure their efficacy, workforce must therefore learn to manage both work-related elements and personal capacities. Meeting these goals and delivering high-quality solutions at the team level depends on cooperative efforts and mutual support. Moreover, at the organizational level, creating a supportive and adaptive work environment plays a vital role in enhancing individual and team performance in the ever-evolving IT landscape (Endriulaitienė & Cirtautienė, 2021).

With proficiency, adaptivity, and proactivity, Griffin et al. (2007) investigated the interactions between individual, team, and organization member behaviors and made important findings. They proposed that in order to understand the varied nature of employee task performance, the three levels of individual behavior-proficiency, adaptivity, and proactivity-should be cross-classified. This approach enhances the efficacy of individuals, groups, and organizations. The conventional understanding of proficiency is the idea that a person satisfies the formal criteria of their position. The ability of a person to adjust to modifications in work procedures or job duties is referred to as adaptivity. Proactivity is the degree to which an individual takes proactive, self-

directed action to foresee or start changes in work systems or roles. To efficiently handle uncertainty in inputs, processes, or outputs, adaptability and proactivity are essential skills. However, the most jobs require a combination of competence, adaptability, and proactivity to strike a balanced approach, considering how difficult it is to formalize work role requirements in such circumstances. Griffin et al. (2007), therefore, used the results of their research to identify a number of task performance indicators. Businesses can assess and improve these dimensions by closely analyzing the unique behaviors and abilities displayed at the individual, team, and organizational levels. This will help them maximize overall performance, effectiveness, and flexibility in reaching their objectives. Leong and Rasli (2014) proposed that the ever-changing environment and expectations have an impact on the need for individuals to perform both inside and outside of their assigned job duties.

This study aims to investigate task performance, which includes individual efforts, team dynamics, and organizational performance. Promoting overall development and success within an organization requires a thorough understanding of and optimization of task performance across these many dimensions. Important insights can be gained to pinpoint areas for improvement, promote improved collaboration and synergy, and establish a productive and effective work environment by investigating the interactions and influences of individual, team, and organizational factors on task performance. By taking into account the contributions and dynamics at the individual, team, and organizational levels, this all-inclusive approach makes it possible to evaluate task performance. Every component, from individual behaviors to team collaboration and organizational strategic decisions, influences task performance and, eventually, adds to the success of the organization.

## 2.5 Review on Empirical Studies

Many scholars have emphasized the traits of creative organizations, such as a focus on originality and inventive transformation, encouragement of self-directed exploration of novel concepts, and acceptance of member variety. While corporate culture and support direct attention and activity toward innovation, leadership is also seen as being crucial to the innovation process. In accordance with LMX theory, innovativeness is also interconnected with the quality of the leader-member relationship (Northouse, 2016). Additionally, organizational factors and individual

learning orientation have a significant impact on individual self-efficacy and innovative work behavior (Amabile, 1988), which in turn improves task performance overall (Pudjiarti & Hutomo, 2020). Researchers have also looked at the links between organizational culture, leadership styles, and individual learning orientation and self-efficacy in order to better understand the antecedents of self-efficacy that influence creative work behavior and task performance (Sheng et al., 2003). Studies have also looked into the relationship between self-efficacy and innovative work behavior, the mediating role of individual creativity in this relationship, and the impact of innovative work behavior on employee task performance (Slåtten et al., 2020).

### 2.5.1 The Relationship between Organizational Culture and Self-Efficacy

One of the determinants of employee self-efficacy is organizational culture. Building on the concept of the scholars, Mardiana and Heriningsih (2016) explored the link between organizational culture and self-efficacy, which is based on the assumption that a positive and empowering organizational culture can considerably increase employee self-efficacy. Employee self-efficacy is likely to develop when they work in an atmosphere that recognizes their skills, offers support and possibilities for advancement, and supports a participative attitude. This results in heightened job satisfaction, improved performance, and a constructive organizational climate. It was determined that organizational culture has an effect on employee self-efficacy, which in turn affects their performance. In an environment characterized by a robust, dynamic, and positively motivated organizational culture, an individual performance is bound to enhance and advance. According to Murphy (1989), maintaining excellent interpersonal ties, absenteeism, withdrawal behaviors, and other workplace dangers all have an impact on individual performance. It can be concluded that an organizational culture that encourages strong interpersonal relationships, work-life balance, and a safe and supportive workplace can boost individual self-efficacy by eliminating negative characteristics that impede performance.

Likewise, Sheng et al. (2003) gave a positive response that IT-based business activities demand high computer self-efficacy among employees because these developments necessitate a widespread usage of computers. Organizational culture, personality, and other internal and external factors are only a few examples of the many that influence computer self-efficacy. As a result, they investigated the connection

between worker self-efficacy and organizational culture. The organizational culture of software development companies, which includes elements such as teamwork, organizational learning, and creating change, can have a significant effect on the self-efficacy and performance of software developers (Erdem, 2012; Skelton & Pais, 2019; Laato et al., 2023). The purpose of this study is to investigate how these dimensions of organizational culture affect the self-efficacy and task performance of software developers by meticulously examining teamwork, organizational learning, and creating change using carefully crafted measurements to clarify the critical role of organizational culture in shaping the abilities and effectiveness of software developers in their innovative endeavors.

### 2.5.2 The Relationship between Leadership Styles and Self-Efficacy

Leadership styles can be viewed as the antecedent factors of employee self-efficacy (Gong et al., 2009; Liu & Gumah, 2020; Jiang et al., 2021). The role of leaders is of great importance in organization, as they inspire and motivate employees of all levels (Rahman et al., 2017) and leadership is the practice of influencing people (Jung, 2001). Researchers have identified several leadership philosophies that influence employee self-efficacy, including ambidextrous, transformational, and transactional leadership.

Mehdinezhad and Mansouri (2016) claimed that a transactional leadership style has an impact on the organization since it is linked to creating incentive structures, outlining expectations precisely, and defining clear goals. Moreover, some behaviors that are characteristic of transactional leadership may also be linked to higher levels of self-efficacy (Turner et al., 1997; Deng et al., 2019). Self-efficacy in IT tasks refers to an individual evaluation of their own competence and ability, according to Safarudin et al. (2015). The results of their study provide more evidence in favor of the effect of transactional leadership style on the self-efficacy of computer operators. The research findings indicated that those who possess higher levels of computer self-efficacy are more capable of completing computing activities successfully without the need for outside aid, as opposed to those who possess lower levels of computer self-efficacy. Given that the transactional leadership style has a favorable effect on both individual self-efficacy and job happiness; it is evident that IT firms can gain from implementing this strategy.

According to Yulianto et al. (2021), a transformational leadership style can increase self-efficacy and intrinsic motivation in the following areas: intellectual stimulation (i.e., questioning the status quo and approaching problems in new ways), charisma or idealized influence, inspirational motivation (i.e., stimulating followers through conveying a persuasive vision), and individualized consideration (i.e., accompanying, mentoring, and cultivating followers). It implies that employee self-efficacy is impacted by human resource development, motivation, training, and other initiatives that align with the goals and objectives of the company and meet the needs of the workforce. According to Fuadiputra (2020), self-efficacy and personal creativity are influenced by transformational leadership. It means that the leader support of continuous personal innovation is a contributing factor since it directly requires the development of knowledge and skills to successfully complete tasks assigned by the company and its leaders.

Within the software industries, transformational leadership is a prominent leadership style that significantly and persuasively affects follower participation in creative processes and innovative pursuits. The study highlighted the beneficial effect of transformational leadership on self-efficacy, according to Azim et al. (2019). It is discovered that behaviours encouraging transformational leadership help employees become more confident in their own skills, boost their sense of self-efficacy, and eventually lead to more engagement in creative endeavors.

An ambidextrous leadership style can help people develop and feel more confident in them. According to Jiang et al. (2021), ambidextrous leaders are able to maintain a suitable balance between incremental innovation (exploitation) and discontinuous innovation (exploration), which is why ambidextrous leadership style can foster self-efficacy. In their leadership styles, ambidextrous leaders can combine and harmonize both exploitative and exploratory activities. They place a strong emphasis on efficiency, stability, and execution while simultaneously encouraging experimentation, innovation, and risk-taking. Furthermore, research by Jiang et al. (2021) demonstrated that ambidextrous leadership is a critical component in encouraging employee innovation and that encouraging innovative behavior in workers enhances an organization overall performance. Ambidextrous leadership is crucial to the process of employee innovation since it fosters a variety of behaviors among staff members and skillfully makes use of organizational elements to boost their sense of

self-efficacy and creative work habits. Thus, by encouraging creativity, learning, and development, an ambidextrous leadership style-which places equal emphasis on exploration and exploitation-can create an atmosphere that helps people feel more confident in them.

Considering this, Rosing et al. (2011) applied the ambidextrous concept to project leaders involved in innovation processes to examine how these leaders effectively balance exploration and exploitation for efficient management. They recognized ambidextrous leadership style, in which the leader uses open leadership to encourage exploration and closed leadership to encourage exploitation. Through the adoption of ambidextrous leadership style, project managers were able to effectively negotiate the obstacles associated with innovation and maintain a balanced and efficient approach to managing both exploration and exploitation activities. This leadership style can lead to better outcomes in fostering creativity and overall organizational performance can be obtained with this leadership style.

Based on a thorough review of empirical research, Hughes et al. (2018) and Lee et al. (2019) conducted a recent meta-analysis that found a significant positive relationship between the leadership styles they looked at and creativity and innovation. The results emphasized how important leadership styles are in influencing organizational innovation and creativity. The analysis revealed that both transactional and transformational leadership styles are particularly relevant for fostering innovative performance through improving self-efficacy As a matter of fact, followers of transactional leaders perceive higher levels of overall support for their activities because these leaders tend to oversee tasks more closely. However, transformational leaders may foster the impression of distant management while also being more receptive to the unexpected acquisition of new resources. The mix of approaches that ambidextrous leaders provide the necessary equilibrium to encourage software developers to act creatively in real-world situations. When it comes to encouraging innovative behavior, ambidextrous leadership style that blends transformational and transactional techniques are more likely to yield positive outcomes.

In the software industry, project managers and other group leaders should be encouraged and assisted in implementing these leadership practices in order to foster an environment that fosters innovative behavior (da Silva et al., 2016). Extensive previous research consistently highlighted the important roles that self-efficacy,

ambidextrous leadership style, transformational leadership, and transactional leadership play in promoting the innovation process. Employee creativity has been found to be significantly enhanced by these leadership styles and the incorporation of self-efficacy as part of psychological empowerment (Tung, 2016; Llorente-Alonso et al., 2023). This study aims to provide insights on software development that enhances creativity and promotes innovation for all companies. Three types of leadership styles-transactional, transformational, and ambidextrous-are investigated based on empirical evidence.

### 2.5.3 Relationship between Individual Learning Orientation and Self-Efficacy

Additionally, the self-efficacy of employees is derived from individual learning orientation, which includes vicarious learning and enactive learning (Gong et al., 2009; Slåtten, 2014; Kong et al., 2019). One can actually learn new talents, become competent in new settings, and enhance their abilities through enactive mastery experience, which involves gaining a task or skill firsthand, and mastery modeling, which involves seeing and learning from skilled models like leaders. By giving people examples and proof of their capacity to complete things successfully, both enactive learning and vicarious learning boost self-efficacy.

Through personal experiences and observation of others, individuals increase their self-efficacy by strengthening their belief in their own talents. The predisposition or aptitude of a person to learn and acquire new knowledge and abilities is referred to as their individual learning orientation (Schunk, 2012). When it comes to individual learning orientation, those who have a high learning orientation are responsive to feedback, open to new experiences, and actively seek out learning opportunities to increase their knowledge and skill set. According to research, learning is crucial for creativity.

The study by Kong et al. (2019) investigated the effect of learning orientation on an individual self-efficacy and its consequences for outcomes connected to creativity. The researchers discovered that an individual self-efficacy was influenced by a dynamic interaction among their learning goal orientation, the need for creativity in their line of work, and team learning behavior. This interaction was based on social cognitive theory. Based on the findings, teams can better develop a culture of creativity and increase self-efficacy by creating a learning-oriented atmosphere. Additionally, the

research findings demonstrated that self-efficacy of team members peaked in situations where there was significant consistency across these characteristics, and declined in situations where there was poor or no consistency. The results generally corroborated the idea that self-efficacy develops more favorably when there is congruence between the situation and the individual, while incongruence prevents this growth.

### 2.5.4 Relationship between Self-Efficacy and Innovative Work Behavior

Research on the relationship between self-efficacy and innovative work behaviour was carried out by Kanapathipillai et al. (2021). Researchers found a positive relationship between self-efficacy and innovative work behavior, meaning that higher levels of self-efficacy are associated with higher levels of innovative work behavior. Additionally, a high degree of self-efficacy is linked to higher levels of innovative work behavior, according to Zahra and Waheed (2017). This indicated that self-efficacy positively fostered innovative work behavior. The study of Santoso and Furinto (2019) involved surveying workers in Indonesian telecommunications businesses, likewise shown a favorable and substantial association between employee self-efficacy and innovative work behavior. Additionally, utilizing a cross-sectional study, Mohamad and Osman (2017) investigated the relationship between learning, self-efficacy, and work behavior. The main finding of their research was that self-efficacy functions as a bridge between learning and behaviour; that is, self-efficacy and innovative work behavior are related.

### 2.5.5 Relationship between Innovative Work Behavior and Task Performance

The majority of research has highlighted task performance and innovative work behavior as desirable organizational outcomes. Employees with greater levels of self-efficacy, according to Jiang and Gu (2017), tend to be more innovative in their behavior because they are more confident in their knowledge, talents, and skills. This confidence enables them to come up with more amazing ideas that improve task performance. In this regard, innovative work behavior is essential to complete tasks more effectively. Moreover, Sadikoglu and Zehir (2010) discovered a benefit for organizational development in their investigation of the relationship between innovative work behavior and task performance. It was claimed that innovative work behavior leads to unchallenged competitiveness by enhancing task performance and producing inventive

ideas for the development of new goods and services. Al Wali et al. (2021) examined the relationship between innovative work behavior and task performance among physicians public hospitals in Iraq. According to this study, innovative work behavior can enhance task performance and dynamic capabilities of physicians. Additionally, innovative work behavior can amplify the effect of employee dynamic talents on task performance.

### 2.5.6 Relationship between Self-Efficacy, Innovative Work Behavior, and Task Performance

According to Abdullah et al. (2019), self-efficacy played a predictive role in both innovative work behavior and task performance. The importance of self-efficacy was highlighted by this finding, which extends beyond the idea that it influences innovative work behavior exclusively. Employees with an innovative work behavior typically outperform others, as previously indicated, because they are more likely to identify and address performance problems. According to Abdullah et al. (2019), several scholars had recognized that innovative behavior is a crucial element in improving task performance. Innovativeness is the means by which organizations aim to attain exceptional performance. Thus, the foundation of organizational performance is task performance and innovative work behavior. According to earlier research, self-efficacy positively affects both innovative work behavior and task performance (Abdullah et al., 2019; Kanapathipillai et al., 2021).

### 2.5.7 The Mediating Role of Creativity between Self-Efficacy and Innovative Work Behavior

In addition to the direct effect of self-efficacy on employee innovative behavior, research has demonstrated a more complex process by which self-efficacy affects the innovative work behavior. Organizational innovation is influenced by creativity, according to Jiang et al. (2012). Moreover, they looked for a link between innovative work behavior and individual creativity. Danish et al. (2019) examined how creativity functions as a mediator in the relationship between self-efficacy and openness to change in entrepreneurial culture. As a result, self-efficacy and openness to change have a positive effect on entrepreneurial culture, while creativity acts as a mediator.

In addition, Asbari et al. (2021) investigated how employee individual innovation behavior and psychological capital or self-efficacy were mediated by individual creativity. Based on individual creativity acting as a mediator, the result of the study demonstrated that self-efficacy influences innovative behavior. Individual creativity is a vital prerequisite for individual innovative behavior, according to the researchers, who discussed this from the perspective of individual employees. Given the fundamental importance of individual creativity, the enhanced individual creativity as a result of their self-efficacy may motivate them to try new things and use their creative ideas if they believe they would benefit their jobs.

Liu et al. (2022) explored and verified the mediating function of creativity in the relationship between student self-efficacy in programming and their arithmetic achievement. Their research indicated that the relationship between programming self-efficacy and mathematical achievement is mediated by creativity. According to research, students who perform better mathematically also have a tendency to be more creative. This is likely because mathematical thinking is inherently flexible and unique, and creativity is crucial to learning computer programming. As a result, creativity might operate as a link between student programming self-efficacy and their academic accomplishment. Furthermore, the mediating role of creativity on the relationship between task performance and personal success was investigated by Karaboga et al. (2022). The findings indicated that a mediation function of creativity was discovered in the relationship between task performance and personal accomplishment.

## 2.6 Conceptual Models of Previous Studies

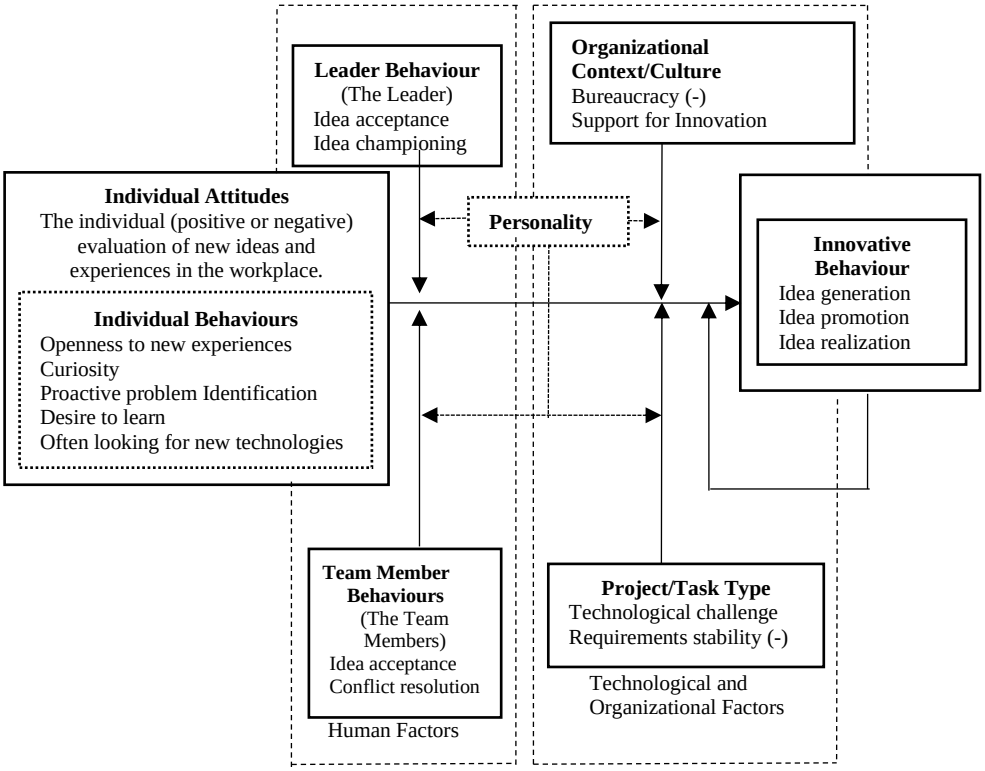
Previous studies have developed conceptual models that explore the relationships and interactions between self-efficacy, innovative work behavior, and task performance. Furthermore, researcher have found creativity as a mediating factor that affects the relationship between task performance and self-efficacy. To gain a deeper understanding of the complex interactions between these variables and how they affect individuals and organizations, these conceptual models are useful theoretical frameworks.

### 2.6.1 The Model of Innovative Behaviour in Software Engineering Company

A pilot case study in a Canadian software company was carried out by Monteiro et al. (2016) in order to determine the features that encourage or obstruct innovative behavior in software engineering practice. For a software company, they created an innovative behavior model. The model presents the elements that support or inhibit innovative behavior in software engineering practice. In fact, factors related to innovative work behavior are leadership, workgroup, psychological climate for innovation, individual characteristics of problem-solving style, the organization, and the intersection between employee and employer. It was recognized that the individual attitude towards putting out, advocating and carrying out new concepts is closely linked to the exhibition of innovative behavior.

Additionally, specific leadership approaches were critical in establishing an environment that is viewed favorably by those who value innovation. Both personal attitudes and contextual factors, such as relationships in the workplace, organizational traits, and project type, had an impact on an individual innovative behavior. The researchers arrived at the conclusion that working circumstances and individual factors influenced innovative behavior. The work environment created by these factors influences how individuals perceive and interpret it, which in turn moderates how innovative behavior can be expressed on an individual basis. Expression of innovative behavior is encouraged by favorable workplace perceptions while it is typically suppressed by non-favorable perceptions. In Figure (2.2), this model is described.

**Figure (2.2) The Model of Innovative Behaviour in Software Engineering Company**




Source: Monteiro et al. (2016)

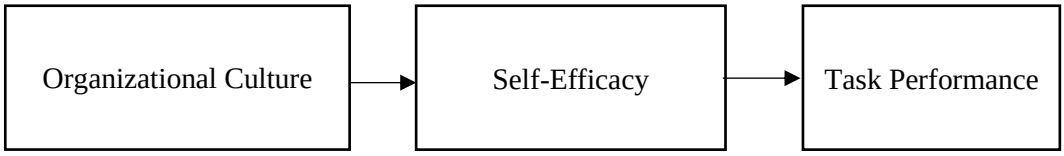
In the context of software engineering practice, Monteiro et al. (2016) shown that innovative behavior not only benefits individuals but also has a favorable impact on groups and organizations. This means that innovative behavior, defined as the intentional generation, promotion, and implementation of new ideas to improve role performance, groups, or organizations, is critical in fostering total innovation. Such behavior promotes a culture of creativity and continual improvement, resulting in increased productivity and competitiveness in the software engineering sector.

For the current study, the model is a suitable choice since it focuses on the early phases of innovative behavior in the context of software development and has been shown to be valid in earlier studies. It is especially pertinent to studying software development projects that are just getting started because it offers a useful framework for comprehending the initial stages of innovative behavior and the antecedent factors that influence it in the software development context. Further evidence for its validity and dependability as a theoretical framework for this study comes from the fact that it has been empirically tested and validated in earlier studies.

### 2.6.2 The Conceptual Model of Organizational Culture and Task Performance

Sheng et al. (2003) developed the conceptual model of organizational culture, employee self-efficacy, and task performance. Figure (2.3) presents the effect of organizational culture on the computer self-efficacy and task performance of employees.

**Figure (2.3) The Conceptual Model of Organizational Culture, Computer Self-Efficacy and Task Performance of Employees**




Source: Sheng et al. (2003)

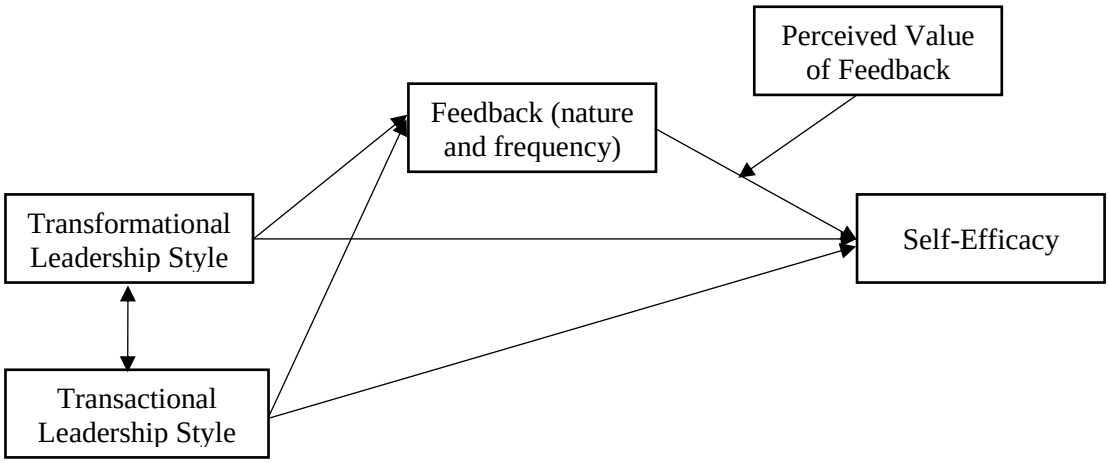
According to Figure (2.3), the results of the study highlighted the crucial role of organizational culture, specifically teamwork culture and information flow, in shaping employee computer self-efficacy. It was found that components of organizational culture, such as teamwork and information flow, have a positive correlation with an employee computer self-efficacy which, in turn, affects their overall performance. Consequently, this heightened self-belief translates into improved output quality, innovative problem-solving, and successful project outcomes within software development companies. The findings collectively highlighted the importance of a conducive organizational culture in promoting employee self-efficacy and overall performance in the dynamic field of software development.

The research of Sheng et al. (2003) was a good fit for this study because it highlights how organizational culture plays a key role in helping software engineers feel more confident about themselves. This is accomplished through activities like empowerment, teamwork, and coordination. When software developers possess a strong sense of self-efficacy, they approach tasks with confidence, effectively tackle complex challenges, and persist in the face of obstacles.

### 2.6.3 The Conceptual Models of Leadership Styles and Self-Efficacy

Liu and Gumah (2020) proposed the conceptual model of leadership styles and self-efficacy. It is shown in Figure (2.4).

**Figure (2.4) The Conceptual Model of Leadership Styles and Self-Efficacy**



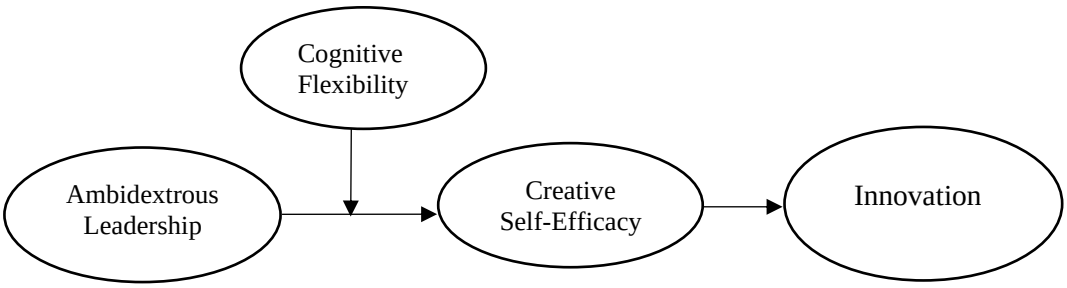

Source: Liu and Gumah (2020)

Through feedback, the study aimed to determine how leadership style affected self-efficacy. The study conducted by Liu and Gumah (2020) discovered that self-efficacy of employees is enhanced when they perceive their supervisors to have transformational or transactional leadership styles. Feedback is likely to have a good effect on teacher self-efficacy because of transactional leadership, which is defining clear objectives, creating explicit goals, and outlining reward systems. However, there is also a relationship between transformational leadership and increased intrinsic motivation and self-efficacy in teachers. Transformational leadership is centered on emotional resilience, favorable working connections, and dedication. Even though leadership styles may differ, the study showed that they had more similarities and differences in terms of their impact on intrinsic drive and self-efficacy. Positive feedback not only increases self-efficacy but also intrinsic motivation, which in turn makes employees more enthusiastic and satisfied with their work. This is especially important in culturally diverse settings where effective adjustment is critical. Receiving frequent and positive feedback is linked to higher levels of self-efficacy. The research conducted by Liu and Gumah (2020) is a relevant choice for this investigation. The outcomes of the research can be approved to the effects of transactional and transformational leadership approaches. It was discovered that a major factor in raising

employee job self-efficacy is how they view their leadership styles, particularly transformational and transactional leadership.

A study on ambidextrous leadership was also carried out by Jiang et al. (2021). They offered proof that innovation boosts business success and that one of the most important things to encourage employee innovation is ambidextrous leadership. Employee innovation is facilitated by ambidextrous leadership, which is crucial. Recognizing paradoxes and contradictions can provide an environment at work that is more dynamic and open while encouraging employee innovation. It fosters innovation and experimentation by enabling employees to investigate a variety of concepts and solutions. It is more probable that employees will feel empowered to question presumptions, exercise critical thought, and come up with creative solutions to challenging issues when leaders foster a culture that values and encourages paradoxes. The conceptual model of ambidextrous leadership and self-efficacy is depicted in Figure (2.5).

**Figure (2.5) The Conceptual Model of Ambidextrous Leadership Style and Self-Efficacy**



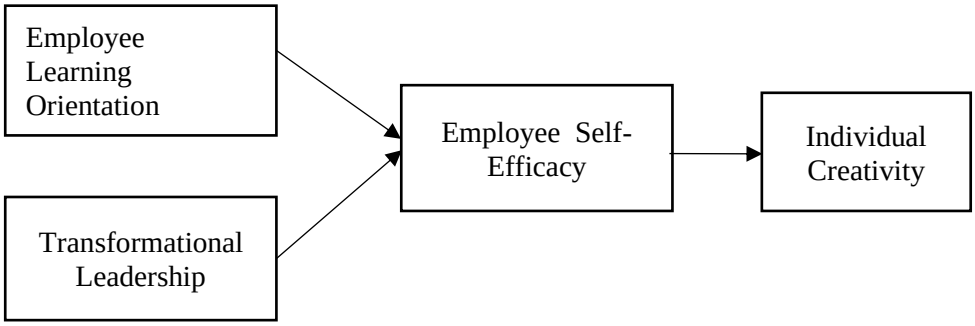

Source: Jiang et al. (2021)

Their results revealed a positive correlation between ambidextrous leadership and employee innovation and the role of self-efficacy and cognitive flexibility. The analysis shows that ambidextrous leadership indirectly affects employee innovation through self-efficacy. The findings of the study offered leaders a new viewpoint on how to deviate from the conventional single behavior path and embrace dynamic, complementary, ambidextrous leadership behaviors in order to boost employee innovation. Thus, Jiang et al.'s (2021) study is a relevant selection for the current research because their findings showed a positive relationship between ambidextrous leadership and employee innovation, with a focus on the roles of self-efficacy and cognitive flexibility.

### 2.6.4 The Conceptual Model of Learning, Transformational Leadership, Self-Efficacy and Creativity

In this study, the model developed by Gong et al. (2009) was adopted. They paid particular attention to factors: learning orientation, transformative leadership, self-efficacy and creativity. The researchers examined how these factors influenced individual creativity through employee self-efficacy. Figure (2.6) shows the conceptual model of the study.

**Figure (2.6) The Conceptual Framework of Employee Learning Orientation, Transformational Leadership, Self-Efficacy and Individual Creativity**



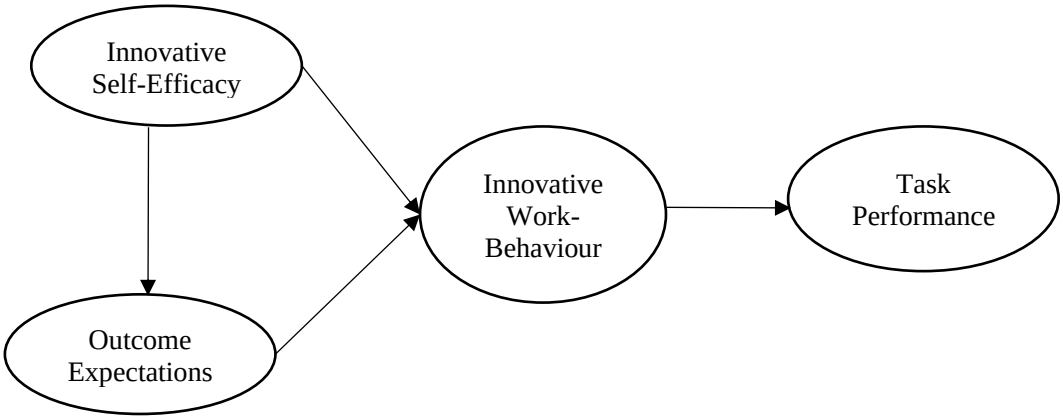

Source: Gong et al. (2009)

The study by Gong et al. (2009) highlighted that employee learning orientation and transformational leadership were positively associated with employee self-efficacy, which in turn affects creativity. Specifically, learning experiences can influence individual self-efficacy or the belief in his or her ability to succeed. The self-efficacy, in turn, can influence the creativity of an individual by altering their perceptions about their abilities to produce and implement new ideas. According to the findings, establishing a culture of continuous learning and giving inspirational leadership have a beneficial impact on employee self-efficacy, which leads to increased individual creativity. These findings have important implications for firms that want to improve overall workplace performance and creativity. Theoretical framework of Gong et al. (2009) is also a useful model for studying the relationships between learning, self-efficacy, and creativity because it provides a useful lens through which to examine the complex relationships between learning, self-efficacy, and creativity. By applying this model to this study, insights into how these factors interact and influence one another in a variety of contexts can be gained.

### 2.6.5 The Conceptual Model of Self-Efficacy, Innovative Work Behaviour, and Task Performance

Dorner (2012) conducted a research, which explores the connections between self-efficacy, innovative work behavior, and task performance. The findings showed that employees with greater self-efficacy have more confidence when engaging in tasks requiring innovative behavior, which often leads to enhanced task performance. Figure (2.7) illustrates the research model of Dorner.

**Figure (2.7) The Conceptual Model of Relationships between Self-Efficacy, Innovative Work Behaviour, and Task Performance**




Source: Dorner (2012)

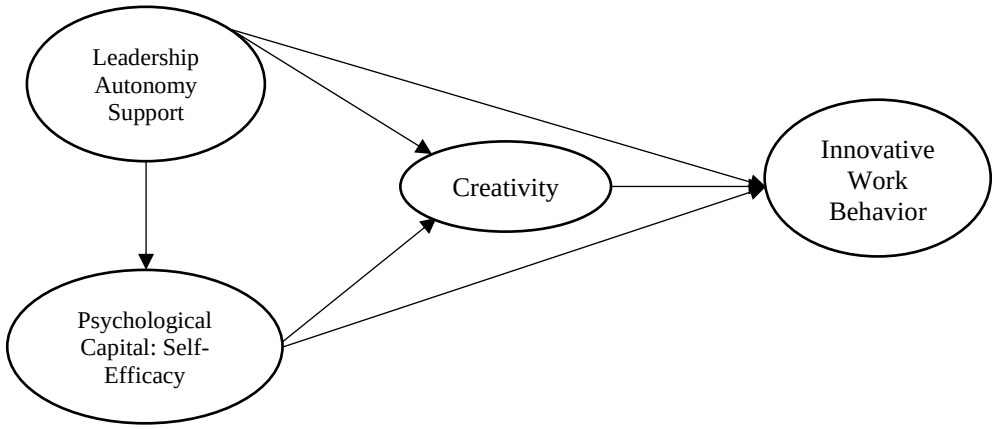
The study of Dorner (2012) confirmed the innovative self-efficacy is an important predictor of innovative work behavior and the importance of innovative work behavior for task performance. According to social cognitive theory, innovative work behavior that can improve task performance is expected to be determined by self-efficacy. Based on the research conducted by Dorner, it appears that innovative work behaviour of employees boost productivity and can eventually help businesses gain a competitive gain.

The model created by Dorner (2012) is suitable reference for this study, providing understandings for managers and leaders. It emphasizes the significance of fostering self-efficacy among employees to drive innovative work behavior. By fostering creativity, exploring alternative approaches, and allocating resources, task performance can be enhanced, ultimately fostering overall organizational growth.

### 2.6.6 The Conceptual Model of Innovative Work Behavior

Slåtten et al. (2020) also revealed a complex pattern of links between individual innovative behavior and leadership autonomy support, individual creativity and psychological capital such as self-efficacy, hope, resilience and optimism. They found a direct and positive association with unique innovative behavior of employees and their psychological capital (self-efficacy), leadership autonomy support, and individual creativity. They also verified that employee creativity acts as a mediator in the links between psychological capital, individual innovative behavior, and leadership autonomy support. This is shown in Figure (2.8).

**Figure (2.8) The Conceptual Model of Innovative Work Behavior of Employees**



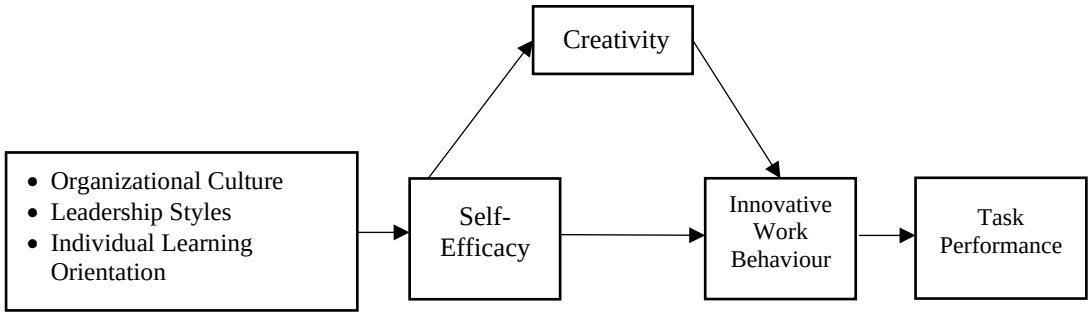

Source: Slåtten et al. (2020)

From an individual perspective, individual creativity is essential for innovative work behavior. According to Slåtten et al. (2020), individual creativity acts as a mediator in the relationship between self-efficacy and innovative work behavior. Based on the fundamental function of individual creativity, employees may be more motivated to experiment with and implement creative ideas if they perceive an advantage to their work if their self-efficacy improves. As a result, leveraging employee self-efficacy is critical to enhancing an organization capacity for innovation. This highlights the ongoing necessity to develop and maintain self-efficacy. Therefore, the conceptual models created by Slåtten et al. (2020) serves as a suitable model for carrying out the current investigation. Its goal is to learn more about how creativity functions as a mediator in the interaction between self-efficacy and innovative work behavior, which in turn influences task performance.

## 2.7 Conceptual Framework of the Study

The conceptual framework of this study has been formulated based on the factors associated with the theoretical considerations discussed earlier and the insights gained from prior research. The chosen models are suitable to construct conceptual framework for the current study because of their special focus on the variables that are most appropriate to the research questions and their documented validity and reliability in earlier studies. Factors such as organizational culture, leadership styles, and individual learning orientation are considered to be antecedent factors for self-efficacy. The two assumptions are also developed that there is a significant direct relationship between self-efficacy and innovative work behavior without a mediator; and there is a significant indirect relation as with the presence of mediator creativity. Moreover, the conceptual framework of the study proposed that there is an effect of innovative work behavior on task performance of software developers. The conceptual model of the study is depicted as shown in Figure (2.9).

**Figure (2.9) Conceptual Framework of the Study**




Source: Own Compilation (2023)

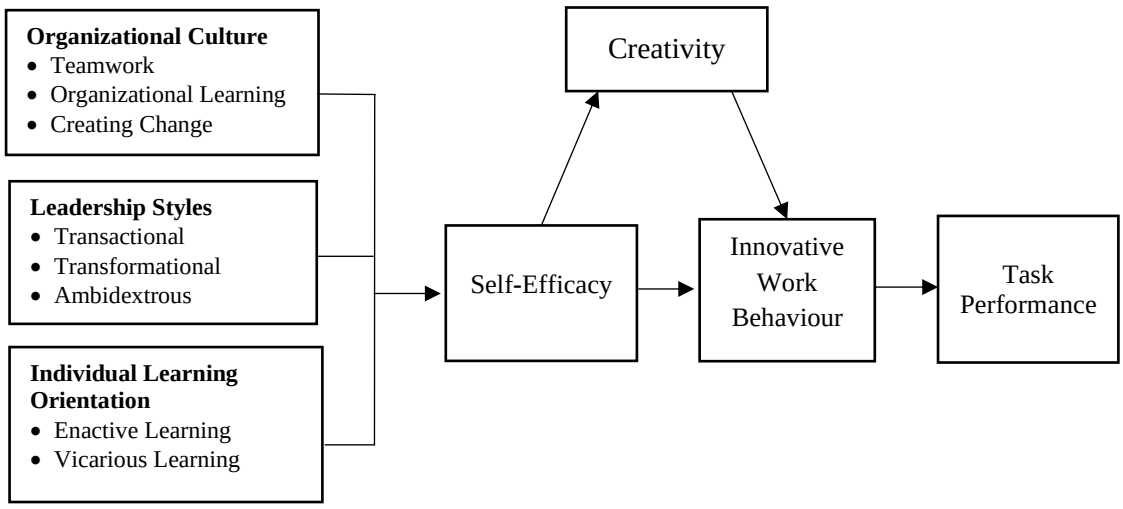
As shown in Figure (2.9) of the conceptual framework, task performance is built through the antecedents of self-efficacy: organizational culture, leadership styles and individual learning orientation, creativity, and innovative work behavior. This conceptual framework of the study proposed that organizational culture, leadership styles and individual learning orientation are antecedents of self-efficacy. The term "antecedents" has been used to maintain consistent terminology. The antecedent factors are the independent variables. Self-efficacy, creativity, innovative work behavior, and

task performance are the dependent variables. Creativity is a mediator as to whether it mediates the relationship between self-efficacy and innovative work behaviour.

## 2.8 Analytical Framework of the Study

The analytical model used in this study is indeed founded on the conceptual models developed by earlier researchers, which are rooted in the concepts of self-efficacy, innovative work behavior, creativity, and task performance. Through building upon this foundation, the study aims to investigate and analyze the relationships between these variables and their influence on the research outcomes. It is illustrated in Figure (2.10).

**Figure (2.10) Analytical Framework of the Study**




Source: Own Compilation (2023)

As shown in Figure (2.10), the key elements of the analytical framework of this study are outlined, including the antecedents of self-efficacy such as organizational culture, leadership styles and individual learning orientation, creativity, innovative work behavior and task performance. The variables included in this framework of the study are extracted from literature review on related research journals. Although the literature review focuses on all variables discussed by researchers, filtering is made to be in line with the context of software developers.

The first antecedent of self-efficacy is organizational culture. In organizational culture, teamwork, organizational learning, and creating change are included. According to Sheng et al. (2003), teamwork is characterized by harmonizing efforts,

fostering interpersonal collaboration, and having transparent discussions about problem-solving effectiveness. Effective communication fosters team cohesion, coordination, mutual trust, and support, which in turn raises self-efficacy and improves the effectiveness of the company as a whole (Kozlowski & Ilgen, 2006). In this study, self-efficacy is assumed to be influenced by a variable, namely teamwork. Through chances for skill development, information acquisition, and successfully navigating unfamiliar situations, organizational learning can influence an individual sense of self-efficacy. According to Tobin et al. (2006), these experiences can contribute to boosting individual self-efficacy in their abilities. Therefore, it is assumed that organizational learning can influence the self-efficacy of software developers. In the context of software development companies, the need to create change becomes imperative to respond effectively to evolving market conditions, advancing technologies, and changing customer requirements. As noted by Laato et al. (2023), the act of creating change can indeed enhance self-efficacy by improving confidence through effective actions and adaptability.

The second antecedent is leadership styles that refer to transactional leadership, transformational leadership, and ambidextrous leadership. The transactional style of leadership, known for its capacity to positively affect individual self-efficacy and job satisfaction, can be attributed to specific inherent behaviors, as emphasized by Turner et al. (1997) and Deng et al. (2019). Consequently, IT organizations can derive significant benefits from embracing a transactional leadership approach. This leads to the recognition that the transactional leadership style is considered a factor presumed to have a favorable effect on individual self-efficacy. According to Fuadiputra (2020), transformational leadership can influence both self-efficacy and individual creativity. This influence is attributed to the leader support of ongoing individual creativity, which requires the direct improvement of knowledge and abilities to successfully accomplish tasks assigned by the organization and its leaders. The study reveals that the supportive behaviors exhibited by transformational leadership contribute to reinforcing employee belief in their own abilities, ultimately strengthening their self-efficacy. In this study, ambidextrous leadership is regarded as a key factor influencing the development of self-efficacy of software developers. This leadership style is known to promote self-efficacy and significantly boost innovation efficiency, as evidenced by research conducted by Rosing et al. (2011) and Bledow et al. (2009). Furthermore, according to

Jiang et al. (2021), the presence of high cognitive flexibility acts as a vital link connecting ambidextrous leadership with individual self-efficacy, eventually contributing to improved innovation efficiency.

The third antecedent is individual learning orientation: enactive learning and vicarious learning as personal factors because many researchers have suggested that they are critical factor to develop employe self-efficacy, and skills or competence. In the context of this study, it is important to recognize that learning, as highlighted by Bandura (1977), is a fundamental driver of self-efficacy. Specifically, this study focuses on two modes of learning: enactive learning, where individuals acquire knowledge through their own direct experiences and practice, and vicarious learning, which involves learning by observing and modeling, as outlined by Weiss (1990). For the purposes of this study, both enactive learning and vicarious learning are regarded as significant factors influencing self-efficacy.

Self-efficacy, as defined by Bandura (1997), represents an individual belief in their capacity to accomplish tasks and attain objectives. This study examines how organizational culture, leadership styles, and individual learning orientation influence the self-efficacy of software developers at companies in Yangon. Organizational culture involves how well employees work together, the organizational learning processes, and its capacity for change. Leadership styles can be transactional, transformational, and ambidextrous. Individual learning orientation encompasses learning by doing and learning by observing. The study assumes that these factors play a significant role in shaping the self-efficacy software developers within their workplace.

Individual creativity is a prerequisite for innovative work behavior, as highlighted by Slåtten et al. (2020). It was discovered that the effect of self-efficacy on innovative work behavior is mediated by individual creativity. Given the critical role of individual creativity, an increase in it due to a positive shift in self-efficacy may motivate employees to experiment with and apply creative ideas if they perceive a benefit in their work. Therefore, this study assumes that creativity acts as a mediator in the relationship between self-efficacy and innovative work behavior.

Yuan and Woodman (2010) emphasized that innovative work behavior is concerned with how employees behave and their ability to adopt and apply new and

valuable ideas in their workplace. It involves applying innovations that can potentially improve individual performance. In the context of software companies, fostering innovative work behavior is crucial due to the rapidly evolving nature of the industry. By encouraging and putting into action creative ideas, companies gain a competitive advantage through their employee innovative work behavior. Thus, in this study, innovative work behavior is considered as the result of creativity, acting as a mediator.

Task performance, as defined by Motowildo et al. (1997), centers on actions in line with the objectives of an organization, not just outcomes. Dorner (2012) stated that innovative work behavior of employees positively affects task performance at individual, team, and organizational levels, enhancing competitiveness. This study emphasizes the importance of nurturing self-efficacy in employees to drive innovative work behavior. By encouraging creativity and providing resources, task performance can be improved, which will ultimately lead to an overall organizational growth. Therefore, in this study, it is assumed that task performance results from the innovative work behavior of software developers.

As indicated in conceptual framework, the analytical steps in this study cover the three main components. With the comparison of the distinct factors, which act as the antecedents of self-efficacy, the first part of this study is to examine which factors are more prevalent in software development businesses and how they contribute to self-efficacy of software developers. The second part is to examine mediating effects of creativity on the relationship between self-efficacy and innovative work behaviours that leads to enhanced task performance. To examine the mediating effect, this study employed Hayes's (2013) approach, which draws upon the mediation framework initially formulated by Baron and Kenny (1986), that emphasizes the estimating and interpreting direct and indirect effects. The third part of the study aims to investigate the relationship between innovative work behavior and the task performance of software developers in software companies located in Yangon.

## 2.9 Working Definitions of the Study

According to Babbie (2008), conceptualisation means the act of defining the meaning of the particular terms used in the research study. Since the main goal of quantitative research study is to generalize the results or findings to the target population, it is important to be clear about what the researcher intends evaluate. The

majority of the concepts included in a study are only suitable for that specific research (Babbie, 2008). Therefore, every variable of the study is defined to fit with the objectives and the context of the study. The definitions of self-efficacy, software developers, and software development companies in this study align with its intended purpose and context. Moreover, the definitions of organizational culture, leadership styles, individual learning orientation, creativity, innovative work behavior, and task performance rely on the appropriate definitions of scholars.

Self-Efficacy: Self-efficacy refers to the perceptions of software developers on their own capability to successfully accomplish tasks or achieve specific goals, thereby bolstering their confidence in their ability to attain those objectives.

Software Developers: Software developers refer to all software development team members, including product owners, project managers, user experience (UX) designers/user interface (UI) designers, business analyst, software developers, team lead /tech lead, and scrum master.

Software Development Companies: In this study, software development companies are defined as organizations that specialize in creating, designing, and programming software solutions for diverse industries and clients, and they prioritize the implementation of systematic training and enablement programs.

Organizational Culture: Organizational culture refers to the appropriate way of promoting teamwork, fostering organizational learning, and cultivating change to encourage self-efficacy, adaptability, and innovation within software development companies.

Leadership Styles: The term leadership style in this study refers to the ways in which individuals approach leadership and decision-making in immediate leadership positions within software development team, such as transactional, transformational, and ambidextrous styles. It can be analyzed by examining their behaviors and approaches in team member interactions.

Individual Learning Orientation: It refers to the natural tendency of software development team members to actively seek and acquire knowledge and skills for creating new products or software, fostering continuous learning, and cultivating a sense of competence in their professional endeavors.

Creativity: Creativity is the generation of new and useful ideas that is an important component of innovative behavior.

Innovative Work Behavior: Innovative work behavior pertains to actions that specifically involve the promotion and implementation of creative ideas within a software development context.

Task Performance: The present study focuses on task performance of software developers, encompassing a wide range from individual contributions and team dynamics to organizational development through proficiency, adaptivity, and proactive task performance.

For this study, a theoretical foundation is established through a literature review. Afterward, a conceptual framework is constructed using the knowledge obtained from this review. This framework acts as a guiding tool for the next chapters. It applies the insights to the context of selected software development companies, enabling an investigation into the individual and organizational factors that affect the self-efficacy of software developers.

# CHAPTER 3

# BACKGROUND OF SOFTWARE DEVELOPMNET COMPANIES IN YANGON

This chapter begins with the description of software industry in Myanmar. It also provides an overview of software development companies in Yangon. Additionally, the chapter presents insights from team leader interviews on factors that influence the self-efficacy of software developers, including organizational culture, leadership styles, and individual learning orientation, within the selected software development companies.

## 3.1 Software Industry in Myanmar

In Myanmar, the market for computer technology has grown since 1988, and as ICT has advanced and shaped the country, more private computer training facilities and computer selling shops have increasingly opened (Aye, 2012). The software industry has also changed, according to the USAID (2016), from traditional computer-based platforms to network-based online platforms.

According to Nam et al. (2015), Myanmar has the ability to build a strong ICT sector, increase productivity, and become more competitive on the international stage, although it is still in the early phases of ICT development. They identify software development and training as the main forces behind ICT development in Myanmar. Although the hardware sector is primarily reliant on trading and assembly rather than large production, private enterprises are actively developing their software development and hardware sales operations. Local software creation is the main focus of the software sector, while some businesses also work with overseas partners on outsourcing projects.

The Myanmar Computer Federation (MCF) and its three member associations- the Myanmar Computer Professionals Association (MCPA), the Myanmar Computer

Industry Association (MCIA), and the Myanmar Computer Enthusiasts Association (MCEA)-drive towards the development of a modern, advanced country through ICT initiatives and by raising ICT awareness. These organizations prioritize ICT development within Myanmar. They do this through activities such as providing training, developing educational curricula, offering accreditation programs, encouraging the production of quality computer hardware and software, supporting research efforts, facilitating international collaboration and networking, cultivating computer literacy, and recognizing outstanding computer scientists and their contributions (Oo & Than, 2010).

With the development of ICT, the software industry in Myanmar is growing significantly in importance. The finance sector in Myanmar is an early adoption of software, with banks setting up secure systems, according to British Chamber of Commerce Myanmar-BCCM (2016). Larger companies, including major airlines with online reservation platforms, are the only ones in the trading and tourism industries using IT. Industries including manufacturing, healthcare, education, and agriculture employ very little, if any, software. The diverse industries of the country are predicted to grow and necessitate more advanced solutions, from custom-made apps to licensed comprehensive systems, which will increase demand for complex applications (BCCM, 2016).

In order to demonstrate its commitment to internet growth, Myanmar has established public access centers, computer universities, government fiber networks, e-government initiatives, Yatanarpon Cyber City, and localization efforts for a knowledge-based economy (ITU, 2012). The ICT master plan of the government purposes to utilize IT for worldwide corporate penetration and widespread commercial applications to increase productivity. (Lau et al., 2013). Despite the great enthusiasm for technology, its access is still limited in Myanmar. Compared to that in neighboring countries, the size of the software industry in Myanmar is quite small. According to Nam et al. (2015), in Myanmar, ICT industry is still in stages of development and contributes very little to the GDP of the nation in terms of hardware sales, software creation, and ICT market.

The ICT sector has the potential to propel economic growth in Myanmar, despite the current insignificant contribution of the software industry to overall global trade and employment. The three most well-liked ICT enterprises in the nation are

system integration, hardware sales, and software development and training. According to Nam et al. (2015), the software industry, which makes up more than 50% of all ICT enterprises, would be the main immediate force behind ICT development in Myanmar. Therefore, in the software development context, adequate attention should be given to the role of open standards, open innovation and free and open-source software whenever it offers a competitive solution. Through learning about and modifying software, users can become knowledge creators instead of just being passive consumers of proprietary technologies.

Software development is valuable in many industries since businesses are increasingly dependent on digital technology to operate. Additionally, it is critical to value employee innovative thinking and a certain amount of literacy in software development. Thus, in order to get a competitive edge, software developers must improve their creative work habits and task execution. However, according to MCF (2013), one of the issues that needs to be addressed is the lack of skilled ICT engineers and software developers. It means that finding individuals who excel in managing upstream ICT processes, such as systems designs, is quite rare. The software sector in Myanmar is still substantially undeveloped, which presents potential for businesses to participate in this space, according to a 2011 final report of the follow-up project of the establishment of ICT master plan in Myanmar, supported by the Korea International Cooperation Agency. With the market being underdeveloped, there is room for early movers to gain a competitive advantage in this sector. Therefore, to facilitate growth and expansion in this sector, software companies need to focus on developing creative thinking skills of employees, enriching their understanding of ICT and software development techniques, encouraging innovative work practices, and improving task performance.

## 3.2 An Overview of Selected Software Development Companies

This section describes the context of selected software development companies and the roles of software developers in software companies. The information presented is derived from the interviews conducted with the responsible persons from software development companies, including software team leaders and team members of respective organizations.

### 3.2.1 Context of Selected Software Development Companies

In 2022, there are 62 registered software development companies in Yangon (MCIA, 2022). In this study, four companies; ACE Data Systems Co., Ltd, Myanmar Information Technology Pte. Ltd (MIT), Innovative Global Wave Technology Co., Ltd. (IGWT), and Seattle Consulting Myanmar Co., Ltd. (SCM) are used as the sample companies. The information about these four companies is gathered through interviews conducted with team leaders and information offered in their websites.

**(1) ACE Data Systems Co., Ltd**

In 1992, ACE Data Systems Co., Ltd. was established as a small software company and IT training facility. ACE employed 175 people in total in 2022, of whom 145 were software developers. In 1993, ACE Data Systems Co., Ltd. (ACE), a pioneer in the software sector, introduced the first computerized accounting system in Myanmar. Following this, ACE launched a number of software solutions for the manufacturing, retail, and distribution, banking and finance, hotel, and tourist and hospitality sectors, and it went on to become one of the well-known Myanmar software development and system integration firms.

ACE has not only been a pioneer in the Myanmar software industry, but also played a pivotal role in promoting Myanmar as one of the new frontiers for global IT outsourcing destinations. In order to effectively promote their outsourcing services, ACE Japan Ltd. (ACE Japan) was established in Japan in 2013, marking the first investment by a Myanmar national IT company in the Japanese IT sector. Benefitting from strong synergy among its group companies, which mutually enhance one another, ACE is strategically positioned to contribute to the establishment of IT infrastructure and the implementation of cybersecurity measures undertaken by numerous organizations.

As a component of their internal system development or worldwide delivery network, ACE offers software development center services to major international corporations. A substantial pool of human resources is being produced and deployed throughout the course of medium-to long-term plans with regular training and enablement programs. ACE is assisting partners in cutting costs associated with internal system development or their worldwide distribution network by collaborating directly with them. In addition, ACE Data Systems Co., Ltd. offers server integration, network

integration, cyber security services and solutions, internet infrastructure, and consultation on IT infrastructure construction initiatives.

Given the economic development of Myanmar and its increasing internet and mobile penetration, ACE has been assisting companies in launching their digital channels through web and mobile innovations. In the upcoming years, ACE plans to introduce a range of e-commerce services to help Myanmar enter and stay in the internet era. ACE has developed software development, business process engineering, and project management procedures after more than 28 years of experience. By taking advantage of this, ACE provides specialized system development services across many technological platforms to a range of local and global companies.

**(2) Myanmar Information Technology Pte. Ltd (MIT)**

In order to advance the ICT sector in Myanmar, Myanmar Information Technology (MIT) was established in 1997. Since then, by utilizing incredibly cutting-edge technologies to deliver dependable strategic ICT Solutions and Services, MIT has emerged as a top software company in Myanmar. Of the 350 people that worked at MIT in 2022, 180 were software developers. Through strategic alliances with top global technology companies and the application of their subject and business experience, MIT offers an extensive array of end-to-end IT solutions. MIT established strategic partnerships with top players in the market, including System Analysis Program Development, Microsoft, and Oracle, to provide clients cutting-edge technologies, best practices, and innovative solutions. This strategic partnership grants MIT the distinction of being the sole company in Myanmar which has Platinum and Gold Partner status with three leading global software giants.

The majority of the software market share in Myanmar is held by MIT, particularly in the government, banking, retail, and enterprise systems industries. In the case of developing software and offering cutting-edge, safe, and secure technologies, MIT offers a full range of integrated core banking solutions that are driven by the newest technologies, service-oriented architecture (SOA), and open standards in the digital age. Likewise, MIT provides a wide range of retail solutions, including single-store and multi-channel storefront options, to assist the retail sector run more smoothly. These solutions range from enhanced customer satisfaction to improved supplier and stock management. Retail stores may become considerably more proficient at

identifying customer demand and responding quickly due to integration with SAP (Systems, Applications, and Products)-a widely used enterprise resource planning (ERP). SAP guarantees that customer, order, vendor, inventory, and financial data is always up to current. MIT also provides point of sale (POS) systems for supermarkets, retail establishments, department stores, and restaurants. In addition, software is supplied by MIT to the following industries: factories, retail stores, hotels, hospitals, schools, and logistics.

**(3) Innovative Global Wave Technology Co., Ltd. (IGWT)**

Innovative Global Wave Technologies, which was established in 2005, employs more than 100 IT specialists and offers software development, outsourcing, and consulting services. In many industries, it has been providing government, and the small and medium-sized enterprises (SMEs) with solutions and services for more than ten years. In 2022, IGWT employed 130 people, of whom 105 worked exclusively on software development projects. For businesses locally and internationally (including in the US, UK, and Singapore), IGWT has successfully completed more than 250 outsourced projects. With cutting-edge technology, IGWT has been concentrating in creating software solutions that are practical, affordable, and satisfy customers. For small to large scale enterprises, IGWT develops cutting edge software and solutions that automate daily operations and improve productivity. Among the software solutions produced by IGWT are human resources (HR) filing management systems, payroll HR software, time attendance applications, and POS applications.

IGWT has also produced hundreds of high-quality, reasonably priced software solutions for a variety of markets and sectors, such as e-government, retail, manufacturing, community services, consumer and commercial software development, and many more. In order to give practitioners, researchers, educational leaders, and policymakers a worldwide platform, it offers conference management systems. A system of online professional learning communities is offered to enhance understanding of practice and professional learning communities. Additionally, a web-based restaurant administration system is provided by the online reservation system, which also manages restaurant reservations for different clientele and collects data for future marketing campaigns. In order to make the recording, retrieval, analysis, and exchange of complaint information simple, IGWT has also provided a complaint information system. A noteworthy achievement of IGWT was the development of a

Global Positioning System (GPS) vessel monitoring system that can keep an eye on anchoring ships within a designated alarm region and prevent harm to nearby objects. In terms of utilizing automated fingerprint identification systems, it aids businesses in gathering, storing, and analyzing fingerprint data.

**(4) Seattle Consulting Myanmar Co., Ltd. (SCM)**

Seattle Consulting Myanmar Co., Ltd. (SCM) is one of the top Japan offshore companies in Myanmar. It was established in 2014. There were 200 people working for the SCM in 2022, 180 of whom were software engineers. It has implemented and provided businesses in Japan with specialized software development, website and mobile application development, domain registration and hosting, package software, and business process outsourcing services. For every project, SCM adheres to the International Standard Software Quality Assurance (SQA) protocols. In terms of web application development, SCM provides custom application development services to create solutions that use the newest technology available and can be scaled under the demands of company.

In addition, it provides maintenance and support to guarantee reliable operation and ongoing relevance. Additionally, it delivers a wide range of domains, including those for hotel management, factory management, travel and tour, school, insurance, property, and other domains. Moreover, businesses can create business-critical mobile applications with the assistance of the skilled SCM mobile app developers. They also assist with app ideation, maintenance, and launch for the Google Play Store and Apple Store. In addition to designing, developing, testing, and delivering responsive, well-formatted websites, it offers one-stop website development services. Moreover, it provides the Football Tracking service, service of identifying the players, the referee, the reserve, the ball, etc in the Video File and labeling services and tagging services for table tennis, football, and basketball match.

### 3.2.2 The Roles of Software Developers in Software Companies

In the context of this study, software developers are referred to as all the members of the software development team. For software development, the team members must possess a variety of skills. These skills encompass technical practices like programming, system analysis, and testing; managerial practices such as coaching

and collaborating with stakeholders; and human practices like teamwork and reflection. Within software teams, there are various roles with titles such as product owners, project managers, UX/UI designers, business analysts, team leads/tech leads, scrum masters, software support team members, technical specialists, and any other individuals who contribute to software development. These roles are interconnected through their distinct responsibilities and contributions.

Specifically, technical specialists, UX/UI designers, and software support team members primarily fulfill technical roles by providing technical guidance, designing intuitive and visually appealing software interfaces, and offering continuous support to end-users. On the other hand, product owners, project managers, and team leads/tech leads are involved in managerial roles within the development team. They ensure the development of the right product, coordinate team efforts, provide mentorship, and ensure adherence to best practices. Furthermore, business analysts and scrum masters often fulfill human roles by gathering and analyzing requirements, ensuring alignment with business objectives, facilitating the agile development process, and ensuring adherence to Scrum practices.

When considering the responsibilities of a role, team members are often expected to handle certain duties that may arise unexpectedly or irregularly. People in the role are responsible for addressing tasks as they come up. These tasks are typically not part of their regular or defined responsibilities, but they are necessary to address specific situations or needs that arise in their work. For example, a project manager has a set of defined responsibilities such as planning and coordinating project activities, managing budgets, and ensuring deadlines are met. In addition to these regular duties, the project manager may also be expected to handle ad hoc tasks, such as resolving conflicts among team members, addressing unexpected issues that arise during the project, or responding to urgent client requests that fall outside the usual scope of their responsibilities. However, when describing the responsibilities of role holders in terms of tasks and activities, they often only relate to their specific phase in the project, such as code development. During other phases, they are aware of what is going on but not directly responsible.

According to the information obtained from interviews and archival company data, qualifications and talents of software developers are critical to the process of developing software. Since a strong educational background is essential to their job

responsibilities, software development organizations typically need its software developers to obtain a suitable IT degree, especially a Bachelor's or Master's degree in Computer Science. In addition to academic qualifications, practical expertise in new development areas is considered essential as per the job specification. Chosen candidates must possess the capability to execute software development tasks. Additionally, software developers need to have a foundation in programming languages, as well as strong database administration, web development, and algorithmic reasoning abilities. Their abilities allow them to design scalable and effective solutions. Software developers should also understand software architecture and security considerations. According to information provided by companies, they prioritize the recruitment of young individuals who represent the backbone of their success. These companies recognize the value of young, energetic, and innovative employees in driving their progress. Therefore, they have provided comprehensive IT training programs to cultivate a pool of skilled IT engineers and qualified software developers, leading to significant contributions to the IT industry.

Soft skills like teamwork and ongoing learning are just as important as technical proficiency. Effectively communicating workable and efficient business solutions to functional as well as technical teams requires strong interpersonal and communication abilities. Software developers are also expected to be well-mannered, to work well in teams, to be highly motivated and have good work ethics, and to be willing to put in extra hours when needed. Every member of a software development team makes use of their individual areas of expertise to increase output and provide outstanding results. For instance, core developers write code and create software while collaborating with others to accomplish goals, complete specifications, and meet organizational needs. For the project to be successful, an efficient team is essential to smooth planning, execution, and timely delivery within the constraints of scope, budget, and quality requirements.

Team members need to constantly upgrade their abilities to stay up to speed with the latest technological developments in software development. In order to promote continuous learning at the individual and organizational levels, companies provide their employees a variety of programs targeted at improving their abilities. These include pre-training sessions, ongoing training, and brainstorming sessions. Team-building training sessions also promote cooperation and collaborative growth.

## 3.3 Organizational Culture, Leadership and Learning in Selected Software Development Companies

In this study, interviews were used to analyze three characteristics that are the antecedents of self-efficacy of software developers: corporate culture, leadership styles, and individual learning orientation. Zoom interviews were conducted with software team leaders from particular software development companies in Yangon. Furthermore, some collected data was made available on their website.

### (1) Organizational Culture of the Selected Companies

The team leaders defined organizational learning, fostering change, and collaboration as the three main components of organizational culture during the interviews.

According to participants, ACE exemplifies good team communication by emphasizing team development, sharing ideas, and transferring information. It values teamwork and acknowledges that team structures should be flexible to accommodate the demands and constraints of projects. Even if the number of team members may vary, it is advised to keep the number between 5 and 8 in order to guarantee that a variety of viewpoints, levels of competence and efficient communication are included. In addition, team members at the organization work closely together to choose the right person for each project. Furthermore, ACE leverages organizational learning to help team members further their professional development while also identifying the underlying problems and developing alternatives. Offering “the right functionality” and “the right quality” is another way that ACE promotes creating change. Because of the company culture, employees may accomplish their professional and personal goals in a supportive and stimulating work environment. ACE makes sure that applicants are aware of its goals and vision from the outset of the hiring process in order for them to exemplify this culture. Upon analyzing the organizational culture, it has been discovered that the ACE company fosters collaboration, encourages knowledge sharing, and places emphasis on change to drive innovation.

The leaders of MIT software teams highlight the value of trust and collaboration for the success of their business. To provide feedback, organize work, and promote organizational learning in software development, they make use of trust and communication within the team. MIT accomplishes this by offering brief but pertinent information segments for on-the-job training. MIT drives continual innovation to

improve its company and bring about revolutionary change by embracing multiple perspectives and utilizing the functionality of its software platforms. Consequently, strong engineering technologies, products, services, platforms, solutions, and systems, as well as agility, efficiency, high performance, sustainable growth, and governance, are made possible by the successful culture at MIT. In order to preserve a productive culture, the HR division monitors employee skill metrics to predict future training requirements and provide guidance for recruitment decisions.

As a team leader, IGWT examines their experiences with the software development process. Team leaders assert that members are driven to uphold the team spirit and that teams are capable of managing the interdependencies of skills and knowledge. The software development team recognizes that the environment is changing, seizes the chance to adapt, and reduces the risks that accompany change. Team members can therefore develop cutting-edge software and applications for small and large businesses. As a result of their mutual influence and primary focus on developing apps that streamline the daily operations of an organization and make life easier, all organizational components are also interrelated. Furthermore, by imparting their expertise to their peers, the members of the IGWT team are able to acquire and comprehend the material properly. The organizational learning, teamwork, and creating change are the cornerstones of IGWT culture, according to an analysis of the organizational culture.

According to the information provided by SCM, it can assemble the most skilled team of IT engineers, deliver excellent and affordable solutions, create beneficial IT products for society, and cultivate enduring bonds with partners and clients. In the workplace, everyone in the team is aligned on purpose, values, behaviors, and working practices. Team members are driven to work as a respectful and cooperative member of the team. SCM is interested in the creation of new information or understandings that might affect behavior. Additionally, recognizing diversity is highly valued in SCM. Their active efforts aim to establish a welcoming workplace for people of all faiths and ethnicities. A learning platform and ongoing training are two other ways that SCM actively adopts the newest IT innovations and helps team members to advance their skills. An innovative and self-challenging culture is also fostered by regular feedback and praise. According to the analysis, SCM company cultivates a culture that prioritizes change and innovation. This is achieved through the collective

contributions of both team members and organizational members, as well as by promoting organizational learning.

By conducting interviews with team leaders and gathering information from their respective company websites, it is apparent that the workplaces in their organizations cultivate a friendly and inviting atmosphere that prioritizes teamwork, continuous learning, and the capacity to initiate change.

**(2) Leadership Styles of Team Leaders**

Regarding leadership styles, the team leaders gave an explanation of their leadership philosophies, including how they delegate, manage deadlines, and guide their team. Team leaders have the responsibility for team performance because, as they have stated, their motivation and the contentment of their teammates have a significant impact on the success of a working team.

ACE Data Systems Co., Ltd utilizes the two methods for software development projects: waterfall and agile. During interviews, the team leaders at ACE Data Systems Co., Ltd explain the criteria for choosing between these two approaches. The waterfall method is used when the requirements are precise and unchanging, the product description is steady, and the technology is well-understood. This strategy focuses on defining errors and upholding standards by giving precise directions and objectives. In a waterfall setting, leaders also evaluate the needs, capabilities, and goals of each individual while building teams in order to accomplish project objectives. However, when requirements and results change during iterations, agile is used. Team leaders first establish the requirements before moving forward in iterative cycles with designing, developing, testing, and delivering. By eliminating roadblocks and arranging meetings, they actively assist the team. In addition to encouraging shared leadership, agile has a track record of successfully resolving challenging issues. Moreover, it offers prospects for personal growth by promoting feedback seeking, pinpointing fundamental abilities, and learning new abilities.

At MIT, team leaders are essential in promoting efficient communication between team members, supporting multi-faceted problem-solving, and making sure standards are fulfilled. A hierarchical structure with well-defined roles gives the project manager more control over decision-making and project operations, especially in projects that use the waterfall methodology. A rigorous and top-down approach is what

defines leadership in a waterfall context. Furthermore, encouraging autonomy and developing an environment of open information sharing are crucial to meeting the always changing requirements of a software product. Team members cooperate and exchange viewpoints to accomplish shared objectives in agile software development methodologies like Scrum. Teams use the knowledge at their disposal to build features and go through each stage of the product development process gradually over the course of sprints. Team leaders in these situations concentrate on giving teams the freedom to decide for themselves and find their own solutions to problems. With this strategy, team members can flexibly prioritize tasks and customize procedures to suit their needs.

The IGWT team leader stated that the team fostered an environment that encouraged new and improved ideas and proposals by emphasizing the productive channels of communication between team members and team leaders. The open and transparent communication flow helps the business expand. Within the software team, both leaders and members collaborate, prioritizing collective skills rather than individual capabilities. This method makes sure that work is done in a team environment and encourages members to stand by principles like honesty, integrity, openness, and transparency. Leaders at IGWT are also committed to setting clear objectives and rewarding success. Together with these, they promote teamwork, vision sharing, and coordination in order to accomplish shared goals. They also establish a climate in which team members are free to voice their ideas to one another. Also, they actively promote creativity and innovation by welcoming the chance to learn from mistakes, investigating new ideas, and cultivating an environment of ongoing experimentation and learning.

Regarding team leadership style practiced at SCM, a team leader discusses their experiences leading the team. A project leader disclosed that leading a software development team necessitates striking the ideal mix of emotional intelligence and technical know-how while maintaining an eye on the wider picture. Together with their team members, the team leaders set clear, measurable objectives and make sure that everyone on the team receives the promised reward for achieving the goals. They also trade promises of rewards for the effort of each worker. Alternatively, in order to foster the creativity of team members, the team leader provides opportunities for autonomous thought and action, promotes error learning, and encourages team members to maintain an open mind.

According to the gathered information from interviews and the website of each company, it is evident that team leaders place a high priority on delivering clear expectations, accomplishing objectives, rewarding employees, upholding performance standards, and providing direction for waterfall projects. Furthermore, they prioritize the effective utilization of resources and processes to improve operations and maximum performance, in order to adjust to dynamic circumstances when conducting agile projects. They also support taking risks, learning new skills, and developing new abilities by promoting experimentation, innovation, and the quest of new chances. As a result, these leadership styles can be categorized as transactional leadership style and ambidextrous leadership style, which include transformational and transactional aspects.

**(3) Learning Orientation of Software Developers**

Team leaders have described the enthusiasm of their members for learning about the latest advancements, discoveries, and industry changes while characterizing the learning orientation of their team members.

Team members understand how important it is to study in order to fully comprehend the needs of their consumers, according to the ACE team leader who took part in the interview. By being hands-on and actively participating in tasks, the team leader actively facilitates the understanding of topics by the software development team. The software team is also given the chance to gain knowledge by watching knowledgeable and experienced people as they perform a variety of software development tasks, such as testing and programming. In order to promote the seamless execution of new projects, team leaders assign tasks to team members and provide training to ensure the tasks can be accomplished effectively. Team members are also urged to study related project documentation, provide current materials, and actively participate in weekly project meetings in order to keep informed. These gatherings provide forums for conversation, idea generation, and problem-solving. Team members are also encouraged to reflect on their own achievements and limitations and visualize themselves carrying out the necessary tasks even if they are not carried out physically.

The leader of the software development team at MIT also discussed the concept of individual learning orientation and how acquiring complicated skills is a result of both performance and observation. In fact, software team members first observe others

explain and demonstrate skills. After that they engage in much practice and receive corrective feedback from instructors. Team leaders often encourage pair programming and code reviews, where individuals work together on coding tasks. Through pair programming, less experienced developers can learn from more experienced ones by observing their coding techniques, problem-solving strategies, and best practices. Code reviews provide opportunities for individuals to learn from the feedback and suggestions provided by their peers. According to the team leader, team members learn new, complicated behavioral patterns through firsthand experience, reflecting on and assessing the effects of their actions. The MIT adopt project-based learning practices to facilitate enactive learning. Team members are assigned to projects or tasks that require them to apply their knowledge and skills to solve practical problems.

As stated by the IGWT team leader, the members of the software team improve their knowledge and abilities in terms of learning by doing and feeling the results of their activities. According to the available information, the company employs simulations and virtual environments to offer immersive learning experiences. These resources generate lifelike scenarios that enable team members to participate in virtual tasks and acquire practical expertise within a managed environment. A case in point is how software developers within the company utilize virtual environments to replicate the process of deploying and maintaining intricate systems. IGWT has mentoring and coaching programs to promote vicarious learning. Experienced professionals act as mentors, offering guidance, support, and knowledge transfer to those with less experience. Through mentoring relationships, team members have the opportunity to learn from the experiences of their mentors, gain insights into the industry, imitate role models to retain information, and receive personalized advice.

The SCM company team members acquire the necessary knowledge and skills to effectively accomplish tasks. Similar to enactive learning, they proactively engage in actions with the aim of achieving desired outcomes. By actively experiencing and mastering tasks, they observe the consequences and extract valuable information to assess their own abilities. In the field of IT, enactive learning frequently entails prototyping and experimentation. Team members are motivated to generate prototypes, explore ideas, and continuously refine their solutions. This iterative approach enables them to learn from errors, enhance their expertise, and acquire practical insights into the practical aspects of IT development. On the other hand, to achieve a desired outcome,

they also observe others perform a task, retain the information intended to be learned, and learn the theoretical knowledge of how to solve a problem. By observing, individuals often acquire certain elements of a complex skill and subsequently engage in practice. The company regularly fosters shared professional interests and goals. These practices function as avenues for interaction, collaboration, and mutual learning, allowing individuals to tap into a vast reservoir of collective knowledge, exchange valuable experiences, and remain up to date with the latest trends and practices in the software industry.

Based on the information acquired from the chosen companies, it can be assumed that members of software teams cultivate a mindset centered on learning through active engagement in tasks, observation of the actions of their peers, and the acquisition of enactive experience.

From this chapter, it becomes evident that Myanmar software industry is encountered a range of challenges. It is well-known that there is a shortage of creative software developers and skilled professionals in the field, as well as an underdeveloped software market. An investigation of software development companies provided insights into their organizational culture, leadership styles, and learning methods. It was observed that team members require diverse roles and skills for successful project execution. The next chapter outlines the research methodology utilized to examine whether antecedents can influence self-efficacy, which in turn can promote creativity, innovative work behavior, and task performance.

# CHAPTER 4

# RESEARCH METHODOLOGY

This chapter introduces the research design employed in the study, followed by a discussion of the target population of the study and the procedures for sampling, including an explanation of the sample size determination. Additionally, it explores the preliminary pilot study, the development of the research questionnaire, and reliability and validity of the questionnaire. Furthermore, it outlines the precise methods employed during data collection. Moreover, the chosen data analysis methodology is outlined, accompanied by an explanation of the fundamental assumptions that underlie the application of multiple linear regression (MLR) in the study. Lastly, the chapter outlines the approach to mediation analysis.

## 4.1 Research Design

This study is designed based on a quantitative approach. The main focus of this study is to examine the relationships among the variables that have been tested in previous literature and to determine whether these existing relationships are consistent in the Myanmar context of software development companies. A quantitative approach is generally used to test the existing theories by examining the relationships among the variables which are assessed using specific research instruments such as questionnaire (Creswell, 2014). Online survey as a method was used to gather data using questionnaires for the purpose of this study (Sue & Ritter, 2007).

In surveys, generally, data is collected at a particular point in time for the purpose of describing the nature of current conditions, or investigating the relationships among specific events (Cohen et al., 2007). This approach is known as a cross-sectional design to produce a “snapshot of a population at a particular point in time” (p. 213). This analysis enabled the researcher to determine the degree of association among dependent and independent variables (Creswell, 2014). In addition, the survey was pre-tested by pilot method. Multiple regression was employed in order to determine the

relationships among the variables. It is a comprehensive statistical approach to analyze the relationships among observed variables (Adams et al., 2014). Following Hayes's (2013) guidance, the PROCESS macro was used to examine the mediation effect of creativity on the relationship between self-efficacy and innovative work behavior. Data analysis was conducted using Statistical Package for the Social Sciences (SPSS).

## 4.2 Sample Size and Sampling Procedure

According to MCIA data, 62 software development companies are registered in Yangon Region Computer Industry Association in 2022. From these registered companies, two companies closed up their companies and suspended the sales of software products. Therefore, for data analysis, out of 60 registered software development companies, four large software development companies with over 100 software developers were specifically selected based on their clear organizational structure and the date of their establishment. Based on the data from MCIA, there were 610 software developers who were working at the selected 4 companies in 2022. To define the sample size, the formula developed by Yamane (1967) with 95% confidence level was applied.

$$n = \frac{N}{1 + N(e)^2}$$

In this formula, the sampling deviation (e) is assumed as 0.05 (95% of level of precision).

$$n = \frac{610}{1 + 610\ (0.05)^2} = 241.58 \approx 242$$

Thus, the sample size is 242 software developers which represents about 40% of the total software developers in the selected companies. The resulting 242 respondents were allocated proportionately to each software development company. Sample size allocation of selected software development companies is shown in Table (4.1).

**Table (4.1) Sample Size Allocation of Selected Software Development Companies**

| No. | Name of Selected Software Development Companies | Total Software Developers | Sample Size |
|---|---|---|---|
| 1. | ACE Data Systems Co., Ltd | 145 | 58 |
| 2. | Myanmar Information Technology Pte. Ltd | 180 | 71 |
| 3. | Innovative Global Wave Technology Co., Ltd. | 105 | 42 |
| 4. | Seattle Consulting Myanmar Co., Ltd. | 180 | 71 |
| **Total** | | **610** | **242** |

Source: Own Compilation (2023)

The 242 respondents were identified by employing a random number generator. Subsequently, the list of selected respondents was sent to respective software companies via email in order to request selected respondents to participate in the survey. This approach enhanced the statistical validity and reliability of the results of the study.

## 4.3 Pilot Study

It is important that pilot survey is conducted before the actual survey is carried out (Adams et al., 2014). This is done to ensure that the questionnaire is clear to respondents and to avoid ambiguous usages. According to Kothari (2004), it is always advisable to conduct 'pilot study' (Pilot Survey) for testing the questionnaires. Such a survey, being conducted by experts, brings to the light the weaknesses (if any) of the questionnaires and also of the survey techniques. From the experience gained in this way, improvement can be effected.

In this study, a pilot study for testing the questionnaire had been conduced on 15 respondents from ACE Data Systems Co., Ltd and Myanmar Information Technology Pte. Ltd to examine the potential problems with research. Questionnaire to be used must be prepared very carefully so that it may prove to be effective in collecting the relevant information (Kothari, 2004). The efficacy of questionaries was evaluated based on the results of the pilot test, and minor changes were made to the wordings of some questions, for example, item No. 8 in self-efficacy and item No. 10 in creativity. The modified version of the questionnaire items was used in the full survey. The final version of questionaries utilized in this study is presented in Appendix-A.

## 4.4 Research Instrument

In terms of constructing questions, it is important to consider the structure of the questions and the types of response formats for each question (Siniscalco & Auriat, 2005) as well as to obtain "a true scale for the measurement" (Likert, 1932). In attempting to measure the opinion of respondents, Likert proposed "method of summated rating" or "the Likert method", e.g. the strongly disagree-strongly agree continuum (Punch & Oancea, 2014). In this survey, the Likert summated rating procedure was chosen to use to foresee understanding of the survey participants.

Before developing instruments/questionnaires, on 30 September 2022, a conversation with an Executive Director of the Myanmar Computer Federation (MCF) was conducted to check a rough draft of the questionnaire, to gain acceptance and assess from the expert, and to understand the context of software development companies. By using expert judgment and comments, the questionnaire (first version) was modified by removing some question items which were ambiguous and unnecessary to be included in final version.

Questionnaire was structured into three sections. Section (A) includes personal and professional background information of software developers. Section (B) explores the three antecedents factors of the self-efficacy of software developers: organizational culture, leadership styles, and individual learning orientation. Section (C) measures the levels of the self-efficacy, creativity, innovative work behavior and task performance of software developers at the selected companies in Yangon. The questionnaires are shown in Appendix-A. Table (4.2) displays the variables, the number of items in each variable and adapted source for each variable involved in the questionnaire.

**Table (4.2) The Development of the Items in the Questionnaire**

| Variables | Number of Items | Adopted and Adapted Sources |
|---|---|---|
| Teamwork | 5 | Denison et al. (2006) |
| Organizational Learning | 5 | Denison et al. (2006) |
| Creating Change | 5 | Denison et al. (2006) |
| Transactional Leadership | 5 | Podsakoff et al. (1990); Mejia-Trejo et al. (2013); Tung (2016) |
| Transformational Leadership | 5 | García-Morales et al. (2008); Mejia-Trejo et al. (2013); Tung (2016) |
| Ambidextrous Leadership | 10 | Jansen et al. (2009); Tung (2016) |
| Enactive Learning | 5 | Schunk (2012) |
| Vicarious Learning | 5 | Schunk (2012) |
| Self-Efficacy | 10 | Dörner (2012); Downey and Kher (2015); Sun et al. (2019) |
| Creativity | 10 | Elidemir et al. (2020) |
| Innovative Work Behavior | 10 | Dörner (2012); Elidemir et al. (2020) |
| Task Performance | 15 | Griffin, Neal and Parker (2007) |

Source: Own Compilation (2023)

Table (4.2) displays the independent and dependent variables in this study. Specifically, organizational culture, leadership styles, and individual learning orientation are the antecedent factors that are being examined as independent variables. The dependent variables being measured are self-efficacy, creativity, innovative work behavior, and task performance. Additionally, creativity is being tested as a potential mediator to determine whether it plays a mediating role in the relationship between the antecedent factors and the dependent variables. To measure the variable of interest in this study, each dimension is rate on a five-point Likert scale in the questionnaire to answer the question related to the variable. The five-point Likert scale was chosen to be applied in this study because it is a practical and efficient way to collect data from a large sample of respondents. Additionally, a five-point scale is easy for respondents to understand and complete, while still providing a reasonable level of discrimination between the different levels of agreement or endorsement (Punch & Oancea, 2014).

In this study, organizational culture is measured as three dimensions: teamwork, organizational learning, and creating change. These dimensions are taken from Denison et al.'s (2006) Organizational Culture Survey. To measure organizational culture, a total of 15 items was used, with 5 items allocated to each of the dimensions of teamwork, organizational learning, and creating change.

For the examination of leadership styles, the study adopts transactional, transformational, and ambidextrous leadership styles as dimensions relevant to software development companies. To effectively measure and quantify these styles, the study draws insights from various research sources to develop well-suited questionnaires. Among the selected studies, an influential investigation conducted by Mejia-Trejo et al. (2013) holds prominence, as it concentrates on transactional and transformational leadership styles. This investigation set out to measure the effectiveness of leadership approaches across various industries, including the field of software development. By leveraging their study, the research thoughtfully selected the most appropriate statements associated with transactional and transformational leadership.

Moreover, the study incorporates insights from another scholarly work authored by Tung (2016). This work provides a comprehensive examination of leadership styles, encompassing not only transactional and transformational but also ambidextrous approaches. While the primary emphasis of the study remains on these three styles, the research studied by Tung (2016) contributes a comprehensive understanding of various leadership behaviors. By adapting a questionnaire designed to encompass all three styles, the study achieves a comprehensive grasp of prevailing leadership practices within software development teams. This broader perspective allows for thorough analysis and meaningful comparisons across the diverse spectrum of leadership styles being explored.

For the assessment tools, the study chose 5 items related to transactional leadership and 5 items related to transformational leadership. The selection of these options was developed by the research conducted on transactional leadership (Podsakoff et al., 1990; Mejia-Trejo et al., 2013; Tung, 2016). For transformational leadership, the choices were influenced by the studies conducted by García-Morales et al. (2008) and Tung (2016). In addition, the study included 10 questions about

ambidextrous leadership, and these questions were taken from in the works of Jansen et al. (2009) and Tung (2016).

To measure individual learning orientation, Schunk (2012)'s learning theory is used. Schunk (2012) proposed two learning orientations: enactive learning and vicarious learning. For this study, a questionnaire was developed using Schunk's (2012) learning theory and including 10 items, with items aligned to the two types of learning defined in Schunk's theory.

This study centers around the identifying the more accurate measurement of self-efficacy, drawing inspiration from Dörner (2012) and building upon the research conducted by Downey and Kher (2015) and Sun et al. (2019). It takes the ten statements originally presented by Dörner (2012). Then, it refines them to align with the approach provided by Downey and Kher (2015) as they highlight the crucial role of technology training in preparing students for advanced academic pursuits and successful professional careers, particularly in technology-focused sectors. Therefore, this study adapts these self-efficacy items to investigate the self-efficacy of software developers in the organizational context.

In this study, the mediating variable being investigated is the creativity of software developers, which was operationalized using Elidemir et al.'s (2020) questionnaire items. The decision to use 10 out of the 13 questionnaire items to measure the mediating variable was based on the validity, reliability, and relevance of the items to the research question at hand. This selection process aims to ensure that the measurements accurately represent the construct being studied and provide meaningful insights for the research.

The measurement of innovative work behavior relies on a 10-item scale created by Dörner (2012). The selection of these items was based on their suitability for the research topics under investigation and their relevance to the context of software developers. Ten items pertaining to innovative work behavior were selected from Dörner (2012) and Elidemir et al. (2020).

The task performance of software developers was assessed using a 15-item scale derived from a larger set of 27 items originally developed by Griffin et al. (2007). These specific items were chosen due to their perceived relevance and appropriateness within the context of the study and its research question. The scale aimed to evaluate different

aspects of task performance among software developers at the team and organizational levels.

## 4.5 Reliability and Validity of the Questionnaire

In quantitative research, the issues of reliability and validity of the questionnaire play one of the most significant roles (Bryman, 2012). Reliability and validity are two basic elements to evaluate the quality of measurement instrument (Tavakol & Dennick, 2011). Reliability refers to the extent to which an experiment, test, or any measuring procedure yields the same results on repeated trials, and validity is the extent to which any measuring instrument measures what is intended to measure (Carmines & Zeller, 1979).

In terms of reliability, Cronbach's alpha was used to examine the internal consistency of the instrument in this study (Cronbach, 1951). The Alpha coefficient of reliability provides "a coefficient of inter-item correlations, that is, the correlation of each item with the sum of all the other relevant items" (Cohen et al., 2007, p.148). Alpha values of above 0.70 are reliable and below 0.60 indicates low reliability which is not acceptable. Nunnally (1978) provide the guideline for Alpha coefficient and these ranges are stated below.

> 0.90 Very highly reliable

0.80 – 0.90 Highly reliable

0.70 – 0.79 Reliable

0.60 – 0.69 Marginally/minimally reliable

< 0.60 Unacceptably low reliable

The alpha values of higher than 0.60 are used as the cut-off value for the reliability. The higher Alpha value are assumed as greater reliability. However, Pallant (2001) considered that variables with Cronbach's alpha values near 0.7 are reliable.

In this study, the validity of measurement constructs was assessed using factor analysis (Shrestha, 2021). To determine the suitability of the data set for factor analysis, determinant score, the Kaiser-Meyer-Olkin (KMO) measure, and Bartlett's test of sphericity are tested. As a preliminary step in, the correlation matrix (R-matrix) was examined. The top half of the matrix contained Pearson correlation coefficients

between all pairs of questions, while the bottom half contains the one-tailed significance values of these coefficients. First, significance values above 0.05 are identified, indicating potential issues with individual variables. Additionally, correlation coefficients exceeding 0.9 are scrutinized, as these suggest high correlations between question items. If such high correlations are found, the determinant of the correlation matrix is checked to avoid singularity issues in the data. A determinant value greater than 0.00001 indicates no multicollinearity problem, signifying no autocorrelation between variables (question items). If a problem is detected, eliminating the problematic variables (question items) is necessary.

Following the preliminary analysis, key assessments include KMO measure of sampling adequacy and Bartlett's test of sphericity. The KMO statistic ranges from 0 to 1, with a value of 0 indicating diffuse correlations and suggesting inappropriateness for factor analysis. Conversely, a value close to 1 indicates compact correlation patterns, conducive to distinct and reliable factors. Kaiser (1974) suggests accepting KMO values above 0.5 as adequate. Values below this threshold necessitate either additional data collection or reconsideration of included variables. For factor analysis to be applicable, Bartlett's test should yield a significant result with a value less than 0.05. Significance below 0.05 indicates existing relationships between variables, and the R-matrix is not an identity matrix. The test results in aforementioned stages indicated that the measurement model is viable for proceeding to factor analysis.

## 4.6 Data Collection

To investigate the context of software development companies and roles of software developers, both qualitative (interview) and quantitive (survey) data were collected. Personal interviews were carried out with four team leaders with at least 5 years of work experience in their respective companies. Each leader was contacted beforehand via phone to schedule a meeting at a specific time. Zoom interviews were carried out during March, 2023, and each interview was lasted for 45 minutes. The interviews were recorded and later transcribed. During the interviews, team leaders were asked about various aspects, including how to work collectively as a team, the role of leaders in continuous learning and driving change, Exemplary of successful projects, and the learning style preferences of team members.

To obtain the quantitative data, online survey was conducted to collect data from a randomly selected 242 software developers. The data collection period began on 1st May 2023 and ended on 1st August 2023. The Google form was used for designing and developing online questionnaires. After creating the Google form, the process of distributing to software development companies was initiated. The software development companies were requested via email to distribute the Google form to selected 242 software developers.

## 4.7 Data Analysis Methods

In data analysis, both descriptive and inferential (regression) statistics were applied so as to obtain answers to the research questions. The descriptive statistics were applied to show the demographic factors of the software developers and to assess the mean perceptions of software developers about the measurement variables. SPSS was used for the analysis of data. A series of regression analyses were performed for major findings of this study. The objective of regression is to make a prediction about the dependent variable based on its covariance with all the concerned independent variables. When there are two or more than two independent variables, the analysis concerning relationship is known as multiple correlation, describing such relationship as the multiple regression (Kothari, 2004). In this study, the MLR analysis was conducted to test the prediction that the antecedent factors concerning organizational culture, leadership styles and individual learning orientation affect the self-efficacy of software developers. In addition, simple linear regression analysis was used to investigate the effect of innovative work behavior on task performance of software developers. In accordance with the guideline proposed by Andrew Hayes (Hayes, 2013), the PROCESS macro model 4 for SPSS was used to test the mediation effect of creativity on the relationship between self-efficacy and innovative work behaviour.

## 4.8 Multiple Linear Regression (MLR)

The general form of MLR equation is;

$Y_i = \beta_0 + \beta_1 X_{1i} + ... + \beta_k X_{ki} + \varepsilon_i$

Where:

$Y_i$ = Dependent variable

$X_{1i}, X_{2i}, ..., X_{ki}$ = Independent variables

$\beta_0$ = Intercept

$\beta_i, ..., \beta_k$ = Regression Coefficients

$\varepsilon_i$ = Error Term

In order to apply the MLR method effectively, it is essential to evaluate its underlying assumptions. When conducting a multiple regression analysis, several assumptions must be examined to ensure the reliability and validity of the analysis. The following key assumptions of MLR are assessed:

Assumption (1); Linearity: The assumption is that the relationship between independent variables and the dependent variable is linear.

Assumption (2); Independence of Residuals: Durbin-Watson statistic assesses whether residuals are independent or uncorrelated. The Durbin-Watson statistic can range from 0 to 4. To meet the independence assumption, the optimal value should be near 2. Values below 1 and above 3 are problematic and can potentially invalidate the analysis.

Assumption (3); Constant Residual Variance (Homoscedasticity): Residual variance remains consistent across the model, indicating homoscedasticity, is assessed through the examination of scatter plots. This analysis ensures that residuals exhibit random dispersion rather than a funnel-shaped pattern.

Assumption (4); Absence of Influential Cases (Outliers): This assumption is verified by assessing Cook's distance values. If values are below 1, the assumption is satisfied.

Assumption (5); Normal Distribution of Residuals: This assumption checks if residuals follow a normal distribution. To test it, P-P (Probability-Probability) plots are used. Residuals are considered more normal when the dots on the P-P plot align closely with the diagonal line.

Assumption (6); Multicollinearity: To detect multicollinearity, two approaches are employed. First, if correlations exceed 0.8 in the table, consider removing a variable. Second, Variance Inflation Factors (VIF) are employed to assess the presence of multicollinearity. The analysis revealed that if the VIF values are greater than 5 to 10 and lower than 0.1 to 0.2, multicollinearity exists. If they are below 5, according to Hair et al. (2010), multicollinearity is not a significant concern in this study.

## 4.9 Mediation Analysis

This study follows Hayes's (2013) approach in conducting meditation analysis. This approach is based on the 4-step mediation framework originally developed by Baron and Kenny (1986).

Baron and Kenny (1986) introduced a method for conducting mediation analysis using regression models. This method consists of fitting regression models in four steps, where the significance of coefficients is analyzed at each step. To illustrate the steps, consider the following three variables: X, Y, and M. In this context, X represents the covariate of interest, Y signifies the result, and M stands for the potential mediating variable. The steps in the Baron and Kenny approach are summarized in Table (4.3).

**Table (4.3) The Steps in the Mediation Analysis**

| Step | Tested Path | Regression Equation |
|---|---|---|
| Step 1 | Conduct a simple regression analysis with X predicting Y to test for path *c* alone (Total effect of X on Y). | $Y=B_0+ B_1X+ e$ |
| Step 2 | Conduct a simple regression analysis with X predicting M to test for path *a* (Effect of X on M). | $M=B_0+ B_1X+ e$ |
| Step 3 | Conduct a simple regression analysis with M prediction Y to test for path *b* alone (Effect of M on Y). | $Y=B_0+ B_1X+ e$ |
| Step 4 | Conduct a multiple regression analysis with X and M predicting Y to test for path *c'* (Direct Effect of X on Y). | $Y=B_0+ B_1X+ B_2M+ e$ |

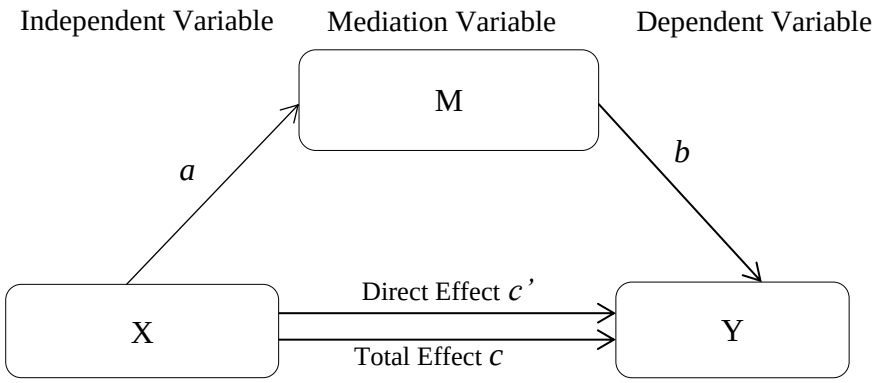
Source: Baron and Kenny (1986)

In Baron and Kenny (1986)'s approach, the relationships among the variables are established in three of 4 steps. If any of these relationships are found to be insignificant, it is suggested that mediation is impossible or unlikely. It is assumed that if significant relationships are established in Step 1 through 3, one should proceed to Step 4. In Step 4, the significance of mediation and its nature are determined by looking at their effects on Y after controlling the independent and mediator variable. If the significant effect of Y is not found when controlling M, the process of mediation is referred to as a full mediation. By contrast, if the significant effect of X is maintained on Y even after introducing M, the resulting mediation is known as a partial mediation.

While the Baron and Kenny approach is well-recognized, there are constraints when testing for mediation (MacKinnon et al., 2007). Firstly, it does not test the significance of the indirect path, representing how X influences Y through the compound pathway of *a* and *b*. The regression coefficient for the indirect effect is determined by the rate of change process between X and Y due to M. Secondly, the Baron and Kenny approach might overlook mediation effects due to the prerequisite of significance for path *c* in Step 1 before engaging in mediation analysis. Recent advancements in mediation analysis have highlighted that significant mediated effects could arise even without a significant association between X and Y, particularly when one of the path coefficients is negative. For these reasons, the Baron and Kenny approach is associated with decreased statistical power (MacKinnon et al., 2007).

Fortunately, there are alternative methods to the Baron and Kenny approach that can overcome these limitations. One of these approaches involves testing for the indirect effect. This process is considered superior to Baron and Kenny's (Hayes, 2013). This process is based on a premise that estimation and evaluation of both direct and indirect paths are needed when investigation of causal paths involving mediators in empirical studies. The primary aim is to comprehend how the independent variable (X) affects the dependent variable (Y), both directly and indirectly through the mediator (M). Direct effects estimation requires an independent investigation of individual components of it. The simple mediation model represented in the form of a statistical diagram can be found in Figure (4.1).

**Figure (4.1) A Statistical Diagram of the Simple Mediation Model**




Source: Hayes (2022)

In this mediation analysis, the examination involves assessing the effect of X on M (path *a*), the effect of M on Y (path *b*), and the effect of X on Y, independent of M, is *c'*. Besides the indirect effects, researchers often estimate the total effect of X on Y (path *c*) as well. The total effect reveals the overall relationship between the independent variable (X) and the dependent variable (Y) without considering the mediation pathway. Despite total effects is not focal interest in mediation analysis, it is a common practice to examine its effect for fuller understanding about the conditions that underneath a mediation.

When conducting mediation analysis, bootstrapping approach was utilized to examine the significance of the mediation effect (Preacher & Hayes, 2004). This method is robust since it considers statistically significant indirect effect by examining distribution of confidence intervals around it (Steffener, 2021). Alternatively, mediation is assessed whether *ab* effect is significant or not. As a general rule, the significant indirect effect should reveal a proper distribution of confidence interval (CI). It is a normative practice to assume the presence of an indirect effect when CIs does not fall into zero (Efron & Tibshirani, 1994). Any CI value that includes zero is considered non-significant indirect effect. Hayes (2013) further advocates that when 95% CI does not fall into zero in a mediation analysis, an occurrence of mediation effect in that particular analysis is warranted.

This chapter presents the research methodology as a valuable tool that serves as a roadmap for conducting a study. It offers guidance for the entire research process, ensuring the attainment of research objectives and addressing research questions. Subsequently, the following chapter focuses on the analysis of the gathered data to

examine the effect of antecedent factors on self-efficacy, the influence of self-efficacy on innovative work behavior, the exploration of the effects of innovative work behavior on task performance, and the evaluation of the mediating role of creativity in the relationship between self-efficacy and innovative work behavior.

CHAPTER 5

# ANALYSIS OF THE STUDY

This chapter examines the effects of contextual variables on task performance of software developers at software development companies in Yangon by using statistical analysis. It begins preliminary analysis by explicating the profile of software developers and then by conducting reliability and validity tests for measurement variables. Next, the multiple linear regression assumptions testing and the results of main analysis are presented with regards to the antecedents of self-efficacy. Finally, it unearths the process how self-efficacy influences the innovative work behavior of software developers via the creativity and, in turn, on task performance.

## 5.1 Demographic Profile of Software Developers

In this section, the profile of the respondents is presented, including important demographic information essential for understanding their characteristics. The demographic factors include gender, age, marital status, education level, current work position, tenure at the current company, previous employment, and the number of team members. Table (5.1) displays the demographic characteristics of 242 software developers in the sample.

Based on the findings from the survey data presented in Table (5.1), it is evident that out of the 242 respondents, 78 (32.2%) are identified as female and 164 (67.8%) are identified as male. The survey results show a higher representation of male respondents compared to females, which could be due to factors such as the trends of males showing more interest in IT skills and pursuing careers in software development. Cultural and societal norms in Myanmar may also play a role in favoring males in technical fields like software development.

**Table (5.1) Profile of Software Developers**

| Characteristics | | No. of Respondents | (%) |
|---|---|---|---|
| Gender | Male | 164 | 67.8 |
| | Female | 78 | 32.2 |
| Age (Years) | < 25 | 89 | 36.8 |
| | 25-35 | 132 | 54.5 |
| | 35-45 | 16 | 6.6 |
| | 45-50 | 5 | 2.1 |
| Marital Status | Single | 184 | 76.0 |
| | Married | 39 | 16.1 |
| | Others (e.g., Divorce/ Widower/ Widow) | 19 | 7.9 |
| Educational Qualification | Undergraduate | 43 | 17.8 |
| | Bachelor's Degree | 156 | 64.5 |
| | Master's Degree | 37 | 15.3 |
| | Others (e.g., IT certifications/ Training/Diploma) | 6 | 2.4 |
| Current Work Position | Software Developers | 145 | 59.9 |
| | Product Owner | 24 | 9.9 |
| | Scrum Master | 24 | 9.9 |
| | UX/UI Designers | 17 | 7.0 |
| | Business Analyst | 16 | 6.6 |
| | Team/Tech Lead | 8 | 3.3 |
| | Project Manager | 4 | 1.7 |
| | Others (e.g., Software Support Team, Development Contributors, Technical Specialists) | 4 | 1.7 |
| Tenure at the Current Company (Years) | < 5 years | 191 | 78.9 |
| | 5-10 years | 36 | 14.9 |
| | ≥ 10 years | 15 | 6.2 |
| Previous Employment | Software Developer | 169 | 69.8 |
| | Project Manager | 8 | 3.3 |
| | Team Lead/Tech Lead | 20 | 8.3 |
| | Research Programmer | 6 | 2.5 |
| | Others (e.g., Software Support Team, Development Contributors, Technical Specialists) | 39 | 16.1 |
| Number of Team Members | Under 5 members | 34 | 14.0 |
| | 5-9 members | 80 | 33.1 |
| | 10-14 members | 90 | 37.2 |
| | 15-19 members | 28 | 11.6 |
| | 20 and above members | 10 | 4.1 |
| **Total** | | **242** | **100** |

Source: Survey Data (2023)

The age distribution of respondents indicated that individuals of different age groups are employed in the software development companies. It shows that the largest portion, representing 132 (54.5%) developers, is aged between 25-35 years. Moreover, 89 (36.8%) developers fall into the aged younger than 25. However, the number of developers aged between 35-45 is relatively small, comprising only 16 (6.6%). Additionally, the age group of 45-50 years accounts for an even smaller representation, with 5 (2.1%) developers. The finding shows that the substantial proportion of software developers is between 25 and 35 years old. It seems that younger people have grown up with technology and are interested in learning about new technologies, which makes them more likely to work in software development. However, people of all ages may be valuable to the software industry. Having a diverse range of ages and experiences can be important for fostering innovation and building well-rounded development teams.

The survey data described valuable information about the marital status of the respondents. Among 242 surveyed respondents, the minority of 19 respondents (7.9%) are categorized as "Other", while only 39 respondents (16.1%) are identified as "Married". In contrast, most respondents (76.0%) fall under the "Single" category, totaling 184 respondents. The data highlighted the prevalence of single individuals in the surveyed group, with a smaller proportion being married. The dominance of the single in software development companies in Myanmar may be due to the demanding nature of the industry, which requires long hours and dedication. Pursuing education and professional development may delay marriage and start a family for software developers. In addition, the flexibility and mobility associated with software development careers may offer the single convenience to pursue job opportunities without any ties or obligations.

The survey data described that the majority of respondents in the surveyed group, 156 (64.5%), hold bachelor's degrees. This indicates that completing at least a bachelor's degree is common among the respondents. Furthermore, 37 (15.3%) have master's degrees, while 6 (2.4%) have other qualifications such as IT courses, training, diplomas, and certificates. Interestingly, 43 (17.8%) possess undergraduate degrees. The prevalence of professionals with bachelor's degrees in the software industry indicated that this level of education has become a standard requirement for employment. This understanding can guide companies in prioritizing candidates with a

bachelor's degree, shape educational policies, and align programs with industry needs for software development jobs.

Among 242 respondents in the survey, the majority 145 (59.9%) are "Software Developers". "Product Owners" and "Scrum Masters" make up 24 (9.9%) each. "UX/UI Designers" represent 17 (7.0%), while "Business Analysts" are 16 (6.6%). Furthermore, 8 (3.3%) individuals occupy the role of "Team Lead/Tech Lead," while 4 (1.7%) serve as "Project Managers." "Others" 4 (1.7%) contribute to various other positions in the software development process, including technical specialists, technical writers, junior team members, support team members, and administrative or clerical staff. These individuals contribute to the overall team effort. In the software development process, software development is a crucial aspect of the overall team effort. Developing and coding software requires specific technical skills, knowledge, and expertise, making software developers essential to the team, and there is typically a greater demand for software developers in comparison to other roles. Therefore, having a larger number of software developers in the team ensures that there are enough resources to manage the workload and meet project deadlines.

Within the selected companies, the distribution of work experience among employees is varied. The majority, accounting for 191 (78.9%), have less than five years of experience. Another notable group, comprising 36 (14.9%), has been with the company for a period ranging from 5 to 10 years. However, a small segment of individuals, totaling 15 (6.2%), have accumulated 10 years or more of service. According to the data, it can be inferred that, the rapid advancements in the software industry in Myanmar, including the introduction of new programming languages, tools, and frameworks, are attracting young professionals, including recent graduates. Consequently, companies actively recruit fresh talent for new ideas and energy. However, the industry faces high turnover due to competition, career growth opportunities, and the desire for new challenges. Thus, experienced employees have more opportunities, leading to a higher turnover rate among them. As a result, there is a higher proportion of employees with fewer years of experience, explaining the smaller percentage with 10 or more years of service. To retain skilled personnel, companies can provide opportunities for career development and progression. Additionally, if a company has recently experienced significant growth, it may have hired more

employees with less experience to meet the demand for software development, leading to a higher concentration of individuals with fewer years of experience.

According to the data, the majority of respondents 169 (69.8%) possessed prior employment as software developers. A small portion 8 (3.3%) worked as project managers, while 20 (8.3%) held positions as team leads or tech leads. A further 6 (2.5%) were employed as research programmers, and 39 (16.1%) had diverse roles such as administrative staff or junior team members. The data are valuable for evaluating backgrounds and skills of employees, aiding in HR decisions and team formation. The data indicate that there is a limited pool of professionals with project management experience, highlighting potential opportunities for leadership and management development within the industry. This information is vital for software organizations to make informed decisions about HR allocation and team composition, ensuring a balance of technical expertise and leadership capabilities within their workforce.

According to the survey data, it was indicated that medium-sized teams of 5-14 members are the most common, highlighting their significance. Conversely, larger teams of 15 or more members are less frequent, while teams with under 5 members are found moderate. This reveals a diverse range of team sizes, with more prevalence of medium-sized teams and less commonality of very large ones. It is clearly shown that medium-sized teams are the most found in various organizations. This emphasizes their importance and effectiveness in decision-making and collaboration. On the other hand, less commonality of larger teams suggests that managing a large group may present challenges. Interestingly, the moderate number of teams consisting of fewer than 5 members indicates that there is a diverse range of team sizes. Therefore, the focus on medium-sized teams and the scarcity of very large ones reflects that the efficiency and effective communication among individuals within teams in the workplace may occur at optimal moderate team size.

## 5.2 Reliability and Validity Testing for Variables

In this study, all variables are assessed using a Likert scale. Subsequently, reliability and validity tests are conducted to ensure the accuracy and reliability of the measurements for each construct. Table (5.2) presents the results of the assessments conducted on the variables.

**Table (5.2) Reliability and Validity Test for Variables**

| Sr. No. | Variables | No. of Items | Reliability | Validity | |
|---|---|---|---|---|---|
| | | | Cronbach's Alpha | KMO | Significance |
| 1 | Teamwork | 5 | 0.782 | 0.781 | .000 |
| 2 | Organizational Learning | 5 | 0.766 | 0.772 | .000 |
| 3 | Creating Change | 5 | 0.698 | 0.770 | .000 |
| 4 | Transactional Leadership | 5 | 0.810 | 0.782 | .000 |
| 5 | Transformational Leadership | 5 | 0.842 | 0.803 | .000 |
| 6 | Ambidextrous Leadership | 10 | 0.953 | 0.692 | .000 |
| 7 | Enactive Learning | 5 | 0.875 | 0.760 | .000 |
| 8 | Vicarious Learning | 5 | 0.829 | 0.801 | .000 |
| 9 | Self-Efficacy | 10 | 0.969 | 0.798 | .000 |
| 10 | Creativity | 10 | 0.937 | 0.922 | .000 |
| 11 | Innovative Work Behavior | 10 | 0.926 | 0.914 | .000 |
| 12 | Task Performance | 9 | 0.965 | 0.798 | .000 |

Source: Survey Data (2023**)**

In this study, the accuracy of the measurements was examined for internal consistency through the calculation of Cronbach's alpha (Sekaran & Bougie, 2016). As indicated in Table (5.2), except for the "creating change" variable, all variables demonstrate Cronbach's alpha values above 0.7, illustrating a strong level of reliability and internal consistency within their respective groups of items (Nunnally, 1978). The creating change variable, i.e., 0.69, falls only slightly below the threshold, i.e., 0.7. However, it still displays an acceptable reliability and internal consistency since Pallant (2001) contended that variables with Cronbach's alpha values near to 0.7 are still reliable. Therefore, all variables, including the creating change variable, can be trusted and considered reliable for analysis. For the test of KMO, all variables are greater than 0.5, and it can be said that each variable has a sampling adequacy (Kaiser, 1974).

## 5.3 Antecedents of Self-Efficacy, Innovative Work Behavior, and Task Performance of Software Developers

This study examines the perception on antecedents of self-efficacy, innovative work behavior, and task performance. Descriptive statistics was applied to analyze the

demographic characteristics of the sample of software developers. This analysis focused on the key variables, including organizational culture: teamwork, organizational learning, and creating change; leadership styles: transactional, transformational, and ambidextrous; individual learning orientation: enactive and vicarious; self-efficacy; creativity; innovative work behavior; and task performance. Each factor in the analysis comprises a distinct number of items and is examined using a five-point Likert scale.

The perception level of developers on antecedents, mediator and outcome of self-efficacy was evaluated by exploring their mean values before the main regression analysis. The mean values derived from these assessments are classified into three levels for interpretation. Specifically, a mean value below 2 is indicative of a low level of perception, while a mean value ranging from 2 to less than 3.5 signifies a moderate level of perception. Furthermore, a mean value of 3.5 or higher is considered as reflecting a high level of perception regarding a specific variable, in accordance with the methodology outlined by Sekaran and Bougie (2016). In the following sections, the results of key variables are discussed.

### 5.3.1 Antecedents of Self-Efficacy of Software Developers

The mean values regarding the antecedents of self-efficacy of software developers can be seen in Table (5.3).

**Table (5.3) Mean Values of Antecedents of Self-Efficacy**

| Sr. No. | Items | Mean |
|---|---|---|
| 1 | Teamwork | 3.89 |
| 2 | Organiational Learning | 3.90 |
| 3 | Creating Change | 3.92 |
| 4 | Transactional Leadership | 3.93 |
| 5 | Transformational Leadership | 3.95 |
| 6 | Ambidextrous Leadership | 4.06 |
| 7 | Enactive Learning | 3.93 |
| 8 | Vicarious Learning | 3.91 |

Source: Survey Data (2023)

According to the survey data, teamwork culture is a crucial factor in improving self-efficacy among software developers, as the mean score is found to be 3.89. This score highlights the pivotal role of teamwork in shaping the self-efficacy levels of software developers within the organization. The high level of perception of teamwork within the organizational culture emphasizes its significance in promoting collaboration, communication, and a positive work environment. The findings from interviews with team leaders confirm the beneficial influence of working together as a team, which fosters a supportive and collaborative organizational climate. Additionally, it emphasizes the significance of embracing diversity as a driving force behind continued innovation and positive change. In selected software development companies, teamwork is crucial for success, with trust being the core value.

Similarly, organizational learning demonstrates a mean score of 3.90. This score shows the perceived effectiveness of learning within the organizations in the study. The software companies foster ongoing professional growth among their team members, enabling them to gain diverse knowledge and information that benefits the organization. This is reflected in the commentary of interviews with the team leaders from software companies. They reveal provisions of their companies on training programs, mentorship opportunities, or access to resources to facilitate learning. This cultural approach contributes positively to the level of self-efficacy among software developers. By investing in the growth and development of their workforce, organizations create an environment that promotes continual improvement and innovation.

Creating change exhibits the mean score, standing at 3.92. The score, above 3.5, is considered high that underlines the positive view of the respondents towards creating change culture. This high level of perception describes that individuals believe in the effect of this culture on their personal development, daily lives, and overall well-being. As observed through interview commentary with team leaders, software companies, by virtue of their nature, exhibit a culture that fosters change and innovation. These companies actively cultivate a culture that prioritize agility, efficiency, high performance, sustainable growth, and effective governance. To ensure success, challenges are encouraged to be viewed as opportunities for growth and professional development, fostering an environment of continuous improvement and innovation.

The mean score of transactional leadership is 3.93, indicating high perception of software developers on leadership behaviors that prioritize tasks. They prefer transactional leaders who offer clear guidelines and directions due to the precise and

predictable nature of their work. This type of leadership fosters a sense of role clarity and task comprehension, ultimately enhancing self-efficacy of software developers. It has been confirmed during the interviews, as they reveal that team members received clear guidance and directives from their team leaders for accomplishing task requirements. The prevalence of transactional leadership is especially notable in project methodologies like waterfall, where it is a common choice for ensuring precise and dependable project results within set parameters.

For transformational leadership, the mean score is 3.95, indicating a high level of perception. The positive perception of transformational leadership is likely due to its ability to inspire and motivate teams, encourage innovation, and provide feedback and recognition. These aspects foster a sense of achievement and self-efficacy among software developers, which is supported by interviews with team leaders who express their preference towards adoption of transformation leadership. One key aspect is granting teams autonomy to prioritize workloads, shape workflows, and collaborate based on individual skills for task completion, fostering a shared vision and teamwork for goal achievement.

Ambidextrous leadership is highly valued, as the mean score is 4.06. This shows strong support for leaders who possess ambidextrous qualities. According to the interviews with software team leaders, ambidextrous leadership improves their self-efficacy in several ways, emphasizing the importance of balancing exploratory and exploitative tasks to keep developers engaged. Besides, they encourage the exploration of new concepts and technologies to help developers prepare for challenges. This approach boosts the confidence of developers in their ability to adapt. Additionally, they utilize agile methodology to adjust to changing requirements through iterative processes. As a matter of fact, they guide teams from initial requirements to design, development, testing, and deployment phases while gathering feedback for future updates.

In terms of individual learning orientation, enactive learning reveals an average score of 3.93, indicating that respondents highly perceive it as an effective approach to learning. The results imply an overall positive attitude among participants towards this method. The data are further reinforced by interviews conducted with team leaders, who reported that their team members actively involve in effective programming practices by engaging in trial and error, and by learning from the outcomes of their actions.

Regarding vicarious learning, the average score is 3.91. This implies that most of the participants have expressed a positive view and strong belief in the effectiveness

of this learning style. The interviews carried out with team leaders also support it and disclosed that team members acquire knowledge by observing and studying code, utilizing online resources and forums to avoid obstacles, and analyzing code written by others to enhance their coding abilities. As a result, they comprehend the rationales behind both successes and failures, envisioning themselves taking proper actions without actually executing the task.

Overall, the mean values of all antecedents related to self-efficacy are particularly high, with each factor scoring over 3.50, indicating that software developers perceive these factors as relevant to their companies. Especially, ambidextrous leadership shows the highest mean score among all variables, standing at 4.06.

### 5.3.2 Self-Efficacy of Software Developers

To understand the state of self-efficacy of software developers within the organization, an assessment has been done to provide insights into how software developers perceive self-efficacy in their workplace as can be seen in the Table (5.4).

**Table (5.4) Mean Values of Self-Efficacy of Software Developers**

| Sr. No. | Items | Mean |
|---|---|---|
| 1. | Having confidence in the ability to create innovative ideas | 4.04 |
| 2. | Being assured in problem-solving skills | 4.04 |
| 3. | Having a talent for expanding upon others ideas | 3.90 |
| 4. | Having an ability to inspire enthusiasm in others for new ideas is evident | 3.90 |
| 5. | Having confidence in convincing other members of the benefits of new ideas | 4.04 |
| 6. | Having social contacts for finding support to realize new ideas | 4.04 |
| 7. | Approaching implementation of new methods at work with confidence | 3.90 |
| 8. | Pursuing exploration of new technologies for skill enhancement | 3.90 |
| 9. | Embracing adaptation to new methods at work iconfidently | 3.99 |
| 10. | Having dedication to continually improving proficiency in using tools for optimal results | 3.95 |
| **Overall Mean** | | **3.97** |

Source: Survey Data (2023)

According to the survey data, software developers exhibit a relatively high level of self-efficacy, as indicated by a mean score of 3.97. This suggests that, on average, respondents hold a positive view of their own self-efficacy within their organization. The data serve as a valuable indicator for organizations, highlighting the importance of nurturing and enhancing self-efficacy of software developers.

According to the interviews, the chosen companies demonstrate a strong organizational culture centered around teamwork, driving change, promoting organizational learning, and utilizing leadership styles such as transactional, transformational, and ambidextrous leadership. Additionally, they actively encourage individual learning orientation. Ultimately, these factors significantly shape how software developers perceive their own self-efficacy in relation to their capabilities.

### 5.3.3 Creativity of Software Developers

Creativity is crucial for software developers, enabling effective problem-solving and process enhancement. An assessment of creativity of software developers is presented in Table (5.5).

**Table (5.5) Mean Values of Creativity of Software Developers**

| Sr. No. | Items | Mean |
|---|---|---|
| 1. | Giving attention to issues beyond daily tasks | 3.95 |
| 2. | Encouraging the exploration of opportunities for improvement | 3.99 |
| 3. | Conducting research to discover new technologies, processes, techniques, and product concepts | 4.05 |
| 4. | Making suggestions to enhance quality | 4.00 |
| 5. | Having innovation in task execution | 4.03 |
| 6. | Generating new ideas to improve performance | 3.93 |
| 7. | Devising creative problem-solving strategies | 4.00 |
| 8. | Bring fresh perspectives to problems | 3.96 |
| 9. | Being valued in contribution of innovative ideas to software projects | 4.03 |
| 10. | Being highly valued in staying updated on software development trends | 4.08 |
| **Overall Mean** | | **4.00** |

Source: Survey Data (2023)

Table (5.5) shows the perspectives of software developers regarding the creativity in their professional settings. The data indicated that creativity scores an average of 4.00, demonstrating a positive perception of their creativity capabilities. By examining their creativity, valuable knowledge is acquired concerning how software developers perceive and utilize this skill in their work environment. This is evident from the information gathered from each company, which concurs that software developers reveal growth mindsets, prioritizing issues beyond their daily tasks, and conducting research to explore new and modern technologies, processes, techniques, and product concepts. They generate innovative ideas to enhance performance, and highly value staying updated with software development trends. Thus, these factors contribute to their positive perception of their own creativity level.

### 5.3.4 Innovative Work Behavior of Software Developers

In the context of software development, innovative work behavior of software developers reflects readiness to exceed their primary obligations. Table (5.6) describes how software developers perceive and engage in innovative work behavior within their roles.

**Table (5.6) Mean Values of Innovative Work Behavior of Software Developers**

| Sr. No. | Items | Mean |
|---|---|---|
| 1. | Promoting ideas and being championed to others | 3.94 |
| 2. | Making efforts to support an innovative idea through persuasive individuals | 3.95 |
| 3. | Having advocacy for the integration of innovative technologies and practices in the organization | 3.99 |
| 4. | Introducting innovative ideas into work practices | 4.05 |
| 5. | Inspiring key stakeholders to embrace innovative ideas | 4.00 |
| 6. | Making contribution towards implementing new ideas | 4.03 |
| 7. | Suggesting new ways to achieve goals and objectives | 3.93 |
| 8. | Demonstrating creativity on the job when given the opportunity | 4.00 |
| 9. | Developing adequate plans for the implementation of new ideas | 3.96 |
| 10. | Achieving successful implementation of new ideas and features through collaboration | 4.03 |
| **Overall Mean** | | **3.99** |

Source: Survey Data (2023)

In Table (5.6), the data clearly demonstrated that software developers have favorable perspective towards innovative work behavior. The average mean score of 3.99 indicates their willingness to go beyond core job responsibilities and actively engage in activities that foster innovation. Additionally, the emotional and cognitive experiences of software developers significantly shape their perception and engagement with innovative work behavior. The information gathered from each company further supports this observation. It becomes evident that software team leaders emphasize the promotion of innovative ideas and practices within their organizations and their members collaborate assigned tasks. This promotion is deemed essential in order to inspire key stakeholders, like software developers, within the organization to adopt innovative ideas.

### 5.3.5 Task Performance of Software Developers

Individual task performance is a crucial factor that profoundly influences organizational development. Table (5.7) explains how software developers perceive their task performance.

According to Table (5.7), software developers view their performance favorably. The average mean score of 3.99 indicates that they contribute effectively to their roles as innovators. It becomes clear that software developers proficiently complete core tasks by following established procedures. They continuously acquire new skills to adapt to changes in tasks and effectively coordinate their work through collaboration with colleagues. This enables members of the organization to possess expertise in adopting creative solutions and radical changes in operational activities. Overall, software developers perceive that their individual contributions extend beyond the team level, where the effective coordination among them promotes progress and improves task proficiency, fosters adaptability and triggers proactivity at individual level.

**Table (5.7) Mean Values of Task Performance of Software Developers**

| Sr. No. | Items | Mean |
|---|---|---|
| 1. | Completing core tasks proficiently using standard procedures | 3.93 |
| 2. | Achieving adaptation to changes in core tasks successfully | 4.00 |
| 3. | Acquiring new skills to adapt to changes in core tasks | 3.96 |
| 4. | Initiating better ways of executing core tasks | 4.03 |
| 5. | Doing proactive brainstorming to improve core task execution | 3.90 |
| 6. | Achieving work coordination through teamwork with coworkers | 4.04 |
| 7. | Handling and adjusting changes accordingly within the work unit | 3.95 |
| 8. | Taking on new roles to adapt to changes in the unit functioning | 4.03 |
| 9. | Making recommendations to enhance the effectiveness of the work unit | 4.01 |
| 10. | Developing and implementing Innovative methods to improve the performance of the work unit | 4.10 |
| 11. | Demonstrating excellent skills in presenting a positive image to clients | 3.96 |
| 12. | Having flexibility in adapting to organizational changes | 4.03 |
| 13. | Being trusted to effectively suggest improvements during operational changes | 3.90 |
| 14. | Having active contribution to enhancing effectiveness through recommendations | 4.04 |
| 15. | Having expertise in adapting to operational changes | 3.95 |
| **Overall Mean** | | **3.99** |

Source: Survey Data (2023)

## 5.4 Test for Multiple Linear Regression (MLR) Assumptions

To ensure the reliability and validity of the analysis, the following key assumptions of MLR are made. The test results of these assumptions are discussed in Appendix-C.

Assumption (1) Linearity: According to assumption 1, the relationship between independent variables and the dependent variable is tested whether they are linear. This assumption is met because many independent variables such as antecedents, self-efficacy, creativity and innovative work behavior show a linear relationship with the dependent variables in this study.

Assumption (2) Independence of Residuals: To evaluate this assumption, the

Durbin-Watson statistic was employed. This statistic assesses whether residuals are independent or uncorrelated. The Durbin-Watson statistic's independence assumption was met because the optimal values were near 2, thereby suggesting for making validate analysis for regression.

Assumption (3) Constant Residual Variance (Homoscedasticity): The assumption that residual variance remains consistent across the model, indicating homoscedasticity, is assessed through the examination of scatter plots. This analysis ensures that residuals exhibit random dispersion rather than a funnel-shaped pattern, so this assumption is met.

Assumption (4) Absence of Influential Cases (Outliers): The assumption is that there are no influential cases (outliers) biasing the model. This assumption was verified by assessing Cook's distance values. Since all values in this study were below 1, the assumption was satisfied.

Assumption (5) Normal Distribution of Residuals: This assumption checks if residuals follow a normal distribution. P-P (Probability-Probability) plots were used in this study. Residuals of P-P plots in this study showed more normal, aligning closely with the diagonal line, thereby suggesting no violation of normal assumption.

Assumption (6) Multicollinearity: To detect multicollinearity (high correlations among independent variables), Variance Inflation Factors (VIF) was assessed. The analysis revealed that the VIF and tolerance for each variable was below 5, this outcome suggests that multicollinearity is not a significant concern in this study (Hair et al., 2010).

## 5.5 Analysis on Antecedent Factors of Self-Efficacy

In this study, MLR models were employed to evaluate how antecedent factors affect self-efficacy of software developers, and subsequently, how their self-efficacy influences their innovative work behavior and, in turn, their task performance. SPSS output is shown in Appendix-C. The independent variables in this analysis encompassed teamwork, organizational learning, creating change, transactional leadership, transformational leadership, ambidextrous leadership, enactive learning and vicarious learning. Self-efficacy, innovative work behavior, and task performance were considered as the dependent variables. The results are shown in Table (5.8).

**Table (5.8) The Results of Regression Analysis on Antecedent Factors of Self-Efficacy**

| Independent Variables | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta (β) | | |
| (Constant) | -0.213 | 0.298 | | -0.714 | 0.476 |
| Teamwork | 0.157* | 0.089 | 0.129 | 1.772 | 0.078 |
| Organizational Learning | 0.039 | 0.113 | 0.029 | 0.340 | 0.734 |
| Creating Change | 0.203* | 0.118 | 0.132 | 1.717 | 0.087 |
| Transactional Leadership | 0.363*** | 0.116 | 0.265 | 3.125 | 0.002 |
| Transformational Leadership | 0.033 | 0.102 | 0.026 | 0.323 | 0.747 |
| Ambidextrous Leadership | 0.489*** | 0.076 | 0.413 | 6.471 | 0.000 |
| Enactive Learning | 0.109 | 0.103 | 0.091 | 1.060 | 0.290 |
| Vicarious Learning | 0.124 | 0.104 | 0.100 | 1.186 | 0.237 |
| R | 0.714 | | | | |
| $R^2$ | 0.510 | | | | |
| Adjusted $R^2$ | 0.493 | | | | |
| F- test | 30.350*** | | | | |

Source: SPSS Outputs (2023)
***, **, and * indicate 1 percent, 5 percent, and 10 percent level of significance, respectively.

As shown in Table (5.8), the value of adjusted $R^2$ is 0.493, which means that 49.3% of the variation in self-efficacy, is explained by antecedent factors. The value of the F-test, overall significance of the model, is highly significant at a 1% level.

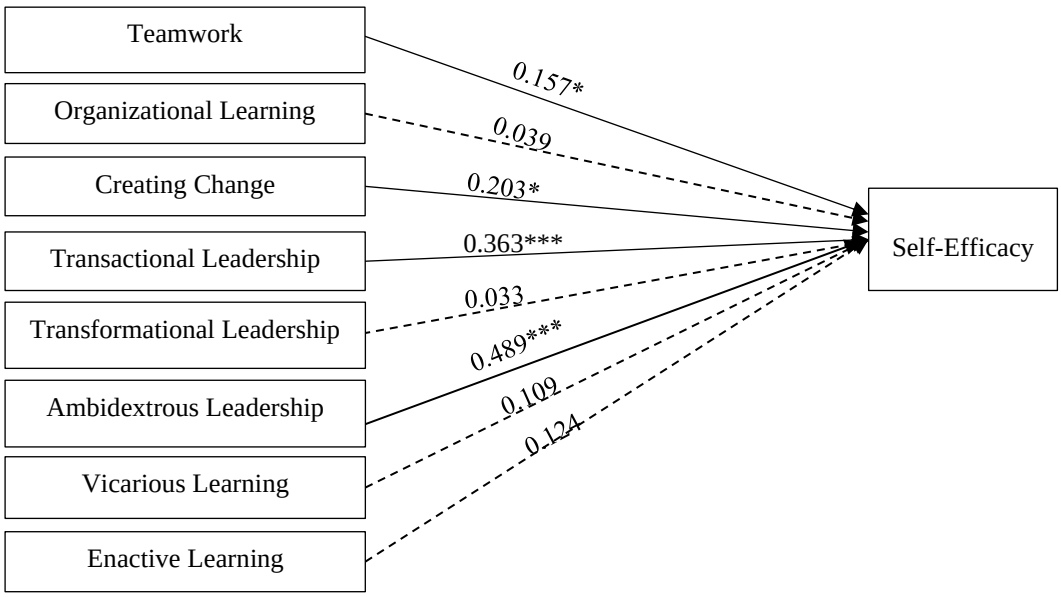
There is a positive relationship between teamwork culture and self-efficacy, with statistical significance at the 10% level. The coefficient value of 0.157 indicates that the effect of teamwork culture significantly contributes to the enhancement of self-efficacy. Similarly, creating change culture exhibits a positive effect on self-efficacy with the coefficient, 0.203 which is significant at a 10% level. Furthermore, there is a positive and highly significant effect of transactional leadership on self-efficacy, with statistical significance at the 1% level and coefficient is 0.363. Additionally, ambidextrous leadership also exhibits a positive and highly significant effect on self-efficacy, at a 1% significance level. The coefficient value of 0.489 indicates that ambidextrous leadership positively affects the enhancement of self-efficacy.

The results clearly indicated the significant positive effects of teamwork culture, creating change, transactional leadership and ambidextrous leadership on self-efficacy. In fact, ambidextrous is the most influencing factor on self-efficacy, with the highest standardized coefficient value of 0.413, as compared to other significant antecedent factors.

## 5.6 Summary Resulted from the Model

The summary results based on the MLR models were shown in Figure (5.1).

**Figure (5.1) Antecedent Factors and Self-Efficacy of Software Developers**




Source: Survey Data (2023)

Notes: ⟶ Significant - - - -▸ Insignificant

***, **, and * indicate 1 percent, 5 percent, and 10 percent level of significance, respectively.

As shown in Figure (5.1) using dotted lines, it is evident that self-efficacy is not influenced by organizational learning, transformational leadership, enactive learning, and vicarious learning. However, as illustrated in solid line, teamwork culture, creating change culture, transactional and ambidextrous leadership styles show positive and significant effects on self-efficacy.

## 5.7 The Effect of Self-Efficacy on Innovative Work Behavior

In this analysis, the independent variable comprises self-efficacy, while the dependent variable is innovative work behavior. SPSS output is described in Appendix-C. The results are presented in the Table (5.9).

**Table (5.9) The Results of Regression Analysis of Self-Efficacy and Innovative Work Behavior**

| Independent Variables | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 2.035 | 0.158 | | 12.856 | 0.000 |
| Self-Efficacy | 0.492*** | 0.039 | 0.631 | 12.588 | 0.000 |
| R | 0.631 | | | | |
| $R^2$ | 0.398 | | | | |
| F-test | 158.448*** | | | | |

Source: SPSS Outputs (2023)

***, **, and * indicate 1 percent, 5 percent, and 10 percent level of significance, respectively.

According to Table (5.9), the value of $R^2$ indicates that 39.8% of the variation in innovative work behavior can be explained by self-efficacy. It is noted that the result explains a moderate amount of variability in the dependent variable, but it is critical that the independent variable (self-efficacy) has a significant effect on the innovative work behaviour. The reason is that an $R^2$ between 0.1 and 0.5 is considered acceptable if the explanatory variable is statistically significant (Ozili, 2023). The F-test statistic, which evaluates the overall significance of the model, demonstrates a high degree of significance at the 1% level. The coefficient value (0.492) also highlights that an increase in self-efficacy is associated with an increase in innovative work behavior. Based on the results, it can be inferred, software developers with a strong sense of self-efficacy tend to exhibit higher levels of innovative work behavior.

## 5.8 The Effect of Innovative Work Behavior on Task Performance

Within this investigation, the independent variable is innovative work behavior, while the dependent variable is task performance. SPSS output is presented in Appendix-C. The regression result is described in Table (5.10).

**Table (5.10) The Results of Regression Analysis of Innovative Work Behavior and Task Performance**

| IndependentVariables | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 0.240 | 0.176 | | 1.368 | 0.173 |
| Innovative Work Behavior | 0.942*** | 0.044 | 0.813 | 21.659 | 0.000 |
| R | 0.813 | | | | |
| $R^2$ | 0.662 | | | | |
| F- test | 469.098*** | | | | |

Source: SPSS Outputs (2023)

***, **, and * indicate 1 percent, 5 percent, and 10 percent level of significance, respectively.

From the provided data, the $R^2$ value of 0.662 indicates that 66.2% of the variance in task performance can be explained by innovative work behavior. The F-test statistic, for assessing the overall significance of the model, displays a level of significance at the 1% level. The coefficient value (0.942) also highlighted that an increase in innovative work behavior corresponds to an increase in the task performance. This analysis shows that innovative work behavior serves as a significant predictor to increase task performance and extends its effect beyond the individual level. It also significantly contributes to team performance and overall organizational success, especially within the software industry.

## 5.9 The Mediation Effect of Creativity on the Relationship between Self-Efficacy and Innovative Work Behavior

This study explores the role of creativity as a mediator in the connection between self-efficacy of software developers and their innovative work behavior within

software development companies in Myanmar. In this study, X denotes the independent variable (Self-Efficacy), Y denotes the dependent variable (Innovative Work Behavior) and M denotes the mediator variable (Creativity). SPSS output is shown in Appendix-D and the result of mediation analysis is shown in Table (5.11).

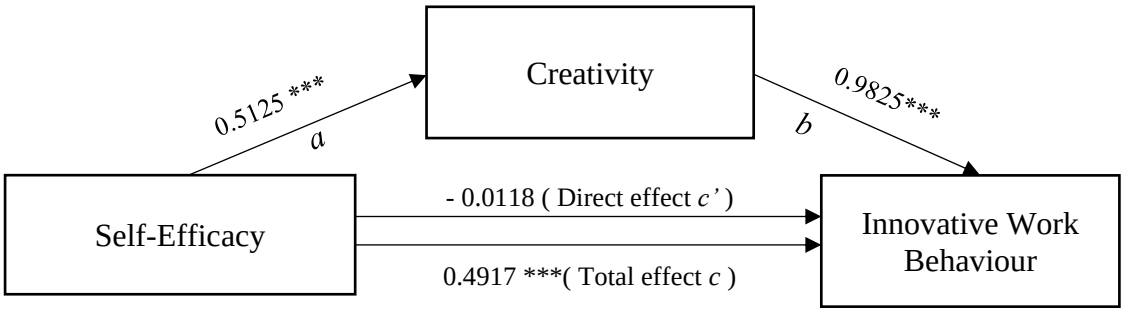
**Table (5.11) The Mediation Effect of Creativity between Self-efficacy and Innovative Work Behavior**

| Paths | Effect | Std. Error | 95% CI | |
|---|---|---|---|---|
| | | | LLCI | ULCI |
| Total effect (*c*) | 0.4917 | 0.0391 | 0.4148 | 0.5687 |
| Direct effect (*c'*) | -0.0118 | 0.0099 | -0.0312 | 0.0076 |
| Total indirect effect ($a \times b$) | 0.5035 | 0.0817 | 0.3425 | 0.6607 |

Source: SPSS Outputs (2023)

The study utilized the Bootstrap sampling test method to examine the mediation effect of creativity on innovative work behavior within the context of self-efficacy. According to Table (5.11), it is evident that the direct relationship between self-efficacy and innovative work behavior is not statistically significant, as evidenced by a non-significant direct effect of -0.0118. However, the bootstrapping analysis reveals a significant indirect effect of 0.5035 from self-efficacy to innovative work behavior through creativity. The mediation effect of creativity was affirmed with a 95% confidence interval (CI) excluding 0 (Bootstrap 95% CI: 0.3425, 0.6607), indicating that self-efficacy affects innovative work behavior through the mediation effect of creativity. Therefore, it can be concluded that creativity plays a full mediating role in the relationship between self-efficacy and innovative work behavior of software developers since the direct effect is non-significant. SPSS output is shown in Appendix-D. Figure (5.3) illustrates the mediation effect of creativity on the relationship between self-efficacy and innovative work behaviour.

**Figure (5.3) The Mediation Effect of Creativity on the Relationship between Self-Efficacy and Innovative Work Behaviour**




Source: SPSS Outputs (2023)

***, **, and * indicate 1percent, 5 percent, and 10 percent level of significance, respectively.

In Figure (5.3), the results of mediation analysis show that self-efficacy was significantly associated with creativity (b= 0.5125; p < .001) and innovative work behavior (b = 0.4917; p < .001). When creativity was included in the PROCESS macro as a mediator variable, the relationship between creativity and innovative work behavior was significant (b = 0.9825; p < .001), but the relationship between self-efficacy and innovative work behavior became non-significant (b= -0.0118; p =0.2325). The indirect effect of self-efficacy on innovative work behavior was 0.5035, and the bootstrap CI did not include zero (95% CI= 0.3425 to 0.6607). The results confirmed a fully mediating effect of creativity on the relationship between self-efficacy and innovative work behavior. In other words, self-efficacy has a significant positive effect on creativity that, in turn, significantly promotes innovative work behavior.

This chapter mainly emphasizes on the valuable perspectives in examining the effect of antecedent factors on self-efficacy, which in turn influences innovative work behavior and task performance. Among the antecedent factors investigated, it is observed that self-efficacy of software developers is influenced by teamwork, creating change, transactional leadership, and ambidextrous leadership. It also describes the role of creativity as a mediator in the relationship between self-efficacy and innovative work behavior, contributing to understanding about complexities behind the drivers of self-efficacy and creativity of software developers in software development companies in Myanmar. Therefore, based on the findings in this section, the next chapter will present logical plausible explanations about antecedents, its theoretical implications, and recommendation to practices in organizational settings. It will also describe the limitations and contributions of the study, followed by future research directions.

# CHAPTER 6
# CONCLUSION

This chapter presents the findings and discussions of the study. It also explores the theoretical implications and offers suggestions and recommendations on how antecedent factors affect the self-efficacy of software developers. This, in turn, affects their ability to engage in innovative work behavior and ultimately influences their overall task performance. Moreover, it highlights the significance of creativity in software developers when examining the link between self-efficacy and innovative work behavior. The chapter concludes by assessing the contributions and limitations of the study and suggesting potential areas for future research.

## 6.1 Findings and Discussions

This study investigated self-efficacy, innovative work behavior, and task performance of software developers within the context of Myanmar software development companies. Four software development companies that showed continued operation were selected to ensure that their software developers have a substantial level of experience. Information regarding the selected companies was obtained from MCIA and the team leaders of their respective companies. In addition, structured questionnaire was administered to 242 software developers in order to gather information about their demographic characteristics, to assess their perceptions and to respond the research questions.

In the findings section of this study, the demographic characteristics of the software developers are delineated to provide insights into their backgrounds. Additionally, a description of how software developers perceive the factors that influence their self-efficacy, creativity, innovative work behavior, and task performance is provided. It also explores how antecedent factors influence self-efficacy, which subsequently affects innovative work behavior and, in turn, task performance. Moreover, the role of creativity as a mediator between self-efficacy and

innovative work behavior is presented. Finally, it focuses on the relationship between innovative work behavior and task performance of software developers.

The study found that more males than females participated, possibly because males tend to have a greater interest in IT skills and careers in software development. This disproportionate gender distribution among software developers in Myanmar is consistent with the industry trend. It can be implied that the industry is composed of relatively younger population. This may be because pf the need for creativity of the workforce. Furthermore, the dominance of singles in software development companies states that the flexibility of the job attracts individuals without ties or obligations. Therefore, this occurrence is reflected in job description that implicitly advocates the application of singles who can devote more time and energy to the demanding jobs of typical software companies in the ICT sector. The ability to allocate more time is dependent upon being single. In addition, a significant number of software developers hold Bachelor's degrees, highlighting their importance in the industry. This supports the requirement for developers to have some extent of educational qualification. With regard to the current work position, it has been observed that the increased demand for software developers can be attributed to the sophisticated nature of the task. Furthermore, many developers have less than five years of experience, possibly as a result of the growing demand for software developers and the entry of recent graduates into the field. In terms of previous work experience, many participants have served as software developers, and it can be supposed that the emphasis was primarily on handling technical responsibilities rather than managerial positions. Concerning the number of team members, medium-sized teams ranging from 5-14 members are most commonly found in organizations, emphasizing their importance and effectiveness. These findings provide significant and insightful perspectives for workforce planning and educational policies in the software industry.

According to the mean values, software developers have positive perceptions of organizational culture, leadership styles, and individual learning orientation, which are considered important for their self-efficacy, innovative work behavior, and task performance. The high mean values of these antecedent factors, which is higher than 3.5, related to self-efficacy indicate that the importance for the attribute of software developers to these aspects within their work environment. Survey data also uncovers a positive perception of self-efficacy among software developers, as well as a strong

preference towards creativity and willingness to exceed job responsibilities. Recognizing and appreciating the task performance of software developers are the fundamental for business success.

Regarding the first research question, this study analyzes the effects of antecedent factors on self-efficacy. The analysis indicates that teamwork, creating change, transactional leadership, ambidextrous leadership are key factors that significantly affect self-efficacy. In fact, ambidextrous leadership emerges as the most prominent factor in enhancing self-efficacy. The other antecedent factors, namely organizational learning culture, transformational leadership, enactive learning orientation, and vicarious learning orientation, were found to have no significant effect on self-efficacy, as indicated by the findings.

In terms of transactional leadership, it is evident that software developers generally prefer this style of leadership in their work environments. Team leaders within software development companies often utilize transactional leadership styles with teams following the waterfall model, allowing for detailed planning of project timelines and deliverables. The waterfall approach ensures to progress systematically through product development, maintaining a structured workflow. In the hierarchical structure of waterfall project, the project leaders are empowered with clear procedures and authority to assign role and responsibilities to team members, to make crucial decisions and oversee project workflows effectively. This leadership style inherently enhances self-efficacy of software developers as it provides clear directions and responsibilities for them to follow.

Moreover, the study highlighted the prominent role of ambidextrous leaders in the software companies. Their influence is achieved through various ways, effectively creating an environment that nurtures self-efficacy of software developers. They have unique ability to balance innovation and efficiency in a highly competitive environment. They oversee both incremental innovation through agile practices and longer-term strategic initiatives. This fosters innovation, enhances the self-efficacy of software developers, and maintains the industry competitiveness and adaptability. In the software development companies, agile methodologies and project management techniques are commonly employed. These approaches ensure sustained success in a dynamic landscape. This balance is crucial due to the industry distinctive challenges.

The findings indicated that a teamwork culture within software development projects can improve the self-efficacy of software developers. In fact, collaborating in a team setting offers developers encouragement, motivation, and resources to address complex challenges and achieve their objectives, thereby cultivating a greater faith in their capabilities to excel. Interviews with team leaders have also confirmed that an atmosphere of a supportive and collaborative environment boosts self-confidence of their team members. Embracing diversity has been highlighted as a key driver of innovation and positive transformation in the software industry. In software companies, teamwork is seen as essential for success, with trust being at the core of their values.

The study showed a significant connection between a creating change culture and the increased self-efficacy of software developers. This highlighted the positive influence of a strong culture of change on the self-efficacy levels within software development teams. Interactions with software team leaders confirm proactive culture promoting change, focusing on adaptability, efficiency, productivity, growth, and effective management practices. Challenges are incorporated as chances for individual development-promoting a culture of continual improvement and innovation, to foster the self-efficacy of software developers.

Concerning the effect of transformational leadership style, contrary to expectation, transformational leadership does not improve the self-efficacy of software developers. Since transformational leadership is characterized by visionary thinking and inspiring team members, it may not always have a direct effect on the self-efficacy of software developers in the software development context. This is because software development tasks often relies more on clear instructions and guidance and embodies in structured decision making and problem-solving. While inspiration, freedom and autonomy conferred by transformational leadership may be beneficial in other various contexts, it may be more advantageous to employ transactional and ambidextrous leadership styles in this software companies. These styles are better aligned with the technical and procedural aspects of work, therfore they can enhance self-efficacy of software developers. However, it is important to note that leadership effectiveness is often situational, and a blend of leadership styles such as ambidextrous leadership style may be most effective in different phases of a software development project.

According to the results of the study, organizational learning culture may not be an effective way to enhance self-efficacy of software developers. From the general

observation, it can be inferred that lack of necessary resources could hinder developers in acquiring skills and knowledge essential for advancing self-efficacy. In addition, it could be doubtful that if learning methods applied by these companies may not be engaging or relevant to the needs of developers. When their interests are mis-aligned with their needs, it may lead to a lack of interest and motivation. Moreover, inadequate learning methods that are not relatable or effective can hinder developers in building self-efficacy and confidence. Without timely and relevant feedback, developers may struggle to enhance their self-efficacy. It means that effective feedback mechanisms are crucial for developers to monitor their progress and receive valuable input for improvement. Cultural factors may also influence the willingness of developers to embrace new learning opportunities and adapt to organizational changes.

From an individual learning orientation perspective, neither enactive learning nor vicarious learning appears to have a substantial effect on improving self-efficacy. According to the results from the study, it can be assumed that the relationship between enactive learning and self-efficacy is not strong enough to reach conventional levels of statistical significance. This could imply that in software development, while enactive learning may have some influence on self-efficacy, it is not a major driver. Other factors may play a more significant role in shaping the confidence of software developers in their abilities. It is possible that enactive learning interacts with other variables in ways that mitigate its direct influence on self-efficacy. For example, if employees are not provided with opportunities to apply what they have learned through enactive learning in real work scenarios, its effect on self-efficacy might be limited.

Based on the findings of this study, vicarious learning may not significantly affect self-efficacy in software development. This could be that observation alone is insufficient to boost the efficacy of software developers since some individuals may find difficulty in translating observed experiences into practical skills, as well as well diverse nature of tasks and roles in this field. Additionally, if experiences being observed do not align with individual goals or challenges, the effect on self-efficacy may be limited. Lack of information on vicarious learning experiences and delays in applying knowledge could also hinder its effectiveness. Developers may prefer enactive experience over vicarious learning in improving self-efficacy. It seems that the self-efficacy of individuals in software development can be shaped by a range of factors, such as engaging in active learning through enactive experience, gaining insights from

others, and receiving valuable guidance. If these elements combine harmoniously, they will possess the capacity to greatly amplify the self-confidence of an individual.

With the intention of the second research objective, this study examined research question (2), which explored the mediating effect of creativity on the innovative work behavior of software developers. The findings implied that when focusing exclusively on self-efficacy, software developers with self-efficacy may not necessarily display innovative work behavior. Instead, self-efficacy significantly enhances innovative work behavior through creativity. The presence of creativity among software developers is crucial as it serves as the catalyst for fostering innovative work behavior. In essence, this study highlighted the salient role of self-efficacy in promoting creativity of the software developers, ultimately contributing to the enhancement of innovative work behavior within the workplace. However, it should be noted that self-efficacy is not the sole contributor that can enhance the creativity of software developers. Other contextual factors, such as teamwork, creating change, transactional, and ambidextrous leadership styles, and individual learning orientation are also essential mechanisms for boosting self-efficacy of software developers in ICT industry. Hence, experimentations and creativity of software developers can be stimulated when proper organizational context is coordinated to improve the self-confidence of individuals in their ability in performing required tasks.

For research question (3) that is reflected in the third research objective, this study investigated the effect of innovative work behavior on the task performance of software developers. The innovative work behavior involves possession of a range of competencies such as proficiency, adaptivity, and proactivity. The results of a strong positive connection between innovative work behavior and task performance imply that when software developers engage in such competencies, it not only positively affects their individual task performance but also extends beyond the individual and team levels, potentially benefiting the entire organization.

At the individual level, proficiency entails accurate task completion in coding and debugging, while adaptivity demands quick responses to changes and proactive role adjustments. Individual contributions extend to the team level, where the proficiency of team members emphasizes effective coordination. The ability to adapt empowers individuals to generate constructive reactions to changes, while proactivity cultivates advancements and fuels innovation. Progressing from the team to the

organizational level, proficiency ensures precise task execution, adaptivity enhances the ability to respond to changes, and proactivity fosters the generation of innovative solutions, leading to valuable contributions and improved project success. Thus, high level of task performance is essential to the success of software development companies and their ability to provide cutting-edge solutions to clients across different industries.

## 6.2 Theoretical Implications

The findings presented in this study make significant contributions to both the leader-member exchange (LMX) Theory, as proposed by Dansereau et al. (1975), and the social cognitive theory of self-efficacy, as demonstrated by Bandura (1977, 1986, 1997). This study enhances the existing literature on self-efficacy, as exemplified by the works of various researchers (e.g., Gist et al., 1989; Bandura, 1997; Cassidy & Eachus, 2002; Hughes et al., 2018; Deng et al., 2019). The findings on self-efficacy provide insights into the consequences of learning, leadership and culture, as explored in the studies conducted by Danish et al. (2019) and Asbari et al. (2021). In addition, it suggests a notion that self-efficacy developed through leader-member exchange relationship and/or social cognitive can future enhances the individual productive behavior, such as innovative work behavior and task performance, by extending the prior research conducted by Motowildo et al. (1997), Griffin et al. (2007), and Dorner (2012). This study confirms that LMX serves as a robust predictor of self-efficacy, supported by the works of Lee et al. (2019), and Jiang et al. (2021).

Within the context of teamwork, this study emphasized that high-quality leader-member exchanges contribute to the cultivation of positive and inclusive self-efficacy. Consequently, this fosters the enhancement of individual creativity among team members. These findings supported the previous studies, indicating that a teamwork culture has a beneficial effect on individual self-efficacy (Baker et al., 2005; Pérez et al., 2015; Rehman, 2016; Strode et al., 2022). Similarly, in the context of creating change culture, the study showed that cultivating such a culture can enhance self-efficacy by fostering confidence through successful actions and adaptation. This finding aligned with the discoveries made by Cassidy and Eachus (2002) as well as Tsalits and Kismono (2019). In addition to that pervious research have predominantly operated under the assumption that transactional leaders enhance self-efficacy (e.g., Turner et al., 1997; Safarudin et al., 2015; Deng et al., 2019) and the importance of

ambidextrous leaders in self-efficacy research (Jiang et al., 2021). The findings aligned with previous research, highlighting a positive relationship between transactional leadership and self-efficacy, as well as ambidextrous leadership and self-efficacy.

Contrary to prior research on the relationship between transformational leadership and self-efficacy, this study found that transformational leadership was not significantly associated with innovative self-efficacy. While previous studies had suggested that transformational leaders can enhance employee self-efficacy and confidence in the abilities of their followers (Gong et al., 2009; Liu & Gumah, 2020), the findings indicated that when transformational leaders prioritize exerting pressure rather than expressing faith in their followers, it can have destructive effects on the self-efficacy of team. In fact, the effect of transformational leadership on self-efficacy of software developers is limited due to the software development process relying on technical expertise, clear processes, and problem-solving skills rather than visionary thinking and inspiring team members.

In addition, despite previous research indicating that organizational learning can affect the self-efficacy of an individual (Tobin et al., 2006), this study presented contrasting findings. It might be that if the learning methods in the organization cannot match the needs of developers, they may lose interest and motivation. This can make it difficult for developers to build self-confidence and belief in their abilities. It can be concluded that organizational learning does not effectively enhance self-efficacy among software developers. Furthermore, the results of this study portrayed that individual learning orientation (enactive learning and vicarious learning), which has been proposed as a precursor to employee self-efficacy (Gong et al., 2009; Slåtten, 2014; Kong et al., 2019), does not receive support for enhancing self-efficacy of software developers. Therefore, it is important to note that research often yields contradictory findings, and further studies are needed to gain a better understanding of the intricate connections among the variables.

In terms of the concept of creativity, some scholars discussed that creativity functioned as a mediator between self-efficacy and innovation work behavior of employees (Mumford & Gustafson, 1988; Danish et al., 2019; Slåtten et al, 2020; Asbari et al., 2021; Liu et al., 2022). This implied that individual creativity is an essential prerequisite for individual innovative behavior from the perspective of individual employees. Building on the fundamental role of individual creativity,

enhancing the self-efficacy of employees through creative abilities can stimulate them to experiment with and apply creative ideas, particularly when they perceive benefits for their work. The findings of this study showed a mediating effect of creativity on the relationship between self-efficacy and innovative work behavior of software developers. This relationship contributes to the understanding of creativity as a phenomenon. Thus, this study extends the current understanding of creativity by showing that differences in self-efficacy can lead to variations in innovation performance, highlighting the importance of self-efficacy in fostering creativity.

Besides the contribution to the mediating effect of creativity, linking innovative work behavior to task performance also supports previous research on individual performance and its effect on task performance. The findings showed that innovative work behavior has a positive relationship with task performance, which is consistent with the findings of the Dorner study (2012) and adds to the existing literature on innovative work behavior. Furthermore, the study provided support for the idea that innovative work behavior at various levels (proficiency, adaptivity, and proactivity) contributes to the overall effectiveness of individuals, teams, and organizations (Motowildo et al., 1997; Griffin et al., 2007). This implied that striving for innovative work behavior actually leads to the desired improvements in task performance and ultimately assists organizations in attaining competitive advantages.

## 6.3 Suggestions and Recommendations

The findings provided software development companies with precious knowledge on how to improve the self-efficacy of their developers, which is essential for improving overall organizational performance. To capitalize on these opportunities, software development companies should explore the effective approaches. In light of the findings, most software development companies in Myanmar are employing ambidextrous and transactional leadership approaches, fostering teamwork cultures, and implementing change initiatives to enhance self-efficacy of software developers. Therefore, there exists potential for career progression and development within this sector.

One important suggestion for software companies is to prioritize improving their leadership practices, specifically by incorporating ambidextrous leadership principles. This leadership approach, which blends transactional and transformational

elements, is essential for maintaining stability while driving innovation within the organization. When leaders are ambidextrous, they can create a teamwork culture by encouraging diverse perspectives, fostering collaboration, and promoting a shared vision among team members. Ambidextrous leadership can also drive change within an organization by encouraging experimentation, risk-taking, and continuous learning. Through this approach, software development firms can improve their capacity to address the diverse needs of their teams and projects, resulting in better overall performance. They can recognize when to use transactional leadership for stability and structure, and when to switch to transformational leadership for inspiration and vision. Encouraging leaders to switch between leadership styles as needed can create a flexible and successful leadership culture that fits the unique challenges of the software industry.

It is also recommended that software development companies prioritize the implementation of transactional leadership techniques as a crucial means to enhance self-efficacy among their software developers. To achieve this, team leaders should prioritize setting clear goals, monitoring performance, and providing rewards based on achievements. In terms of strengthening transactional leadership, software companies can create a supportive environment that empowers developers to excel in their roles. Emphasizing structured, goal-oriented approaches is key to building self-efficacy and fostering a conducive workplace for software developers to thrive.

When it comes to software development, relying only on transformational leadership is not enough to influence self-efficacy. The style of transformational leadership, in fact, has the power to motivate team members by nurturing their intrinsic drive, emotional resilience, and creative thinking, thus stimulating the generation of innovative ideas. However, in order to effectively bring these ideas to fruition, it is essential to supplement transformational leadership with transactional leadership. Transactional leadership centers around well-defined systems, rules, and encompasses the technical and procedural aspects of work. Therefore, team leaders should take note that fostering self-efficacy necessitates the simultaneous application of both transactional and transformational leadership approaches.

The companies should focus on resource allocation and engaging learning methods for improving organizational learning culture. In fact, methods such as pair programming, innovation challenges, code reviews, and personalized development

plans can enhance self-efficacy. For example, in software development, pair programming can enhance self-efficacy by fostering collaboration on a single workstation. One programmer codes while the other provides feedback, thereby improving communication and teamwork within development teams. This approach involves the active participation of two programmers, which further enhances self-efficacy. In addition, providing access to online learning platforms, technical resources, training and learning programs, and internal knowledge sharing can support the self-efficacy of software developers. By implementing these recommendations, organizations can effectively enhance the self-efficacy of their software developers and support their overall professional development and success.

Within the context of self-efficacy enhancement, both enactive and vicarious learning may have limited direct effect on self-efficacy. However, enactive learning, which involves applying theoretical knowledge in real-world scenarios, can be facilitated by the organization. This facilitation provides software developers with the opportunity to gain practical experience. Through this enactive experience, individuals can directly interact with the tools, technologies, and processes employed in software development, thereby bolstering their confidence in their own abilities. In software development education, hands-on experience serves as a valuable foundation for enactive learning, which in turn enhances self-efficacy.

On the other hand, the effectiveness of vicarious learning in boosting self-efficacy is restricted when the observed experiences do not align with individual goals or challenges. Therefore, team leaders should understand when to provide activities that facilitate this type of learning. One excellent way to engage in vicarious learning is contributing to open-source projects. By collaborating with experienced developers in the open-source community, individuals can observe their coding practices, review their code, and learn from their expertise. This involvement may include studying project documentation, codebase, and discussions, as well as submitting pull requests and receiving feedback from the project maintainers. However, it is crucial to consider that combining vicarious learning with hands-on practice and experimentation is vital. In fact, actively applying observed knowledge is essential for reinforcing learning and developing practical skills. This approach not only enhances confidence but also aligns with the objective of improving self-efficacy in their abilities.

In order to thrive, software development companies must prioritize creating a work environment that encourages creativity. This can be achieved by enhancing self-efficacy, promoting autonomy, facilitating brainstorming sessions, and recognizing and rewarding innovative ideas and behavior. Moreover, by creating an environment that fosters idea generation and encourages cross-functional collaboration, along with dedicating specific time for creative projects, software developers can be motivated to explore innovative solutions and approach their tasks from novel angles.

In order to foster the innovative work behavior of software developers, it is important for companies to cultivate individual creativity and self-efficacy by fostering a culture that promotes and recognizes innovation. This can be achieved by setting ambitious but attainable goals that encourage thinking outside the box, motivating developers to push their limits and explore innovative problem-solving approaches. Additionally, companies should offer opportunities for developers to participate in conferences, workshops, or seminars relevant to their field, as this enables them to be exposed to fresh ideas and emerging technologies. Ultimately, these efforts will lead to a heightened level of innovation within the organization.

To improve organizational performance metrics, companies must create a work culture characterized by supportiveness and adaptability. This enables companies to effectively address various levels of performance within the organization, such as individual task performance, team performance, and overall organizational performance. Additionally, establishing such a culture empowers software developers to skillfully adapt to changes in the dynamic IT environment. Consequently, these fosters can enhance proficiency, adaptability, and proactivity. Embracing this approach allows companies to gain a competitive edge, enhance customer satisfaction, and boost profitability. Ultimately, the company establishes itself as a leading software service provider across multiple industries

By integrating these recommendations, organizations can successfully address various challenges, including lack of innovation, reliance on commercial software, understanding performance factors for innovation, improving proficiency and creativity of software developers, and overcoming resistance to change among software developers. They can strengthen their competitiveness and adaptability in the ever-changing software market by adopting flexible and agile software development approaches. These approaches provide enhanced resilience to both local and global

market fluctuations, thereby strengthening the software industry in Myanmar. Additionally, these approaches synergistically promote professional development among software developers, enhance the performance of software companies, and accelerate the overall growth of the ICT sector.

## 6.4 Contributions of the Study

This study provides contributions to multiple stakeholders within Myanmar, such as to the individual software developers, to software companies, to ICT industries, and even national level ICT development, effectively addressing the challenges faced by the software industry in Myanmar.

This study makes a significant contribution at the individual level by focusing on the importance of self-efficacy in encouraging innovative work behavior and enhancing task performance. Additionally, it highlights the crucial role of effective team leadership in nurturing self-efficacy and establishing a team culture that supports developers in maximizing their contributions. Furthermore, the study enhances the understanding of the cognitive processes, individual traits, and external factors that influence the ability of software developers to generate creative solutions. This knowledge empowers team members to effectively implement creative changes in their day-to-day tasks, enabling them to continuously acquire new skills and knowledge, adapt to task changes, and coordinate their work with colleagues. As a result, the contributions of software developers transcend the team level by enhancing task proficiency, promoting adaptability, and generating proactivity at individual level.

Besides benefiting individuals, this study presents valuable knowledge regarding the management of software development companies. Primarily, it provides critical observations and recommendations for creating strong and appropriate culture needed for a software development team. By leveraging the innovative work behavior of software developers, companies can reduce software defects, enhance quality, and improve user experiences. Companies can also improve self-efficacy of software developers by providing measures for security vulnerabilities and privacy risks. They can assist individuals with allocating resources, forming teams, and managing projects. In fact, in Myanmar, software companies have the opportunity to independently develop their proprietary software, rather than relying on commercial software imported by other countries such as India. These arrangements can improve the ability

of companies to harness the potential of their team, drive innovation, and deliver high-quality solutions to clients. This empowers them to actively export their ICT products to global markets, thereby strengthening their presence on the international stage.

The study makes a valuable contribution to other software-related companies in ICT sector by emphasizing the significant role of the self-efficacy of software developers. It highlights how their innovative work behavior and tasks drive industry innovation and the development of a diverse range of products and services. As a result, the ICT sector solidifies its position as a leader in innovation, known for pushing technological boundaries and introducing groundbreaking products. It can be considered that the software industry is well-positioned to offer a wide array of tailored products and services that cater to the diverse needs of different sectors in Myanmar. This, in turn, allows businesses across ICT sector to leverage software solutions specifically designed to address their requirements and optimize their operations.

The influence of the software industry extends beyond its own sector and permeates spill-over effect into other industries in Myanmar. The innovative solutions of software industry can enhance efficiency and scalability in various sectors and facilitate the integration of software technologies into traditional industries. For instance, software companies can develop specialized applications to address the unique challenges faced by healthcare, finance, manufacturing, and transportation sectors. There is also a noticeable trend where an ever-growing number of SMEs, which constitute a significant portion of the economy in Myanmar, are utilizing the virtual "online" market to tap into international markets.

In addition to benefiting other industries, this study can provide contributions to national level. Improvements in innovation depth and breadth of software development companies can accelerate digital transformation within the country, providing support for the digitalization in governance, businesses, and industries. The technological competitiveness of software companies can enable the country to enjoy spill-over effect from improving technological standing with state-of-the-art tools and techniques. This progress in ICT sector can attract foreign investments, foster national innovativeness, catch up with technological advancements in other ASEAN countries, and spur economic growth of the country.

## 6.5 Study Limitations

While this study significantly enhances the understanding of factors influencing self-efficacy, creativity, innovative work behavior, and task performance of software developers, it is crucial to acknowledge specific limitations. Firstly, the focus of the study is constrained to some factors affecting self-efficacy and innovative work behavior. Additionally, concentration of research in software development companies in Yangon may limit to generalize other industries or regions. Likewise, the sample consisting of experienced software developers and established companies could hinder the generalizability of findings to newer firms in the software industry. Furthermore, the utilization of self-administered questionnaires can introduce a social desirability bias. Moreover, the adoption of a cross-sectional research design in this study deterred the establishment of dynamic causal relationships between the variables. Finally, this study did not explore the role of demographic factors in promoting self-efficacy of software developers.

## 6.6 Needs for Further Study

To address the limitations identified in the study regarding self-efficacy and innovative work behavior, further exploration is essential.

First, future research should consider investigating a broader range of factors influencing self-efficacy and innovative work behavior, extending beyond those studied in software development companies in Yangon. Moreover, since the observed relationship between transformational leadership and self-efficacy contradicts previous research and theoretical reasoning to some degree, it is advisable for future studies to reevaluate this relationship. In order to accomplish this, future studies should ensure the inclusion of items that pertain to the team leader expression of confidence in their follower ability to meet the high self-efficacy.

Second, this finding is divergent from prior research regarding the relationships between organizational learning and self-efficacy, as well as between individual learning orientation and self-efficacy. Consequently, it is advisable that future research reevaluates these relationships. In order to do so, future studies should employ robust methodologies, such as longitudinal designs, to gain a deeper understanding of the dynamics involved. It would be interesting to explore how ongoing training programs,

leadership initiatives, and cultural improvements can encourage self-confidence, creativity, and innovation in software companies in Myanmar.

Third, when conducting further study, it is preferable to treat the entire team as a cohesive unit instead of emphasizing individual members. By doing so, one can capture the team dynamics, interactions, and collaborative efforts as a whole. This approach facilitates a comprehensive understanding of team functioning and enables the identification of factors that contribute to effectiveness. Moreover, involving the entire team as respondents not only reduces biases but also offers a broader perspective.

Fourth, in terms of research methodology, utilizing mixed methods rather than self-administered questionnaires can help reduce social desirability bias in outcome measures by integrating qualitative and quantitative data within a single inquiry. These designs can help researchers address complexities and interactions inherent in phenomena like software development, enhancing the depth of analysis and the richness of findings. By employing mixed methods, it can enhance the validity of research findings by aligning statistical outcomes derived from surveys of software developers with qualitative insights gathered from interviews with team leaders.

Finally, further studies should expand beyond specific regions and industries to include a diverse range of sectors and locations. It is crucial to involve newer firms in the software industry to ensure that research findings are applicable across various types of companies, not just established ones. Furthermore, conducting comparative studies across different developing nations may uncover contextual factors that affect self-efficacy and innovation, thereby increasing the applicability of findings across a range of software industries. Moreover, demographic variables such as age, education, and organizational tenure seem to be related to self-efficacy. Future research should examine how demographic variables impact, either by enhancing or inhibiting, the self-efficacy of software developers.

In conclusion, the findings from this study can inform leaders of software development companies on effective ways to enhance self-efficacy, creativity, innovative work behavior, and task performance of software developers. This can also contribute to the economic growth and technological progress of the CT industry in Myanmar. In addition, this study has made significant contributions and highlights numerous opportunities for future research. These research directions can further advance industry knowledge to improve organizational performance within the software industry, particularly in developing nations like Myanmar.

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# APPENDICES

# APPENDIX-A

## Questionnaire

# Questionnaire for Software Developers at
# Selected Software Development Companies in Yangon

This questionnaire was designed to analyze the antecedent factors, self-efficacy, innovative work behaviour, creativity, and task performance of software developers. Use the following rating scale for each questioner and all information collected will be anonymous. Thank you for your precious time.

## Section (A): Background Information

Please tick where appropriate or fill the blank space.

1. Gender

   Male ☐ Female ☐

2. Age (Years) ----------

3. Marital Status

   Single ☐ Married ☐ Others (Divorce/Widower/Widow) ☐

4. Educational Qualifications

◊ Undergraduate ☐

◊ Bachelor's Degree ☐

◊ Master's Degree ☐

◊ Doctor's Degree ☐

◊ Others (e.g., IT certifications /**Training**/Diploma) ☐

5. Current Work Position

   ◊ Software Developers ☐

   ◊ Product Owner ☐

   ◊ Scrum Master ☐

   ◊ User Experience (UX)/User Interface (UI) Designers ☐

   ◊ Business Analyst ☐

   ◊ Team/Tech Lead ☐

   ◊ Project Manager ☐

   ◊ Others (e.g., Software Support Team, Development Contributors, Technical Specialists) ☐

6. Tenure at the Current Company (Years)----------

7. Previous Employment ---------

8. Number of Team Members in Your Team ---------

**Section (B)**

1. Organizational Culture

Please answer all the questions by circling the number which best represent your choice.

Scale: (Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1)

| Sr. No. | Particular | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | **Teamwork** | | | | | |
| 1. | The organization actively encourages cooperation and collaboration across different departments/teams/units. | | | | | |
| 2. | The organization fosters a team-oriented approach where individuals work together seamlessly. | | | | | |
| 3. | The organization places a priority on teamwork over hierarchy to effectively accomplish tasks. | | | | | |
| 4. | The organization recognizes teams as the fundamental units for achieving organizational goals. | | | | | |
| 5. | The organization ensures alignment between individual roles and organizational objectives. | | | | | |
| | **Organizational Learning** | | | | | |
| 1. | The organization embraces failure as an opportunity for learning and improvement. | | | | | |
| 2. | The organization actively encourages and rewards innovation and risk-taking. | | | | | |
| 3. | The organization prioritizes addressing and managing complex situations effectively. | | | | | |
| 4. | The organization places a strong emphasis on continuous learning in our daily work. | | | | | |
| 5. | The organization ensures effective communication and coordination to keep everyone informed and aligned. | | | | | |
| | **Creating Change** | | | | | |
| 1. | The organization embraces a highly flexible and adaptable approach, making it easy to implement changes. | | | | | |
| 2. | The organization demonstrates strong responsiveness to competitors and other shifts in the business environment. | | | | | |
| 3. | The organization consistently embraces and incorporates new and improved methods of working. | | | | | |
| 4. | The organization encounters resistance when attempting to introduce changes, but perseveres in its efforts. | | | | | |
| 5. | The organization encourages collaboration and cooperation among different parts of the organization to drive change initiatives. | | | | | |

## 2. Leadership Styles

Please answer all the questions by circling the number which best represent your choice.

Scale: (Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1)

(The leader referred to in this questionnaire means the team leader or head of the team with whom he/she is working directly).

| Sr. No. | Particular | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | **Transactional Leadership** | | | | | |
| 1. | Our leader always gives me positive feedback when I perform well. | | | | | |
| 2. | Our leader gives me special recognition when my work is very good. | | | | | |
| 3. | Our leader commends me when I do a better than average job. | | | | | |
| 4. | Our leader personally compliments me when I do outstanding work. | | | | | |
| 5. | Our leader often fails to recognize or acknowledge my positive performance. | | | | | |
| | **Transformational Leadership** | | | | | |
| 1. | Our leader is always on the lookout for new opportunities for the unit/department/organization. | | | | | |
| 2. | Our leader has a clear common view of its final aims. | | | | | |
| 3. | Our leader succeeds in motivating the rest of the company. | | | | | |
| 4. | Our leader always acts as the leading force in the organization. | | | | | |
| 5. | Our leader has leaders who are capable of motivating and guiding their colleagues on the job (masters). | | | | | |
| | **Ambidextrous Leadership** | | | | | |
| 1. | Our leader encourages us to accept demands beyond existing products and services. | | | | | |
| 2. | Our leader fosters innovation by driving the invention of new products and services. | | | | | |
| 3. | Our leader promotes experimentation with new products and services in our local market. | | | | | |
| 4. | Our leader leads the commercialization of completely new products and services. | | | | | |
| 5. | Our leader actively explores and capitalizes on new opportunities in new markets. | | | | | |
| 6. | Our leader emphasizes frequent refinement of existing products and services. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. | Our leader promotes continuous improvement for products and services. | | | | | |
| 8. | Our leader introduces improved versions of existing products and services for our local market. | | | | | |
| 9. | Our leader drives efforts to increase economies of scale in existing markets. | | | | | |
| 10. | Our leader prioritizes the objective of lowering costs of internal processes. | | | | | |

### 3. Individual Learning Orientation

Please answer all the questions by circling the number which best represent your choice.

Scale: (Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1)

| **Sr. No.** | Particular | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | Enactive Learning | | | | | |
| 1. | I learn from the consequences of my actions. | | | | | |
| 2. | I actively identify effective programming practices through trial and error. | | | | | |
| 3. | I enhance my coding confidence through the successful implementation of software features. | | | | | |
| 4. | I comprehend the impact of my coding decisions, enhancing my software understanding. | | | | | |
| 5. | I actively learn and grow by adapting and adjusting based on failures. | | | | | |
| | **Vicarious Learning** | | | | | |
| 1. | I gain insights by observing and studying code, improving my coding practices. | | | | | |
| 2. | I accelerate learning using online resources and forums to avoid pitfalls. | | | | | |
| 3. | I improve coding skills by analyzing code written by others. | | | | | |
| 4. | I broaden my problem-solving perspective through diverse approaches. | | | | | |
| 5. | I optimize my workflow by learning from the valuable experiences shared within the development community. | | | | | |

**Section (C)**

Self-Efficacy

Please answer all the questions by circling the number which best represent your choice.

Scale: (Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1)

| Sr. No. | Particular | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. | I have confidence in my ability to create into innovative ideas. | | | | | |
| 2. | I have confidence in my ability to solve problems. | | | | | |
| 3. | I have a talent for further developing the ideas of others. | | | | | |
| 4. | I have a talent for making others enthusiastic for new ideas. | | | | | |
| 5. | I have confidence in my ability to convince others of the benefit of new ideas. | | | | | |
| 6. | I have the social contacts needed to find backers for realizing new ideas. | | | | | |
| 7. | I have confidence in my ability to implement new methods at work. | | | | | |
| 8. | I am keen on exploring new technologies to enhance my skill set. | | | | | |
| 9. | I have confidence in my ability to adapt to new methods at work. | | | | | |
| 10. | I am dedicated to continually improving my proficiency in using the tools for optimal results. | | | | | |

## 2. Creativity

Please answer all the questions by circling the number which best represent your choice.

Scale: (Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1)

| Sr. No. | Particular | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. | I pay attention to issues that are not part of their daily work. | | | | | |
| 2. | I wonder how things can be improved. | | | | | |
| 3. | I search out new technologies, processes, techniques, and/or product ideas. | | | | | |
| 4. | I suggest new ways to increase quality. | | | | | |
| 5. | I find new approaches to execute tasks. | | | | | |
| 6. | I come up with new and practical ideas to improve performance. | | | | | |
| 7. | I come up with creative solutions to problems. | | | | | |
| 8. | I often have a fresh approach to problems. | | | | | |
| 9. | I contribute innovative ideas to software projects. | | | | | |
| 10. | I stay updated on emerging trends for innovation in software development. | | | | | |

### 3. Innovative Work Behavior

Please answer all the questions by circling the number which best represent your choice.

Scale: (Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1)

| Sr. No. | Particular | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. | I promote and champion ideas to others. | | | | | |
| 2. | I attempt to convince people to support an innovative idea. | | | | | |
| 3. | I advocate innovative technologies and practices within the organization. | | | | | |
| 4. | I systematically introduce innovative ideas into work practices. | | | | | |
| 5. | I inspire key stakeholders within the organization to embrace innovative ideas. | | | | | |
| 6. | I contribute to the implementation of new ideas. | | | | | |
| 7. | I suggest new ways to achieve goals and objectives. | | | | | |
| 8. | I exhibit creativity on the job when given the opportunity. | | | | | |
| 9. | I develop adequate plans and schedules for the implementation of new ideas. | | | | | |
| 10. | I collaborate for successful implementation of new ideas and features. | | | | | |

## 4. Task Performance

Please answer all the questions by circling the number which best represent your choice.

Scale: (Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1)

| Sr. No. | Particular | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. | I complete my core tasks well using the standard procedures. | | | | | |
| 2. | I adapt well to changes in core tasks. | | | | | |
| 3. | I learn new skills to help me adapt to changes in my core tasks. | | | | | |
| 4. | I initiate better ways of doing my core tasks. | | | | | |
| 5. | I proactively brainstorm ideas to improve core task execution. | | | | | |
| 6. | I coordinate my work with coworkers. | | | | | |
| 7. | I handle and adapt to changes within our work unit. | | | | | |
| 8. | I take on new roles to cope with changes in the way our unit works. | | | | | |
| 9. | I suggest ways to make our work unit more effective. | | | | | |
| 10. | I develop new and improve methods to help our work unit perform better. | | | | | |
| 11. | I acknowledge the outstanding efforts of our organizational members in presenting a positive image to clients. | | | | | |
| 12. | I have observed our organizational members adapt flexibly to organizational changes. | | | | | |
| 13. | I trust our organizational members to suggest improvements effectively during operational changes. | | | | | |
| 14. | I recognize the active participation of our organizational members in enhancing effectiveness through recommendations. | | | | | |
| 15. | I comprehend the expertise of our organizational members in adapting to operational changes. | | | | | |

**"Thank you very much for your understanding and patient response"**

# APPENDIX-B

## Perception on Antecedents of Self-Efficacy

**Organizational Culture: Teamwork**

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | The organization actively encourages cooperation and collaboration across different departments/teams/units. | 3.73 | 1.035 |
| 2. | The organization fosters a team-oriented approach where individuals work together seamlessly. | 3.98 | 0.949 |
| 3. | The organization places a priority on teamwork over hierarchy to effectively accomplish tasks. | 3.77 | 0.903 |
| 4. | The organization recognizes teams as the fundamental units for achieving organizational goals. | 3.97 | 0.807 |
| 5. | The organization ensures alignment between individuals' roles and organizational objectives. | 4.02 | 0.812 |
| | **Overall Mean** | **3.89** | |

Source: Survey Data (2023)

**Organizational Culture: Organizational Learning**

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | The organization embraces failure as an opportunity for learning and improvement. | 4.02 | 0.827 |
| 2. | The organization actively encourages and rewards innovation and risk-taking. | 3.65 | 0.992 |
| 3. | The organization prioritizes addressing and managing complex situations effectively. | 3.90 | 0.861 |
| 4. | The organization places a strong emphasis on continuous learning in our daily work. | 4.03 | 0.731 |
| 5. | The organization ensures effective communication and coordination to keep everyone informed and aligned. | 3.88 | 0.861 |
| | **Overall Mean** | **3.90** | |

Source: Survey Data (2023)

**Organizational Culture: Creating Change**

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | The organization embraces a highly flexible and adaptable approach, making it easy to implement changes. | 3.93 | 0.785 |
| 2. | The organization demonstrates strong responsiveness to competitors and other shifts in the business environment. | 4.00 | 0.676 |
| 3. | The organization consistently embraces and incorporates new and improved methods of working. | 4.04 | 0.704 |
| 4. | The organization encounters resistance when attempting to introduce changes, but perseveres in its efforts. | 3.82 | 0.891 |
| 5. | The organization encourages collaboration and cooperation among different parts of the organization to drive change initiatives. | 3.81 | 0.841 |
| | **Overall Mean** | **3.92** | |

Source: Survey Data (2023)

**Leadership Style: Transactional Leadership**

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | Our leader always gives me positive feedback when I perform well. | 4.02 | 0.783 |
| 2. | Our leader gives me special recognition when my work is very good. | 3.84 | 0.784 |
| 3. | Our leader commends me when I do a better than average job. | 3.74 | 0.860 |
| 4. | Our leader personally compliments me when I do outstanding work. | 4.10 | 0.786 |
| 5. | Our leader often fails to recognize or acknowledge my positive performance. | 3.95 | 0.701 |
| | **Overall Mean** | **3.93** | |

Source: Survey Data (2023)

**Leadership Style: Transformational Leadership**

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | Our leader is always on the lookout for new opportunities for the unit/department/ organization. | 3.95 | 0.800 |
| 2. | Our leader has a clear common view of its final aims. | 3.91 | 0.840 |
| 3. | Our leader succeeds in motivating the rest of the company. | 3.97 | 0.834 |
| 4. | Our leader always acts as the organization's leading force. | 3.99 | 0.762 |
| 5. | Our leader has leaders who are capable of motivating and guiding their colleagues on the job (masters). | 3.93 | 0.772 |
| | **Overall Mean** | **3.95** | |

Source: Survey Data (2023)

**Leadership Style: Ambidextrous Leadership**

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | Our leader encourages us to accept demands beyond existing products and services. | 4.11 | 0.840 |
| 2. | Our leader fosters innovation by driving the invention of new products and services. | 4.00 | 0.913 |
| 3. | Our leader promotes experimentation with new products and services in our local market. | 4.03 | 0.720 |
| 4. | Our leader leads the commercialization of completely new products and services. | 4.06 | 0.845 |
| 5. | Our leader actively explores and capitalizes on new opportunities in new markets. | 4.08 | 0.735 |
| 6. | Our leader emphasizes frequent refinement of existing products and services. | 4.11 | 0.840 |
| 7. | Our leader promotes continuous improvement for products and services. | 4.00 | 0.913 |
| 8. | Our leader introduces improved versions of existing products and services for our local market. | 4.03 | 0.720 |
| 9. | Our leader drives efforts to increase economies of scale in existing markets. | 4.06 | 0.845 |
| 10. | Our leader prioritizes the objective of lowering costs of internal processes. | 4.08 | 0.735 |
| | **Overall Mean** | **4.06** | |

Source: Survey Data (2023)

**Individual Learning Orientation: Enactive Learning**

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | I learn from the consequences of my actions. | 4.09 | 0.723 |
| 2. | I actively identify effective programming practices through trial and error. | 3.94 | 0.835 |
| 3. | I enhance my coding confidence through the successful implementation of software features. | 3.91 | 0.813 |
| 4. | I comprehend the impact of my coding decisions, enhancing my software understanding. | 3.81 | 0.933 |
| 5. | I actively learn and grow by adapting and adjusting based on failures. | 3.90 | 0.817 |
| | Overall Mean | **3.93** | |

Source: Survey Data (2023)

Individual Learning Orientation: Vicarious Learning

| Sr. No. | Items | Mean | Standard Deviation |
|---|---|---|---|
| 1. | I gain insights by observing and studying code, improving my coding practices. | 3.71 | 0.915 |
| 2. | I accelerate learning using online resources and forums to avoid pitfalls. | 4.02 | 0.840 |
| 3. | I improve coding skills by analyzing others' code. | 3.97 | 0.791 |
| 4. | I broaden my problem-solving perspective through diverse approaches. | 4.02 | 0.778 |
| 5. | I save time through others' experiences in the development community. | 3.81 | 0.933 |
| | Overall Mean | **3.91** | |

Source: Survey Data (2023)

# APPENDIX-C

## SPSS Results

## I. Reliability Test

### Teamwork

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.782 | 5 |

### Organizational Learning

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.766 | 5 |

### Creating Change

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.696 | 5 |

### Transactional Leadership

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.810 | 5 |

### Transformational Leadership

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.842 | 5 |

### Ambidextrous Leadership

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.953 | 10 |

### Enactive Learning

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.875 | 5 |

**Vicarious Learning**

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.829 | 5 |

**Self-efficacy**

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.969 | 10 |

**Creativity**

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.937 | 10 |

**Innovative Work Behavior**

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.926 | 10 |

**Task Performance**

| Reliability Statistics | |
|---|---|
| Cronbach's Alpha | No. of Items |
| 0.965 | 15 |

## II. Multiple Regression Analysis

### (a) The Effect of Antecedent Factors on Self-Efficacy

| Model Summary [b] | | | | | |
|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .714[a] | .510 | .493 | .57588 | 1.097 |

a. Predictors: (Constant), Teamwork, Organizational Learning, Creating Change, Transactional Leadership, Transformational Leadership, Ambidextrous Leadership, Enactive Learning, Vicarious Learning

b. Dependent Variable: Self-Efficacy

| ANOVA [a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 80.521 | 8 | 10.065 | 30.350 | .000[b] |
| | Residual | 77.272 | 233 | .332 | | |
| | Total | 157.793 | 241 | | | |

a. Dependent Variable: Self-Efficacy

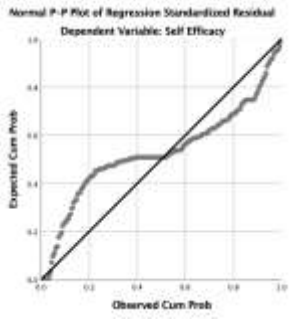
b. Predictors: (Constant), Teamwork, Organizational Learning, Creating Change, Transactional Leadership, Transformational Leadership, Ambidextrous Leadership, Enactive Learning, Vicarious Learning

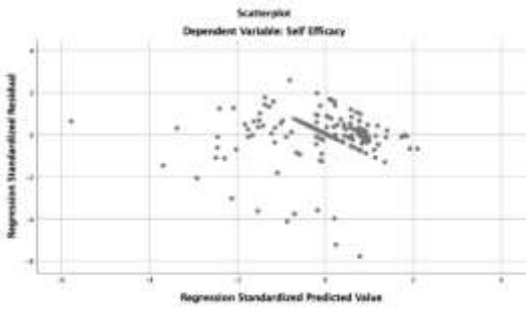
| Coefficients[a] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | -.213 | .298 | | -.714 | .476 | | |
| | Teamwork | .157 | .089 | .129 | 1.772 | .078 | .400 | 2.503 |
| | Organizational Learning | .039 | .113 | .029 | .340 | .734 | .281 | 3.556 |
| | Creating Change | .203 | .118 | .132 | 1.717 | .087 | .355 | 2.814 |
| | Transactional Leadership | .363 | .116 | .265 | 3.125 | .002 | .292 | 3.419 |
| | Transformational Leadership | .033 | .102 | .026 | .323 | .747 | .335 | 2.988 |
| | Ambidextrous Leadership | .489 | .076 | .413 | 6.471 | .000 | .517 | 1.934 |
| | Enactive Learning | .109 | .103 | .091 | 1.060 | .290 | .282 | 3.540 |
| | Vicarious Learning | .124 | .104 | .100 | 1.186 | .237 | .293 | 3.411 |

| Residuals Statistics | | | | | |
|---|---|---|---|---|---|
| | Minimum | Maximum | Mean | Std. Deviation | N |
| Predicted Value | .6349 | 5.1806 | 3.9715 | .57803 | 242 |
| Residual | -3.32188 | 1.49460 | .00000 | .56624 | 242 |
| Std. Predicted Value | -5.772 | 2.092 | .000 | 1.000 | 242 |
| Std. Residual | -5.768 | 2.595 | .000 | .983 | 242 |
| a. Dependent Variable: Self-Efficacy | | | | | |

a. Dependent Variable: Self-Efficacy

## Charts



## (b) The Effect of Self-Efficacy on Innovative Work Behaviour

| Model Summary [b] | | | | | |
|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .631[a] | .398 | .395 | .49069 | 1.658 |

a. Predictors: (Constant), Self-Efficacy
b. Dependent Variable: Innovative Work Behavior

| ANOVA [a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig |
| 1 | Regression | 38.150 | 1 | 38.150 | 158.448 | .000[b] |
| | Residual | 57.785 | 240 | .241 | | |
| | Total | 95.935 | 241 | | | |

a. Dependent Variable: Innovative Work Behavior
b. Predictors: (Constant), Self-Efficacy

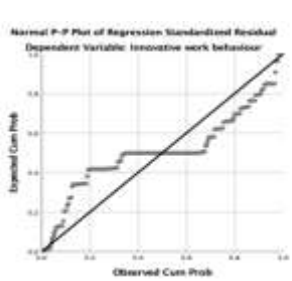
| Coefficients[a] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 2.035 | .158 | | 12.856 | .000 | | |
| | Self Efficacy | .492 | .039 | .631 | 12.588 | .000 | 1.000 | 1.000 |

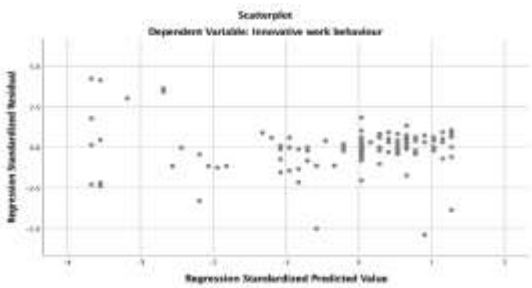
a. Dependent Variable: Innovative Work Behavior

| Residuals Statistics | | | | | |
|---|---|---|---|---|---|
| | Minimum | Maximum | Mean | Std. Deviation | N |
| Predicted Value | 2.5269 | 4.4937 | 3.9880 | .39787 | 242 |
| Residual | -2.64623 | 2.07307 | .00000 | .48967 | 242 |
| Std. Predicted Value | -3.672 | 1.271 | .000 | 1.000 | 242 |
| Std. Residual | -5.393 | 4.225 | .000 | .998 | 242 |

a. Dependent Variable: Innovative Work Behavior

# Charts



### (c) The Effect of Innovative Work Behavior on Task Performance

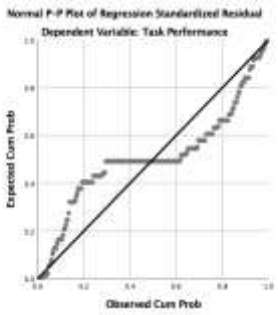
| Model Summary [b] | | | | | |
|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .813[a] | .662 | .660 | .42611 | 1.948 |
| a. Predictors: (Constant), Innovative Work Behavior | | | | | |
| b. Dependent Variable: Task Performance | | | | | |

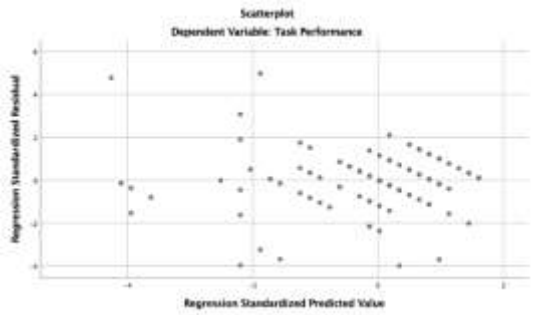
| ANOVA [a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 85.173 | 1 | 85.173 | 469.098 | .000[b] |
| | Residual | 43.576 | 240 | .182 | | |
| | Total | 128.749 | 241 | | | |
| a. Dependent Variable: Task Performance | | | | | | |
| b. Predictors: (Constant), Innovative Work Behavior | | | | | | |

| Coefficients[a] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | .240 | .176 | | 1.368 | .173 | | |
| | Innovative Work Behavior | .942 | .044 | .813 | 21.659 | .000 | 1.000 | 1.000 |
| a. Dependent Variable: Task Performance | | | | | | | | |

| Residuals Statistics | | | | | |
|---|---|---|---|---|---|
| | Minimum | Maximum | Mean | Std. Deviation | N |
| Predicted Value | 1.4652 | 4.9515 | 3.9979 | .59449 | 242 |
| Residual | -1.69767 | 2.12146 | .00000 | .42522 | 242 |
| Std. Predicted Value | -4.260 | 1.604 | .000 | 1.000 | 242 |
| Std. Residual | -3.984 | 4.979 | .000 | .998 | 242 |
| a. Dependent Variable: Task Performance | | | | | |

## Charts



# APPENDIX-D

## Mediating Analysis

**Mediating Analysis**

Self-Efficacy, Creativity and Innovative Work Behavior of Software Developers

Mediated Effect Models

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Version 3.4 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com

Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************

Model : 4

Y : IWB

X : SE

M : C

Sample

Size: 242

**************************************************************************

OUTCOME VARIABLE:

C

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .6467 | .4182 | .2402 | 172.5158 | 1.0000 | 240.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | 1.9671 | .1581 | 12.4399 | .0000 | 1.6556 | 2.2786 |
| SE | .5125 | .0390 | 13.1345 | .0000 | .4356 | .5893 |

Standardized coefficients

| | coeff |
|---|---|
| SE | .6467 |

**************************************************************************

OUTCOME VARIABLE:

IWB

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .9888 | .9778 | .0089 | 5253.9560 | 2.0000 | 239.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | .1026 | .0391 | 2.6235 | .0093 | .0255 | .1796 |
| SE | -.0118 | .0099 | -1.1970 | .2325 | -.0312 | .0076 |
| C | .9825 | .0124 | 78.9574 | .0000 | .9580 | 1.0070 |

Standardized coefficients

| | coeff |
|---|---|
| SE | -.0151 |
| C | .9985 |

********** TOTAL EFFECT MODEL **********

OUTCOME VARIABLE:

IWB

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .6306 | .3977 | .2408 | 158.4478 | 1.0000 | 240.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | 2.0352 | .1583 | 12.8560 | .0000 | 1.7234 | 2.3471 |
| SE | .4917 | .0391 | 12.5876 | .0000 | .4148 | .5687 |

Standardized coefficients

| | coeff |
|---|---|
| SE | .6306 |

********** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **********

Total effect of X on Y

| Effect | se | t | p | LLCI | ULCI | c_ps | c_cs |
|---|---|---|---|---|---|---|---|
| .4917 | .0391 | 12.5876 | .0000 | .4148 | .5687 | .7793 | .6306 |

Direct effect of X on Y

| Effect | se | t | p | LLCI | ULCI | c'_ps | c'_cs |
|---|---|---|---|---|---|---|---|
| -.0118 | .0099 | -1.1970 | .2325 | -.0312 | .0076 | -.0187 | -.0151 |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| C | .5035 | .0817 | .3425 | .6607 |

Partially standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| C | .7980 | .1230 | .5726 | 1.0673 |

Completely standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| C | .6457 | .0826 | .4730 | .7931 |

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

------ END MATRIX -----