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EDITORS' REMARKS

It is with great pride that we introduce the latest volume of NUM Research Series, Volume 7, a publication that reflects the dynamic intersection of leadership and digital transformation, particularly within the Cambodian and ASEAN contexts. This issue brings together a compelling collection of research articles that examine the profound impacts of technological advancements and leadership strategies on various sectors, including higher education, banking, accountancy, and environmental sustainability.

As editors, we extend our gratitude to all authors for their contributions of dedication in bringing this volume to fruition. We are confident that the insights presented here will serve as a valuable resource for researchers, policymakers, and practitioners committed to advancing leadership and digital transformation in Cambodia and beyond.

Warm regards,

H.E. Prof. Hor Peng, Chief Editor
Assoc. Prof. Dr. Ly Sok Heng
Dr. Kang Sovannara

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THE JOURNEY TOWARDS UNIVERSITY 4.0: *Case Study of National University of Management*

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ABSTRACT

In alignment with the Fourth Industrial Revolution, which encapsulates Industry 4.0, Technology 4.0, Education 4.0, and Curriculum 4.0, University 4.0 emerges as a contemporary paradigm for higher education. The objective of this study is to shed light on the National University of Management's intentions in embracing the University 4.0 paradigm. University 4.0 primarily aims to facilitate knowledge dissemination, foster and enhance innovation in alignment with the demands of the professional world within the context of digital transformation. Given its harmonization with the principles of Industry 4.0, or the Fourth Industrial Revolution (IR4), the concept of University 4.0 holds great appeal. Key elements and prerequisites for its implementation include the incorporation of new learning methods that align with educational competencies, research and development, and innovation (Education 4.0), the adoption of learning methods suitable for the digital era (Technology 4.0), and the establishment of innovative infrastructure to enhance learning processes and offer education and training providers a systematic overview of new approaches to organizing learning experiences for individuals and groups within the realm of Industry 4.0 (Curriculum 4.0).

Keywords: Industry 4.0, Technology 4.0, Education 4.0, Curriculum 4.0, University 4.0.

1. INTRODUCTION

The landscape of higher education is currently confronted with unprecedented challenges, primarily stemming from the rapid digital transformation happening worldwide (Gkrimpizi, 2024). In this dynamic environment, higher education institutions face numerous hurdles in integrating emerging technologies into their curriculum, adapting to the evolving needs of students, and ensuring that graduates possess the necessary qualifications that align with the demands of the job market (Alenezi, 2023). In the era of digital advancements, the University 4.0 model emerges as the most suitable and effective approach for higher education, particularly when traditional face-to-face instruction is hampered by the challenges posed by Industry 4.0 (Chigbu *et al.*, 2023).

In recent years, the concept of University 4.0 has emerged as a response to the profound transformations brought about by the Fourth Industrial Revolution (Mian *et al.*, 2020). As higher education institutions grapple with the challenges and opportunities presented by globalization, digitalization, and technological advancements, the notion of University 4.0 has garnered increasing attention (Rodríguez-Abitia & Bribiesca-Correa, 2021). University 4.0 represents a paradigm shift in higher education, characterized by the incorporation of cutting-edge technologies such as artificial intelligence, big data analytics, Internet of Things (IoT), and cyber-physical systems into various aspects of teaching, learning, and administrative processes (Nermend *et al.*, 2022). Scholars have extensively discussed the implications and imperatives of University 4.0 in adapting to the rapidly evolving educational landscape (Mian *et al.*, 2020 & Lim *et al.*, 2020). Lim et al., (2020) highlight the necessity for universities to effectively manage their business processes through the application of information technology, emphasizing the fusion of cyber technology and automation in service and learning processes. Oluka, A. M. (2023) emphasizes the importance of integrating digital and mobile technologies into learning methods, underscoring the need for universities to adapt to the demands of Education 4.0. Grosseck *et al.*, (2023) shed light on the pivotal role of the Internet of Things, Big Data, and Cyber Security in meeting the evolving needs of higher education, emphasizing the imperative for institutions to align with the requirements of university

4.0. Furthermore, Dima *et al.*, (2022) discuss the concept of Education 4.0, which involves the integration of technology into learning methods, laying the foundation for the emergence of university 4.0. This integration encompasses both the physical and indirect utilization of technology, facilitating a comprehensive transformation of higher education. In essence, the National University of Management represents a paradigm shift towards a more dynamic and integrated approach to higher education, positioning itself to effectively address the challenges and seize the opportunities presented by the Fourth Industrial Revolution (4IR). By prioritizing these core components and implementing the necessary conditions, universities can enhance their ability to prepare students and make significant contributions to societal progress in the digital age.

The National University of Management is an institution that embraces change in higher education to meet the demands of the Fourth Industrial Revolution. This shift entails integrating disciplines, leveraging technology, and adapting teaching methods to adequately prepare students for the complexities of the current digital landscape. By doing so, universities not only equip students with the necessary skills but also contribute to societal progress in an increasingly interconnected world. It is an exciting direction for education to embark upon.

2. PROBLEM STATEMENT

Many educational experts concur that the landscape of higher education is undergoing a significant transformation (Kaputa *et al.*, 2022). As the National University of Management in Cambodia embarks on its journey towards embracing University 4.0, it becomes crucial to delve deeper into the relevant literature to gain a comprehensive understanding of the key principles, challenges, and strategies associated with this transformative concept (Sovanara, 2023). Rapanta *et al.*, (2021) have stated that by thoroughly exploring the scholarly discourse surrounding University 4.0, the university can develop well-informed strategies to effectively navigate the digital disruption and position itself as a trailblazer in the ever-evolving realm of higher education.

3. RESEARCH QUESTIONS

In this study, the researchers seek to answer three principal research questions:

1. How does the adoption of University 4.0 principles impact the teaching methodologies and learning outcomes at the National University of Management in Cambodia?

2. What are the key challenges faced by faculty members in integrating emerging technologies into their instructional practices at the National University of Management, and how can these challenges be addressed to facilitate successful implementation of University 4.0 initiatives?

3. What are the perceptions and experiences of students at the National University of Management regarding the use of digital technologies and online learning platforms in the context of University 4.0, and how do these perceptions influence their engagement and academic performance?

4. RESEARCH OBJECTIVES

The objectives of this research is to contribute at accelerating the development of University 4.0 based on a holistic analysis of the impacts of IR4.0:

1. To evaluate the effectiveness of University 4.0 implementation at the National University of Management by examining changes in teaching methodologies, student engagement, and learning outcomes across various academic disciplines and programs.

2. To identify the specific barriers and constraints hindering faculty members' adoption of University 4.0 strategies, such as technological literacy, time constraints, and resistance to change, and to develop targeted interventions and support mechanisms to address these challenges.

3. To investigate the impact of digital technology integration on student learning experiences and academic performance at the National University of Management, with a focus on factors such as accessibility, usability, and the quality of online resources and support services, in order to inform strategies for enhancing student satisfaction and success in the digital learning environment.

5. LITERATURE REVIEW
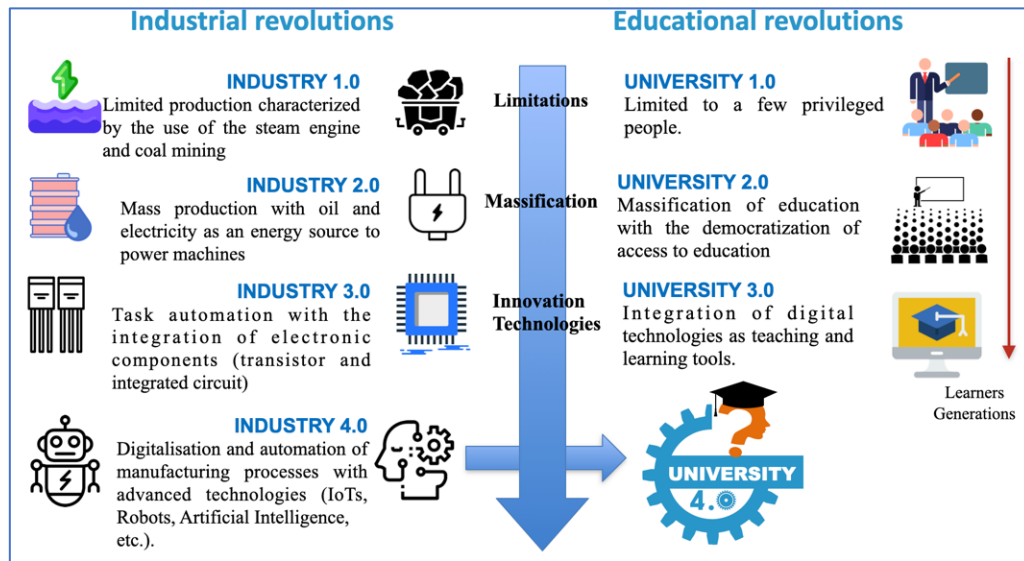
5.1. Evolution of the concept of University 4.0

The "University" model's history is closely tied to global industrial revolutions. After the first industrial revolution, a one-way educational paradigm known as "University 1.0" emerged, which emphasized administration, instruction, and knowledge generation. This model promoted the idea of "owning knowledge," where the lecturer played a central role in imparting knowledge to students in a passive manner. Consequently, the lecturer was considered the primary source of instruction in the University 1.0 model, providing students with the necessary information (Pangarso, A., 2024). In the midst of the fifteenth century, the concept of University 2.0 emerged. In this iteration, students continue to learn passively, but lecturers now also serve as the primary sources of reference material for students, in addition to their role in delivering information. University 2.0 strives to offer a greater quantity of mass general education, coupled with higher-quality and more targeted instruction. Moreover, training curricula are becoming increasingly standardized (de Ridder-Symoens, H. (Ed.). 1991). University 3.0 represents a newer approach to higher education that places a strong emphasis on inter-institutional and cross-cultural learning in the age of the Internet and information technology. In this model, known as University 3.0, the primary goal is to provide knowledge and training that aligns with the demands of the modern world, including social networks, computers, automation, the Internet, and information and communication technology (ICT). Teaching and research in University 3.0 make extensive use of virtual labs, internet tools, and multimedia resources. Instructors are seen as partners in enhancing students' learning experiences, facilitating a collaborative and interactive learning environment (Cronje, J., 2016).

As an educational paradigm that harnesses the advancements in technology and digital transformation brought about by the fourth industrial revolution, University 4.0 is currently emerging. In this model, the traditional lecturer-led approach is replaced by a focus on self-directed learning for students (Metreveli, A., 2019). The goal of University 4.0 is to empower students to continuously acquire knowledge and skills throughout their lives, enabling them to shape their own educational journey while also fulfilling

the requirements of their chosen field. Education in University 4.0 is closely intertwined with intelligent systems, robotics, artificial intelligence, nanotechnology, biotechnology, the Internet of Things, 3D printing, and self-driving cars, all of which are key components of the fourth industrial revolution (Pangarso, A., 2024; El-Ebiary *et al.*, 2024).

According to the defined parameters, University 4.0 can be described as a comprehensive educational model that is specifically designed to address the evolving needs of learners and the workforce within the context of Industry 4.0. This innovative approach harnesses the power of Technology 4.0 and incorporates the principles of Education 4.0, all while utilizing a forward-thinking Curriculum 4.0. The ultimate goal of University 4.0 is to equip students with the necessary skills and knowledge to thrive in an ever-changing world. This holistic approach not only provides a robust education but also emphasizes continuous adaptability and skill enhancement, which are crucial for success in the modern economy (Oke, A., & Fernandes, F. A. P. 2020).

In essence, University 4.0 functions as a nurturing ecosystem that encompasses teaching, learning, and fostering innovative startup initiatives, while also effectively applying and leveraging knowledge in production and business operations, thus making a valuable contribution to local socioeconomic development. With the principles of University 4.0, students are empowered to actively select their learning resources, personalize their learning paths, have flexibility in study schedules, strike a balance between acquiring new technological knowledge and its practical application in the workplace, and swiftly adapt to the demands of a technology-driven landscape (Jirapong, *et al.*, 2021).

Industrial revolutions

INDUSTRY 1.0
Limited production characterized by the use of the steam engine and coal mining

INDUSTRY 2.0
Mass production with oil and electricity as an energy source to power machines

INDUSTRY 3.0
Task automation with the integration of electronic components (transistor and integrated circuit)

INDUSTRY 4.0
Digitalisation and automation of manufacturing processes with advanced technologies (IoTs, Robots, Artificial Intelligence, etc.).

Limitations

Massification

Innovation Technologies

Educational revolutions

UNIVERSITY 1.0
Limited to a few privileged people.

UNIVERSITY 2.0
Massification of education with the democratization of access to education

UNIVERSITY 3.0
Integration of digital technologies as teaching and learning tools.

Learners Generations

UNIVERSITY 4.0

Therefore, the activities of University 4.0 are intricately connected to the concepts of the Fourth Industrial Revolution, specifically Industry 4.0 (Mian *et al.*, 2020). Within the framework of Industry 4.0 and the Internet of Things, intelligent tools like robots and artificial intelligence agent software have emerged, gradually displacing workers and service staff in various sectors including education, commerce, tourism, recreation, healthcare, and manufacturing. This shift presents a considerable challenge to the recruitment market in terms of human resources (Gueye & Exposito, 2020). Consequently, this serves as the driving force behind the transformation of the training program and the University 4.0 model, which empowers students to tackle problems, situations, and challenges by acquiring and developing the most relevant competencies applicable to their personal lives, careers, and society (Oliveira, K. K. D. S., & De Souza, R. A., 2022).

Moreover, the teaching methods employed by universities are highly adaptable to changing circumstances. With the integration of new technologies into practical education, traditional teaching methods are no longer suitable. Hence, universities must adopt innovative teaching approaches that cater to the evolving demands of the labor market in the Industry 4.0 era. To meet the need for highly skilled and competent professionals, teaching quality is enhanced through the implementation of challenge-

based learning methods, enabling students to navigate real-world scenarios through practical problem-solving (Brudermann, *et al.*, 2019).

University 4.0 employs cutting-edge facilities, services, and systems to enhance the learning process, including admissions, the commencement of a new academic year, and end-of-module exams. The advent of technology has played a significant role in eliminating geographical barriers in education and serves as a key means of fostering connectivity between University 4.0, lecturers, staff, and a diverse student body hailing from all corners of the globe (Wawak, S., *et al.*, 2024). Information from universities is swiftly and seamlessly transmitted to students, enabling them to engage in learning anytime, anywhere, and utilize technology to access and share a wealth of valuable resources (Rambe, P., & Bere, A., 2013). Simultaneously, University 4.0 espouses a learner-centered educational model, where students take charge of their own learning and delve into the intricacies of their chosen field, with lecturers assuming the role of facilitators and guides.

In order to remain relevant and thrive in an ever-evolving landscape, global higher education institutions must shift from traditional education to a needs-based approach. This shift is essential due to the emergence of increasingly diverse student populations with varying learning and studying requirements. Under this model, the responsibility for knowledge transmission or acquisition rests squarely on the shoulders of each individual student, empowering them to take ownership of their educational journey.

5.2. In the digital age, university 4.0

Digital transformation signifies a significant shift in operational activities, organizational processes, capabilities, and other patterns within an institution. Its primary objective is to harness the advantages and opportunities presented by digital technology (Perkin & Abraham, 2017). In the realm of higher education, digital technology and online resources have become pervasive, driving the transformation and advancement of administrative management, admissions processes, as well as teaching, learning methods, and research initiatives. Specifically, digital transformation

empowers universities to effectively engage with students, faculty, scientists, and external partners. Online lectures, audio and video recordings serve as valuable teaching materials, accessible to students at their convenience. Digital platforms facilitate seamless communication and interactive engagement between instructors and students, while also organizing learning materials and evaluating the quality of online learning experiences. Furthermore, digital transformation fosters expanded networking activities and facilitates interactions with the business community, corporate partners, and government agencies. Meetings, negotiations, training programs, and technology transfer sessions can now be conducted through digital platforms, applications, computer programs, and online meetings (Zhao *et al*., 2021; Mukul & Büyüközkan, 2023).

In the present digital landscape, which is closely intertwined with the environmental changes brought about by Industry 4.0, higher education is undergoing a direct influence, propelling its evolution towards the University 4.0 model (Gueye and Exposito, 2020; Zhao *et al.*, 2022). This model leverages the benefits of digital advancements to effectively fulfill the mission of knowledge transfer. Specifically, it aims to:

First and foremost, in the context of University 4.0, establishing strong linkages between universities and Industry 4.0, also known as the fourth industrial revolution, is of utmost importance to ensure relevance and foster innovation. Here are several types of linkages that play a crucial role:

1. Industry Partnerships: Collaborating with industries to develop curriculum that is aligned with industry needs, offering internships to students, and facilitating joint research projects (Gibson *et al.*, 2016).
2. Workforce Development: Designing specialized programs that focus on developing skills required by the Fourth Industrial Revolution, such as artificial intelligence, data science, robotics, and sustainable technologies (Li, 2022).
3. Agile Education Models: Implementing flexible education models that can swiftly adapt to changing industry demands and technological advancements (López-Alcarria *et al.*, 2019).

4. Entrepreneurship Ecosystem: Creating an environment within the university that nurtures innovation, entrepreneurship, and the incubation of startups. This allows students to apply their academic knowledge to real-world applications (Bodolica & Spraggon, 2021).

5. Cross-disciplinary Collaboration: Encouraging collaboration and knowledge-sharing among different departments and faculties to tackle complex real-world problems. This interdisciplinary approach enhances the university's ability to address challenges from multiple perspectives (Bates *et al.*, 2022).

By embracing these linkages, universities can effectively bridge the gap between academia and industry, preparing students for the dynamic and evolving landscape of Industry 4.0 within the University 4.0 model.

Furthermore, in the context of University 4.0, establishing strong linkages to Technology 4.0 is crucial. Technology 4.0 encompasses advanced technologies that drive the fourth industrial revolution. Here are several types of linkages that are essential for a university aiming to transition to the University 4.0 model:

1. Digital Infrastructure: Investing in robust digital infrastructure is essential for supporting online learning, virtual classrooms, and digital collaboration tools (Kraus et al., 2021).

2. Big Data Analytics: Utilizing big data analytics to personalize learning experiences, track student progress, and improve educational outcomes (Al-Sai *et al.*, 2022).

3. Artificial Intelligence (AI): Implementing AI-driven solutions for adaptive learning, virtual tutoring, and intelligent content delivery (Rane *et al.*, 2023).

4. Internet of Things (IoT): Integrating IoT devices to enable smart campus management, real-time monitoring of resources, and enhance student experiences (Abuarqoub *et al.*, 2017).

5. Virtual and Augmented Reality (VR/AR): Leveraging VR/AR technologies for immersive learning experiences, virtual labs, and simulations (Fominykh *et al.*, 2015).

6. Cybersecurity: Strengthening cybersecurity measures to safeguard sensitive student data, research findings, and institutional information (Cheng & Wang, 2022).

By embracing these linkages, universities can effectively harness the power of Technology 4.0, enabling them to provide cutting-edge educational experiences and prepare students for the digital era within the University 4.0 model.

Moreover, when it comes to transitioning to University 4.0, establishing strong linkages to Education 4.0 is crucial. Education 4.0 involves adopting innovative approaches to education in the digital age. Here are some strategies that universities can employ to establish these linkages:

1. Student-Centric Approach: Shifting the focus from a teacher-centered to a student-centered learning approach, where students actively participate in the learning process and have more control over their education (Devi & Deepa, 2021).

2. Collaborative Learning Environments: Creating environments that foster collaboration among students, encouraging them to work together, share ideas, and learn from one another (Hmelo-Silver *et al.*, 2008).

3. Blended Learning: Integrating traditional face-to-face instruction with online learning resources and digital tools to enhance flexibility and accessibility (Dakhi *et al.*, 2020).

4. Assessment and Feedback: Implementing innovative assessment methods and providing timely feedback to facilitate continuous improvement and mastery of skills (Dittmar & McCracken, 2012).

5. Emotional Intelligence and Well-being: Incorporating initiatives that prioritize students' emotional well-being, mental health, and resilience, recognizing the importance of holistic development (Ramos-Díaz *et al.*, 2019).

By embracing these linkages, universities can create a dynamic and inclusive educational environment that prepares students for the challenges and opportunities of the digital era within the University 4.0 framework.

In addition, establishing strong linkages between University 4.0 and Curriculum 4.0 is essential for universities striving to embrace the digital era and prepare students for the future workforce. Here are some key linkages to consider:

1. Competency-Based Education: Designing curriculum that focuses on developing specific competencies and skills that are relevant to future careers, moving away from traditional course-based structures (Boyer & Bucklew, 2019).

2. Personalized Learning Paths: Offering personalized learning paths that take into account individual students' strengths, weaknesses, and career aspirations, allowing for tailored educational experiences (Ingkavara *et al.*, 2022).

3. Experiential Learning: Incorporating experiential learning opportunities, such as internships, co-op programs, service learning, and project-based courses, to provide hands-on experiences and practical skills development (Aithal & Mishra, 2024).

4. Global Perspectives: Integrating global perspectives and cross-cultural understanding into the curriculum to prepare students for the interconnected world and foster a global mindset (Merryfield, 1998).

5. Continuous Learning: Promoting lifelong learning by offering opportunities for continuous education, upskilling, and reskilling to adapt to the evolving requirements of the job market (Mozelius *et al.*, 2024).

By establishing these linkages, universities can ensure that their curriculum remains relevant, dynamic, and responsive to the needs of the digital age, equipping students with the skills and knowledge necessary for success in the future workforce within the University 4.0 framework.
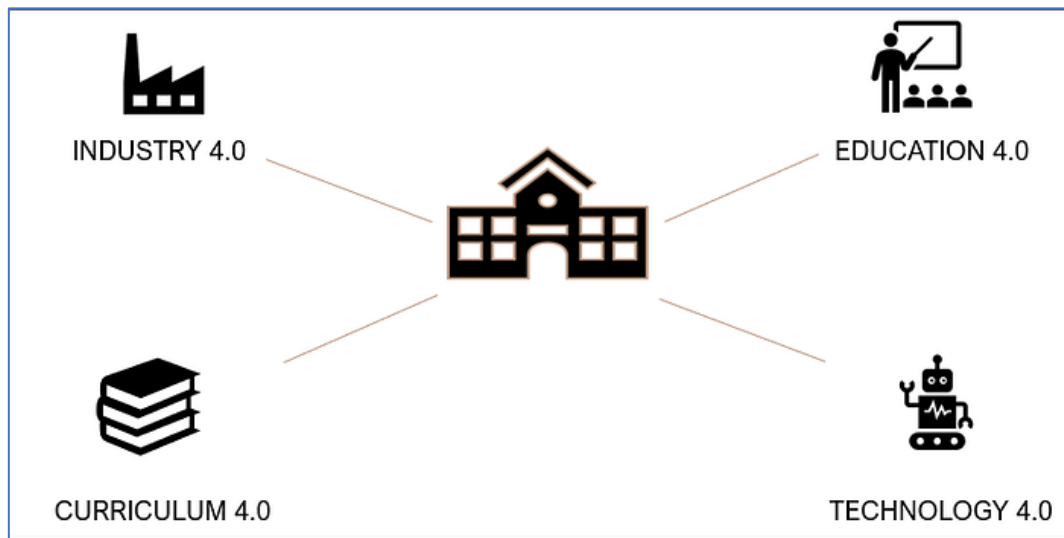
Figure 1 Key Elements of University 4.0 (Parag Diwan, 2020: A noted academic leader, is at the vanguard of research and curriculum design across disciplines to usher in Education.40. Evangelist & Advisor to universities:

The adoption of the University 4.0 concept necessitates the development of a curriculum that aligns with the skills required to sustain Industry 4.0. This would result in the creation of Curriculum 4.0. The pedagogy would undergo a transformation, embracing Education 4.0 principles that incorporate digital teaching and learning methods, utilizing online resources and technology advancements of Industry 4.0. Furthermore, it would foster a culture of co-creation of knowledge and innovation.

A crucial aspect of this transformation is the development of a robust digital platform for teaching and learning. This platform should incorporate cutting-edge technologies like Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI) and Machine Learning (ML) to provide adaptive learning experiences. By leveraging these technologies, universities can ensure that today's digital natives receive an exemplary student experience that aligns with their preferences and learning styles. University 4.0 signifies a groundbreaking advancement in higher education, encompassing a multidimensional approach to learning and skill enhancement (Lapteva, A. V., & Efimov, V. S. 2016 & Wessels, L., & van Wyk, J. A. 2022).

6. METHODOLOGY

This study adopts a qualitative research approach to investigate the skills required for University 4.0 in linkage with Industry 4.0, Technology 4.0, Education 4.0, and Curriculum 4.0. Empirical data was collected through a combination of semi-structured and structured interviews conducted with school leaders, lecturers, experts and selective students. The duration of the interviews ranged from 30 to 60 minutes. The semi-structured interviews aimed to identify specific themes for the structured interviews. Thematic content analysis was employed to analyze the collected data.

6.1. Research Design and Sample

In order to determine NUM readiness for the transition to the University 4.0 model and the use of modern technologies in the learning process, this research work on University 4.0 principles. This methodological approach made it possible to study the effect of University 4.0 on the development of students' professional competencies, skills, readiness, and motivation to move to this learning model. The experiment was conducted at the National University of from March to May 2024. As far as the paper intended to determine the readiness for the transition to the University 4.0 model and for use modern technologies in the learning process.

6.2. Survey

There were three phases to the entire study. The Industrial Revolution 4.0, Technology 4.0, Education 4.0, and Curriculum 4.0 statements are linkage to University 4.0 in the initial stage of design. Bring all statements for verification from high-ranking administrators, leaders, and specialists who are knowledgeable of the actual and ongoing transformation of NUM toward U4.0.

Subsequently, the second phase convenes with a subset of lecturers who express interest in deliberating on the scenario learning program, which is based on the ideas of University 4.0 and innovative pedagogy. Its goal was to determine the main obstacles National University of Management faculty members face when incorporating

emerging technologies into their teaching methods and how to overcome these obstacles to enable the effective execution of University 4.0 projects.

In the last phase, the researcher spoke with a few students who were acquainted with the University 4.0 curriculum that had been created and its current technology integration. For a month, this task was done at National University of Management. The suggested course of study was added to the campus learning system on what are the attitudes and experiences of National University of Management students about using digital technologies and online learning platforms in the context of University 4.0, and how do these attitudes impact their engagement and academic performance? This program was available to educators and students alike. and to look into how the National University of Management's students' learning experiences and academic performance are affected by the integration of digital technology. Specific attention will be paid to aspects like usability, accessibility, and the caliber of online resources and support services, as these will help shape strategies for improving student success and satisfaction in the digital learning environment.

7. DATA ANALYSIS AND DISCUSSION
7.1. General situation of NUM

As Cambodia progressed from the recovery stage, the university experienced significant growth in both its scope and scale. It expanded its academic offerings by establishing seven faculties and a graduate school, effectively delivering educational services across various levels of higher education. These academic entities have played a crucial role in nurturing responsible human resources to contribute to the development of the country. Additionally, a research center with abundant resources has been instrumental in generating high-quality research outputs and sharing new knowledge with our community.

Moreover, the university has extended its vision beyond domestic trends in higher education by introducing internationally recognized bachelor's degree programs and a master's degree program in high-demand fields. These emerging programs play a crucial

role in nurturing the human capital required for Cambodia's development in the midst of the country's digital transformation. To ensure a comprehensive education, students are taught by experienced professors from both national and international backgrounds, as well as world-class experts affiliated with the university's esteemed partners. The university also provides students with abundant opportunities to engage in practical learning experiences, such as project-based learning, internships, and mobility programs. These initiatives allow students to apply their talents and knowledge in real-world settings, fostering their holistic growth and development.

The National University of Management has recently initiated the "Digital Career Development" project. Over the course of five years, this project seeks to enhance digital employment skills by bolstering the capabilities of higher education institutions in Cambodia. The project aims to achieve this by facilitating international standard assessments, increasing the availability of scholarships and internships, and fostering relationship-building opportunities. These efforts are designed to support the effective implementation of skills development and promote better employment prospects for students.

In the present era, digitalization is causing significant transformations across various domains, including education. NUM is witnessing revolutionary changes that are disrupting the traditional dynamics among different stakeholders in the education sector. The prevailing landscape of digital transformations revolves around the seamless integration of technology as a powerful learning tool. This integration not only facilitates the adoption of innovative teaching and learning approaches but also fosters the development of new methodologies that promote creativity and ingenuity in education.

Hence, University 4.0 is embracing the integration of technology within the curriculum, fundamentally transforming the approach to learning as a whole. By leveraging technology, universities aim to enhance the overall student experience and equip future graduates with the necessary skills for success in the workforce. University 4.0 draws

inspiration from the principles of Industry 4.0, incorporating new pedagogical approaches, innovative teaching and management tools, as well as smart and sustainable infrastructure to create a dynamic and future-oriented learning environment.

Since its establishment in 1983, the National University of Management has been a key player in the education and development of human resources in Cambodia. Recognizing the evolving needs of the modern workforce, the university has developed a comprehensive training program and embraced cutting-edge technology, including a digital platform, to enhance the efficiency and effectiveness of its staff, research, teaching, and learning processes. In line with the vision of University 4.0, the university's new strategic plan aims to position itself as a leading institution in research and innovation. By embracing this transformative approach, the National University of Management strives to stay at the forefront of higher education, empowering students and contributing to the advancement of Cambodia's society and economy (NUM's prospectus 2021 to 2024).

7.2. Data Analysis

In light of the aforementioned situation and the researcher's intentions, the following statements are proposed to elicit response ideas from key individuals within the institution.

Considering the importance of establishing linkages between universities and Industry 4.0 to ensure relevance and foster innovation, the following types of linkages have been identified: industry partnerships, workforce development, agile education models, entrepreneurship ecosystems, and cross-disciplinary collaboration. The responses obtained will provide valuable insights into the case of the National University of Management (NUM).

A	Linkages between universities and Industry 4.0	Available	In process	Not applicable
1	Industry Partnerships	16 (40.0)	20 (50.0)	04 (10.0)
2	Workforce Development	13 (32.5)	23 (57.5)	04 (10.0)
3	Agile Education Models	19 (47.5)	18 (45.0)	03 (07.5)

| 4 | Entrepreneurship Ecosystem | 26 (65.0) | 14 (35.0) | 00 (00.0) |
| 5 | Cross-disciplinary Collaboration | 17 (42.5) | 19 (47.5) | 04 (10.0) |

The Entrepreneurship Ecosystem is predominantly available (65%) and also in the process of further development (35%). Agile Education is slightly lagging behind, with availability at 47.5% and ongoing development at 45%. Cross-disciplinary Collaboration is available at 42.5% and in the process of improvement at 47.5%. Industry Partnerships are available at 40%, with ongoing efforts to enhance them at 50%. Workforce Development is available at 32.5% and in the process of improvement at 57.5%.

In terms of Industry 4.0 relevant skills and competencies, the ability to apply one's knowledge in various collaborative contexts to create synergies and add value to tasks is considered the most crucial skill for future professionals. What future professionals need is a readiness for continuous learning in new settings and from individuals with diverse backgrounds and experiences. This willingness to learn from others provides a fruitful basis for exploring the best practices in educating the future workforce within the context of the Fourth Industrial Revolution. The findings obtained from the responses serve as valuable inspiration for co-creating the final outcome of the Universities of the future project: a blueprint for education in the era of Industry 4.0.

The insights obtained from these findings serve as valuable inspiration for the development of a comprehensive blueprint for education within the context of the Fourth Industrial Revolution. This blueprint is a crucial component of the Universities of the future project, aiming to enhance educational practices and effectively prepare the future workforce for the challenges and opportunities presented by Industry 4.0. By leveraging these insights, the blueprint will provide a solid foundation for equipping students with the necessary skills and knowledge to thrive in the rapidly evolving digital landscape of the fourth industrial revolution.

In summary, the dynamic and evolving nature of entrepreneurship ecosystems, the significance of Industry 4.0 skills, and the imperative for agile education highlight the

challenges and opportunities involved in preparing future professionals. The Universities of the future project aims to address these needs by developing a comprehensive blueprint that fosters a culture of continuous learning, collaboration, and adaptability to meet the demands of the fourth industrial revolution. By embracing these principles, universities can effectively equip students with the necessary tools and competencies to thrive in an ever-changing digital landscape.

Consider the intend to be University 4.0 of NUM, any of the following kinds of linkage to Technology 4.0: Digital Infrastructure, Data Analytics, Artificial Intelligence (AI), Internet of Things (IoT), Virtual and Augmented Reality (VR/AR) and Cybersecurity response are:

B	Linkages to Technology 4.0	Available	In process	Not applicable
1	Digital Infrastructure	22 (55.0)	18 (45.0)	00 (00.0)
2	Big Data Analytics	08 (20.0)	17 (42.5)	15 (37.5)
3	Artificial Intelligence (AI)	11 (27.5)	19 (47.5)	10 (25.0)
4	Internet of Things (IoT)	11 (27.5)	20 (50.0)	09 (22.5)
5	Virtual and Augmented Reality (VR/AR)	11 (27.5)	22 (55.0)	07 (17.5)
6	Cybersecurity	07 (17.5)	21 (52.5)	12 (30.0)

The digital infrastructure at the University 4.0 of NUM is already established and in progress, while cybersecurity measures are currently being improved. To create a smart campus, the university is incorporating cutting-edge technologies such as IoT, AR/VR, big data analytics, and AI. These interventions will optimize resource management, provide immersive learning experiences, and enhance decision-making processes. By embracing these advancements, the University 4.0 of NUM aims to realize a smart campus and prepare students for the fourth industrial revolution.

In the context of global progress towards sustainability and resilient infrastructure, digitalization plays a crucial role. The assimilation of Industry 4.0 technologies, including IoT, AI, big data, cloud computing, blockchain, and robotics, enables the digital transformation of various fields. While individual studies have explored the use of these technologies for smart campuses, there is a limited focus on presenting a comprehensive understanding of their collective role. This study aims to bridge that gap

and provides insights into the implementation of these technologies with a sustainability perspective.

The study provides an overview of the different Industry 4.0 enabling technologies for smart campuses. It highlights their significance and application in creating intelligent and sustainable learning environments. One notable finding is the widespread use of Wi-Fi as a wireless communication protocol for connectivity in various studies. Additionally, the study acknowledges the utilization of Raspberry Pi as a hardware controller for realizing smart campus applications with cloud computing capabilities. Overall, this research empowers researchers to gain a deeper understanding of how these Industry 4.0 technologies can be effectively implemented in the context of smart campuses, taking into account sustainability considerations.

NUM, as a University 4.0, embraces key linkages to Education 4.0. These include a student-centric approach, collaborative learning environments, blended learning, assessment and feedback, and emotional intelligence and well-being. These initiatives aim to create a dynamic and inclusive educational environment that prepares students for the future.

C	Linkages to Education 4.0	Available	In process	Not applicable
1	Student-Centric Approach	28 (70.0)	10 (25.0)	02 (05.0)
2	Collaborative Learning Environments	28 (70.0)	12 (30.0)	00 (00.0)
3	Blended Learning	34 (85.0)	06 (15.0)	00 (00.0)
4	Assessment and Feedback	28 (70.0)	10 (25.0)	02 (05.0)
5	Emotional Intelligence and Well-being	13 (32.5)	14 (35.0)	13 (32.5)

NUM, as a University 4.0, has successfully implemented blended learning and collaborative learning environments. However, there is still progress to be made in terms of incorporating emotional intelligence and well-being initiatives into the education framework. Efforts are being made to prioritize and develop programs that address the emotional well-being of students, ensuring a holistic educational experience.

Education 4.0 envisions a future of education that harnesses the potential of digital technologies, personalized data, and connectivity to foster lifelong learning. It revolutionizes the teaching-learning process, empowering learners to shape their own education through personalized, flexible, dynamic, and adaptive pathways. Extensive literature has demonstrated that Education 4.0-based systems bring significant societal benefits, offering increasingly efficient, agile, personalized, and affordable education. Emphasizing emotional intelligence and well-being is an integral part of this transformative approach (Haleem *et al.*, 2024).

As a University 4.0, NUM prioritizes key linkages to Curriculum 4.0. These include competency-based education, personalized learning paths, experiential learning, global perspectives, and continuous learning. These initiatives ensure a dynamic and comprehensive curriculum that prepares students for the demands of the modern world.

D	Linkages to Curriculum 4.0	Available	In process	Not applicable
1	Competency-Based Education	23 (57.5)	16 (40.0)	01 (02.5)
2	Personalized Learning Paths	18 (45.0)	13 (32.5)	09 (22.5)
3	Experiential Learning	31 (77.5)	8 (20.0)	01 (02.5)
4	Global Perspectives	29 (72.5)	10 (25.0)	01 (02.5)
5	Continuous Learning	23 (57.5)	16 (40.0)	01 (02.5)

As a University 4.0, NUM has successfully implemented global perspectives, competency-based education, experiential learning, and continuous learning initiatives. However, there is still progress to be made in terms of developing and implementing personalized learning paths. Efforts are underway to further enhance and integrate personalized learning approaches into the curriculum, providing students with tailored educational experiences.

The ability of universities to adapt to the demands of the 21st century will play a crucial role in shaping the future workforce. Skills such as critical thinking, effective communication, collaboration, and a growth mindset are essential in this context. By fostering these abilities, universities can equip students with the necessary tools to thrive in an ever-evolving professional landscape (Finegold, D., & Notabartolo, A. S. 2010).

Faculty members at Cambodia's National University of Management (NUM) may confront a number of significant hurdles while integrating emerging technologies into their instructional techniques. Addressing these problems is critical to the successful implementation of University 4.0 projects. Here are the main challenges: some faculty members may lack full proficiency in using advanced digital tools and technologies required for University 4.0, and there may be insufficient access to the necessary technological infrastructure, such as high-speed internet, computers, and specialized software. Some faculty members may be hesitant to adopt new teaching methodology and technology because they are comfortable with traditional ways. They frequently have enormous workloads, making it difficult to find time to study and integrate new technologies into their teaching practices. It's possible that instructors aren't receiving the ongoing assistance and organized training programs they need to acquire the necessary abilities to use developing technology. The National University of Management can help University 4.0 programs be implemented successfully by tackling these issues with focused tactics. This will eventually improve the quality of education and equip teachers and students for a future driven by technology.

Scholars stress that not every university is prepared for the shift to University 4.0. This can be explained by a number of factors, including inadequate technical support, a lack of control, design, and empowerment, inadequate development, and a lack of general knowledge about the characteristics of this model's implementation in the educational process at all organizational levels (Alzahrani et al., 2021). In order to better prepare educators and learners for the shift to University 4.0, it is first imperative that they become acquainted with the intricacies of this model and the characteristics of its integration into the educational process via seminars, special courses, and educational programs.

The perceptions and experiences of students at the National University of Management (NUM) regarding the use of digital technologies and online learning platforms play a significant role in their engagement and academic performance within the context of University 4.0. Here's a detailed exploration of these perceptions: Students like being

able to learn at their own speed and on their own schedule, which is made possible by digital technology and online learning platforms. improved access to a variety of learning resources, such as online libraries, interactive tools, and multimedia material, can enhance the educational process. Multimedia and interactive content, including gamified learning, videos, and simulations, can increase student engagement and enjoyment. The self-directed nature of online learning necessitates high levels of self-discipline and time management, which can be challenging for some students. On the other hand, some students feel that online learning lacks the personal interaction and immediate feedback that traditional classroom settings provide, leading to feelings of isolation. Students may also encounter technical issues like poor internet connectivity, software problems, or inadequate access to necessary devices, which can hinder their learning experience.

By understanding and addressing the perceptions and experiences of students regarding digital technologies and online learning platforms, the National University of Management can foster a more engaging and supportive learning environment, ultimately leading to improved academic performance and satisfaction.

Based on the respond of student in this study, there is a different perception on University 4.0 (U4.0) among students. They agreed that this paradigm could create permanent changes in a way of people work. As such, students are more familiar and interested in 4.0 technologies. One possible reason is because they are more involved in specific project that is close to industry 4.0. On the other hand, the level of education influences the perception of students based on the terms that academic job will be substituted by machines followed by the assumption that they have the strategy to develop their IR 4.0 skills. The improvement of innovation, for example, ICT greatly affects human life including the education system (education 4.0). There are researchers indicated that instructors, speakers, and students in schools or tertiary foundations utilized ICT in teaching and learning practice. This shows that computers, mobile phone and other specialized devices had occupied significant in education field development and techniques in delivering the process of teaching and learning (Brahim & Mohamad,

2018). Besides that, students in high level of education is likely to have more exposure on the use of technologies particularly students in urban schools. Therefore, they have more understanding on the uses and applications on components in IR4.0 such as cloud computing which is widely used nowadays. As compared to students in high schools, a number of them still highly depend on teachers as their source of knowledge and information. As a result, their understanding and practices on technologies related to IR 4.0 is still lacking.

However, not every nation has introduced the University 4.0 model to its academic institutions. The University 3.0 model, which links education, science, and innovative entrepreneurship and allows students to engage in both through the development of their business projects, is still in use in Thailand's current education system. This is a good example of how science and entrepreneurship can be combined. (Songkram, et al., 2021). Since information and communication links permeate all social development areas, the University 4.0 model views universities in the context of the knowledge economy and aims to develop innovative digital activities that can meet the needs of society as a whole. This is the main difference between the University 3.0 and University 4.0 models (Nguyen, X.T. & Nguyen, T.T., 2020).

The difficulties faced by higher education lecturers while implementing novel teaching strategies would be seen firsthand. It has seen how teaching approaches are impacted by the expectation that faculty members embrace and integrate technology into the curriculum. Certain technologies were formerly easily embraced and approved by both teachers and students. Based on years of experience, a faculty member's willingness to embrace and disseminate a new method of teaching and learning can sometimes be determined by whether or not they believe the technology is a suitable teaching tool for the subject they are teaching.

At other occasions, it was noted that instructors and students can resist embracing new technology because they thought the previous approaches and tools were sufficient. The instructor would argue that there was no reason to alter a tried-and-true teaching

strategy. The faculty's views about the uptake and dissemination of technology are consistent with the literature that was examined for this study: Because they see the potential repercussions of using new technologies, individual teachers' views, beliefs, and attitudes influence their decisions about technology adoption (Kardasz, S. M., 2013).

8. CONCLUSION

The adoption of University 4.0 principles at the National University of Management (NUM) in Cambodia can significantly impact teaching methodologies and learning outcomes. University 4.0 emphasizes the integration of digital technologies, personalized learning, and collaboration with industry to enhance education. Here are some ways these principles might manifest at NUM as respond by NUM instructors who familiar with teaching methodologies. The University 4.0 model requires a new-format instructor who possesses modern competencies of personal and professional growth (communicativeness, critical thinking, reflective thinking, creativity, self-organization), prefers modern teaching methods (person-centered and interdisciplinary approaches, use of cutting-edge teaching means, emphasis on practice and lifelong learning), and can adjust to the new requirements of the modern world and develop new competencies and skills. The pandemic experience has shown the importance of being prepared for the transition to a new format of learning, in particular, a remote one, and use of digital technologies. Thus, as researchers indicate, one of the priorities in today's universities should be to increase the readiness of educators to move to the University 4.0 model and introduce digital technologies in the educational process (Ishak, R. & Mansor, M., 2020).

Overall, the adoption of University 4.0 principles at the National University of Management in Cambodia can lead to more innovative, effective, and student-centered teaching methodologies, resulting in improved learning outcomes and better preparation for the future workforce. (University 4.0 will enable educational organizations to better adopt the integration of technologies and the autonomous management of learning

processes in University 4.0 for better management of the adaptation and differentiation of learning paths, as well as the optimization of learning processes)

University 4.0 embodies an innovative educational framework designed to align with the requirements of Industry 4.0. It seamlessly integrates Technology 4.0 and embraces the principles of Education 4.0, underpinned by a forward-thinking Curriculum 4.0. This comprehensive approach equips students with the adaptable skills necessary to thrive in a rapidly evolving global economy.

University 4.0 represents an innovative educational model that harnesses the power of digital technologies, leveraging connectivity to facilitate lifelong learning. It emphasizes the integration of physical and digital realms, enabling autonomous management of learning processes. This approach aims to enhance and adapt learning in response to the rapid advancements in technology, ultimately serving the needs of society. As stated by Gueye and Exposito (2020), "The University 4.0 provides autonomous management of learning processes based on the integration of the physical and digital worlds in order to improve and adapt learning."

University 4.0 is a revolutionary approach to higher education that effectively addresses the requirements of the fourth industrial revolution. By seamlessly integrating cutting-edge technologies and establishing strong partnerships with industries, universities can empower students with the essential skills and knowledge needed to excel in a digital economy. The flexible, personalized, and industry-focused nature of University 4.0 guarantees that learners are thoroughly prepared to navigate the ever-changing landscape of the future workforce, embracing both challenges and opportunities with confidence.

The findings of a study on the potential of developing new educational technologies in the digital era indicate that the establishment of future university models, such as University 4.0, should proactively anticipate the advancement of digital technologies. This can be achieved by leveraging cyber-physical systems and widely adopting artificial intelligence technologies in higher education. By accumulating a vast

knowledge base through these means, University 4.0 can stay at the forefront of technological advancements and effectively cater to the evolving needs of learners in the digital age.

The evolution of modern universities necessitates the development of educational technologies that align with the systemic nature of higher education. It is crucial to recognize that the success of these technologies relies not only on the advancements of the fourth industrial revolution but also on the changing socio-psychological traits of young individuals. In this regard, the study highlights new psychological characteristics of the younger generation, such as infantilism and personal irresponsibility, clip thinking, poor memory, low concentration of attention, dependence on gadgets, and an increasing digital presence. These factors have been found to have a significant impact on the effectiveness of higher education. Therefore, addressing these challenges is imperative in order to enhance the efficacy of higher education in the digital era.

9. RECOMMENDATIONS

The implementation of the University 4.0 framework at the National University of Management (NUM) necessitates a holistic transformation of educational practices, technological infrastructure, and institutional culture. By embracing the principles of the Fourth Industrial Revolution, NUM can effectively enhance its capacity to impart knowledge, foster innovation, and equip students with the necessary skills for thriving in the digital economy (Oke, A., & Fernandes, F. A. P. 2020). This strategic shift holds the promise of positioning the university as a frontrunner in higher education and innovation, both at the national and global levels.

In accordance with the Fourth Industrial Revolution, which encompasses Industry 4.0, Technology 4.0, Education 4.0, and Curriculum 4.0, University 4.0 represents a contemporary paradigm for higher education. The aim of this study is to shed light on the National University of Management's (NUM) intention to adopt the University 4.0 framework. Within the context of digital transformation, University 4.0 strives to achieve goals such as knowledge transmission, innovation support, and enhancement of

skills relevant to the professional world. The concept of University 4.0 is appealing as it aligns higher education with the principles of Industry 4.0.

Essential Elements and Prerequisites for Implementation:

1. New Learning Methods Appropriate for Competencies in Education, R&D, and Innovation (Education 4.0)

- Competency-Based Education: Emphasizing the acquisition of industry-relevant skills and competencies that align with industry standards.
- Interdisciplinary Learning: Encouraging students to participate in courses and projects that integrate knowledge and perspectives from various disciplines.
- Project-Based Learning: Utilizing learning approaches that involve practical, hands-on projects to solve real-world problems.

2. New Learning Methods Suitable for the Digital Era (Technology 4.0)

- E-Learning Platforms: Implementing robust online learning management systems to facilitate remote education and enable flexible learning opportunities.
- Virtual and Augmented Reality: Utilizing virtual and augmented reality technologies to create immersive learning environments, simulations, and interactive experiences.
- Artificial Intelligence: Leveraging artificial intelligence to provide personalized learning experiences, automate grading processes, and offer administrative support for educational institutions.

3. Innovative Infrastructure to Improve Learning Processes (Curriculum 4.0)

- Smart Classrooms: Incorporating state-of-the-art technology in classrooms to facilitate interactive and adaptable learning experiences.
- Digital Libraries: Offering comprehensive online resources, enabling students to access a wide range of materials from any location and at any time.
- Learning Analytics: Harnessing the power of data analytics to monitor and analyze student progress, allowing for personalized and targeted educational approaches.

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CHANGE MANAGEMENT IN THE DIGITAL TRANSFORMATION OF THE BANKING SECTOR IN CAMBODIA

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ABSTRACT

Change management in the digital transformation of the banking is not just moving from traditional banking to the digital world, but an important change in the way banks and other financial institutions learn about interacting and satisfying customers. This study aims to find out the key factors driving change management in digital transformation and the relationship between change management model and successful digital transformation. The study utilizes a descriptive quantitative approach to explore the perceptions and experiences related to this transformation specifically within Cambodia's banking industry. The research employs purposive sampling to select 62 participants, including branch managers, bank officers, staff, and other stakeholders from various banks in Cambodia. The significant findings of this study are: (1) digitalized operating model to increase productivity and (2) skillset need to improve to fulfill changing operational demands are perceived as more critical of factors driving change; big data analytics is more important for technology driving digital transformation; and all stages of change management have significant positive correlations with successful digital transformation. Thus, it highlights the critical role of advanced technologies, robust key performance indicators, and effective change management strategies in driving successful digital transformation.

Keywords: *Change, Change Management, Digital Transformation, Banking Sector*

1. BACKGROUND OF STUDY

Organizations today are under pressure from the changing environment, where global trends such as digitalization entail constant changes which affect the conditions for how organizations should run their business (Hallin et al., 2020). For instance, Industry 4.0 affects almost all industries, where production and logistics are affected, and new connections to technology within the physical and digital worlds have been created (Robert et al., 2022; Molino et al., 2020). Furthermore, the technology advancements implies that changes are occurring fast, and that the competitiveness is rapidly increasing for organizations on the market (Hanelt et al., 2021). According to the fourth annual digital transformation survey (2022), conducted by Harvard Business Review Analytic Services of 727 Executives from around the globe found that 92% say their organization's digital transformation will become more important to business success. Digital transformation is a process of organizational change that enables an organization to use technology in create new value for customers, employees, and other stakeholders. However, a successful digital transformation requires a strong change management strategy (Kumar, 2023).

The banking industry has undergone a significant transformation with advances in digital technology. This shift includes the use technology such as online banking, mobile banking, and digital payments. At the same time, customers are also increasingly choosing banking services that are easy to access, fast and safe. Therefore, banks must be ready to face challenges and take advantage of opportunities that arise from this transaction (Nurjanah, Shalshabilla & Wulan Dari, 2023). In Cambodia, the banking industry has begun engaging in extensive digital transformation efforts to meet the local market's growing demands (NBC, 2022). Commercial banks are the largest and most important type of bank and they offer a wide range of services to individuals and businesses, including checking and savings accounts, loans, and credit cards and mobile banking has seen a rapidly increasing rate of adoption in Cambodia (NBC, 2023).

2. PROBLEM STATEMENT

The study conducted by the Boston Consulting Group, however, shows that among 825 companies which claimed to move towards Industry 4.0, 70% didn't achieved the goals. Uchihira (2021) argues that 84% of digital transformations fail. According to Dergletckaia (2023) states that digital transformation is expanding tremendously, but the risk of failure remains still high. Cambodia has made significant progress in digitalization in recent years. However, there are still a number of challenges that need to be addressed in order to fully realize the potential of digital technologies (Aquarii, 2023). One of the biggest challenges to digitalization in Cambodia is the low level of financial and digital literacy. Many people in Cambodia, especially those in rural areas, do not have the knowledge or skills to use digital banking services. This can make it difficult for them to access financial services and participate in the digital economy. Another challenge to digitalization in Cambodia is the threat of cybersecurity, as more and more people use digital banking services, there is an increased risk of fraud and cyberattacks. This is a serious concern, as it could undermine public trust in digital banking and hinder the growth of the digital economy. There are also now dozens of different providers offering similar products and services, this can make it difficult for consumers to choose the right provider for their needs (Aquarii, 2023).

3. RESEARCH QUESTIONS

Digital transformation is rarely easy to succeed, but effective change management makes change feel less difficult and brings the benefits of change into sharper focus, both of which make employees more likely to support change and help to make it stick (APQC, 2022). Change management can help organizations overcome the challenges of digital transformation and realize the full benefits of their investment. This study aimed to answer the three following questions:

1. What factors driving change management in digital transformation of the banking sector?
2. What technology driving digital transformation in banking sector?
3. How do the banks measure successful digital transformation?

4. How do the banks implement change management during digital transformation?

4. RESEARCH OBJECTIVES

Change management of the commercial banks in digital transformation is not just moving from traditional banking to the digital world, but an important change in the way banks and other financial institutions learn about interacting and satisfying customers. The main objectives of the study:

1. To find out the factors driving change management in digital transformation of the banking sector.
2. To study the technology that drive digital transformation in banking sector.
3. To measure the key successful change management in digital transformation of the banking sector.
4. To discuss the implementation of change management in relation with successful digital transformation.

5. SIGNIFICANCE OF STUDY

The study of change management in the digital transformation of Cambodia's banking industry is essential for harnessing the full potential of technological advancements. As Cambodia's banking sector embraces digital transformation, understanding change management becomes crucial. It enables banks to adapt, compete, and thrive in a digital-first economy while delivering superior customer experiences and driving economic development.

6. METHODOLOGY

This study utilizes a descriptive quantitative approach to provide a detailed account of variables concerning change management in the digital transformation of the banking sector. It aims to explore perceptions and experiences related to this transformation specifically within Cambodia's banking industry. The research employs purposive sampling to select 62 participants, including branch managers, bank officers, staff, and

other stakeholders from various banks in Cambodia. Data collection is conducted through a Google Form survey focusing on factors and technologies driving digital transformation, as well as measures of its success. The survey includes questions based on Kurt Lewin's 3-step change management model, using a Likert scale for responses, and the data is analyzed using descriptive statistics such as frequencies, means, and correlations.

7. ETHICAL CONSIDERATIONS

Ethical considerations include obtaining informed consent from participants, ensuring confidentiality of responses, and adhering to ethical guidelines throughout the research process.

8. LITERATURE REVIEW

8.1 The Concept of Digital Transformation

The term digital transformation refers to the use of digital technology; such as, machine learning, virtual and augmented reality, artificial intelligence and internet of things, in order to improve or create new business process. It is a systematic change that aims to use disruptive technologies for better productivity, social welfare and value creation (Ebert & Duarte, 2018). According to Verhoef et al., (2021), digital transformation has two prerequisite stages; digitation and digitalization. Digitation is the process documents are stored and transferred from analogue information to digital information, while, digitalization represents the effect of digital technologies on work practices. Furthermore, digital technologies consider people and leadership not only technology (Alhinaai, 2023). Digital transformation has a broad perspective of how organizations can adapt to new technology (Imran et al., 2021). For instance, digital transformations involve changes in working methods, business offers, and professional roles due to implementation of digital technologies. Thus, digital transformation is about organizational change (Hanelt et al., 2021), rather than only addressing a specific technology. Thereby, digital transformation is a combination of advanced social systems and digital technologies, which enables improvements on business ideas by better services, products, customization, new business processes and innovation (Imran et al.,

2021; Molino et al., 2020). Digital transformation involves utilizing digital assets such as digital technologies and tools to transform existing business processes and systems. Thus, digital transformation is quite hard to achieve without first understanding how digital technologies can benefit businesses. Change management is the documented process for implementing any change, large or small, to an existing business process or system. Well-executed change management steps can significantly improve digital outcomes (Ghosh, 2023).

8.2 Digital Transformation in Banking Sector

Digital transformation in banking refers to the integration of digital technologies and innovative strategies into the financial services sector to improve operational efficiency, enhance customer experiences, and adapt to the evolving market landscape (Ovington, 2023). Digital transformation in banking is not merely a shift from traditional to digital methods but entails a strategic process of analyzing, engaging, and satisfying customer needs (Singh, 2024). This transformation makes a shift from product-centric to customer-centric banking, driven by understanding customer behavior, preferences, and demands. Many banks initiated their digital banking strategies years ago, recognizing the prevalence of digital channels among their customer base (Singh, 2024). The transformation involves integrating technology comprehensively across banking operations, revolutionizing service delivery and competitiveness in a crowded market (Ovington, 2023). Examples of digital transformation in banking include:

1. **Mobile Banking**: Mobile banking enables customers to manage their accounts, conduct transactions, monitor investments, and access customer support via smartphone applications, enhancing convenience and accessibility (Kazim, 2023).

2. **Digital Account Opening**: Automation has streamlined the account opening process, reducing the time and manual effort required, and allowing staff to focus more on customer-centric activities (Ovington, 2023).

3. **Digital Payments**: Integration of digital payment systems facilitates online transactions, mobile payments, and digital wallets, offering customers flexibility and transparency in financial transactions (Kazim, 2023).

8.3. Factors Driving Digital Transformation in Banking Sector

1. **Customer Centricity:** Digital transformation in banking prioritizes meeting customer expectations for seamless service delivery, high-end user experiences, personalized interactions, transparency, and security (PwC, 2022). Adopting a customer-first approach is critical for achieving competitive success in the rapidly evolving market.

2. **Continuous Improvement:** An agile innovation pipeline is essential for continuous improvement in digital banking. This approach facilitates rapid adaptation to market changes, testing of innovative products, and iterative improvements based on customer feedback, enhancing service delivery and accelerating time-to-market (Deloitte, 2021).

3. **Modernized Infrastructure**: Beyond implementing digital technologies, modernizing legacy infrastructure is crucial for facilitating seamless data flow essential for frontend digital transformation (McKinsey & Company, 2023). Technologies like microservices, APIs, and DevOps enable continuous integration and shorter release cycles.

4. **Operating Models**: Digital transformation introduces three distinct operating models in banking:

   - *Digital as Business:* Integrating digital strategies at the management level.

   - *Digital as New Line of Business:* Establishing separate digital divisions.

   - *Digital Native:* Developing new setups with dedicated technology stacks focused directly on customers (Accenture, 2023).

5. **Identify Viable Solutions**: Identify and leverage all potential solutions, even those considered obsolete, to optimize digital transformation efforts without unnecessary expenses (Forbes, 2022).

6. **Leverage the Power of Data**: Implementing data analytics practices enables banks to gain insights into customer behaviors and preferences, facilitating the development of tailored products and services (Gartner, 2021).

7. **Skillset Improvement**: Invest in upgrading employee skill sets to align with digital transformation goals, fostering a culture of continuous learning and adaptability (World Economic Forum, 2023).

8. **Completely Digital-Driven Approach**: Ensure the organization possesses comprehensive digital capabilities such as strategy, culture, technology, funding, and skills to fully embrace and succeed in digital transformation (PwC, 2022).

8.4 Technology Driving Digital Transformation in Banking Sector

- **Artificial Intelligence and Machine Learning:** Artificial intelligence (AI) has revolutionized banking by enabling advancements such as chatbots, online assistants, predictive analytics, and data-driven insights (Accenture, 2023). Machine learning (ML) enhances fraud detection capabilities by continuously analyzing customer data to identify anomalies in real-time and recommend preventive measures (Deloitte, 2021).

- **Blockchain:** Blockchain technology has significantly impacted banking by enhancing transparency, facilitating secure digital transactions, and improving user interfaces (PwC, 2022). It ensures the integrity and security of transactions through decentralized and immutable ledgers.

- **Internet of Things (IoT):** IoT technologies enable biometric sensor-based authentication, asset tracking, location-based services, and contactless payments in banking (McKinsey & Company, 2023). Real-time data analytics personalize customer experiences and enhance risk management practices through seamless data exchange across various platforms.

- **Cloud Computing:** Banks have increasingly adopted cloud computing to enhance operational efficiency and agility (Gartner, 2021). Cloud-based solutions facilitate rapid deployment of applications and infrastructure, enabling banks to deliver products and services more swiftly and effectively.

- **Big Data Analytics:** Big data analytics has transformed banking operations by analyzing customer behavior, enhancing risk assessment, and improving feedback management (Forbes, 2022). It provides insights that drive personalized customer experiences and operational efficiencies within financial institutions.

8.5 Measures Digital Transformation in Banking Sector

1. **Customer Satisfaction:** Digital transformation enhances the customer experience by making interactions more seamless and personalized. Organizations can measure customer satisfaction through feedback surveys, online reviews, or testimonials to assess how well they meet customer needs (Gartner, 2021).

2. **Digital Engagement:** Digital engagement measures how customers interact with an organization's digital channels, such as websites, social media, or mobile apps. Analyzing engagement metrics helps organizations optimize effective channels and improve customer interaction (McKinsey & Company, 2023).

3. **Conversion Rates:** Conversion rates indicate the percentage of visitors who complete desired actions, like purchases or form submissions. Tracking conversion rates helps organizations refine digital strategies and enhance user experience to drive more conversions (Forbes, 2022).

4. **Operational Efficiency:** Operational efficiency measures how effectively resources are utilized to achieve organizational goals. Digital transformation enables process automation and streamlining, leading to cost savings and improved efficiency (Deloitte, 2021).

5. **Employee Productivity:** Employee productivity assesses how efficiently digital tools are used in job performance. Providing employees with effective digital tools enhances productivity and collaboration (PwC, 2022).

6. **Time-to-Market:** Measures how quickly organizations can launch new products or services. Digital transformation optimizes product development

processes, reducing time-to-market and increasing competitiveness (Accenture, 2023).

7. **Return on Investment (ROI):** ROI evaluates financial returns from digital transformation initiatives. Tracking ROI helps assess the effectiveness of investments and identify areas for improvement, ensuring initiatives generate expected returns (KPMG, 2021).

8.6 Change Management in Digital Transformation

Change management is a structured approach that enables organizations to transition from the current state to the desired future state. It involves identifying, communicating, and implementing necessary changes to achieve strategic objectives successfully. In the context of digital transformation, change management plays a pivotal role in orchestrating a smooth transition. It helps employees understand why the changes are happening, aligns their efforts with the transformation objectives, and provides support throughout the journey (Andre Manteigas, 2023). Change management in digital transformation is everything an organization does to help its teams adopt new technologies. While change is constant, half of all change initiatives fail. And the top-down approach to implementing change has lost its impact in modern society. So, companies have shifted change management to a collaborative approach with their employees. Successful digital transformations rely on the employees to lead the changes, not the executives. And at the crux of it, the system's end-users want to know what's in it for them from the start. Leaders play a central role in driving digital transformation. Their visible support and commitment to the change are crucial in influencing the organization's attitude towards transformation. When leaders actively participate and demonstrate their commitment, employees are more likely to embrace the changes with confidence. Empowering employees to become champions of the transformation is crucial. Training programs and upskilling initiatives equip employees with the necessary digital skills and knowledge to thrive in the digital age. Organizations should invest in comprehensive training programs that address the specific needs of different employee groups. Empowered employees are more likely to adopt new

technologies, innovate, and drive change from within the organization (Andre Manteigas, 2023).

8.7 Review Theoretical Models of Change Management

Over the past decade, multiple change management models and processes have been developed and used to direct change initiatives within industries and organizations. There are numerous models and theories about change management, and it is a topic subject to more than its fair share of management fads and fashions. Popular approaches include the linear, step by step methods exemplified by Kurt Lewin's classic three-step model, John Kotter's popular eight-phase model, the McKinsey's 7-S model, and the ADKAR model. Each approach has its pros and cons, however no one framework is "best" in more that the approach that taken is relevant to the circumstance. In fact, the best change approaches appear to use and adapt aspects of various models to suit the culture of the organization and the context of the change (Queensland, 2014).

8.7.1. Kurt Lewin's Model (1951)

Lewin's model emphasizes the need to diagnose the critical steps of a change program in order to reach its goals successfully. The power of Lewin's model does not lay in a formal propositional kind of theory but in the ability to build "models" of processes that can draw attention to the right kinds of variables that needed to be conceptualized and observed. Following are some further elaborations on the three stages (Kurt Lewin, 1951):

1. *Unfreezing:* The essence of this stage is to reduce the forces that maintain the organization's behavior at its present level. It enables a better understanding of the change program and the need for it e.g., through education, training and development program and team building that secures acceptance by helping managers and employees understand the need for the change.

2. *Changing* (Movement /implementing): having analyzed the present situation, the identified solutions are put into action to support the change program e.g., by changing organization structure, roles or processes and introducing performance management systems that recognize particular progress and individual and team contributions.

3. *Refreeze:* stabilizes the change program at a new state of equilibrium in order to ensure that the new ways of working are embedded, maintained and cemented from regression

e.g., through new recruitment, induction programs, performance management systems and cultural reinforcement through the creation of new norms and behaviors.

8.7.2. John Kotter's Model (1996)

In generic management and organization science the eight-step model for successful implementation of organizational change by Jonh Kotter (1996) is well-known and widely accepted.

The eight steps:

1. *Establishing a sense of urgency:* A sense of urgency is crucial in the initial stages of the process. It must primarily overcome any sense of complacency within the organization.
2. *Creating the guiding coalition:* A core group with enough power to lead the change through the transition stat is required to drive the process.
3. *Developing a vision and strategy:* A vision needs to be created in order to direct the course of change. In conjunction with the vision, there should be a strategy designed to achieve the vision.
4. *Communicating the change vision:* The new vision and strategies for implementation of the change process need to be continually communicated using all practical means.
5. *Empowering broad-based action:* How to create an environment in which the actions required for change can take place. Critical empowering actions need to be taken to allow change to occur.
6. *Generating short-term wins:* Positive feedback in the early stages of the project is a critical success factor and plays an important part in sustaining the vision e.g., through the achievement of interim targets; short-term wins.
7. *Consolidating gains and producing more change:* Systems, structures, and policies may be further adapted to be in line with the vision.
8. *Anchoring new approaches in the culture:* Maintaining the results of change in organizational, group and individual culture is crucial e.g., creating better performance through effective management and leadership development and succession.

8.7.3 The ADKAR Change Management Model

The ADKAR model is a change management tool developed by founder of Prosci Jeff Hiatt (2003) to help identify why change is difficult and why some changes succeed

while others are unsuccessful. The model is mainly intended to be a coaching tool and the model focuses on helping and assisting employees through the change process within organizations.

1. *Awareness of the need for change*. Understanding why change is necessary is the first and main key aspect of successful change. This step explains the reasoning and thought that underlies a required change.

2. *Desire the change.* is the second element of the ADKAR model and represents the motivation and ultimate choice to support and participate in a change. Unlike awareness-building, where we can make definition steps to generate the awareness of the need of change, creating the desire to change remains elusive and not under in our control.

3. *Knowledge of change.* is the third building block of the ADKAR model, and represents how to implement the change. This element providing knowledge about the change, that can be achieved through normal training and education methods. Other methods of transferring knowledge are forums and coaching.

4. *Ability to make change.* is the fourth element of the ADKAR model and represents the demonstrated capability to implement the change and achieve the desired performance level. In this model Ability is understood to be the difference between theory and practice.

5. *Reinforcement of the change.* to sustain the change. This final stage of the model is an essential component in which efforts to sustain the change are emphasized. Ensuring that changes stay in place and that individuals do not revert to old ways can be achieved through positive feedback, rewards, recognition, measuring performance and taking corrective actions.

8.8 Comparing Change Management Models in Digital Transformation of Banking

When considering change management in digital transformation, each of the three models Kurt Lewin's 3-step model, John Kotter's 8-step model, and ADKAR, offers distinct advantages depending on the context and objectives of the transformation.

- **Kurt Lewin's 3-Step Model:** Lewin's model is suitable for straightforward, incremental changes where the organization needs to unfreeze the current state, implement changes, and then refreeze the new state to make it permanent. It can be applied in digital transformation for initiating awareness of the need for change (unfreezing), implementing digital technologies and new processes (changing), and embedding these changes into the organizational culture and operations (refreezing). This model is effective when the digital transformation involves clear phases and relatively stable conditions (Lewin, 1947).

- **John Kotter's 8-Step Model**: Kotter's model is more comprehensive and suitable for larger-scale transformations or situations where resistance to change is anticipated. It emphasizes creating urgency, building a guiding coalition, and ensuring short-term wins to sustain momentum. In digital transformation, Kotter's model is beneficial for addressing complex changes that require buy-in from multiple stakeholders and continuous reinforcement of the transformation vision. It helps in navigating resistance, managing cultural shifts, and maintaining motivation throughout the transformation journey (Kotter, 1996).

- **ADKAR Model**: ADKAR focuses on individual change management, emphasizing the awareness, desire, knowledge, ability, and reinforcement necessary for individuals to adopt change successfully. ADKAR is particularly useful in digital transformation for addressing the human side of change. It helps in identifying where individuals may struggle with new technologies or processes and provides a structured approach to ensuring they have the necessary awareness, skills, and motivation to adapt. This model is effective for ensuring that the organization's digital transformation efforts translate into individual behavioral change and adoption (Hiatt, 2006).

Based on reviewing the three popular models of change management, the Kurt Lewin Change Management Model is highly appropriate for digital transformation in the banking sector due to its structured approach, which effectively addresses the complexities and challenges associated with organizational change. Here are several reasons why this model is particularly relevant:

- Digital transformation often requires a shift in employee behaviors, customer interactions, and operational processes. The Lewin Model emphasizes the importance of understanding current behaviors (unfreezing), implementing new practices (changing), and reinforcing these changes (refreezing). For banks transitioning to digital platforms, this aspect is crucial as it helps align employee actions and customer experiences with the new digital strategy (Cummings & Worley, 2015).

- Lewin's model advocates for involvement and participation from stakeholders throughout the change process. In the banking sector, where different departments, regulatory bodies, and customers are involved, this participatory approach fosters collaboration and buy-in. Engaging employees and stakeholders early in the digital transformation journey can mitigate resistance and enhance the likelihood of successful adoption (Burnes, 2004).

- The Lewin Model acknowledges that change is a dynamic process and encourages flexibility in response to feedback and emerging challenges. In the rapidly evolving digital landscape of banking, where technologies and customer expectations continually evolve, this adaptability is critical. Banks can use this model to continuously assess and adjust their digital strategies based on market trends and technological advancements (Chinomona, 2016).

- Evaluation and feedback are integral parts of the Lewin Model, particularly during the refreezing stage. Banks can use metrics and feedback mechanisms to assess the impact of digital transformation on customer satisfaction, operational efficiency, and profitability. This data-driven approach enables continuous improvement and ensures that digital initiatives align with organizational goals (Kotter, 1996).

- Digital transformation in banking involves inherent risks, including cybersecurity threats, regulatory compliance issues, and operational disruptions. The Lewin Model encourages proactive risk assessment and mitigation strategies during the change process. By addressing risks early and

systematically, banks can minimize potential disruptions and safeguard their operations during the transition to digital platforms (Senior & Swailes, 2010).

9. DISCUSSION OF FINDINGS

9.1 Gender

Figure 9.1: Gender of the respondents

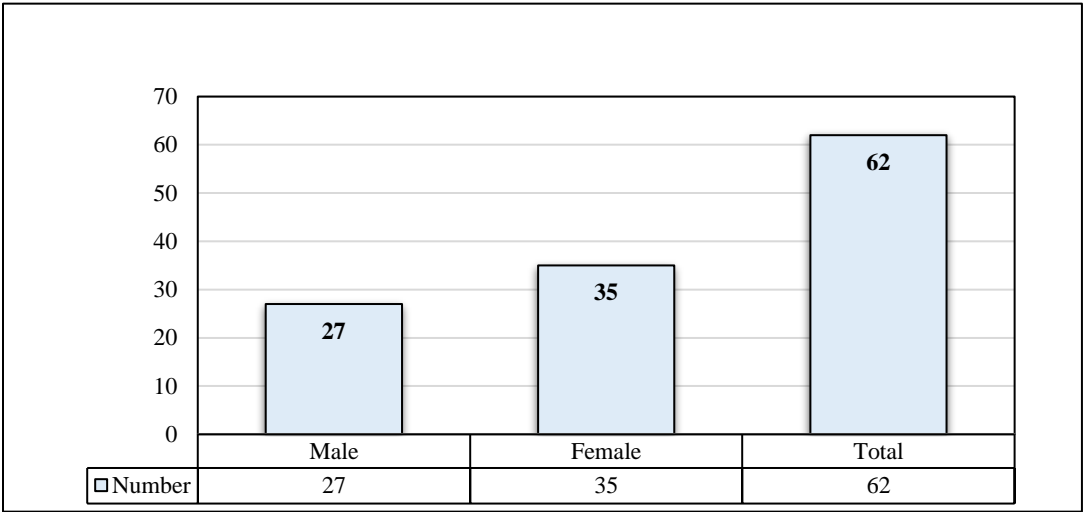|	Male	Female	Total
□ Number	27	35	62

Figure 9.1 shows the gender of the respondents, among 62 respondents, there are 27 (43.5%) female and 35 (56.5%) are male.

9.2 Academic Background

Figure 9.2: Academic Background

	Accounting	Finance	Banking	IT	Management	Other	Total
□ Number	3	3	22	2	20	12	62
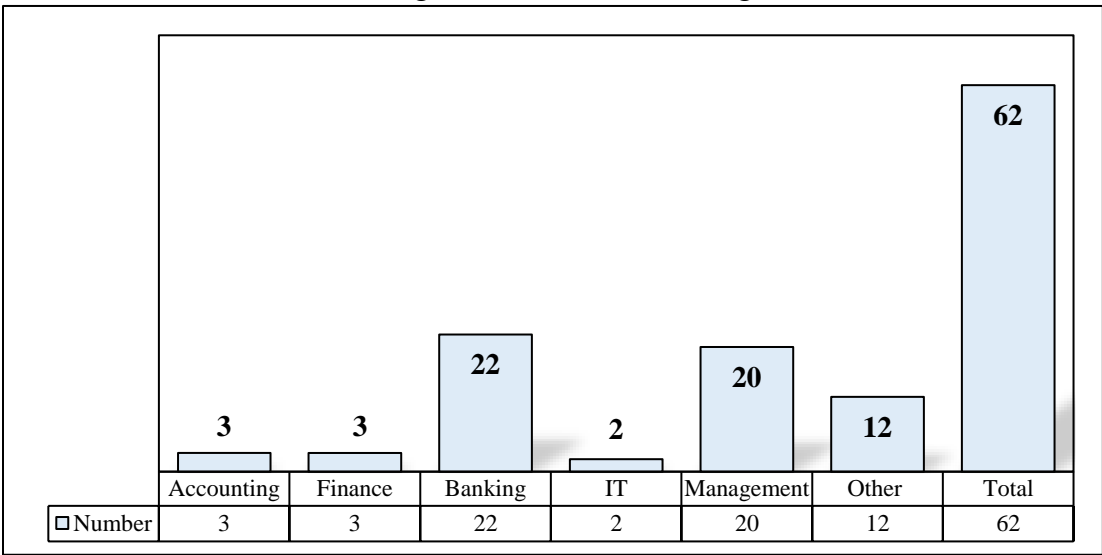
Figure 9.2 shows the academic background of the respondents, among 62 respondents, there are 3 (4.8%) Accounting, 3 (4.8%) Finance, 22 (35.5%) Banking, 2 (3.2%) IT, 20 (32.3%) Management, and others 12 (19.4%).

9.3 Organization/Institution

Figure 9.3: The Organization of the respondents

	Public Bank	Commercial Bank	Specialized Bank	Microfinance	Other	Total
Number	3	29	1	1	28	62
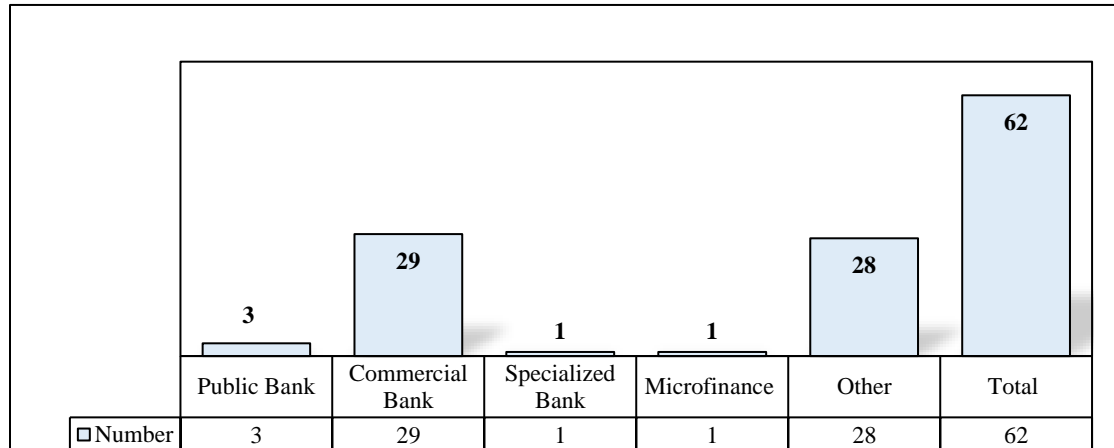
Figure 9.3 shows the results of the respondent organization, among 62 respondents, there are 3 (4.8%) Public Bank, 29 (46.8%) Commercial Bank, 1 (1.6%) Specialized Bank, 1 (1.6%) Microfinance, and others 28 (45.2%).

9.4 Position of the Respondents

Figure 9.4: Position of the Respondents

	Branch Manager	Deputy Branch Manager	Bank Officer	Bank Staff	Other	Total
Number	5	2	19	14	22	62
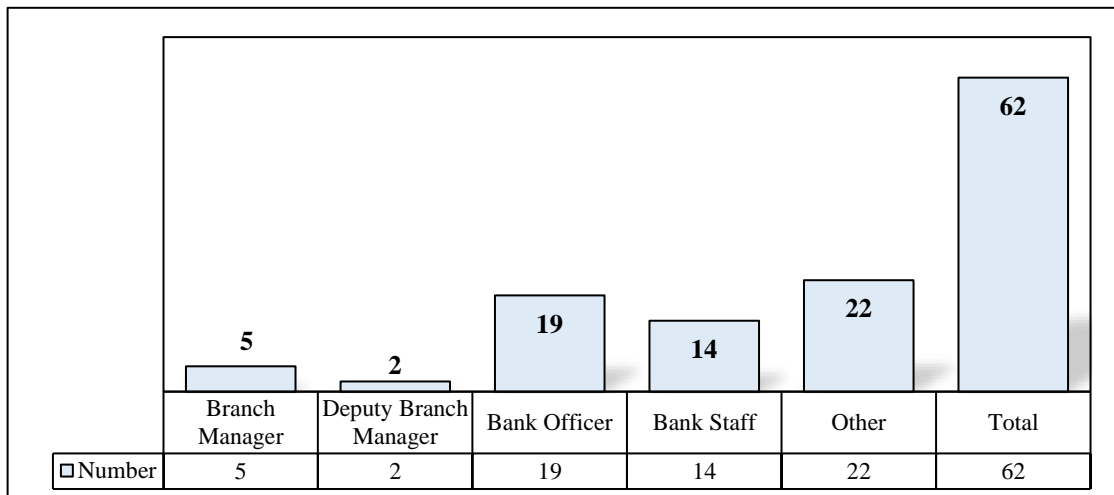
Figure 9.4 shows the results of the respondent positions, among 62 respondents, there are 5 (8.1%) Branch Managers, 2 (3.2%) Deputy Branch Managers, 19 (30.6%) Bank Officers, 14 (22.6%) Bank Staff, and others 22 (35.5%).

9.5 Working in Department of the Organization

Figure 9.5: Working in Department of the Organization

	Marketing	Operations	Finance	Human Resource	Other	Total
□ Number	5	13	5	2	37	62
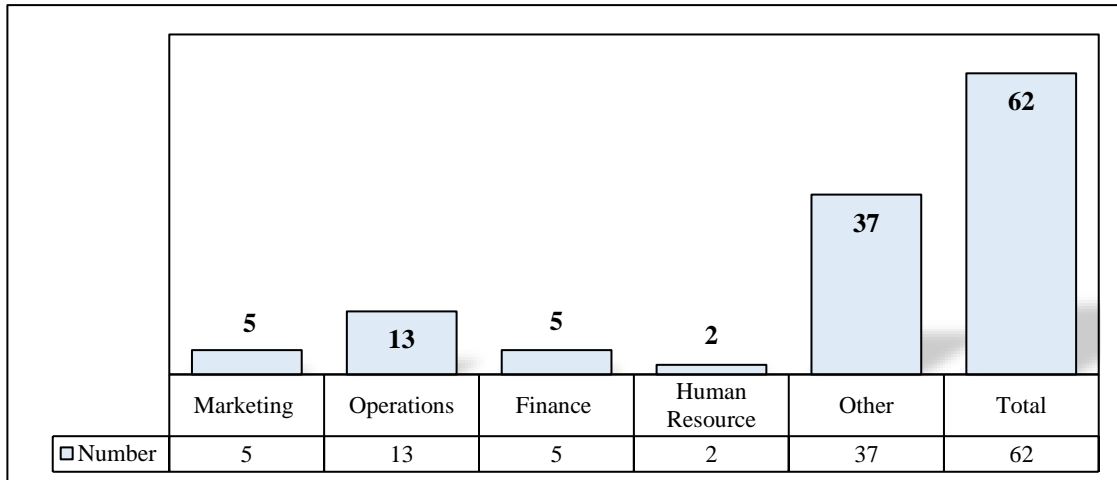
respondents, there are 5 (8.1%) Marketing, 13 (21%) Operations, 5 (8.1%) Finance, 2 (3.2%) Human Resource, and others 37 (59.7%).

9.6 Years of Working Experience

Figure 9.6: Working Experiences

Figure 9.6 shows the results of how many years that respondents work experience, among 62 respondents, there are 14 (22.6%) have over 10-year experience, 22 (35.5%) have 6 to 10 years of working experience, 21 (33.9%) have 4 to 5 years of working experience, and 5 (8.1%) have 1 to 3 years of working experience.

9.7 Understanding Digital Transformation in Banking Sector

Table 9.7: Understanding of Digital Transformation in Banking Sector

	N	%
Yes	52	83.9%
No	10	16.1%
Total	62	100%

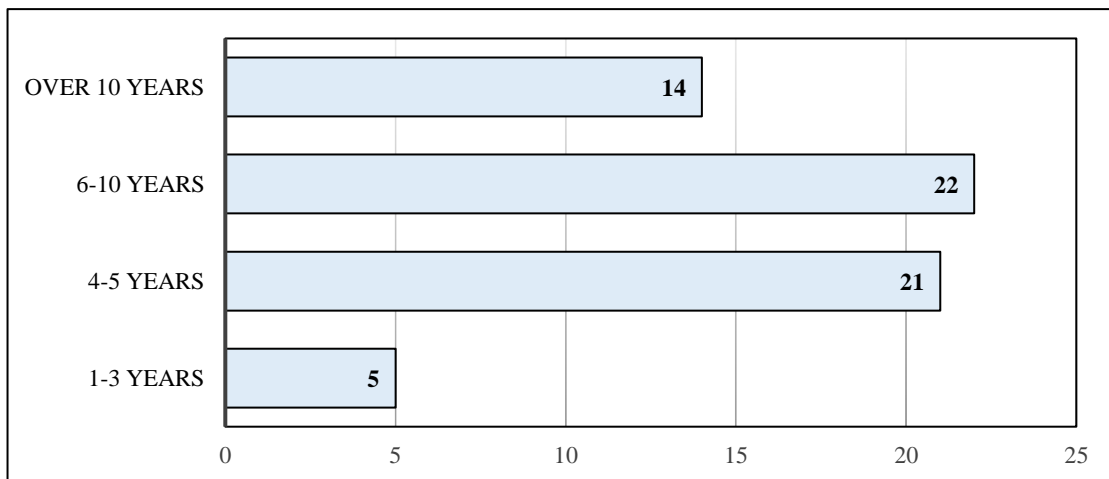The table 9.7 presents the results of question on do you understand the digital transformation in banking sector? Among 62 of the respondents, there are 52 (83.9%) answer yes, and only 10 (16.1%) answer no.

9.8 RQ1: Factors Driving Change Management in Digital Transformation of Banking Sector in Cambodia

Table 9.8: Factors Driving Change Management in Digital Transformation

Descriptive Statistics		
What factors driving change management in digital transformation of banking sector in Cambodia?	Mean	Std. Dev
1. Customer expectations in the fast-changing market trend	3.65	.704
2. Rapid advancement of digital technologies	3.82	.779
3. Modernize infrastructure to facilitate banking operations	3.79	.750
4. Digitalize operating model to increase productivity	**4.00**	.701
5. Modernize legacy infrastructure to identify viable solutions	3.68	.763
6. Power of data in driving the banking success	3.82	.758
7. Skillset need to improve to fulfill changing operational demands	**4.00**	.701
8. Digital capabilities to develop a perfect digital strategy	3.97	**.809**

The results of descriptive statistics, table 9.8 show that item 4: digitalize operating model to increase productivity has the mean score of 4.00, and item 7: skillset need to improve to fulfill changing operational demands has the mean score of 4. These suggest that, on average, respondents are perceived as more critical or effective, as it's closer to the highest possible score (which typically ranges from 1 to 5 in Likert-type scales). Standard deviations vary across variables, indicating differing levels of consensus or agreement among respondents. "Digital capabilities to develop a perfect digital strategy" (item 8) has a standard deviation of 0.809, indicating more variability in how respondents rated this aspect compared to the mean. Thus, this descriptive statistic provides a snapshot of how respondents perceive various aspects related to banking operations and digital transformation. It highlights which areas are seen as more crucial and where opinions are more varied. These insights can guide further analysis or decision-making processes related to enhancing banking operations and digital strategies.

9.9 RQ2: Technology Driving Change Management in Digital Transformation of Banking Sector in Cambodia

Table 9.9: Technology Driving Change Management in Digital Transformation

Descriptive Statistics		
What technologies driving change management in digital transformation of banking sector in Cambodia?	Mean	Std. Dev
1. Artificial intelligence and marching learning	3.71	**.912**
2. Blockchain technology	3.69	.781
3. Internet of things	3.77	.688
4. Cloud computing	3.74	.788
5. Big data analytics	**4.02**	.779
6. Cybersecurity	3.89	**.960**
7. Robotic process automation	3.65	.832
8. Application programming interface	3.76	**.953**

The results of study shows that the "Big data analytics" (item 5) has the mean score of 4.02. This suggests that, on average, respondents perceive this aspect to be quite important or effective. The standard deviation measures the amount of variation or

dispersion in the responses for each variable. A larger standard deviation indicates more variability in responses. For instance, "Cybersecurity" (item 6) has a relatively high standard deviation of 0.960, indicating more variability in how respondents rated this aspect compared to the mean. Thus, this descriptive statistic provides insights into how respondents perceive various technologies related to digital transformation in banking. It highlights which technologies are seen as more crucial and where opinions are more varied. These insights can inform decision-making processes related to technology adoption and strategy within the baking sector.

9.10 Kurt Lewin Model Step 1

Table 9.10: Kurt Lewin Step 1-Change Management in Digital Transformation

Descriptive Statistics		
To what extent do you agree on the following questions are the first step of change management in digital transformation in Cambodia?	Mean	Std. Dev
1. Recognize the needs for change	3.89	.791
2. Determine what needs to change	3.77	.777
3. Ensure there is strong support from management	**3.95**	.876
4. Encourage the replacement of old behaviors and attitudes	3.76	**.900**
5. Manage and understand the doubts and concerns	3.81	**.865**

The results of study shows that the item 3: ensure there is strong support from management has the mean score is 3.95. This suggests that, on average, respondents perceive this aspect to be relatively important or effective in managing change. The standard deviation of item 4: encourage the replacement of old behaviors and attitudes, and item 5: manage and understand the doubts and concerns have higher standard deviations (0.900 and 0.865, respectively), suggesting more varied perceptions compared to other variables with smaller standard deviations. Thus, this descriptive statistics table provides insights into how respondents perceive various factors related to managing change within an organization. It highlights which factors are seen as more crucial and where opinions are more varied. These insights can guide strategies and

approaches to effectively manage change processes, ensuring alignment with organizational goals and employee perceptions.

9.11 Kurt Lewin Model Step 2

Table 9.11: Kurt Lewin Step 2-Change Management in Digital Transformation

Descriptive Statistics		
To what extent do you agree on the following questions are the second step of change management in digital transformation in Cambodia?	Mean	Std. Dev
1. Plan the changes	3.94	.903
2. Implement the changes	3.89	.943
3. Help employees to learn new concepts	3.89	.960

The results of study shows that the item 1: plan the changes has the mean score of 3.94. This suggests that, on average, respondents perceive planning changes as important or effective. The standard deviation of item 3: help employees to learn new concepts has a higher standard deviation (0.960), suggesting more varied perceptions compared to other variables with smaller standard deviations. This descriptive statistic provides insights into how respondents perceive various activities related to managing changes within an organization. It highlights which activities are seen as more crucial and where opinions are more varied. These insights can guide strategies and approaches to effectively plan, implement, and support change initiatives, ensuring alignment with organizational goals and employee perceptions.

9.12 Kurt Lewin Model Step 3

Table 9.12: Kurt Lewin Step 3-Change Management in Digital Transformation

Descriptive Statistics		
To what extent do you agree on the following questions are the third step of change management in digital transformation in Cambodia?	Mean	Std. Dev
1. Reinforce and stabilize the change	3.97	.923
2. Integrate change into the normal way of doing things	3.76	.803

3. Develop ways to sustain the changes	3.89	.870
4. Celebrate success of changes	3.81	.920

The results of study shows that the item 1: reinforce and stabilize the change has the mean score of 3.97. This suggests that, on average, respondents perceive this aspect to be relatively important or effective in managing change. The standard deviations of item 4: Celebrate success of changes has a higher standard deviation (0.920), suggesting more varied perceptions compared to other variables with smaller standard deviations. This descriptive statistic provides insights into how respondents perceive various aspects related to managing and integrating change within an organization. It highlights which aspects are seen as more crucial and where opinions are more varied. These insights can guide strategies and approaches to effectively manage change processes, ensuring successful integration and sustainability of changes within the organization.

9.13 RQ3: Measures of Change Management in Digital Transformation

Table 9.13: Measures of Change Management in Digital Transformation

Descriptive Statistics		
To what extent do you agree on the following questions are the measures of successful digital transformation in Cambodia?	Mean	Std. Dev
1. Customer satisfaction	**3.98**	.779
2. Digital engagement	**3.85**	.786
3. Conversion rate	3.39	.817
4. Operational efficiency	**3.82**	.859
5. Employee productivity	3.81	.807
6. Time-to-market	3.81	.786
7. Return on investment	3.69	**.861**

The results of study shows that the item 1: customer satisfaction has the mean score is 3.98. This suggests that, on average, respondents perceive customer satisfaction to be quite high. This is followed closely by item 4: operational efficiency (mean = 3.82) and item 2: digital engagement (mean = 3.85). The standard deviation of item 7: return on investment has a higher standard deviation (0.861), suggesting more varied perceptions

compared to other variables with smaller standard deviations. Thus, this descriptive statistic provides insights into how respondents perceive various key performance indicators (KPIs) related to business outcomes. It highlights which KPIs are seen as more crucial and where opinions are more varied. These insights can guide strategies and efforts to enhance performance in areas such as customer satisfaction, operational efficiency, and digital engagement, ensuring alignment with organizational goals and stakeholder expectations.

9.14 RQ4: Correlation Between Change Management and Successful Digital Transformation

Table 9.14: Correlation Between Change Management and Successful Digital Transformation

RQ4: CHANGE MANAGEMENT & DIGITAL TRANSFORMATION						
			UNF	CHA	REF	SDT
Change Management	Unfreezing	Pearson Correlation	1	.858**	.845**	.712**
		Sig. (2-tailed)		.000	.000	.000
		N	62	62	62	62
	Changing	Pearson Correlation	.858**	1	.855**	.720**
		Sig. (2-tailed)	.000		.000	.000
		N	62	62	62	62
	Refreezing	Pearson Correlation	.845**	.855**	1	.735**
		Sig. (2-tailed)	.000	.000		.000
		N	62	62	62	62
Digital Transformation	Successful Digital Transformation	Pearson Correlation	.712**	.720**	.735**	1
		Sig. (2-tailed)	.000	.000	.000	
		N	62	62	62	62
**. Correlation is significant at the 0.01 level (2-tailed).						

The results of study show that all variables related to different stages of change management (Unfreezing, Changing, Refreezing) are strongly positively correlated with each other. Unfreezing and Changing: $r = 0.858^{**}$, Unfreezing and Refreezing: $r = 0.845^{**}$, and Changing and Refreezing: $r = 0.855^{**}$. These correlations indicate that as one aspect of change management (e.g., Unfreezing) increases or decreases, the others tend to follow in a similar manner. The results of study also show that all stages of change management (Unfreezing, Changing, Refreezing) show significant positive correlations with Successful Digital Transformation (ranging from 0.712^{**} to 0.735^{**}). This suggests that effective management across all stages of change (from preparation to implementation and stabilization) is associated with greater success in digital transformation outcomes.

Thus, the correlation table provides valuable insights into how different aspects of change management in digital transformation (Unfreezing, Changing, Refreezing) relate to each other and their combined impact on successful change management outcomes. These findings can inform strategies to improve change management practices within organizations, emphasizing the importance of comprehensive approaches that address all stages of the change process effectively.

10. CASE STUDY OF DIGITAL TRANSFORMATION FOR ABA BANK

Background

ABA Bank, established in 1996 as the Advanced Bank of Asia Limited, has grown to become Cambodia's leading private financial institution. Over more than 25 years, ABA has solidified its position as the country's largest commercial bank in terms of total assets, customer deposits, loans, and net profit, according to the National Bank of Cambodia's Annual Supervision Report 2022. Operating through 85 branches and over 1,200 self-banking machines nationwide, alongside advanced online banking and mobile banking platforms, ABA serves a wide range of SMEs, microbusinesses, and individuals with comprehensive financial services and digital banking solutions. Supported by a dedicated and cohesive professional team, ABA Bank is committed to

continually enhancing its performance. Guided by an international management team, ABA adheres to global standards of service and security, ensuring robust compliance and operational excellence (Annual Report 2022).

10.1 Change Management in Digital Transformation for ABA Bank

ABA Bank has likely expanded its digital banking services, such as mobile banking apps, online account management, and digital payment solutions. These initiatives aim to enhance customer convenience and accessibility. The bank may have invested in adopting modern technologies like AI (Artificial Intelligence) and machine learning for customer service improvements, fraud prevention, and operational efficiency. ABA Bank could have initiatives to promote financial inclusion through digital channels, reaching underserved populations with banking services via mobile devices and the internet. Success in digital transformation often correlates with improved customer experience. This includes smoother transactions, quicker response times, and personalized services tailored to individual customer needs. ABA Bank's digital transformation efforts likely play a role in its market competitiveness and positioning within Cambodia's banking industry, potentially attracting tech-savvy customers and businesses.

10.3 Kurt Lewin Model of Change Management for ABA Bank

Step 1: Unfreezing

ABA Bank would initiate the digital transformation process by creating awareness among its employees and stakeholders about the need for change. This could involve highlighting market trends, customer expectations, and technological advancements that necessitate digital transformation. The bank might emphasize the importance of adapting to digital technologies to remain competitive in the banking industry. This step involves convincing stakeholders that maintaining the status quo is no longer viable or advantageous.

Step 2: Changing

ABA Bank would implement new digital systems and processes across its operations. This could include launching mobile banking apps, upgrading online banking platforms, introducing digital payment solutions, and enhancing backend systems with AI and automation. During this phase, the bank would provide training and support to employees to ensure they are capable and confident in using new digital tools. This helps in minimizing resistance to change and facilitates smooth adoption of new technologies.

Step 3: Refreezing

ABA Bank would integrate the digital transformation into its organizational culture, policies, and practices. This involves reinforcing the use of digital technologies as the new norm within the bank. The bank would continuously monitor the performance of digital systems and gather feedback from customers and employees to identify areas for improvement. Adjustments and refinements are made based on this feedback to ensure the changes are effective and sustainable. Recognizing and celebrating milestones and successes achieved through digital transformation helps reinforce the positive outcomes and encourages continued commitment to the changes.

10.4 Key Success of Digital Transformation for ABA Bank

ABA Bank has been proactive in digital transformation, focusing on expanding its digital banking services. ABA Bank's efforts have aimed at providing convenient banking solutions through digital channels, aiming to enhance customer experience and operational efficiency. The following are key success measures for ABA Bank:

(1) **Increased Digital Service Adoption:** ABA Bank has seen significant growth in the adoption of its digital banking services, including mobile banking apps and online platforms. This has allowed the bank to reach a wider customer base and enhance customer convenience.'

(2) **Enhanced Customer Experience:** The bank has focused on improving the overall customer experience through streamlined digital channels, reducing wait times and providing 24/7 access to banking services.

(3) **Operational Efficiency:** By digitizing many banking processes, ABA Bank has achieved improvements in operational efficiency, leading to cost savings and faster service delivery.

11. CASE STUDY OF DIGITAL TRANSFORMATION FOR ACLEDA BANK

11.1 Background

Established in 1993 in Cambodia as a non-governmental organization for micro, small and medium enterprises' development and credit, ACLEDA has gradually evolved into a micro finance institution and, at the latest, into a commercial bank. Today, ACLEDA provides full banking services and became the largest bank in Cambodia. ACLEDA has a special focus on lending and other financial services to micro, small and medium sized enterprises as well as private consumers. ACLEDA Bank Plc, one of the largest commercial banks in Cambodia, announced that it is boosting and expanding its self-automation post banking services as part of its focus on digitalization in the Kingdom. ACLEDA Bank has provided various kinds of digital services such as Mobile Banking, Internet Banking, ATM, POS, Ecommerce, Deposit Machine, Virtual Teller Machine, Virtual Card, and other services (ACLEDA, 2024).

11.2 Change Management in Digital Transformation for ACLEDA Bank

ACLEDA Bank has invested in developing robust digital banking platforms, including mobile banking apps and internet banking portals. These platforms enable customers to perform various banking transactions conveniently from their mobile devices or computers. The bank has introduced and expanded digital payment solutions to cater to the evolving needs of businesses and individuals in Cambodia. This includes e-wallet services, online payment gateways, and QR code payments, facilitating seamless transactions both online and offline. ACLEDA Bank has utilized digital technologies to enhance financial inclusion in Cambodia. Through mobile banking and digital financial services, the bank has extended its reach to underserved communities, providing them with access to basic banking services. The bank has adopted a customer-centric approach in its digital transformation journey. This includes personalizing customer

experiences through data analytics and offering tailored products and services based on customer preferences and behaviors. ACLEDA Bank has formed strategic partnerships and collaborations with fintech companies and technology providers to leverage innovative solutions and stay ahead in the digital banking landscape. These partnerships have helped in accelerating the deployment of new technologies and enhancing service delivery. Recognizing the importance of cybersecurity in digital banking, ACLEDA Bank has implemented robust security measures to protect customer data and transactions. This includes encryption technologies, multi-factor authentication, and continuous monitoring of cyber threats. Digital transformation at ACLEDA Bank has also focused on improving operational efficiency through automation of processes, reducing manual interventions, and optimizing resource utilization. This enables the bank to deliver faster and more reliable services to its customers. ACLEDA Bank has navigated regulatory requirements effectively in its digital transformation journey. This includes complying with data protection laws, financial regulations, and guidelines for digital banking operations in Cambodia.

11.3 Kurt Lewin Model of Change Management for ACLEDA Bank

Step 1: Unfreezing

ACLEDA Bank likely initiated its digital transformation by creating awareness among its employees and stakeholders about the need to adopt digital technologies. This could involve highlighting market trends, customer expectations, and technological advancements. The bank would emphasize the importance of digital transformation in staying competitive and meeting evolving customer demands. This step helps stakeholders understand why change is necessary and urgent.

Step 2: Changing

ACLEDA Bank would implement various digital technologies such as mobile banking apps, internet banking platforms, and digital payment solutions. These technologies enhance customer convenience, operational efficiency, and market competitiveness. During this phase, the bank would provide training programs and support to employees

to ensure they are proficient in using new digital tools and processes. This helps in minimizing resistance to change and facilitates smooth adoption.

Step 3: Refreezing

ACLEDA Bank integrates digital transformation into its organizational culture, policies, and practices. This involves embedding digital technologies as the new norm and aligning workflows and operations accordingly. The bank continuously monitors the performance of digital systems and gathers feedback from customers and employees. This helps identify areas for improvement and ensures that the changes are effective and sustainable. ACLEDA Bank likely celebrates milestones and successes achieved through digital transformation. This reinforces the positive outcomes of the change process and motivates continued commitment to digital initiatives.

11.4   Key Success of Digital Transformation for ACLEDA Bank

ACLEDA Bank has made significant strides in digital transformation. It has invested in modernizing its banking infrastructure to offer a wide range of digital services. This transformation has contributed to ACLEDA Bank's efforts in reaching more customers and improving service delivery. The following key success measures for ACLEDA Bank:

(1) **Expansion of Digital Services**: ACLEDA Bank has successfully expanded its digital service offerings, encompassing mobile banking, internet banking, and digital payment solutions. This expansion has enabled the bank to cater to diverse customer needs across Cambodia.

(2) **Financial Inclusion**: The bank's digital transformation efforts have contributed to advancing financial inclusion by providing banking services to previously underserved populations through digital channels.

(3) **Technological Integration**: ACLEDA Bank has integrated advanced technology into its operations, improving transaction security, data management, and customer service capabilities.

12. CASE STUDY OF DIGITAL TRANSFORMATION FOR CANADIA BANK

12.1 Background

Canadia Bank has been in the Kingdom's financial market for more than 32 years and is always a beacon of stability, reliability, and banking excellence. To adapt to the constantly changing local and global financial landscape and needs of the customers, the Bank's digital transformation journey picked up its pace in 2020 and have been in full swing since 2022. Center to Canadia Bank's digital transformation efforts are the launch of its new mobile app, expansion of Smart Bank Centers, and the creation of complete digital ecosystem for businesses. To better serve the customers, the Canadia Bank App was publicly-launched in February 2023 providing fast, easy, and secured banking services with just a few clicks (CANADIA Bank Annual Report, 2023).

12.2 Change Management in Digital Transformation for CANADIA Bank

CANADIA Bank has invested in developing and expanding digital banking platforms such as mobile banking apps and internet banking portals, enabling convenient banking transactions. The bank has introduced and enhanced digital payment solutions including e-wallet services, online payment gateways, and QR code payments to facilitate seamless transactions (CANADIA Bank Annual Report, 2023). CANADIA Bank utilizes digital technologies to promote financial inclusion through mobile banking and digital financial services, extending banking services to underserved communities (CANADIA Bank Sustainability Report, 2022). CANADIA Bank focuses on improving customer experience through personalized services and streamlined processes enabled by digital platforms (CANADIA Bank Customer Experience Report, 2023). Digital transformation initiatives at CANADIA Bank aim to enhance operational efficiency through process automation and resource optimization (CANADIA Bank Operational Efficiency Review, 2023). CANADIA Bank implements robust cybersecurity measures including encryption technologies and secure authentication methods to protect customer data (CANADIA Bank Cybersecurity Policy, 2022). The bank forms strategic partnerships with fintech companies and technology providers to innovate and stay competitive (CANADIA Bank Strategic Partnerships Statement, 2023). CANADIA

Bank ensures compliance with regulatory requirements and manages risks specific to digital banking operations (CANADIA Bank Compliance and Risk Management Framework, 2023).

12.3 Kurt Lewin Model of Change Management for CANADIA Bank

Step 1: Unfreezing

CANADIA Bank would have initiated its digital transformation journey by creating awareness among its employees and stakeholders about the need for change. This could involve highlighting market trends, customer expectations, and technological advancements that necessitate digital transformation. The bank would emphasize the importance of embracing digital technologies to stay competitive in the banking sector and to meet evolving customer demands. This step helps stakeholders understand why change is necessary and urgent.

Step 2: Changing

CANADIA Bank would implement various digital technologies such as mobile banking apps, internet banking platforms, and digital payment solutions. These technologies enhance customer experience, operational efficiency, and market competitiveness. During this phase, the bank would provide comprehensive training programs and support to employees to ensure they are proficient in using new digital tools and processes. This helps in minimizing resistance to change and facilitates smooth adoption of digital technologies.

Step 3: Refreezing

CANADIA Bank integrates digital transformation into its organizational culture, policies, and practices. This involves embedding digital technologies as the new standard and aligning workflows and operations accordingly. The bank continuously monitors the performance of digital systems and gathers feedback from customers and employees. This feedback helps identify areas for improvement and ensures that the changes implemented are effective and sustainable. CANADIA Bank likely celebrates

milestones and successes achieved through digital transformation. This reinforces the positive outcomes of the change process and motivates continued commitment to digital initiatives.

12.4 Key Success of Digital Transformation for CANADIA Bank

CANADIA Bank has been actively adapting to the digital age as well. It has developed robust online and mobile banking platforms, allowing customers to conduct transactions and access banking services conveniently. CANADIA Bank's digital transformation initiatives have focused on improving customer engagement and operational efficiency, aligning with global trends towards digital banking. The key success measures for CANADIA Bank:

(1) **Digital Platform Enhancements**: Canadia Bank has invested in enhancing its digital platforms, making it easier for customers to access banking services remotely. This includes updates to mobile apps, internet banking interfaces, and digital payment solutions.

(2) **Customer Engagement**: The bank has focused on increasing customer engagement through personalized digital experiences, such as targeted marketing campaigns and customized service offerings based on digital transaction data.

(3) **Adoption of Fintech Solutions**: Canadia Bank has explored partnerships with fintech companies to integrate innovative solutions, enhancing its digital capabilities and competitiveness in the market.

13. CONCLUSION

The study conducted descriptive statistical analysis to explore various aspects of digital transformation and change management within the banking sector. The study examined various stages of change management, Unfreezing, Changing, and Refreezing and their correlations with successful change management outcomes. Strong positive correlations were found among these stages and with overall successful change management, underscoring the importance of a comprehensive approach to managing organizational change in digital transformation initiatives. In conclusion, the study provides valuable

insights into the complexities of digital transformation in the banking industry. It highlights the critical role of advanced technologies, robust KPIs, and effective change management strategies in driving successful digital initiatives. Organizations can leverage these findings to prioritize investments, refine strategies, and enhance operational practices to stay competitive in the rapidly evolving digital landscape.

ABA Bank's digital transformation aligns with Kurt Lewin's model by first preparing the organization for change (unfreezing), implementing digital technologies and supporting employees through the transition (changing), and finally embedding these changes into the organizational culture and operations (refreezing). This structured approach helps in managing resistance to change, ensuring effective adoption of digital innovations, and sustaining the benefits of transformation over the long term. The success measures reflect how ABA Bank has leveraged digital transformation to improve operational efficiency, expand service accessibility, and enhance customer satisfaction in Cambodia's banking sector.

By following Kurt Lewin's three-step model, ACLEDA Bank effectively manages its digital transformation journey, addressing challenges and ensuring that the changes implemented are sustainable and beneficial to both the organization and its stakeholders. This structured approach helps in navigating complexities associated with technological advancements and evolving customer expectations in the banking industry. The success measures reflect how ACLEDA Bank has leveraged digital transformation to improve operational efficiency, expand service accessibility, and enhance customer satisfaction in Cambodia's banking sector.

By following Kurt Lewin's three-step model, CANADIA Bank effectively manages its digital transformation journey, addressing challenges and ensuring that the changes implemented are sustainable and beneficial to both the organization and its stakeholders. This structured approach helps in navigating complexities associated with technological advancements and evolving customer expectations in the banking industry. These success measures reflect how CANADIA Bank has leveraged digital transformation to

improve operational efficiency, expand service accessibility, and enhance customer satisfaction in Cambodia's banking sector.

14. LIMITATION AND FUTURE RESEARCH

This study focuses on applying the concepts of change management in digital transformation within Cambodian banks. The descriptive quantitative approach is used to describe the data collected from participants with relevant knowledge and experience in digital transformation within Cambodian banks. Only 62 participants in this study, so potential biases inherent in descriptive research, such as research subjectivity in data interpretation, and limited generalizability of findings due to the specific context of Cambodian baking sector.

The recommendation for future study should apply a combination of quantitative and qualitative methods with in-dept sampling strategy and more sample size in order to reduce potential biases and increase generalization of change management in digital transformation of banking sector in Cambodia.

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CIRCULAR STRATEGIES FOR IT DEVICES: *Perception of Young Cambodians on Refurbished Mobile Phones*

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ABSTRACT

The increasing number of mobile phones and their short lifecycles are leading to huge amounts of e-waste globally. One business strategy to regain the key value of such devices and to bring them back to the market 'as good as new' is refurbishment. This circular strategy offers ecological as well as economic benefits and is of increasing relevance in certain countries of the world. However, as of today, such circular strategies have no significance in the Cambodian market. This research explored the usage and purchasing behavior of mobile phones by young Cambodians to analyze this phenomenon. It collected data by survey from around 500 participants. Findings show that young Cambodians have a low level of knowledge of refurbished mobile phones, perceive multiple risks with such devices, and do not consider purchasing such as an alternative to a new mobile phone. Based on these findings, this research derives recommendations for all relevant groups of stakeholders and defines the potential for future research.

Keywords: *Closed-Loop Supply Chains, Circular Economy, Refurbishment, IT Devices, Mobile Phones, Cambodia*

1. INTRODUCTION

Mobile communication has significantly changed private and work-related communication in the last 30 years. The number of registered mobile phones globally has constantly increased over the last three decades. Nowadays, mobile phones are used by nearly all people globally, for communication, gaining information, shopping, entertainment, and many other purposes. Besides the positive effects of increasing mobile communication, this trend has negative effects on the environment. (Martela, 2019) A short product lifecycle resulting from fast technological advancement, intense marketing activities and certain lifestyle trends results in many outdated, unwanted mobile phones after being replaced by new devices. (Mugge et al., 2017a; Wieser & Tröger, 2018)

The resulting high replacement rates of still usable mobile devices lead to great amounts of electronic waste, so-called e-waste. Used devices are often not professionally treated or not correctly recycled but disposed of in landfills. Unsuitable treatment leads to negative environmental effects and the loss of value (e.g. metals, rare earths) of the used part. (Coffey & Toland, 2019; Hazelwood and Pecht, 2021; Santana et al., 2021)

Besides the common way to dispose of used mobile phones, an increasing awareness of efficient resource usage and environmentally friendly manufacturing procedures leads manufacturers of mobile phones to consider concepts of reuse and refurbishment as part of their production strategy. In such concepts, the used device is undergoing a professional process, bringing them back into a usable state and returning them to the market. Concepts of refurbishing have positive effects on the environment as they preserve key values of the part. Additionally, they offer economic benefits, as they can be offered to customers at a lower price and provide business opportunities to companies. (Hazelwood and Pecht, 2021; Ongondo & Williams, 2011; Pamminger et al., 2021; Sharifi & Shokouhyar, 2021)

Such refurbished alternatives to new parts have an increasing market relevance in some countries of the world, especially in Europe and Northern America. The market relevance in Asia specifically in Cambodia is low. This low market relevance leaves the

ecological and economic benefits of refurbished mobile phones unused in Cambodia. Whether refurbished alternatives have a market relevance or not, is highly dependent on the customer perception of refurbished products. (Sharifi & Shokouhyar, 2021) Therefore, this research aims to explore and understand the customer perception of a key age group of mobile phone users in Cambodia to gain a higher understanding of the market potential for such refurbished devices and to develop recommendations for relevant groups of stakeholders.

To reach this aim, this research focuses on answering the following research questions (RQ):

RQ1: What is the usage and purchasing behavior of young Cambodians related to mobile phones?

RQ2: What are the knowledge and perceptions of young Cambodians related to refurbished mobile phones?

2. LITERATURE REVIEW

The following chapter summarizes previous research on the explored topic and particularly provides a comprehensive overview of prior explorations performed on the usage and purchasing behavior of mobile phones as well as on literature on the refurbishment of mobile phones.

2.1 Mobile Phones Market and Customer Purchasing Behavior

Since the 1990s the number of mobile phones globally has increased rapidly. In 2022, 19.5 million mobile cellular registrations have been counted in Cambodia. This number exceeds the number of people living in this country. The market for mobile phones in Cambodia in 2024 is estimated to reach a revenue of 0.6bn USD with a forecast for an annual growth rate of around 3%. (Statista, 2024a; Taylor, 2024)

This trend has a major impact on the environment, due to increasing demands and short product lifecycles. Mugge et al. (2017a) analyzed in their research the duration of mobile phones in Europe and concluded that on average such devices are used for less

than two years. Rapid technological changes and constant innovations lead to the fast obsolescence of mobile phones leading to short product life cycles. Additionally, in research performed on the Brazilian market, unconscious buying behavior is named as a reason for this trend. (Santana et al., 2021) The willingness to buy a new mobile phone here is not only based on the wish to possess something new but also on perceived obsolescence. Wieser & Tröger (2018) list three different forms of this perceived obsolescence:

1. Based on the functionality
2. Based on the novelty / being 'up to date'
3. Based on social pressure, standards, and practices

The second form, the desire to have an 'up to date' device, is especially leading to a high speed of perceived obsolescence, leading to the replacement of devices even though the old device is still functioning. This desire is one of the main motivations of customers to purchase a new mobile phone, besides functional defects. (Wieser & Tröger, 2018)

2.2 E-Waste from Mobile Phones

The described short life span of mobile phones and a lack of circular strategies for the huge, increasing amounts of used devices, leads to a high amount of waste of electronic devices, so-called e-waste. This kind of waste increases faster than most other sorts of waste globally. It sums up to 62 million metric tons in 2022 worldwide, nearly double the amount generated just ten years before and forecasted to be 80 million metric tons by 2030. (Statista, 2024b) This e-waste is often disposed of in landfills and metal is inefficiently recovered by burning cables in open fires leading to environmental and health issues. (Santana et al., 2021) Even though mobile phones, themselves, are rather small in size, they have a significant impact on the global generation of e-waste due to their high quantity of disposals. (Coffey & Toland, 2019)

In their exploration, Hazelwood and Pecht (2021) stress the potential to minimize millions of pounds of e-waste, if customers opt for refurbished devices. By recovering and restoring the key value of the mobile phone, refurbishing can be an effective approach to the overall energy needed over the lifecycle of such an electronic device

making refurbished mobile phones on the whole eco-friendlier compared to new devices.

Besides being disposed of, many used mobile phones remain with their prior users. After buying a new phone, they remain 'in the drawer' as a backup solution or due to a lack of better alternatives. Such used mobile phones are needed as the basis for refurbishment and therefore are crucial for a circular strategy. Remaining unused at the initial user leaves the material and value of the part unexploited. (Mahat, 2021) In their research, Coffey and Toland (2019) analyzed this phenomenon and concluded that consumers care about the environment and have a positive perception of reuse concepts. Nevertheless, such circular strategies remain partly unknown or at least unused on the consumers' side. Here Coffey and Toland (2019) suggest take-back programs, educational actions, and more information, to increase awareness among consumers about the potential of stored old mobile phones and circular strategies. Ongondo and Williams (2011) analyzed the availability of such take-back programs in the UK. They found more than 100 such opportunities, offered by different, decentral institutions, such as mobile phone producers, sellers, phone network providers, charity organizations, and companies performing mobile phone refurbishing or recycling. The vast majority of the take-back programs were commercial programs. Different channels for take-back were offered, such as a take-back by post, by courier, or by returning it to a shop. Incentives were offered, such as payments, charity donations, or participation in competitions with the chance to win prizes. (Ongondo & Williams, 2011) Comparing different forms and channels of take-back programs, customers preferred programs with easy access and sufficient information. (Beigl et al., 2012)

2.3 Circular Strategies and Refurbishment of Mobile Phones

Refurbishment is a concept following a strategy aiming to gain a circular economy. The key aim is to gain closed-loop manufacturing and to retain and recover the key value by restoring it in an industrial way to retain or regain its initial performance and product characteristics. (Pamminger et al., 2021; Sharifi & Shokouhyar, 2021) In their research, Van Weelden (2016) defines refurbishment as a process in which products that have

been used are gathered and returned professionally by a company to bring them into a state where they can be sold again to new customers. Sharifi & Shokouhyar (2021) describes refurbishment, as an attempt to bring a used mobile phone into a state in which it is in good working condition. This is done by cleaning the device, replacing or repairing defective components, and returning the part to a good optical appearance. Hazelwood & Pecht (2021) characterized refurbishment as a process in which all damaged and failed parts are being replaced to regain a good working condition, but the overall functionality and appearance of the product remain unchanged. (Hazelwood & Pecht, 2021) In their research work, Santana et al. (2021) list the sources for used mobile phones, which can serve as a basis for refurbishing:

- Return of defects or worn-out end-of-life products.

- Return from warranty claims

- Return from buyback offers of the manufacturers

The key process steps of refurbishing mobile phones are (Chun et al., 2022; Hazelwood & Pecht (2021): (1) The used mobile phone is collected from the customer and returned to the manufacturer. The sources for such returns are listed above. (2) The mobile phone is disassembled. (3) Components are inspected. Components defined as reusable are cleaned. Other components are scrapped. (4) Scrapped components are replaced by new (or repaired) parts. (5) The mobile phones are reassembled and tested.

In some cases, the terms 'refurbishing' and 'remanufacturing' are used to describe the same thing (Nasiri & Shokouhyar, 2021). A differentiation between these two terms is discussed by Sharifi & Shokouhyar (2021): Whereas 'refurbishment' is a procedure to bring a mobile phone into a sufficient state to make it again usable for the customer, 'remanufacturing' aims to bring the device into a condition in which it is as good as new. In this research, the latter perspective and definition are applied.

2.4 Ecological and Economic Benefits of Refurbishing Mobile Phones

Consuming refurbished mobile phones as an alternative to a new mobile phone can reduce the carbon footprint significantly and have a significant positive impact on the

environment. (Ghorab, 2022; Mahat, 2021) Nevertheless, as refurbishing processes and standards differ significantly, an ecological evaluation might differ from case to case. (Quariguasi-Frota-Neto & Bloemhof, 2012; Zink et al., 2014) In their research work, Nasiri and Shokouhyar (2021) emphasize the extension of the lifespan of products as a key objective of refurbishing and stress its potential as a circular strategy, which they classify as of great importance due to the short lifecycle and fast replacement rate for mobile phones. In addition to the decreased negative impact on the environment, the recovery of the key value of IT devices can have a positive impact on the scarcity of rare materials needed in the industry, such as different types of metals used in mobile phones. (Ongondo & Williams, 2011)

This increasing importance is supported by a growing awareness of environmentally friendly products – both for the customer as well as for the consumer side. (Mishra et al., 2022) This extended life span of mobile phones gained by refurbishment has the potential to decrease the negative impact on the environment. It can decrease energy consumption, the emission of greenhouse gases, and waste generation as well as increase resource efficiency. (Wieser & Tröger, 2018) In their exploration of different circular scenarios, Pamminger et al. (2021) found a high potential to achieve a circular economy when refurbishing mobile phones.

Besides these described ecological benefits from recovering and restoring products, refurbished mobile phones can provide economic benefits. Being priced around 30% below the price of new parts, they can open additional customer segments for producers and have the potential to provide a price advantage for end customers. (Mugge et al., 2017a, Quariguasi-Frota-Neto & Bloemhof, 2012) Decreased production costs compared to the production of new mobile phones are providing opportunities for attractive margins as well as extending potential customer base. Additionally, mobile phones at a lower price are especially needed in the growing market for IT devices in cost-sensitive developing countries, such as Cambodia. (Ghorab, 2022)

2.5 Customer Perception of Refurbished Mobile Phones

Esmaeilian et al. (2021) highlight the relevance of the customer perception towards refurbished mobile phones crucial for the successful implementation of this business strategy. This customer perception has been analyzed in multiple research works.

Analyzing the customer perception of refurbished mobile phones, Mugge et al. (2017a) concluded that around half (46%) of their analyzed sample had a positive attitude towards such alternatives to new phones and therefore stated good possibilities for market success. In their research performed in Sweden, Holmström & Böhlin (2017) initially found a very positive attitude from customers on refurbished mobile phones. At the same time, a lack of knowledge of refurbishing processes and standards was leading to doubts and uncertainty on the customer side. Sharifi & Shokouhyar (2021) analyzed the perceived risks of customers when purchasing a mobile phone: The function, appearance (here especially a scratch-free body and screen), and battery life are listed as the most important characteristics that potential customers worry about.

Van Weelden et al. (2016) concluded that there is a lack of awareness as well as understanding about refurbishing among customers. Consequently, in a trade-off between perceived advantages and disadvantages, often refurbished mobile phones were rejected and new phones were bought. American customers were paying greater attention to technical features, such for example the camera, the screen, or the battery, whereas Indian customers were putting a higher importance on the reputation of the seller and the granting of a warranty period. Additionally, Americans rated environmental aspects higher when making a purchasing decision, whereas Indian customers ranked economic benefits as more important. (Seifian et al., 2023) In an analysis of the perception of millennials in India on refurbished mobile phones, Watson et al. (2017) figured out their main drivers for purchase decision-making were: the knowledge of the product, the perceived risk, and their overall attitude towards refurbished products. Chun et al. (2022) explored customer perception of circular strategies in Japan and Indonesia and concluded that in both countries the perceived risk of such refurbished products are of the highest importance in purchase decision-making. It was followed by the perception of innovation as well as pricing. An analysis by

Olorvida et al. (2023) performed in the Philippines concluded that the perception of refurbished mobile phones is rather negative, as an inferior level of quality and technological obsolescence is assumed. Wallner et al. (2022) added that consumers feared contamination from previous users and proposed a clear communication strategy about the cleaning procedure within the refurbishing process, to make sure all signs of usage are removed, and a replacement of all parts that are in direct contact with the skin of the customer.

A different threat has been analyzed by Martela (2019). He stressed in his research work the need to ensure data security for refurbished mobile phones. Customers were concerned about their personal, sensitive data stored on the old devices. Partly, companies have reacted to such concerns and have defined standards for erasing data and are handing out certificates of securely erased data to customers. (Inrego, 2024)

One way of dealing with the perceived risks of consumers is to provide guarantees. Major companies performing refurbishment of mobile phones provide and promote such guarantees: Apple highlights that "certified refurbished products are backed by a one-year warranty". Samsung assures "guaranteed like-new quality". (Apple, 2024; Samsung, 2024) In Europe, refurbished mobile phones must by law provide a one-year guarantee. (Mugge et al., 2017a)

Informing customers about the initial usage of the refurbished mobile phones can have different effects on their perception. Mugge et al. (2017b & 2018) analyzed this matter and found that providing visual information on wear and tear has a negative impact on customer perception. When providing verbal information, the customer perception depends on the visibility of wear and tear. If no signs of wear and tear are visible, it confuses the customer and has a negative impact. If there are visible signs, it has neither a positive nor a negative impact on the customer perception.

In research performed by Mishra et al. (2022), around half (48%) of all consumers having opted for a refurbished mobile phone did so due to economic reasons. The second most important reason was environmental awareness (25%). Their research, in addition, found that there is a relationship between income as well as education, and the decision

to buy a refurbished mobile phone. (Mishra et al., 2022) In their analysis Sharifi & Shokouhyar (2021) found environmental factors to be dominant when deciding to buy a refurbished mobile phone. This main driver of decision-making was, in their research, followed by pricing, the availability of warranties, the product quality, and the reputation of the seller. In a parallel exploration focusing on the technical components, customers are paying attention to, the most important parts of a mobile phone (from highest to lowest importance have been ranked as follows: internal camera, screen, battery life, and performance. (Sharifi & Shokouhyar, 2021) In research performed by Bigliardi et al. (2022) discrimination analysis has been applied. Their findings show that psychological factors are of the highest importance in the purchase decision-making of refurbished mobile phones. Here especially the 'green' perceived value and the knowledge about environmental aspects in general were the most important factors.

2.6 Challenges and Opportunities of the Market for Refurbished Mobile Phones

Despite the described ecological and economic benefits of the implementation of circular strategies for mobile phones, the market share is small compared to the overall market for mobile phones. Mugge et al. (2017a) assess this market share at just 6% in Europe. Following the described aims to gain a circular economy for products in Western countries, such business strategies have to some extent also been implemented in Asian countries. Nevertheless, it remains rather unpopular. (Chun et al., 2022)

Esmaeilian et al. (2021) highlight the motivation of mobile phone producers to introduce refurbishment strategies into the business strategy to improve the company's image. Nevertheless, the process of marketing refurbished mobile phones remains challenging for producers. As reasons for these challenges, they list, primarily, differing customer perceptions, attitudes, and willingness to purchase such products as well as inefficient pricing policies.

Besides the economic and ecological benefits as well as the partly positive perceptions, there remain threats to the market for refurbished mobile phones. As described in the previous section, customer perceptions of mobile phones partly are uncertain or negative.

Besides negative aspects related to customers, there remain also threats related to producers and potential companies going to perform refurbishment: The complex, delicate technical setup of mobile phones and the precise specifications and standards, require great technical know-how, sourcing options for replacement parts and special tools. Moreover, in some cases, the design of mobile phones is not refurbishment-friendly, for example, if components are glued together without the possibility of opening them destruction-free. (Hazelwood & Pecht, 2021) The introduction of refurbished mobile phones to the product range might open new customer segments and might therefore have the potential to increase the turnover of companies. At the same time, the risk for companies arises, that the refurbished products cannibalize with their new products, which might lead to a decrease in turnover. (Geyer & Doctori Blass, 2010) Such interdependencies have been analyzed by Zheng et al. (2023), who found that the availability of refurbished mobile phones can have a positive effect on certain customer groups and can even increase their intention to purchase a new mobile phone from a company which also offers a refurbished alternative. In this case, the perceived attractiveness of a company or brand increased.

3. METHODOLOGY

This chapter describes the method used to collect data, the population and sampling method, the way the data has been analyzed, and provides information on the validity, reliability, and generalizability as well as on ethical aspects of this research.

3.1 Survey Research

Survey research is one of the most important research approaches globally. It is an effective and efficient way to explore social aspects and behavior. (Ruel et al., 2016) It has been chosen for this exploration, as these strengths of survey research are very much in line with the aims of this research.

In an initial step, the survey questions have been designed. This has been done by breaking down the key findings from previous research (see Chapter 2) into the two research questions. In the second step, survey questions have been derived and linked to the research question (What do we want to find out about the phenomenon?) and

respecting previous research (What do we know about the phenomenon already?). The full survey design including research questions, key literature findings and derived survey questions can be found in Appendix B.

After creating the survey design and its questions, the survey consisted of 15 questions which can be divided into three categories: 5 questions exploring the usage and purchasing behavior of young Cambodians related to mobile phones. Data from these questions is the basis to answer research question 1. Additional 5 questions are investigating the knowledge and perception of young Cambodians related to refurbished mobile phones. This set of questions is focusing on answering research question 2. The survey ends with 5 statistical questions collecting information on the respondents' characteristics. Those questions shall on the one hand assure that the respondent is within the defined research population and on the other hand provide opportunities to code and filter data in the process of data analysis. The survey questions have been created in English and translated into Khmer by a native speaker with research experience. Survey participants could choose between the English and Khmer language versions. The complete survey in both languages including all answer options is available in Appendix C.

The survey was conducted at four different universities in Phnom Penh. As a part of this approach, the research project was presented on-site in 14 different classes of one university with Bachelor and Master students from different disciplines and faculties. After the presentations, the students were invited to voluntarily fill in the survey. In addition to this onsite approach, a link to the online survey has been spread via different social media channels of all four participating universities.

3.2 Population, Sample Size and Sampling Method

In survey research, data collected from the sample is used to make statements about the population (Creswell, 2009). To achieve the opportunity to perform such a generalization, the population, the sample size, and the sampling method need to be carefully defined.

The targeted population for this exploration is young Cambodians. The term 'young' for this research is defined as people being a maximum of 28 years old. As this research focuses on owners and users of mobile phones, it moreover focuses on people of a minimum age of 15 years. 'Cambodians' in this work are defined as people living permanently in Cambodia irrespective of their nationality or immigration status. The latest census was performed in Cambodia in the year 2019. It states that 26% of the overall population was in the age group between 15 and 29 years old. As this data could not be filtered to the targeted maximum age of 28 years, the percentage has been slightly reduced to 25%. The total population has been quantified at 15,5 million people. Applying the 25% to reduce to the targeted age group leads to a population of 3,8 million people this research is aiming to explore. (Government of Cambodia, 2020)

Using the targeted population size of 3,8 million people in the Taro Yamane Formula for sample size calculation and assuming a sampling error of 5%, leads to a minimum of needed survey answers of 400. (Uakarn et al., 2021) The formula, the full set of data, and the calculation method can be found in Appendix A.

A mixed sampling method was carried out to approach samples matching the targeted population (people living in Cambodia between 15 and 28 years): On the one hand, convenience sampling has been performed, approaching the samples according to their highest level of availability. This was achieved by approaching young Cambodians in the context of Cambodian universities. On the other hand, purposive sampling was used, approaching the samples meeting certain characteristics. This has been achieved by approaching Cambodian students who are mainly represented by young people. (Creswell, 2009)

3.3 Data Analysis

After the cleaning and filtering of data, it was analyzed using IBM's software package SPSS (Statistical Package for the Social Sciences) in version 23. In addition, MS Excel in version 2404 has been used to further filter the data and to visualize it. The focus of data analysis was on descriptive statistics, such as frequency and distribution.

3.4 Validity, Reliability and Generalizability

The extent to which the data collection method of this exploration measures what it is aiming to measure, the so-called validity, (Dobakhti, 2020) has been reached in this research by performing several measurements: (1) A carefully designed survey research with questions derived from a comprehensive literature review, (2) a selection of a research environment which highly matches the defined research population, (3) a data cleaning process eliminating data from respondents outside the population, and (4) proven statistical software tools to analyze the data.

Besides striving to gain validity, this research is aiming to reach consistency and sustainability in its exploration, the so-called reliability. (Foroudi & Routledge, 2024) Reliability in this survey research is reached through several assessments: (1) A pilot test of the survey design before starting the data collection, (2) providing a clear statement of the purpose of the survey to the participants, (3) giving background information in cases when the survey was conducted onsite with participants, (4) using short questions with simple language adapted to the respondents, (5) providing clearly defined answer options or scales, and (6) only raising open questions as a voluntary option.

Finally, this research aims to draw conclusions on the population based on data collected within a sample, the so-called generalization. (Pandey & Pandey, 2015) This research assures a high generalizability based on these actions: (1) defining a sample size with low sampling error, (2) exceeding the minimum number of needed samples significantly, and (3) combining different sampling methods.

3.5 Ethical Considerations

As the chosen research design uses survey research involving observations and interactions with human beings, special attention needs to be given to ethical aspects. This research follows recommendations in respect to ethics related to the use of human research participants given by the Chinese University of Hong Kong (CUHK, 2020). This includes:

- Consent of the participant to take part in the research

- Providing information about the background and aim of the research to the participant
- Exclusion of vulnerable participants, especially children under 16 years
- Anonymous collection of data and refraining from acquiring any personal sensitive information

4. RESULTS

This chapter provides information on the characteristics of respondents and provides the findings based on the collected survey data.

4.1 Respondent Characteristics

Data from respondents has been collected between December 2023 and May 2024. A total of 596 complete survey answers have been received. Some survey answers were provided by respondents outside the defined population. Therefore, a cleaning of data was needed. Respondents exceeding the age limit of 28 years (94 answers / 16%) or not living within Cambodia (4 answers / 1%) were filtered out. Those answers were not further respected in the data analysis process. Details are summarized in Table 1.

Table 1: Received surveys and valid surveys after data cleaning (Source: this research)

Received Surveys	Quantity	%
Complete Survey Answers received	596	100%
Total sum of answers from respondents	**596**	**100%**
… being older than 28 years	94	16%
… not living in Cambodia	4	1%
Received valid surveys	**498**	**84%**

The remaining 498 survey answers are the basis of the data analysis process. The number of valid surveys significantly exceeds the targeted minimum sample size of 400 surveys. Therefore, the data basis can be seen as sufficient to answer the research questions and to build a strong basis for generalization from the sample to the population.

The vast majority (74%) of respondents are between 17 and 22 years old, are studying (75%) and hold a university degree (87%). These respondents' characteristics reflect the

method of collecting data, which has been mainly performed within the university context. More women (59%) than men (40%) provided answers. Nearly all (94%) participants are living in Phnom Penh, which again reflects the method of focusing on distribution channels related to institutions operating in the capital. Details of the respondents' characteristics can be found in Table 2.

Table 2: Summary of Respondent Characteristics (Source: this research)

Age	Frequency	%
younger than 17 years	2	0%
17 - 19 years	138	28%
20 - 22 years	231	46%
23 - 25 years	61	12%
26 - 28 years	62	12%
Gender	**Frequency**	**%**
Male	198	40%
Female	296	59%
Place of Living	**Frequency**	**%**
In Phnom Penh	468	94%
In a different city in Cambodia	15	3%
On the countryside in Cambodia	9	2%

Profession	Frequency	%
I am a student	375	75%
I am working	116	23%
I do not have work	4	1%
Highest Education	**Frequency**	**%**
None	3	1%
High-school	49	10%
University (Undergraduate / Bachelor)	359	72%
University (Postgraduate / Master / PhD)	76	15%

Remaining value to 100%: participant has skipped question, chosen "other" or has chosen the option "I wish to not answer". Rounding differences are possible.

4.2 Results of the Usage and Purchasing Behavior of Young Cambodians Related to Mobile Phones (RQ1)

Using a set of five questions designed to explore this phenomenon, young Cambodians have been asked about their usage and the purchasing behavior of mobile phones. Findings from these survey questions are aiming to answer research question 1.

Young Cambodians being asked how old their actual phone is, led to the following results: A group of around 15% of respondents possess a mobile phone younger than 1 year. A group with a comparable share (16%) owns a phone younger than 2 years of age. Together this means more than 30% possess a mobile phone, less than two years old. Just over one quarter (26%) own phones at an age of 2 years. Together the three previously mentioned groups, suggest that more than 50% of young Cambodians possess a phone younger than 2 years. It is followed by a large group of respondents

(31%) having a phone which is between 3 to 4 years old. Phones 5 years or older (11%) have a minor relevance.

Related to the purchasing frequency for new mobile phones, the answers show two peaks: A large group (25%) buys new phones every 3 years, and a second large group (27%) waits a minimum of 5 years for a re-purchase. A very small group (3%) states to buy a new phone every year. Every 2 years has been stated by 13% of respondents.
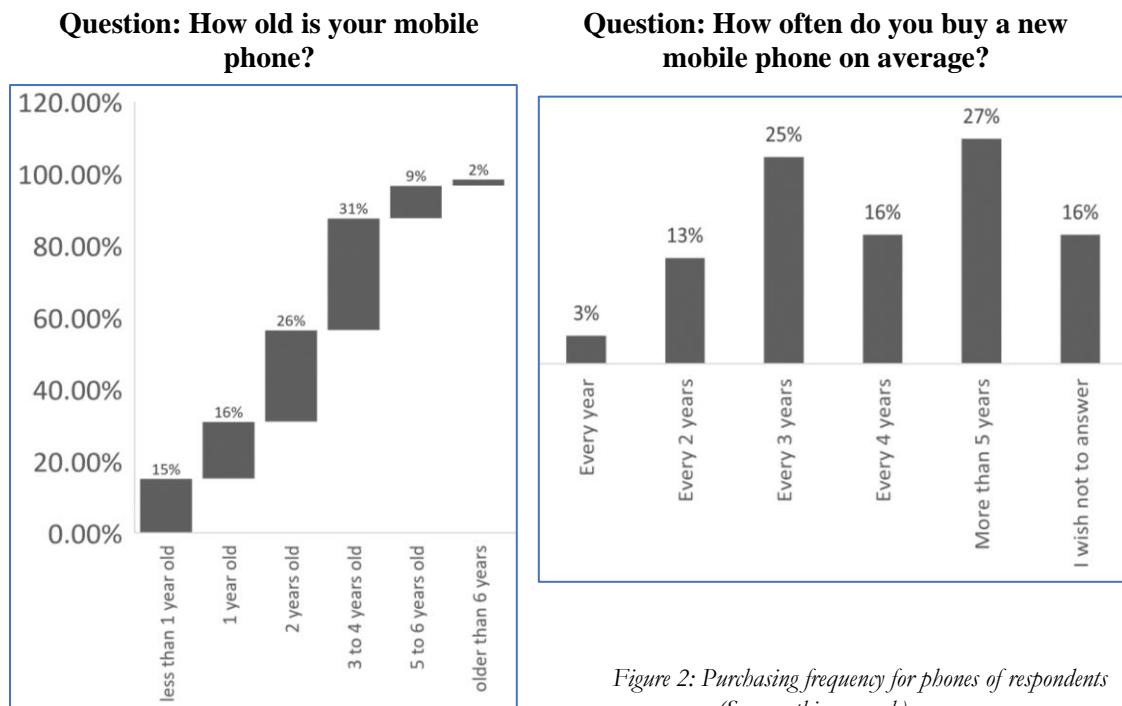
Data from both questions is visualized in Figures 1 and 2

Question: How old is your mobile phone?

Question: How often do you buy a new mobile phone on average?

Figure 2: Purchasing frequency for phones of respondents (Source: this research)

Figure 1: Phone age of respondents (Source: this research)

The respondents were asked to provide their reasons for deciding to purchase a new mobile phone. As visualized in Figure 3, nearly two-thirds of respondents (61%) replied that the main reason to repurchase a new mobile phone is a defect of the old phone. The phone being outdated (18%), a wish to always possess the newest model (5%) or the phone being optically worn out (4%) were reasons of minor relevance. Besides the opportunity to choose from the described answer options, respondents had the chance to describe other reasons. Here, respondents mentioned for example lost or stolen phones and exceeded memory capacity as reasons to opt for a new device.

Additionally, it has been explored in which technical state the old phone is in at the time of repurchasing a new device. In total 70% of the respondents stated that the phone was still working at that time. This number though must be divided into two groups: 55% state that the phone is working but has small defects. 15% state that the phone is fully working. A group of 22% of respondents replied that the old phone is not working anymore when purchasing a new phone. Detailed information is provided in Figure 4.

Question: If you decide to buy a new mobile phone: What is the most important reason?

Give old phone to someone; 5%
Other; 3%
I wish not to answer; 3%
Want newest model; 5%
Old phone optically worn out; 4%
Old phone outdated; 18%
Old mobile phone broke; 61%

Question: If you decide to buy a new mobile phone: Is your old phone still working?

I do not know; 5%
I wish not to answer; 2%
Yes, fully working; 15%
No; 22%
Yes, but small defects; 55%

Figure 3: Reasons for purchasing a new mobile phone
(Source: this research)
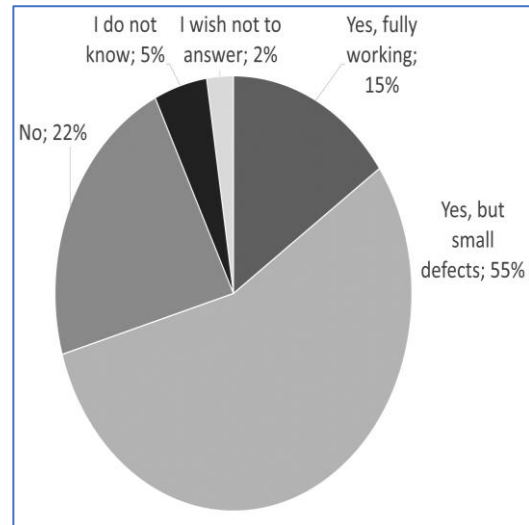
Figure 4: Technical state of old mobile phone
(Source: this research)

Question: If you decide to buy a new mobile phone: What do you do with the old phone?
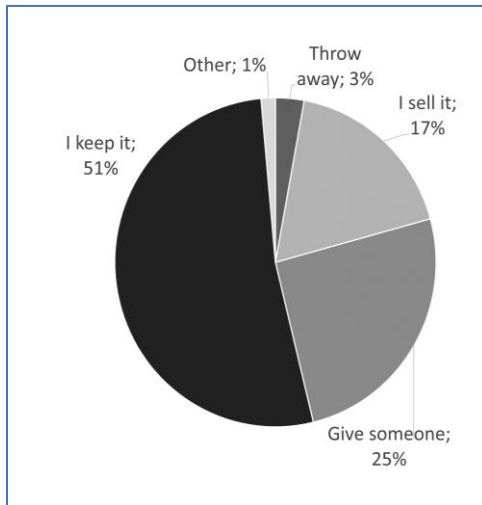

Figure 5: Disposition of old mobile phone after repurchasing (Source: this research)

The respondents have been asked what they do with their old phones once a new mobile phone has been purchased. A large majority (51%) state that they keep their old phones. One quarter (25%) hand it over to friends or family members. A smaller group of people sell it (17%) or throw it away (3%). The disposition of old phones is shown in Figure 5.

A summary of findings from this sub-chapter can be found at the end of this chapter.

After exploring the knowledge and perception of young Cambodians related to refurbished mobile phones (RQ 1) in this sub-chapter, the subsequent sub-chapter investigates the knowledge and perception of young Cambodians related to refurbished mobile phones (RQ2).

4.3 Results of the Knowledge and Perceptions of Young Cambodians Related to Refurbished Mobile Phones (RQ2)

In a second set of additional five questions, young Cambodians have been asked about their knowledge and perception related to refurbished mobile phones. Findings from these survey questions are aiming to answer research question 2.

An initial question investigated whether young Cambodians know of refurbished phones. A majority of more than 40% of the respondents were not aware of such alternatives to new mobile phones. About one-third of respondents (34%), confirmed that they knew such devices. A rather large group of around one quarter of respondents (23%) were unsure if they knew refurbished phones or not. The results are gathered in Figure 6.

Being asked which price level the respondents would see as realistic for a refurbished phone, the largest group of respondents (27%) stated a price of around 50% of the price for a new phone. Accumulated, a group of 56% of respondents sees a price level between 50% and 70% of the price for a new phone as an acceptable price for a refurbished phone. The full distribution of answers can be found in Figure 7.

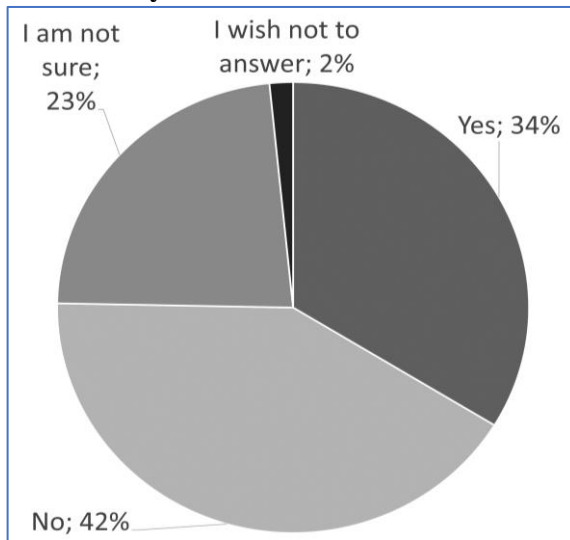**Question: Did you ever hear about refurbished mobile phones before this survey?**

Question: What price would see as realistic for a refurbished phone?

Figure 6: Knowledge about refurbished phones among young Cambodians (Source: this research)
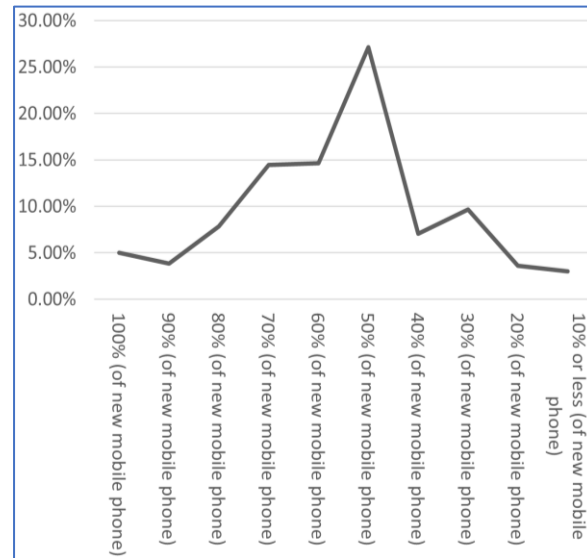
Figure 7: Perception of adequate pricing for refurbished mobile phones (Source: this research)

In two separate questions, the respondents were asked to define the risks as well as the benefits they perceive from a refurbished phone. Multiple answers were possible. When it comes to risks, the major issues were related to low battery health (60%), a lack of accessories (32%), scratched screens (27%) or general malfunctions (25%). Just a minor group (17%) stated that they would see no risks related to refurbished phones. Related to the potential benefits of refurbished phones, a large majority of 86% assume lower prices compared to new mobile phones. A similarly large group of 46% recognize benefits due to lower amounts of e-waste. A small group of 14% cannot see any benefits in such devices. All details are summarized and visualized in Figures 8 and 9.

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Question: If a company would offer you a refurbished phone in which all worn-out and defective parts (e.g. battery, housing) are replaced by original new parts: Which of the following RISKS would you see? (multiple answers possible)
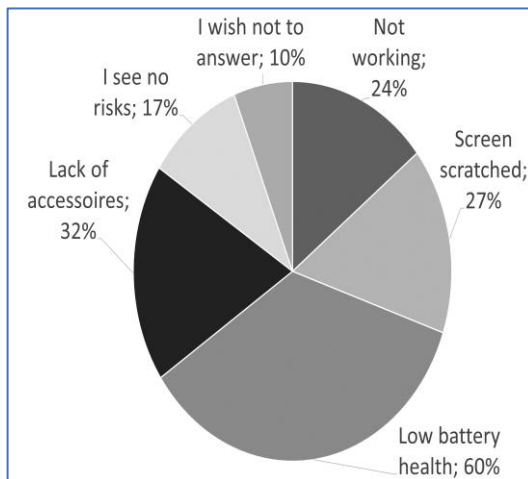
Question: If a company would offer you a refurbished phone in which all worn-out and defective parts (e.g. battery, housing) are replaced by original new parts: Which of the following BENEFITS would you see?
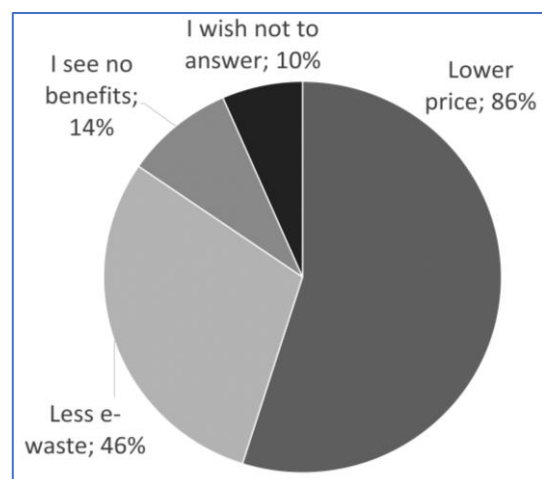
(multiple answers possible)

Figure 8: Perceived risks of refurbished mobile phones (Source: this research)

Figure 9: Perceived benefits of refurbished mobile phones (Source: this research)

Question: Would you buy a refurbished mobile phone?
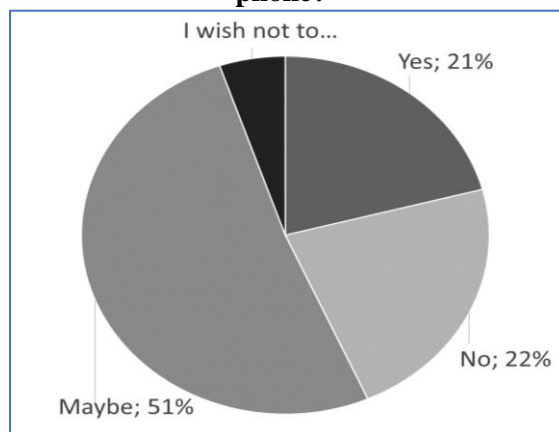
Figure 10: Willingness to buy refurbished phones among young Cambodians (Source: this research)

The last question of the survey asked if respondents would purchase a refurbished mobile phone. A group of 21% gave a positive reply and would be taking buying a refurbished phone into consideration in the future. A second group with a similar share of 22% dismissed the idea and would rather refrain from buying such devices. Nevertheless, besides these two groups making clear statements on their purchasing intentions, by far the largest group representing more than half of all respondents (51%) are indecisive about such a decision. All answers are presented in Figure 10.

4.4 Summary of Results

Based on the results from the survey answers described in the previous two sections, the key findings for each research question are presented in the table below. Using these key findings, answers to each research question are provided.

Table 3: Results, Key Findings and Answers for each Research Question (Source: this research)

Research Questions	Results, Key Findings and Answer to Research Question
RQ1 What is the usage and purchasing behavior of young Cambodians related to mobile phones?	Most young Cambodians (>50%) own a mobile phone with an age of up to two years. A large group (>30%) possess a phone which is a maximum of one-year-old. Two different purchasing behaviors can be analyzed: One peak is seen of a group purchasing new phones after around 3 years. A second group waits a minimum of 5 years. The main reason to buy a new mobile phone is for most young Cambodians that the old phone is not fully working anymore and has defects. Nevertheless, at the same time more than 2/3 state that their old phone is still (partly) working when buying a new phone. After buying a new phone, half of young Cambodians keep their old phone. One quarter hand it over to friends or family members. Summary of key findings: • Phone age: 1/3 < 1 year; 1/2 = < 2 years • Purchasing: 1/4 = every 3 years; 1/4 = +5 years • Motivation new phone: defects = 60% • Functionality of old phone: 44% working w. minor defects, 15% fully working • Disposition of phone: 1/2 keep it, 1/4 to friends or family members
RQ2 What are the knowledge and perceptions of young Cambodians related to refurbished mobile phones?	A majority of young Cambodians (>40%) do not know refurbished mobile phones. One-third (34%) state to have such knowledge. A large group (23%) is unsure about this matter. Most young Cambodians (>50%) see a price level between 50% and 70% of the price for a new phone as an acceptable price for a refurbished phone. Most common among respondents (27%) a

	suitable price of 50% of the original new part price has been mentioned.
	Nearly all young Cambodians perceive risks with refurbished phones, especially related to the battery (60%), the accessories (32%), and the screen (27%). Less than 1 in 5 (17%) sees no risks.
	Also, nearly all young Cambodians perceive benefits from refurbished phones, especially a lower price (86%) and less e-waste (46%). Only a small group (14%) sees no benefits.
	Only about one-fifth (21%) of young Cambodian people would opt for a refurbished phone. A slight majority (51%) is unsure.
	Summary of key findings: • Knowledge of refurbished phones: yes = 34%; no = 42%; unsure = 23% • Price for refurbished phones: 50% opt for a price level of 50-70% of the price for a new device • Risks refurbished phones: perceived risks related to battery, accessories, screen (no risks = 17%) • Benefits refurbished phones: perceived benefits related to price and waste reductions (no benefits = 14%) • Willingness to buy refurbished phone: yes = 21%; no = 22%; unsure = 51%

5. DISCUSSION

The following chapter discusses the results, relates them to findings from previous research, derives hereupon recommendations and highlights limitations as well as opportunities for future research.

5.1 Discussing the Usage and Purchasing Behavior of Young Cambodians Related to Mobile Phones (RQ1)

One objective of this research was to gain a deeper understanding of young Cambodians' usage behavior of mobile phones. In addition, it aimed to analyze their purchasing behavior for mobile phones.

The collected data shows, that a majority of young Cambodians have a phone which is a maximum of 2 years old. This finding supports research performed in Europe by Mugge et al., (2017a) who found that an average lifespan of a mobile phone is 2 years.

Moreover, young Cambodian people stated that their main motivation to buy a new mobile phone is that the old phone is defective. Research performed by Santana et al. (2021) in Brazil described a rather unconscious motivation and a dominant will 'to possess something new' as a major reason to buy a new mobile phone. This phenomenon cannot be supported by data collected in this research.

After buying a new mobile phone, most young Cambodians keep their old phone. A smaller group hand it over to relatives or friends. A very small group sells it. This finding supports research from Mahat (2021) who found that old phones are stored 'in the drawer' as soon as a new mobile phone has been purchased.

5.2 Discussing the Knowledge and Perceptions of Young Cambodians Related to Refurbished Mobile Phones (RQ2)

This study's secondary goal was to investigate the level of knowledge of young Cambodian people about refurbished mobile phones and to better understand their perception of such devices.

A majority of young Cambodian people state to not have any knowledge of refurbished mobile phones. This finding corresponds with research done by Holmström & Böhlin (2017) who found a lack of knowledge on refurbishing processes among consumers. Also, it is supported by findings made by Van Weelden et al. (2016) who found a missing awareness of refurbished devices among mobile phone users.

Most respondents see a price level between 50% and 70% of the price for a new phone as an acceptable price for a refurbished phone. This is a slightly lower price level compared to previous explorations, which concluded 70% of the price for a new phone as acceptable. (Mugge et al., 2017a, Quariguasi-Frota-Neto & Bloemhof, 2012)

The main risk young Cambodians perceive with refurbished phones is related to the battery. This is in contrast to previous research: Sharifi & Shokouhyar (2021) found the

highest ranked perceived risks related to the phone's functions and appearance, especially the screen. These risks were also mentioned by young Cambodians but with a lower relevance. Risks related to the data security of refurbished phones have been described by Martela (2019). Respondents in this Cambodian investigation have only described such risks very rarely. Wallner et al. (2022) describe perceived risks related to potential contamination, particularly of parts being in direct contact with the user. This risk has not been mentioned among young Cambodian people.

The battery-related risk perceived by young Cambodians is also of interest, as the battery is a part, which is in any case replaced by a new battery within the refurbishing process of the major mobile phone manufacturers. This fact is promoted very clearly in their advertising. (Apple, 2024; Samsung, 2024) This phenomenon is supporting the previously described lack of knowledge related to refurbishing processes among the explored population.

The key benefit young Cambodians would perceive with refurbished phones is economic benefits. This is consistent with research performed by Mishram et al. (2022) who found that the majority of people opting for a refurbished phone did so due to assumed financial benefits. Nevertheless, the Cambodian results do not support the findings from Sharifi & Shokouhyar (2021) who found that environmental factors were of the highest importance in the process of purchase decision-making for refurbished mobile phones.

Finally, only a small group of young Cambodians would decide to buy a refurbished phone. The majority remains unsure. This uncertainty can be explained by the previously described lack of knowledge and awareness about refurbished phones, which is also described in the literature by Holmström & Böhlin (2017) and Van Weelden et al., (2016). Moreover, this pessimistic evaluation of young Cambodians on refurbished mobile phones is supported by a rather negative perception of such devices found in the Philippines in research by Olorvida et al. (2023). A positive attitude of nearly half of mobile phone users towards refurbished alternatives described by Mugge et al. (2017a), can as of today not be seen in this Cambodian investigation.

5.3 Recommendations

Based on findings from previous research as well as from findings based on data collected in this exploration the following recommendations can be given, broken down into groups of key stakeholders:

Recommendations to Decision-Makers in Companies Producing and/or Selling Mobile Phones in Cambodia

- Realize and use the market potential for refurbished mobile phones in Cambodia and introduce circular strategies into the business strategy, as described by Esmaeilian et al. (2021). The Cambodian market could be of interest for such devices, as mobile communication in Cambodia is of great importance and the user rates of mobile phones are high. (Statista, 2024; Taylor, 2024) Furthermore, alternatives to new mobile phones at a lower price are of great need in a cost-sensitive developing country like Cambodia (Ghorab, 2022)

- Provide comprehensive guarantees on refurbished mobile phones to reduce the perceived risks found in this exploration among young Cambodians as it is already today requested by law in certain other countries (Mugge et al., 2017a)

- Highlight in a stronger way that certain parts in refurbished phones are always replaced by new parts. This can prevent high perceived risks found in this research related to certain parts (e.g. the battery). If there is a better understanding among customers that such parts are in any case replaced by new parts, the perceived risk might decrease. This research indicates that for young people in Cambodia, there is a lack of clarity in understanding that certain parts are always replaced

- Additionally, companies should strongly stress issues related to the hygiene of refurbished mobile phones. Previous research has shown concerns on customers' side related to hygiene and contamination. (Wallner et al., 2022) Companies should clearly address their cleaning process. Moreover, parts in

direct skin contact with the user (e.g. headphones) should be replaced in any case

- Besides, information about replaced parts and hygiene, companies should clearly address their measurements to gain data security, as customers expressed risks related to their data on their old mobile phones when using take-back programs for refurbishment. (Martela, 2019) Companies should have clear policies related to this perceived risk and communicate it to concerned customers

- Companies should set up take-back programs to make sure the rate of used mobile phones returned to the manufacturer increases. Such take-back programs should be as convenient as possible for the consumer and potentially be combined with incentives for the customer. (Coffey and Toland, 2019) This exploration has confirmed previous research that the majority of used mobile phones remain unused with the previous owner and that used devices are not returned to the manufacturer for refurbishment or recycling

- Besides implementing or further extending refurbishment strategies, companies must take measures to prevent 'cannibalism' resulting from selling new and refurbished products at the same time (Geyer & Doctori Blass, 2010)

- The availability of refurbished phones should be as easy as possible for potential customers. Specific websites providing information and products with easy-to-remember web addresses might support this, as they are already available in other countries (e.g. http://www.refurb.se/; https://www.refurbed.de ; https://www.refurbished.at/)

- Companies producing mobile phones should, already, during the design phase of the device respect potential later refurbishment activities and ensure refurbishment-friendly designs, for example making sure certain components (e.g. battery) can easily be exchanged and the device can be opened destruction-free (Hazelwood & Pecht, 2021)

- Finally, companies should take data security issues seriously, even though they have not been classified as a major perceived risk in this exploration in Cambodia. Standards for erasing data exist and should be used and certified, as it is already performed in other countries (Inrego, 2024)

Recommendations to Policy-Makers in Cambodia

Policy-makers in Cambodia can support and facilitate the operations of companies offering refurbishment strategies into their business strategy in multiple forms:

- Communication activities (e.g. in social media, radio, TV, and billboards) and measurements to increase knowledge (e.g. in schools and universities) on the ecological and economic benefits of refurbishment (Ghorab, 2022; Mahat, 2021; Mugge et al., 2017a, Quariguasi-Frota-Neto & Bloemhof, 2012)
- Setting legal standards about the minimum guarantee requirements for refurbished parts as they are already implemented in other countries of the world (Mugge et al., 2017a)
- Create standards of minimum technical requirements for refurbished devices, which define basic processes and parts that must be replaced in such devices. This can reduce the uncertainty on refurbished products found in this research. These standards should also address perceived risks to hygiene, contamination, and data security. (Martela, 2019; Wallner et al., 2022) and define minimum legal requirements for each of those matters
- Policymakers should request from mobile phone companies operating in Cambodia to clearly define end-of-life strategies for their products. Such strategies should already be in the design phase respecting environment-friendly end-of-life concepts. Ideally, such strategies should include refurbishment. Moreover, they should request the need for professional, efficient, convenient take-back programs for used devices (Hazelwood & Pecht, 2021; Coffey and Toland, 2019)

- Financial incentives, for example, tax reductions, for companies introducing refurbishment strategies into the business strategy should be taken into consideration. Refurbishment potentially provides ecological and economic benefits for Cambodian society and the environment. This potential should be understood and used. (Ghorab, 2022; Mahat, 2021; Mugge et al., 2017a, Quariguasi-Frota-Neto & Bloemhof, 2012)

Recommendations to Academia

- Academia should support and facilitate actions by companies introducing refurbishment strategies into the business strategy and Cambodian policy-makers in multiple forms:
  - Support the described standardization for refurbished mobile phones
  - Help to define terms and processes for refurbished mobile phones
  - Provide the theoretical knowledge on challenges and opportunities related to refurbishment which can be used by companies and the public sector
- Perform future research to analyze this phenomenon in more detail, especially:
  - Among older Cambodians
  - Among Cambodians in rural areas
  - Among people with diverse educational backgrounds in Cambodia
- Previous research in other Asian countries have shown major perceived risks and a rather negative perception on refurbished IT devices. Cultural influences might have an impact on purchasing perceptions, which might be a matter of future research (Chun et al., 2022; Olorvida et al., 2023).

Recommendations to the Cambodian Society

- Young Cambodians should increase their knowledge and awareness of refurbished mobile phones in order to gain the economic and ecological benefits of refurbishment (Ghorab, 2022; Mahat, 2021; Mugge et al., 2017a, Quariguasi-Frota-Neto & Bloemhof, 2012)

- They should actively request refurbished alternatives to new parts from their mobile phone sellers. Higher customer demand will positively impact the willingness of companies to introduce refurbishment strategies into the business strategy in Cambodia

- They should insist on clear definitions and standards for refurbished mobile phones to decrease their uncertainty and lack of clarity on refurbished devices. These definitions should especially provide clarity about
  - Parts which are always being replaced in refurbished mobile phones (this research)
  - Hygiene and contamination (Wallner et al., 2022)
  - Data security (Martela, 2019)

5.4 Limitations and Future Research

The chosen research design and its distribution channels to collect data lead to certain limitations of this exploration. The population has been limited to young people. Therefore, Cambodians being older than 28 years are not represented in this research. Moreover, survey answers have been collected within the context of universities in Phnom Penh. This leads to limitations, as there is a regional focus within Cambodia as well as a focus on people with a higher educational background.

Future research might contribute to those limitations and perform this exploration for a wider age group, for people in rural areas, and people with diverse educational backgrounds. Additionally, data could be collected in different countries using the same research design in order to perform cross-country analysis. Especially, investigating differences among the ASEAN countries might be a potential area for future research. An additional perspective for potential exploration in future academic research might be a stronger focus on the economic relevance of refurbished mobile phones: An estimation of the potential market value of unused mobile phones stored at former users. The financial benefits for potential users of refurbished mobile phones in Cambodia. Economic benefits for Cambodian companies performing refurbishment. Finally, the

relevance of cultural influences on purchasing decisions for refurbished IT devices in Cambodia and Asia in general might be a matter of future investigation.

6. CONCLUSION

This research explored the usage and purchasing behavior of young Cambodians related to mobile phones and their knowledge and perception related to refurbished mobile phones. It found a usage behavior which partly has been found in previous research in different areas of the world (e.g. on the average age of mobile phones) but also found aspects which differ from previous explorations (e.g. on the reasons to buy a new mobile phone). Moreover, it found a low level of knowledge on refurbished devices and a high level of perceived risks related to such items. Based on these findings, this research provided a set of detailed recommendations for each group of stakeholders and defined the need for future research to gain ecological and economic benefits from refurbishment strategies for the Cambodian economy and society.

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TECHNOLOGY ADOPTION BY THE ACCOUNTANCY PROFESSION IN ASEAN COUNTRIES – CAMBODIAN'S PERSPECTIVES

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ABSTRACT

The adoption and adaptation of information technologies have significantly enhanced the efficiency and productivity of information and data processing. The purpose of this research is to provide a comprehensive and thorough analysis of the current state of digitalization in Cambodia's accounting sector, highlighting key factors, challenges, and opportunities. Focusing on accountancy schools, professional bodies, and practitioners, this study examines the impact and adoption of digital technologies as Cambodia's economy transitions into a digital economy. It also explores the readiness of these groups to embrace technological advancements within this new digital context. The research underscores the Cambodian government's push towards establishing a digital economy by 2023 and its effects on the accounting profession. While there is widespread awareness of emerging technologies such as data analytics, artificial intelligence, and cloud computing among all stakeholders, the actual application of these technologies remains limited, particularly within professional organizations and academic institutions. Key barriers to adoption include a shortage of skilled professionals, insufficient funding for technological infrastructure, and inflexibility in the standards of accountancy programs. The study identifies a pressing need for enhanced training and support to help accounting professionals adapt to these technological changes. Universities should integrate training in emerging technologies into their curricula and foster closer industry collaboration to strengthen human resources through internships and industrial attachments. Additionally, the study suggests increased cooperation between industry, educational institutions, and professional bodies to address the skills gap and ensure smoother integration of digital technology into the accountancy sector. One potential solution is the establishment of a shared services platform, which could be developed by vendors, professional bodies, or higher education institutions, and would be particularly beneficial for small and medium-sized accountancy firms.

Keywords: *Information Technologies, Digital Economy, Accountancy Schools, Professional Bodies and Practitioners, Platform.*

1. INTRODUCTION

Over the last two decades, considerable advances in information technology (IT)[1] have been made significantly (Venkatesh et al. 2012[2]). Through the adoption and adaption of information technologies, these improvements have enabled more productive and efficient processing of information and data. The domains affected include economics, accounting, auditing, and corporate information and decision. However, it was not until recently that developed and emerging countries have begun to notice a dramatic increase in digital adoption and adaption on individual, government and corporates.

Digital economy[3] has been regarded as a component of the global trend towards industrial revolution 4.0 since the advent of the internet and the modernization of information and communication technology (ICT). Cambodia expressed its interest in developing its digital economy beginning in 2018 with the introduction of the Rectangular Strategy and the goal to transform Cambodia into a digital economy by 2023. This goal is that a digital economy can enrich the range of opportunities and move Cambodia to higher stages of development.

Discerning the urgency of diversifying Cambodia's economy and the significance of transforming the country into a digital economy, the Royal Government of Cambodia (RGC) has already prepared and readily develop the Cambodia Digital Economy and Society Policy Framework 2021-2035[4], Cambodia Digital Government Policy 2022-

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[1] According to Kaplan et al. (1998); Venkatesh et al. (2003); Kwon & Vogt (2010), Information technology (IT) is a broad term for technology, both tangible and intangible, that makes it easier to gather, process, store, deliver, and share data and other digital content with the aim of providing relevant information and data for directing, evaluating and decision-making.

[2] See: Venkatesh et al. (2012), Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology.

[3] According to World Bank (2019); Heeks (2016); Pohjola (2002); Tapscott (1996), the term digital economy has grown in recognition due to the emergence of business and the adoption of internet and technology contributed to increasing organization's competitiveness since the latest 1990s, and it highlighted the relationship between the new economy, new business, and new technology, and how they enable one another as parts of a digital economy.

[4] See: Cambodia Digital Economy and Society Policy Framework 2021-2035, Supreme National Economic Council (2021).

2035[5], and Cambodia's Science, Technology and Innovation Roadmap 2030[6]. This is in light of the challenges of time constraints and pressures introduced by the COVID-19 outbreak.

These framework, policies and roadmap were framed so as to take full advantage of the development of digital technology, and curate a long-term vision for Cambodia to build a vibrant digital economy and society. This is in response to the RGC's ambitious longer-term aspirations, which is to have an upper middle-income economy by 2030 and a high-income country by 2050[7].

A thorough grasp of the organizational context within which technology operates, encompassing both human and technological components, is necessary for the fruitful adoption of technology, information technology, and digitalization. The purpose of this study is to examine, from the perspectives of Cambodia, how digital technology and digitalization are used in accountancy schools, accountancy and auditing firms, and the accountancy profession, as well as how ready these institutions are to accept technological change in the context of a new economy[8].

Digital transformation is the process of adopting or capturing and maximizing the benefits of advances in Information and Communication Technology (ICT)[9] and digital technology. This is in order to increase productivity and economic efficiency, boost national economic growth, and build a civilized society in which digital citizens can

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[5] See: Cambodia Digital Government Policy 2022-2035, Ministry of Post and Telecommunications (2022).

[6] See: Cambodia's Science, Technology and Innovation Roadmap 2030, Ministry of Industry, Science, Technology & Innovation (2022).

[7] See: Cambodia Industrial Development Policy 2015-2025, Market Orientation and Enabling Environment for Industrial Development, Approved by Council of Ministers at Its Plenary Meeting on 06 March 2015; and Cambodian Vision 2050 presented by Supreme National Economic Council (2022).

[8] According to OECD (2013); European Commission (2014); Mesenbourg (2001); Kling & Lamb (2000); Bukht & Heeks (2017); Lane (1999), the term new economy refers to as the digital economy, internet economy or web economy and/or platform-based economy, which employs information technology to influence production and consumption as well as the development and innovation, adaptation, output and market, and consumption of goods and services which can be understood as an economy based on digital technologies, and can impact other sectors of the economy and society.

[9] See: Policy on Higher Education Vision 2030 and Capacity Development Master Plan in Educational Sector 2020-2024; Policies and Strategies on Information and Communication Technology in Cambodia in 2004, Ministry of Education, Youth and Sports.

benefit from the use of digital services. The usage of digital services must result in high inclusiveness, reliability, and trustworthiness while maintaining national identity and culture[10].

This study emphasizes and pays special attention to the impact of technology adoption, transformation, and disruption on accountancy schools, professionals, and practitioners as Cambodia's economy transitions to become a digital economy. It highlights how government, the private sector, and market-related factors have influenced Real-World Applications[11] in the context of digitalization as seen in figure 1.

Figure 1: The pyramid of data and the trends in the data-driven digital economy

Explanation
Captures both high level of knowledge and the ability to apply knowledge towards particular goals

Real-World Application
Given the knowledge about its web visits, the e-commerce platform can adjust prices and set up targets advertising to increase sales

Wisdom

Information applied to answer "Why" questions and show the reasons

Analysis suggests that certain items are more in demand at a certain price among users with a particular profile

Knowledge

Data used and contextualized as answers to "Who, What, Where, and When" Questions

Data indicate who is looking at what web shop item from which location at what time and for how long

Information

Discrete, objective facts about phenomena, often obtained from sensors, experiments or surveys and questionnaire

E-commerce platform registers website visits and user activity

Data

Source: UNCTAD (2014 & 2021)

With economic growth shrinking and going into negative territory in 2020 as a result of the COVID-19 pandemic, Cambodia saw a negative impact on economic activities, structural challenges and impulse shocks in both the short and medium term. The RGC has an important role to play in restoring, promoting, and developing a new growth model that is highly responsive and resilient to future changes in economic architecture and socio-economic welfare.

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[10] See: https://education-profiles.org/eastern-and-south-eastern-asia/cambodia/~technology.
[11] See: United States Chamber of Commerce Foundation, UNCTAD (2014).

Digital technology has been at the heart of and is a key driving force of all parts of the manifold economic and social activities, efficiency, and productivity of operations. Collectively, these have been typically referred to as the digital transformation of daily lives. Digital technology also promotes economic diversity, and creates jobs targeted at reducing poverty and narrowing social inequality. The digital sector can play three key roles on the national socioeconomic scene such as new growth enabler[12], driving force[13] to support and sustain other sectors in the medium and long term, and becoming value-added driver of all sectors[14].

At the same time, technology and digitalization may lead to some negative outcomes, such as changes in business practices, the loss of low-skilled jobs or jobs that do not meet the sector's needs[15], changes in culture that are at odds with customs and traditions, lifestyle changes that allow people to be more independent or even connected, loss of privacy due to the management and misuse of personal data, and problems with security and public order in both the public and private sectors.

According to Davis (1993); Abdul Gader et.al. (1996), social and cultural views are important considerations. Abdul Gader et.al. (1996); Carnoy (1997) suggested that significant obstacles to the spread of modern technologies in developing nations include a lack of highly competent management and a flexible, self-assured labour force. Many challenges and issues are related to human resources and this is one of the biggest obstacles to technology adoption in organizations.

According to UNCTAD (2021) data, information, knowledge and wisdom gaps were mainly discovered in the digital era that examined the use technology in both public and

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[12] See: Harald Øverby & Jan Arild Audestad (2021): Introduction to Digital Economics, Foundations, Business Models and Case Studies, Second Edition; https://doi.org/10.1007/978-3-030-78237-5
[13] See: Asal Mustfa Taleb Al-Odat (1998); Abd Rahman (2008): The use of technology becomes a primary driving force.
[14] According to the World Bank (2019), digital technologies is to promote economic development, innovation, and the economy as a whole and the variety of sectors, including digital entrepreneurship, e-commerce, FinTech, the ICT sector, and the digital transformation of industries.
[15] See: UNCTAD (2021), Cross-border data flows and development for whom the data flow 2021; Recent trends in the data-driven digital economy.

private bodies. Konrad-Adenauer-Stiftung (KAS, 2019) conducted a survey of 61 Cambodian enterprises which reveals three new skill kinds that are currently lacking: 49% of companies choose "Analytics", which is the ability to create, format, modify, and represent data using sophisticated spreadsheet formulas and functions to extrapolate trends and patterns; 82% choose "Online Collaboration", which entails using tools such as cloud storage, productivity applications, calendars, web meetings, and learning environments; and 90% choose "Managing Online Information", which is the ability to find, identify, evaluate, and communicate online information. Currently, 82% of employees use Microsoft Office, the Internet, and email often at work, whereas less than 40% utilize video-conferencing, online storage, or productivity tools, etc.

Cambodia's business sector is viewed as the primary engine driving the economy, propelling the country into developed status. The "Law of Commercial Enterprises" and the "Law on Corporate Accounts, their Audit, and the Accounting Profession" established the country's basic criteria for accounting, financial reporting, and auditing in 2002. The latter, commonly known as the Accounting Law, requires all businesses to utilize an accounting system based on international accounting standards. The leading institutes of higher education or universities must consider meeting the critical demand for accountancy professionals by preparing and updating courses that qualify students as highly specialized accountants and experts in finance and auditing to ensure that business organizations comply with international standards and regulations.

The end result is that work will be more productive, efficient, and effective. This is especially true in the financial sector. Graduates can work as auditors, financial analysts, business consultants, chief financial officers, chief executive officers, tax consultants, and other related roles in addition to accountants. The study has been divided into three parts to achieve its objective.

Part 1 describes the Audit and Accounting Professionals of the Kampuchea Institute of Certified Public Accountants and Auditors (KICPAA)[16] and their roles in setting the requirements for legal individuals and entities seeking membership to the accountancy and auditing professions. KICPAA is also responsible for maintaining a register of those legal individuals and entities that are legitimately qualified to practise as accountants and auditors.

Part 2 explores the history of Cambodia's public and private universities, institutes and/or institutions that grant degrees in accountancy, as well as other accountancy schools.

Part 3 focuses on accountancy practitioners, including local and foreign accountancy and auditing firms that have been operating and practising in Cambodia.

Due to the nature of the study and the various stages of information technology and digital technology adoption in Cambodia in the field of accountancy amongst the universities, practitioners and professionals, a survey approach was used. In-person interviews and questionnaires are suitable approaches for gathering data. The ability to engage directly with participants and learn more about the situation and issue is one key benefit of these techniques.

To get an update on the growth of the technology and digitalization ecosystem, the study gathered data from primary and secondary sources in two phases: in the first quarter of 2023, and then again, in the second quarter of 2023.

Public and private academic institutions, universities, institutes, accountancy and auditing firms, and KICPAA were surveyed in the study's initial phase to gather primary data and information. Based on in-depth inputs from previous contacts and interviews

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[16] The Kampuchea Institute of Certified Public Accountants and Auditors (KICPAA) was established in accordance with the Law on Corporate Accounts, Their Audits, and Accounting Profession (2002) and the Law on Accounting and Auditing (2016) of the Kingdom of Cambodia. KICPAA is the statutory body and regulator for accounting profession in Cambodia. The Institute was established with the purpose of defending the public interest and the profession's interest, governing its members through the growth of professional capacity, enhancing adherence to standards, professional codes of conduct, rules, and regulations, and developing and supervising professional accounting education initiatives. https://www.kicpaa.org/

with significant stakeholders, such as universities, accountancy and auditing firms, and selected targeted people, the preliminary report from the first phase was revised in the second phase. Analysis was done on the data produced by the quantitative approach's descriptive statistics. Thereafter, qualitative interviews were used to supplement the survey data and investigate a variety of concerns collected by the survey for quantitative analysis.

1.1 Background

In ASEAN, business digitalization has become a rapidly expanding phenomenon. By designating it as one of the top priorities for the updated Rectangular Strategy for Growth, Employment, Equity and Efficiency, the Cambodian government actively supports the preparation for and implementation of the digital economy and Industrial Revolution 4.0. But it will be a long journey for Cambodia to fully embrace the new digital economy. The government needs to invest in infrastructure, such as promoting e-governance, improving people's digital literacy and abilities, and providing the right regulatory framework, among others. These developments in Cambodia are already having effects on job growth and the composition of the labour market. The digital revolution will unavoidably enable a new model of economic growth to achieve the primary goal of the government to transform the country into a digital economy by 2023.

According to the Ministry of Economy and Finance, the Cambodian economy has grown at a rate of roughly 7% annually over the past 10 years. However, it severely slowed down during the COVID-19 pandemic, and the nation is now embracing digitalization as a means of sustaining economic growth and avoiding stagnant development. However, according to Schwab (2019), Cambodia continues to be among the weaker competitive nations regionally and globally, particularly in ASEAN. As long as digital technology and digital utilization continue to develop, it will pose a significant challenge to institutes of higher education and universities, particularly after COVID-19. This is especially true when the world is transitioning to a new normal and the institutes of higher education and universities must not be left behind. After several years of steady and spectacular economic growth, Cambodia must harvest the economic

opportunities presented by the digital revolution of the accountancy profession in higher educational institutions. An increasing number of university students are quickly absorbing technology and digital technology. This is made possible by a rapid rise in the use of cell phones and other smart devices during the COVID-19 crisis. Investment in digital technology is anticipated to aid in the diversification and scaling up of the nation's economic system.

University students frequently learn fundamental hard skills and some digital software such as QuickBooks, SPSS, STATA for statistical data analysis through classroom courses and programs and other online learning tools. To benefit from a positive demographic trend, ongoing organized investment in technology education is essential. At the moment, effective formal teaching for many digital skills is still lacking in Cambodian universities[17].

The significant results of this study which are relevant to Cambodia are emphasized in the series of ILO publications titled "ASEAN in Transformation". These publications examine how businesses and the labour market are changing as a result of current technology trends in the region's five main manufacturing and service sectors.

The surveys were conducted with 2,747 university and TVET students and 4,076 enterprises in the 10 ASEAN member states. Many obstacles prevent Cambodian businesses from modernizing their technology. Due to lower education levels in Cambodia as compared to the other ASEAN countries, the result shows severe skills gaps in Cambodia. According to businesses in Cambodia, technology does require an upgrade. This might be because technology is regarded as being expensive and Cambodian wages are comparably lower and thus there is no need to pivot using technology as manpower is cheap. However, given that technology prices are falling and labour costs are rising, these views could change soon[18].

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[17] See: Olga J. Skriabikova (2020): Country report Cambodia technological change induced by the digital transformation in economic sectors and changing demand for skills.
[18] See: ILO (2017): Cambodia Country Brief: ASEAN in transformation: How technology is changing jobs and enterprises.

Figure 2: Frontier Technology Readiness Index for Cambodia 2008-2021
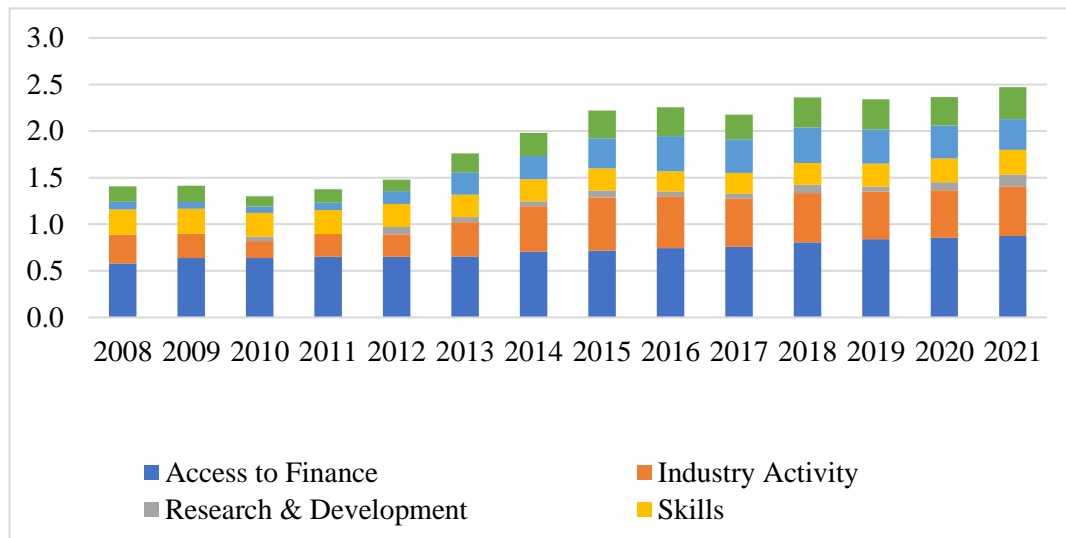
Source: Author's Calculation and UNCTAD (2023)

Cambodia was ranked 104th out of the 131 economies in the Network Readiness Index (NRI 2022)[19]. According to UNCTAD (2023), only a few countries are currently developing frontier technologies. The index is based on five components: ICT deployment, skills, R&D activity, industry activity, and access to funding. Figure 2 presents Cambodia's frontier technology readiness and desire to embrace digital transformation in all facets of the economy.

It is anticipated that a thorough digitalization of the economy will usher in digital innovation, encourage universities to adopt technological changes, open up job opportunities, promote economic growth, and alter Cambodia's economic environment. Despite the many advantages and benefits of digital technology though, there could also be some drawbacks for those who use digital technologies. However, there has not been much empirical research on the possible effects of digitalization in Cambodia,

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[19] The Network Readiness Index (NRI) is one of the leading global indices on the application and impact of information and communication technology (ICT) in economies around the world. The NRI Report (2022) maps the network-based readiness landscape of 131 economies based on their performances in four different pillars: Technology, People, Governance, and Impact. Each of these pillars is itself comprised of three sub-pillars that have been populated by a total of 58 variables.

particularly on how the adoption of digital technology will affect accountancy schools, accountancy firms, and the accountancy profession in the near future.

According to UNCTAD (2019), Bukht & Heeks (2017), the new economy has a favourable impact on job creation, growth and productivity, and innovation. Over the past 10 years, Cambodia's information technology, Internet and digital industry has experienced significant growth. RGC is mainly responsible for creating and implementing digital technology-related policies and initiatives to direct the development of the digital economic sector in Cambodia. This is done by crafting relevant policies and providing guidance and an implementing mechanism for the successful development and enhancement of the digital sector.

1.2 Kampuchea Institute of Certified Public Accountants and Auditors

In Cambodia, all companies are required to comply with Cambodia International Financial Reporting Standards (CIFRS) which are based on International Financial Reporting Standards (IFRS). The National Accounting Council is responsible for developing and improving accounting standards in Cambodia by adopting the IFRS. The Law on Accounting and Auditing was promulgated by the Royal Kram No. NS/RKM/1215/016 dated 11 April 2016.

This law sets forth certain accounting requirements. For instance, an audit shall be carried out by an independent auditor registered with the Kampuchea Institute of Certified Public Accountants and Auditors (KICPAA). There is an obligation to submit annual audited financial statements.

KICPAA is a vital force for matters ranging from strengthening professional accounting ethics to sustaining and ensuring the confidence of the public about accountancy professionals. To fulfil its obligations and responsibilities as the national professional body of accountancy in Cambodia, KICPAA must elevate its reputation and increase public recognition and awareness of the profession in order to attract future-ready and able members such as accountants, auditors, public institutions, enterprises and

individuals. Currently, audit firms registered officially as members with the KICPAA total 52 firms.

1.3 Higher Education Institutions

Since the late 1990s and the signing of the Paris Peace Accord, the Cambodian government has paid specific attention and undertaken initiatives to develop higher education. New subjects such as economics, accountancy and finance were added to the bachelor's degree programmes.

The National University of Management (NUM) is the oldest and leading public university in Cambodia. It commenced as the first accountancy school in Cambodia about 30 years ago after it was founded on 18 March 1983 as the Institute of Economics. The first accounting class and programme was introduced in 1994 as a four-year course. As the education landscape has advanced over the years, the accountancy degree is now offered by both public and private universities or institutes across Cambodia.

Accountancy education has significantly improved, starting with getting schools to follow rules and principles and expanding reforms for the schools to continue to develop and employ quality resources – teachers, school management and study materials. These quality inputs are chosen based on specific criteria and standards. The higher education reform is focused on strengthening governance, improving the qualifications of doctoral-level professors, improving the curriculum in response to industrial development, promoting research, establishing centres of excellence for assessing the quality of education.

The general situation of higher education in Cambodia is that the quality of the programmes must meet the national minimum standards. However, schools have to strive to meet international quality standards and they would need increased investment in research and the publication of research articles, along with the transfer of knowledge and technology with the private and industrial sectors.

According to the Ministry of Education, Youth and Sports (MoEYS), there were 130 higher education institutions in Cambodia in 2022, of which 82 were privately run. These higher education institutions are under the supervision of 16 different ministries and institutions. MoEYS is in charge of 82 higher education institutions.

In the academic year 2021-2022, there were 186,658 students enrolled in both undergraduate and graduate programmes (MoEYS, 2022). There were significant increases in student enrolment each consecutive year between 2015 and 2019. In the wake of the recent slight decrease in student enrolment following peak enrolment in 2019, there is an ongoing debate about how teaching quality can be promoted in the context of digitalization and technology changes as seen in Table 1.

Table 1. Number of students enrolment 20215-2022

Student Enrolled			
Year	Bachelor	Master	Doctor
2015-2016	174,142	18,723	1,229
2016-2017	165,359	20,272	1,222
2017-2018	168,242	22,022	1,349
2018-2019	179,258	23,256	790
2019-2020	171,183	9,984	961
2020-2021	170,246	8,465	978
2021-2022	175,962	9,483	1,213

Source: Author's Calculation and MoEYS (2023)

1.4 Accounting and Auditing Practitioners

The General Accounting Plan that was issued by the Ministry of Economy and Finance (MEF) in 1993 governs the accounting system in Cambodia. The Plan contains a recommended Chart of Accounts, the list of accounts to be applied, accounting treatment, and accounting principles and guidelines for financial statement presentation.

Foreign companies in Cambodia adopt International Accounting Standards (IASs) due to the requirements of their overseas parent companies and the influence of existing international accounting firms in Cambodia. The Audit Law was passed in March 2000 and the General Provisions provided for the establishment of an independent National Audit Authority[20] that was responsible for executing the external auditing function of the Government. This law provides that the Auditor-General is empowered to conduct an audit of transactions, accounts, systems, controls, operations, and programmes of government institutions, in accordance with generally accepted auditing standards and government auditing standards.

This Law on Audit also provides for the establishment of an internal audit function in government ministries and public enterprises. The Internal Audit Department must report to the head of each ministry, institution and public enterprise and submit reports to the National Audit Authority. The Internal Auditing function is also established to examine and evaluate the efficiency of systems of internal controls within each institution, ministry and enterprise (ADB, 2000).

Yapa, et al. (2010) pointed out that there was no professional accounting body in Cambodia until 2002 when the promulgation of the "Law on Corporate Accounts, Their Audit and the Accountancy Profession 2002" resulted in the creation of two accountancy institutions: the National Accounting Council (NAC) and the Kampuchea Institute of Certified Public Accountants and Auditors (KICPAA).

The Big Four of the world's largest accountancy and auditing firms have a presence in Cambodia – Deloitte, KPMG, PricewaterhouseCoopers (PwC), and Ernst and Young (EY). With multinational clients from all over the world looking to expand in the region, the Big Four are helping businesses – large and small – to navigate Cambodia's challenging commercial and tax regulations.

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[20] See: Law on Audit (2000): The Law on Audit of the Kingdom of Cambodia enacted by the National Assembly on the 12th of January 2000 at its plenary approved by the session of the second legislature and entirely Senate on its form and legal concepts on the 21st of January 2000 at its second plenary session of the first legislature and was declared constitutional.

Accounting and auditing are considered important components of Cambodia's economic growth, therefore, higher education institutions (HEIs), the Ministry of Economy and Finance (MEF) and Accounting and Auditing Regulator (ACAR) are key players in developing, teaching and regulating the accountancy profession and financial reporting practices in Cambodia. The Law on Accounting was first promulgated by Royal Kram No. NS/RKM/0702/011 on 8 July 2002, which mandates the *"organization, management, and function of the accounting system based on international accounting standards for enterprises either natural persons or legal entities to have an independent profession in the Kingdom of Cambodia"*.

In Cambodia, digital transformation refers to the adoption, capture, and maximization of the benefits of advances in information and communication technology and digital technology in order to increase production and economic efficiency. Digital transformation is the combination of digital technologies with business processes. Digital transformation has a concrete impact on accountancy information systems and the accountancy profession. The impacts range from storing, classifying, and summarizing financial data to analysing financial statements, building the financial management and reporting system, and maintaining the system's effective continuity. Accountants in business are back-office personnel who assist with operational duties in accordance with the business model of their companies. Their duties include producing timely and reliable financial statements in accordance with legislation and standards. These digital transformations and technological changes are perceived to be critical to the accountancy profession and auditors, for them to constantly renew and improve themselves in tandem with digital advances.

Furthermore, the emerging digital technology, as well as the faster and safer operations performed by accountants necessitate a change in the profession's social image. In the process of digitalization, the accountancy profession will be transformed by reforming itself to meet the challenges of the digital age.

Technology has the ability to automate much of the everyday compliance work performed by accountants and auditors. Accountancy firms were significantly affected by technological transformation and disruption encountered in modernizing accounting and auditing practices in response to market demand and the need to secure market position amidst intense competition. It is not surprising that the accountancy industry today has several gaps and challenges that need to be addressed by all key players and stakeholders in the context of digitalization and technological changes and disruptions.

One key reason is that robotic process automation (RPA), artificial intelligence (AI), and machine learning are harnessing the power of data to transform accounting and auditing. While the auditor of the future will employ data analytics and significantly larger amounts of information from a number of agencies, artificial intelligence (AI) in accounting will change quickly from being a tool for compliance to becoming a tool that offers advice.

With these perspectives, accountancy practitioners must be well-prepared to adopt, adapt, and transform by strengthening digital knowledge, skills, and experience, as well as staying abreast of accounting developments and having access to cutting-edge auditing technology in order to carry out their work effectively and efficiently.

The RGC has encouraged the digital economy and Industry 4.0 in its high-level policy strategies and programme in the public and private sectors, according to ADB's research as is set out in the report, "Cambodia's Ecosystem for Technology Startups (2022)". The Rectangular Strategy IV also strongly aims to build digital infrastructure and develop the digital legal system. It promotes the "digital system in business and SMEs". It also fosters the incorporation of digital technology into academic curricula, the training of digital skills, the promotion of entrepreneurship through a digital ecosystem for startups and businesses and so on.

2. RESULT OF FINDINGS

Part 1: Professional Accounting Organization (PAO) – KICPAA

The survey instrument was sent to the Kampuchea Institute of Certified Public Accountants and Auditors (KICPAA). Cambodia has only one national PAO, which is the only independent and non-profit institution in the accountancy and auditing sector in Cambodia. It was established by the 2002 Law on Corporate Accounts, Their Audits, and the Accounting Profession, and subsequently the 2016 Law on Accounting and Auditing of the Kingdom of Cambodia.

KICPAA has fewer than 10,000 members. The KICPAA was formed less than 30 years ago and functions as a professional membership body. It has a full-time staff of fewer than 50 people. The respondent referred to is a PAO board member. The Institute's top management also participated in the survey. Further discussions with senior KICPAA members allow a more in-depth analysis of the survey responses.

According to KICPAA's top management, the Institute does not have a digital technology roadmap for advancing the accountancy profession. However, a digital technology roadmap will be prepared and developed based on the government's policy and regulatory frameworks – set out in "Cambodia Digital Economy and Society Policy Framework 2021-2035", "Cambodia Digital Government Policy 2022-2035", and Cambodia's Science, Technology, and Innovation Roadmap 2030" from the Ministry of Economy and Finance, Ministry of Post and Telecommunications, and Ministry of Industry, Science, Technology, and Innovation.

a. Technological Preparedness

KICPAA was asked about its readiness for technology adoption across four dimensions: i) attitude toward technology adoption, ii) subjective belief about technology adoption in the accountancy sector, iii) perceived behavioural control over technology adoption, and iv) the accountancy sector's intention to engage technology.

Awareness

According to the respondent, KICPAA is aware of all of the developing technologies depicted in Figure 3. The respondent is moderately aware of the usefulness of adopting some emerging technologies. Artificial human assistants, artificial intelligence, augmented reality, and other technologies fall into this category with a common score of '3.0'. The survey also reveals that the respondent indicates a fair understanding of data analysis/ big data, cyber security, and cloud computing, with the highest rating of '4.0' for attitude toward technology adoption.

Utilization

In terms of utilization, as shown in Figure 4 above, the respondent assigned a relatively low degree of utilization to certain technologies such as robotic process automation (2.0), extended reality (2.0), augmented reality (2.0), and artificial human assistants (2.0). The respondent chose a rating of '3.0' (considered high) for the visual Internet of Things), machine learning/intelligence, data analysis/big data, cyber security, cloud computing, blockchain, and artificial intelligence. This brings up the point that being aware of technologies is one thing, but really using them is quite another.

Figure 3: Level of awareness of the selected emerging technologies
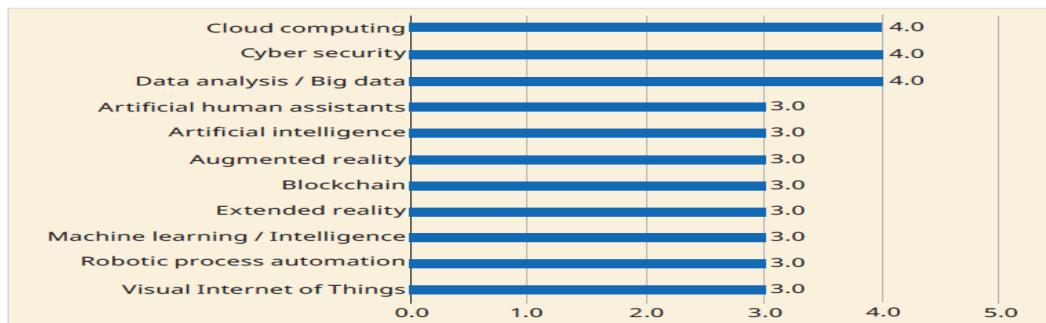(1 – not at all and 5 – fully aware)

Figure 4: Level of utilization of the selected emerging technologies
(1 – not at all and 5 – fully aware)
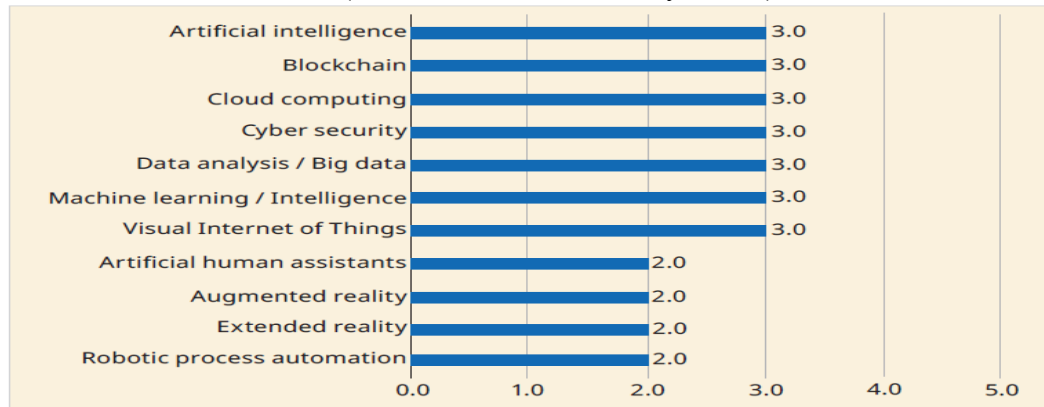
b. Theory of Planned Behaviour

Attitude

The respondent agrees that the adoption of technology in accounting and auditing generates numerous positive outcomes, such as enhancing firm values, increasing value-added benefits or receiving customer rewards. Figure 5 depicts the scores given for attitude to technological advances. Furthermore, the Respondent fully agrees that senior management or leaders in the KICPAA and the profession should embrace technological advances in accounting and auditing. In other words, the respondent agrees that KICPAA encourages the profession to incorporate technological improvements in accounting and auditing. Unfortunately, there are still many disagreements and challenges in working with members to implement technological developments in accounting and auditing.

Figure 5: Attitude – the theory of planned behaviour
(1 – not at all and 5 – fully aware)
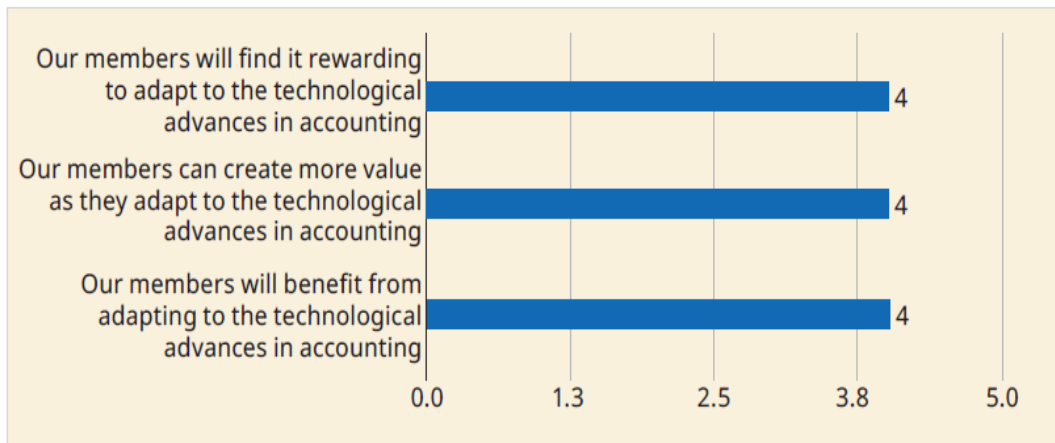
Subjective Norm

KICPAA believes that emerging technology should be adopted by everyone. It also believes that technology is easy to understand and to learn. The user's friendly perception and belief can influence the intention to engage with technology. Accordingly, the study documents a high score for the subjective norm, perceived behavioural control, and intention to engage with technology as shown below in Figures 6, 7 and 8.

The subjective norm regarding what KICPAA's senior management, key leaders in the accountancy profession, regulators, and members think and believe about technological improvements was also asked of KICPAA. The KICPAA expressed its support for the many stakeholders adapting to technology improvements in accountancy.

Figure 6: Subjective Norm – the theory of planned behaviour
(1 – not at all and 5 – fully aware)
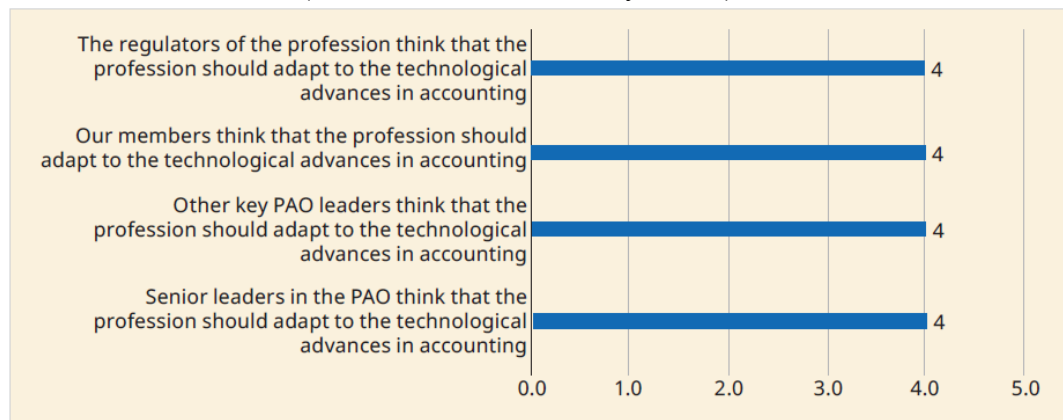
KICPAA sees technology adoption as a vital revolutionary force that will dispel the incorrect and misleading stereotype that accountancy and finance professionals are exclusively "bean counters". Accountancy and finance professionals will be able to better actualize and realize their potential as strategic advisors, regulatory policy makers and champions in emerging areas such as sustainability, artificial intelligence, and digitalization as a result of technology adoption.

Overall, KICPAA believes that with technology adoption, accountancy and finance professionals will benefit from a more meaningful career as well as more diverse career pathways.

Figure 7: Perceived behavioural control
(1 – not at all and 5 – fully aware)
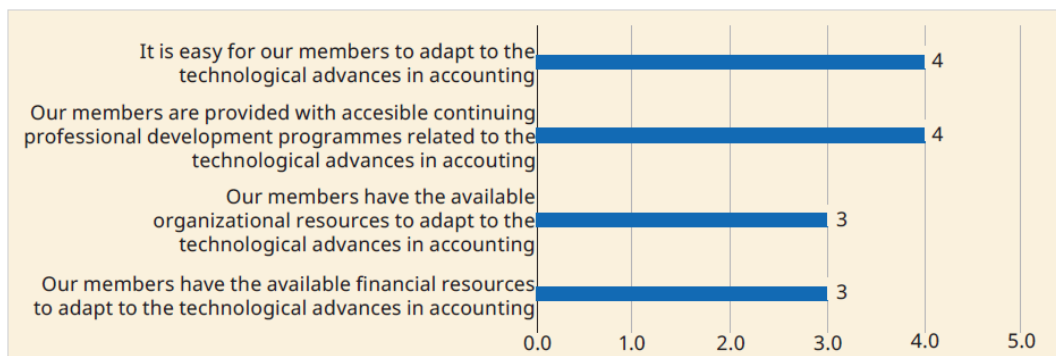
Figure 8: Intention to engage
(1 – not at all and 5 – fully aware)
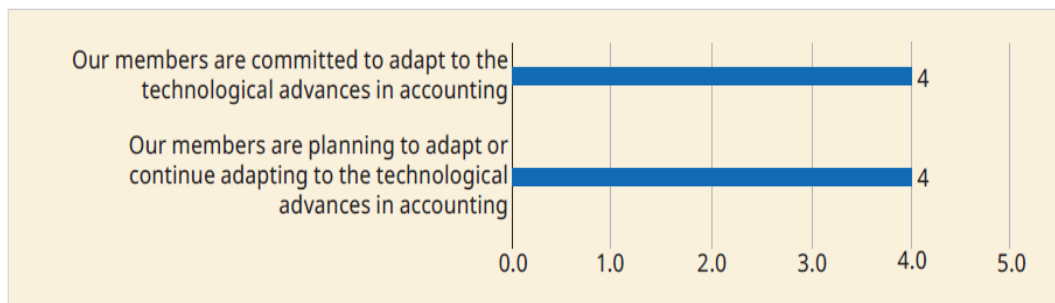
Part 2: Higher Education Institutions

a. Demographics of the Respondents

The higher education reform focuses on strengthening governance, enhancing doctoral level qualifications, improving the curriculum in response to industrial development, developing the use of digital technology, boosting research, and establishing centres of excellence and quality for educational assessment.

According to the Ministry of Education, Youth, and Sports, higher education is defined as education after secondary school. Higher education institutions in Cambodia are classified into 3 types. These are the Royal Academy, the University, and the College. A bachelor's degree takes 4 years of higher education in Cambodia. A master's degree takes another 2 years and a doctorate takes 3 to 6 years after attaining a bachelor's degree. This section presents findings from responses from accountancy schools of HEIs in Cambodia.

A survey instrument was sent to 14 HEIs comprising both public and private universities and institutes. Of the 14 HEIs, 12 are universities (86%) and the remaining 2 are institutes (14%) as shown in Figure 9.

Figure 9: Respondents by types of higher education institutes (HEIs)
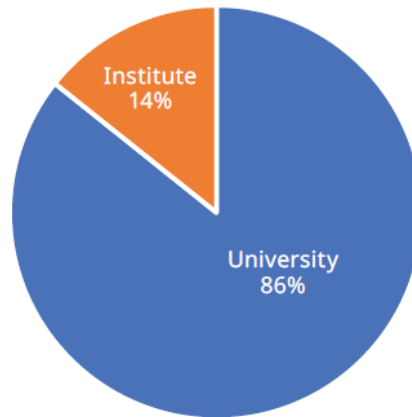
Figure 10: Respondents by university status
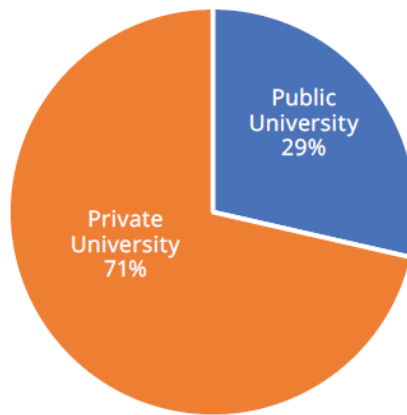
Among the respondents, 4 (29%) are from public universities and 10 (71%) from private universities, as depicted in Figure 10.

The survey instrument was completed by senior staff in the respective HEIs. They included 4 deans (29%), 2 deputy/associate/assistant deans (14%), 1 head of programme (7%), 5 faculty lecturers of accountancy courses (36%) and 2 of other academic ranks (14%) as shown in Figure 11.

Figure 11: Academic status of the respondents at the HEIs
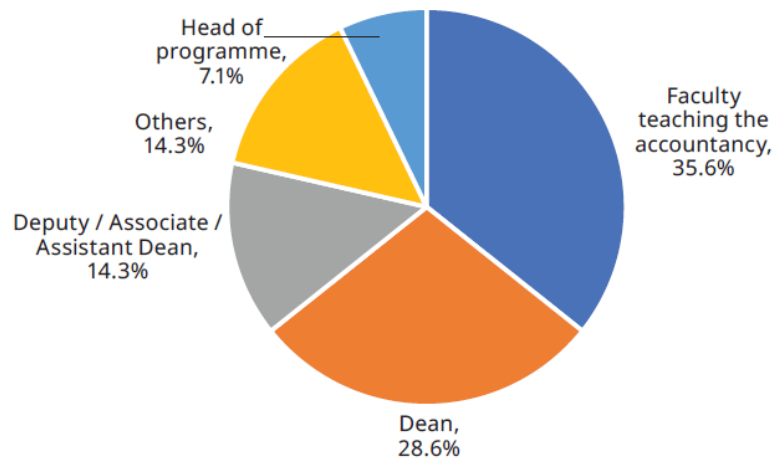
According to data from both public and private accountancy institutions, the total number of enrolled accountancy students in 2022 was around 610 students. Among these institutions, the National University of Management is the oldest and most prestigious public university, having established the first accountancy school and programme about 29 years ago as the Institute of Economics on 18 March 1983. The first accounting course and curriculum were established in the early 1990s as a four-year programme. With respect to the accreditation sought by the various schools, all the respondent HEIs have been accredited in Cambodia since 2003 under Royal Decree NS/RKT/0303/129 on the "Accreditation of Higher Education".

b. **Awareness, Competencies, Importance and Incorporation**

Awareness

Figure 12 shows the level of awareness of the respondents of the selected technologies from the HEIs from the Cambodian perspective. The selected technologies are based on a literature review and industry sensing of what are the more popular technologies employed in the accountancy industry. Data analysis/big data (2.86) and artificial intelligence (2.71) are the two technologies with the highest level of awareness followed by 6 other technologies. There was a moderate level of awareness of 3 technologies, namely, extended reality (1.93), augmented reality (2.00) and artificial human assistants (2.14).

Figure 12: Level of awareness of the selected emerging technologies

(1 – not at all and 5 – fully aware)

Technology	Score
Data analysis / Big data	2.9
Artificial intelligence	2.7
Cloud computing	2.6
Cyber security	2.6
Blockchain	2.5
Visual Internet of Things	2.4
Machine learning / Intelligence	2.4
Robotic process automation	2.2
Artificial human assistants	2.1
Augmented reality	2.0
Extended reality	1.9
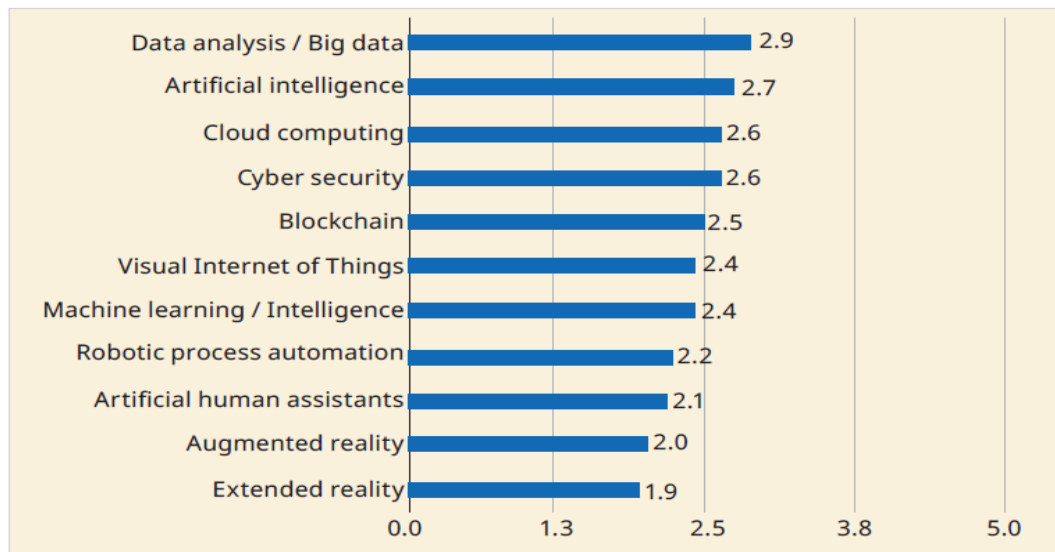
Figure 13: Level of teaching competency of selected emerging technology

(1 – none and 5 – advanced)

Technology	Score
Data analysis / Big data	2.2
Cloud computing	2.1
Cyber security	1.9
Visual Internet of Things	1.9
Machine learning / Intelligence	1.9
Blockchain	1.8
Artificial intelligence	1.7
Extended reality	1.7
Robotic process automation	1.7
Augmented reality	1.7
Artificial human assistants	1.6
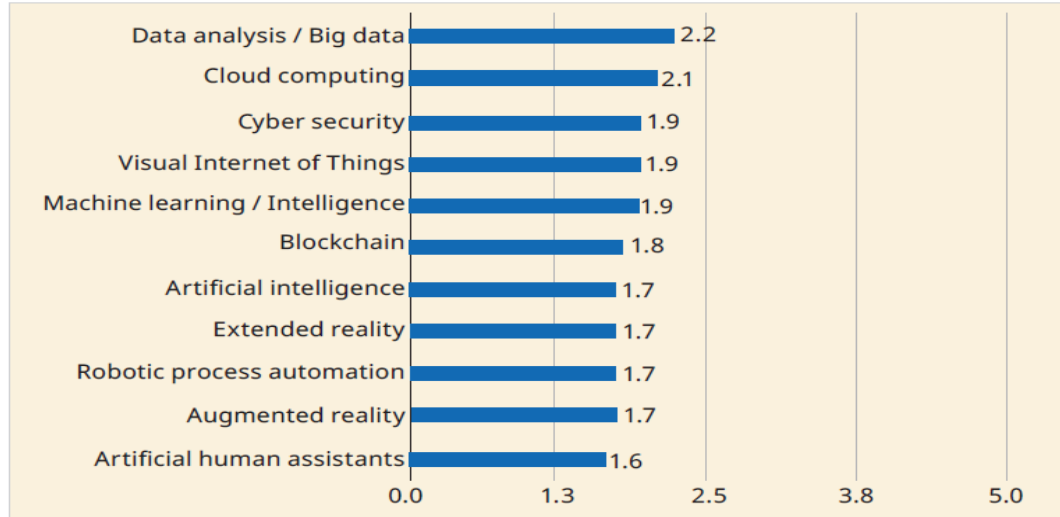
Figure 13 indicates that data analysis/big data (2.2) and cloud-computing (2.1) are the two technologies with the greatest level of teaching competency followed by 2 other technologies: cyber security (1.9) and visual Internet of Things (1.9), while respondents indicate that they have the least degree of competency in artificial human assistants (1.6). The recorded scores are low (i.e., less than 2.5).

Figure 14: Level of importance of selected emerging technologies to be incorporated
into accountancy courses

(1 – least crucial and 5 – most crucial)
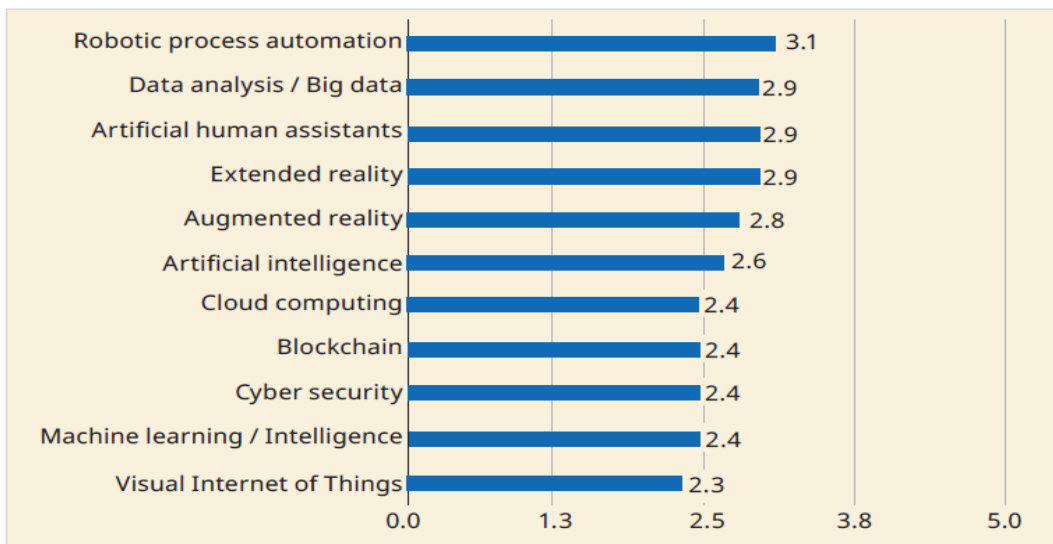
Figure 15: Level of incorporation of selected emerging technology into the
accountancy curriculum
(1 – none, 2 – foundation, 3 – intermediate, 4 – advanced)
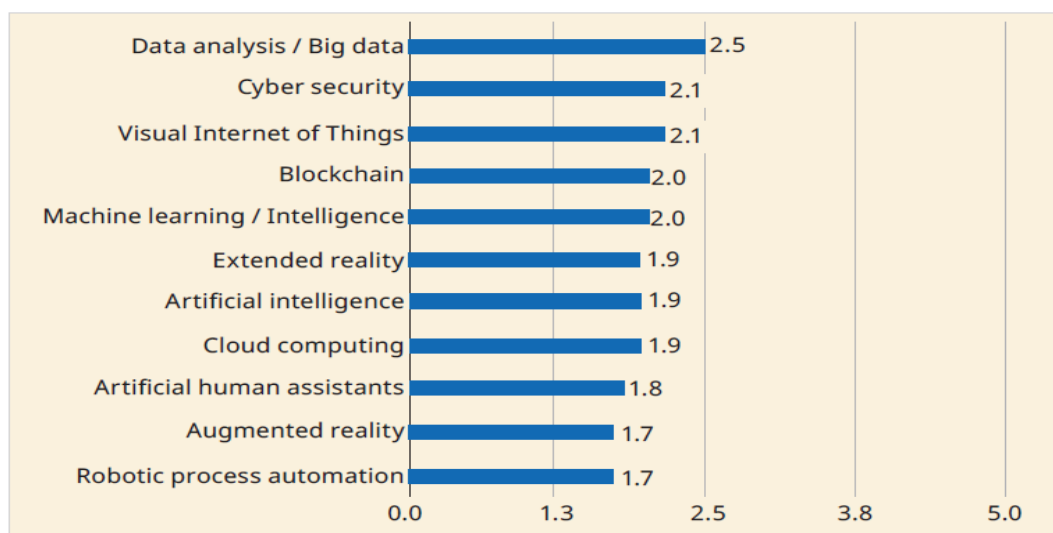
The respondents were further asked which upcoming emerging technology they believe
should be incorporated into their accountancy courses. Figure 14 summarises their

responses. Robotic process automation (3.1) and data analytics/big data (2.9) were clearly the first and second frontrunners respectively. The least crucial are visual Internet of Things (2.3), machine-learning/intelligence (2.4), cyber security (2.4) and blockchain (2.4).

Figure 15 summarizes responses regarding the level of incorporation of the selected technologies into the respondents' current accountancy curriculum. Data analysis/big data (2.5) are the emerging technologies with higher levels of incorporation into the accountancy curriculum, followed by cyber security (2.1) and visual Internet of Things (2.1). The respondents view the incorporation and implementation of emerging technologies in the course curriculum at the foundational level.

Table 2 summarizes the findings in Figures 12–15, specifically, ranging from the level of awareness of the technologies and incorporating them into the accountancy curriculum. The table indicates how respondents rank in terms of awareness, competency, importance, and incorporation of emerging technology. An overall rank is computed by summing the ranks for each of the attributes. The top 3 technologies are data analysis/big data (5), cyber security (17) and cloud computing (19). There is a substantial level of convergence among the top 3 emerging technologies in the rankings for awareness, competency, importance and incorporation in the accountancy curriculum.

Table 2: Ranking of the 4 responses to selected emerging technologies
Awareness, Competency, Importance and Incorporation

	Awareness		Competency		Importance		Incorporation		Average Rank
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Data Analysis / Big Data	2.9	1	2.2	1	2.9	2	2.5	1	1.3
Cyber security	2.6	4	1.9	3	2.4	8	2.1	2	4.3
Cloud computing	2.6	3	2.1	2	2.4	7	1.9	7	4.8
Artificial intelligence	2.7	2	1.7	7	2.6	6	1.9	7	5.5
Visual Internet of Things	2.4	6	1.9	3	2.3	11	2.1	2	5.5
Blockchain	2.50	5	1.79	6	2.36	8	2.00	4	23
Machine Learning/ Intelligence	2.5	5	1.8	6	2.4	8	2.0	4	5.8
Robotic process automation	2.4	7	1.9	5	2.4	8	2.0	4	6.0
Extended reality	1.9	11	1.7	7	2.9	3	1.9	6	6.8
Artificial human assistants	2.1	9	1.6	11	2.9	3	1.8	9	8.0
Augmented reality	2.0	10	1.7	7	2.8	5	1.7	10	8.0

There is a substantial level of convergence as the top 7 emerging technologies in all 4 scoring and ranking responses from awareness, competency, importance and incorporation in the accounting course syllabus.

First, data analysis/big data has the biggest score and tops the average ranking (1.3). It ranks '1' for awareness, competency, and incorporation into the accountancy curriculum; yet, it is ranked second in the level of importance. A possible explanation is that there is a common belief that data analysis/big data will play an important role in the future, but there are still questions about how these technologies will be implemented in the accountancy sector. Despite these concerns, HEIs are including these technologies in their curricula.

Second, while respondents have a higher degree of awareness of and competency in cyber security and cloud computing, the level of importance and incorporation into the accountancy curriculum in comparison to other technologies is lower with average ranking of 4.3 and 4.8 respectively.

Thirdly, robotic process automation has an average ranking of 4.8 and considered as of a high level of importance and incorporation in the syllabus.

Fourthly, even though artificial intelligence recorded a higher level of importance; yet the levels of awareness, competency and incorporation for this technology are the lowest among the four technologies.

The rest of the other technologies are rank lower for awareness, competency, importance and incorporation in the syllabus. This study seeks to find support for the above responses by the HEIs by examining their current accountancy curriculum.

The HEIs' respondents, particularly the faculty of finance and accounting of National University of Management (NUM), need to be well prepared to adopt and transform some critical course programmes and syllabi in order to teach technology in accountancy and finance classes. The teaching should include data analytics, cyber security, cloud computing and artificial intelligence at the very least.

The digital transformation in accountancy and finance schools enables and drives Cambodia's economy and society forward by developing strong human capital competencies to cater to the 4.0 industrial revolution, the digital era, and the new economy. This will align well with regional and global trends, promote new economic growth and improve social welfare.

What are some of the software used in teaching technology courses?

Table 3: Softwares used in teaching technologies

Accountancy course	Software
Cloud Computing	Meet, Microsoft Teams, Zoom and Others
Data Analysis/Big Data	Excel, SPSS, Stata, Eviews
Artificial Intelligence	No mention
Artificial Human Assistants	No mention
Augmented Reality	No mention
Blockchain	No mention
Cyber security	No mention
Extended Reality	No mention
Machine Learning / Intelligence	No mention
Robotic Process Automation	No mention
Visual Internet of Things	No mention

Cambodian universities and other HEIs were also asked to provide the list of software that they use to teach accountancy courses. Recently, some HEIs started to shift from physical classrooms to a hybrid learning through a platform that includes Classroom Management (Zoom, Google Classroom, Google Meet and Microsoft Teams), Cloud-Based Learning (Google Drive, Dropbox, and iCloud), and some online tools and applications for quizzes and exams.

They also offer accounting software courses such as QuickBooks, Peachtree and Sage50. Students are also introduced to and taught software applications that aid in data processing and statistics such as EXCEL, SPSS, STATA and EVIEWS. These classes are offered to students from the National University of Management, particularly.

Which of the following technological tools do you currently use or have embedded in the last 3 years in your school?

The respondents were asked how much of a selected suite of technology tools is currently used or has been embedded in the accountancy curriculum in the last 3 years. The responses are summarised in Figure 16. The findings suggest that the most popular tools are Microsoft Applications (3.4), Video Conferencing (3.2) [due to COVID-19 lockdowns], followed closely by data analytical tools (3.1) and cloud applications (2.7).

Figure 16: Technology tools used in accountancy curriculum
(1 – never and 4 – frequently used)
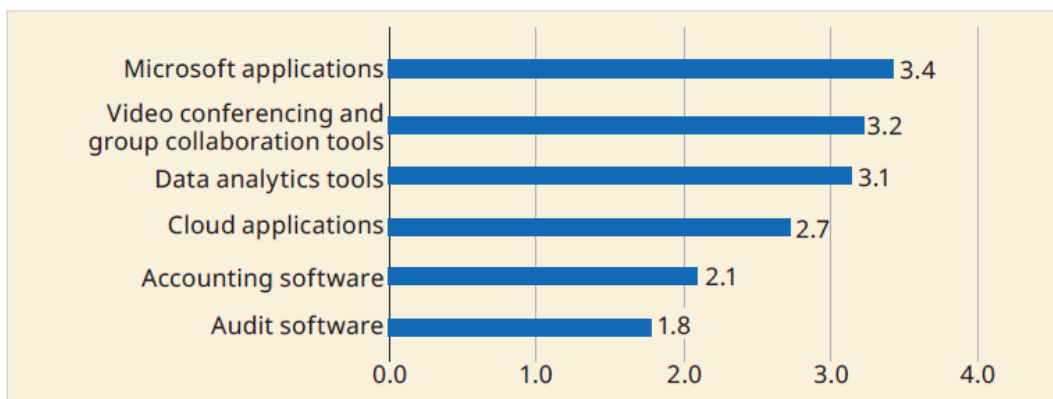
What are some of the barriers to incorporate technologies into the accountancy curriculum?

Figure 17: Barriers to adoption of technologies in accountancy curriculum
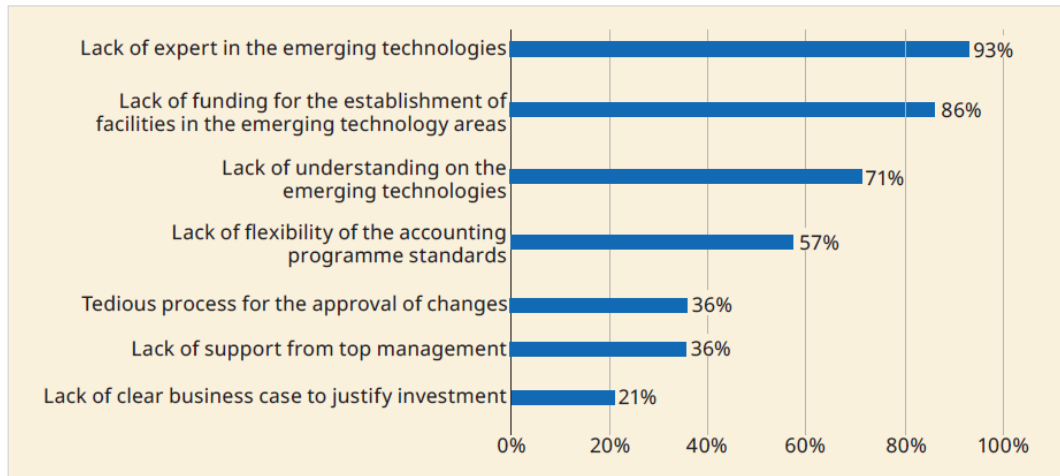
Respondents were asked to select from a list some of the possible barriers to incorporating technology into their accountancy curriculum. Figure 17 provides a summary of their responses. Some of the significant barriers include: shortage of experts in emerging technologies (92.9% of respondents), lack of funding for the establishment of facilities in the emerging technology arena (85.7%), lack of understanding of emerging technologies (71.4%), and lack of flexibility in the accountancy programme standards (57.1%). 71.4% and 57.1% of the respondents cited a lack of funding for the establishment of facilities in the emerging technology area, lack of understanding on the emerging technologies, and lack of flexibility of the accountancy programme standards as a barrier for adoption respectively.

There are 3 barriers that have a response rate of less than 50.0%. 35.0% of the respondents cite the lack of support from top management and the tedious process for the approval of changes in curriculum as barriers. The lack of a clear business case to justify investment in technology adoption attracts a response rate of 21.4%. The findings suggest that the greatest barrier to technology adoption is finding the experts and funds needed to teach emerging technologies.

What kind of help are needed to incorporate technologies into accountancy curriculum?

Respondents were also asked what type of assistance they would want to have to integrate emerging technologies into existing courses/modules. The summary of their responses is shown in Figure 18. It is encouraging to document that 92.9% of respondents state that professors and lecturers should receive training in curriculum design to integrate technology into the accountancy and finance curriculum. The findings also show that 85.7% of faculty respondents believe that training in emerging technologies is an important strategy to incorporate the technology into the accountancy curriculum. 50.0% of respondents say that training in the various technologies can be gained through industry attachments.

Figure 18: Kind of help needed to incorporate technologies into the accountancy curriculum
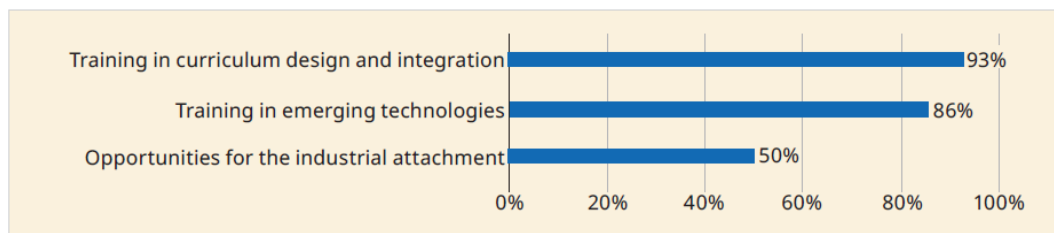
How should technology courses be taught in accounting programmes?

The discussion in the accounting literature is that, ideally, technology for accounting should be taught by accounting instructors who are experts or are very conversant with technology. However, there is a severe shortage of such technologically inclined accountancy instructors. Alternatively, the technology could be taught by technology experts from the accountancy industry. These are also short in supply. Finally, a hybrid approach is suggested that would bundle accountancy instructors with IT instructors to co-teach the technology course. The advantage of this approach is to overcome the shortage of technologically inclined accounting educators. However, the disadvantage of this hybrid approach is that the technology portion of the course could be taught without an accounting context and the course could become disjointed.

Who should teach the technology component?

Figure 19: Who should teach technology courses in the accountancy programme
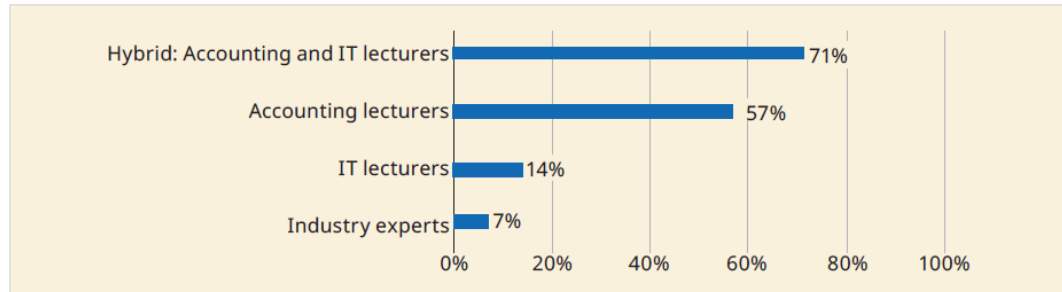
Respondents were asked who should be the main instructors for technology courses. They were allowed to make more than one choice. Figure 19 shows the responses of the HEIs. 71.4% of the respondents believe that technology courses should be jointly taught by accountancy and IT lecturers. However, 57.1% of the respondents also believe that accountancy lecturers should be the instructors.

How should emerging technologies be integrated into the accounting programme?

Figure 20 shows the respondents' view towards teaching technology in accountancy course. The majority of the respondents prefer the technology course to be taught as a separate course/module. Respondents were further asked their preferred mode of conducting technology courses. Should the technology course be taught as a stand-alone course or should technology be embedded into accountancy courses? Both methods have their advantages and disadvantages.

Figure 20: How technology is to be taught in the accountancy programmes
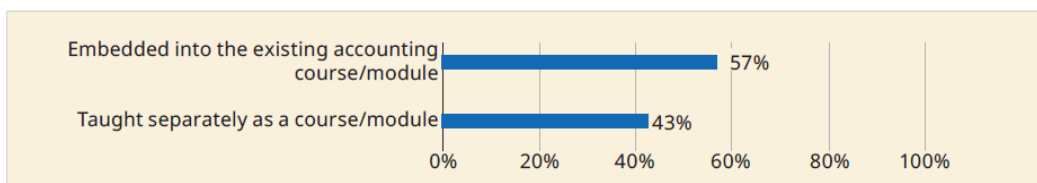
A stand-alone technology course provides the opportunity for the instructors to drill deep into the technology. However, the knowledge can be unrelated to accounting and

suffers from a lack of integration with the accountancy domain. The other approach is to incorporate the technology as part and parcel of the core accountancy courses. This is ideal but it suffers from two major weaknesses. First, it is much harder to teach an accountancy course with embedded technology and the danger is that the course may end up having insufficient depth and coverage in both accountancy and technology knowledge. Secondly, it is very difficult to get accounting instructors who can weave technology effectively into the core accountancy courses.

In your opinion, what is the best approach to embed the emerging technologies into the accounting programme?

The majority of the HEIs prefer to teach technology in accountancy courses as a separate subject. Given the general preference to embed the technology into the existing courses, the respondents were further asked how they should incorporate the selected emerging technologies into their courses? Figure 21 shows the responses.

Figure 21: Incorporating the emerging technologies into the accountancy curriculum
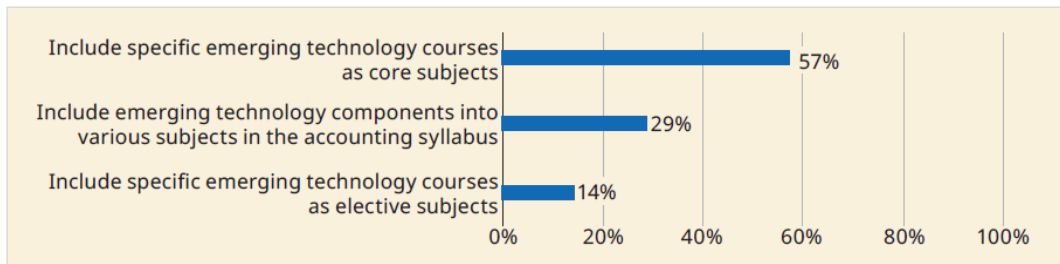
Figure 21 indicates that HEIs which prefer to incorporate technology as a separate course would use the same approach for emerging technologies. Likewise, those who prefer to embed the technology into existing courses would apply the same approach to emerging technologies. Therefore, there are multiple approaches to incorporating emerging technologies into the accountancy curriculum.

What is the current stage of adoption of technology by the HEIs?

Respondents were asked a final question on the stage of adoption of technology in their accountancy curriculum. Figure 22 summarizes their responses. The HEIs are all at

different stages of adoption and they are equally divided along the spectrum from less than 30% to more than 70%. The stage of technology adoption for the majority of them is between 31% to 70%. Technology adoption is a continuous journey and it is heartening to document the fact that HEIs are aware of their stage of adoption and the technologies they need to work with.

Figure 22: Stage of technology adoption in accountancy curriculum
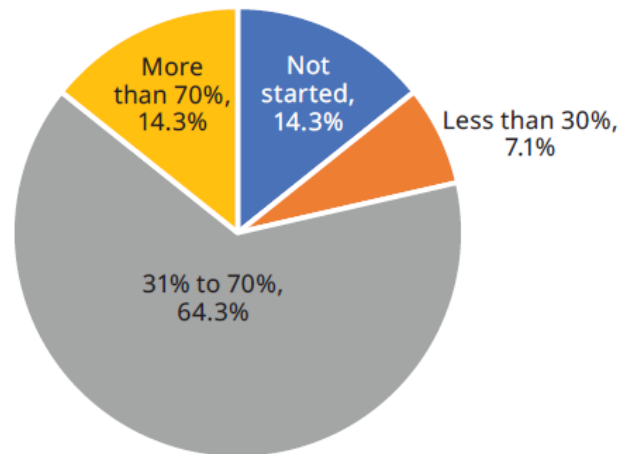
In summary, the survey provides evidence that HEIs in Cambodia are taking significant steps to incorporate technology into their accountancy curricula. The levels of awareness and activity are high. The two main constraints are the lack of curriculum space and technologically-inclined accounting instructors to teach the technologies. Accountancy and IT instructors may have to work together to teach technology in the accountancy programme because of the lack of technologically-inclined accounting instructors. There is a general preference to weave technology into accountancy courses rather than offer it as mere stand-alone technology courses.

Part 3: Accounting and Auditing Practitioners

a. Demographics of the respondents

The survey instrument was sent to accountancy and auditing firms for their responses. There were altogether 6 respondents and the types of firms they represent is shown in Figure 23. There were three firms limited liability partnerships, one sole proprietorship, and two limited partnerships.

Figure 23: Profile of respondents
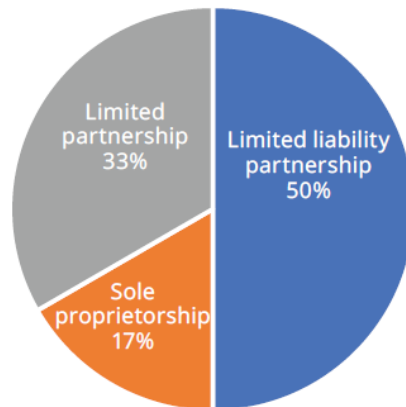
The respective status of the respondents is shown in Figure 24. The survey shows that 4 of the 6 respondents are either owners, partners or directors of their respective firms. The other two respondents are a manager/supervisor and a senior auditor.

Figure 24: Positions of the respondents in their firms
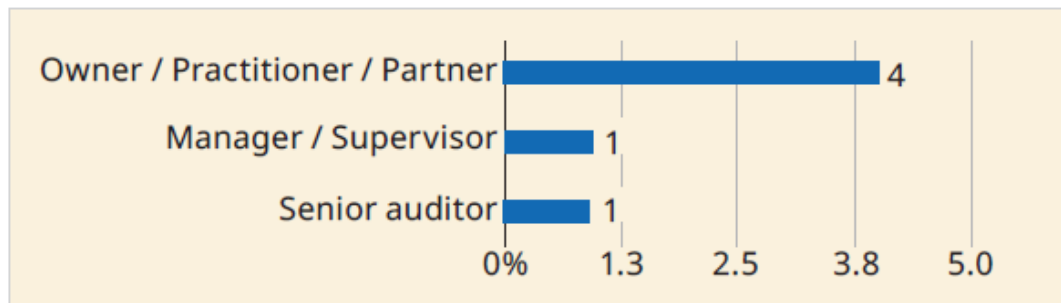
Figure 25 provides an indication of the size of the firms of the respondents. 2 (33.33%) of the 6 respondents hire more than 50 staff while 1 (16.67%) has up to 10 staff and 3 (50%) have between 21 to 40 staff. The respondents were asked to disclose how long the firm has been in existence. 4 out of the 6 respondents have been in existence for more than nine years while the other 2 firms have operating for 4-6 years, and 7-9 years.

Figure 25: Number of employers in the respondent firms
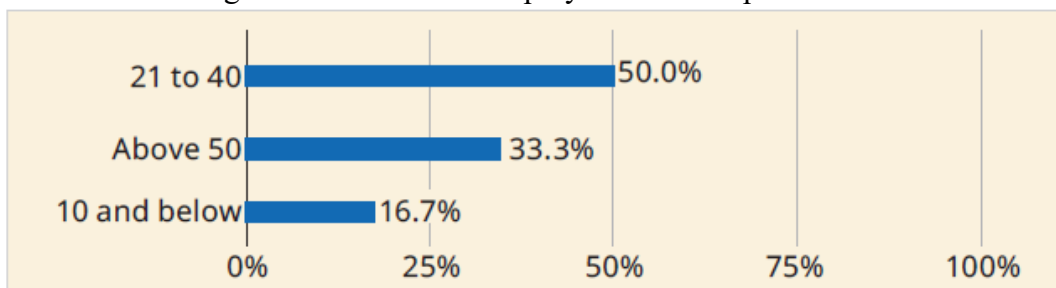
b. Awareness and utilization of selected emerging technology

The respondents were asked to provide an indication of their level of awareness of advances in technology pertaining to their industry. Figure 26 shows the level of awareness of 11 selected emerging technologies. The respondents have the highest level of awareness of cloud computing, cyber security, and data analysis/big data. The three merging technologies that have the lowest level of awareness are machine learning/intelligence, artificial human assistants and augmented reality.

Figure 26: Level of awareness in selected emerging technologies
(1 – not at all and 5 – fully aware)
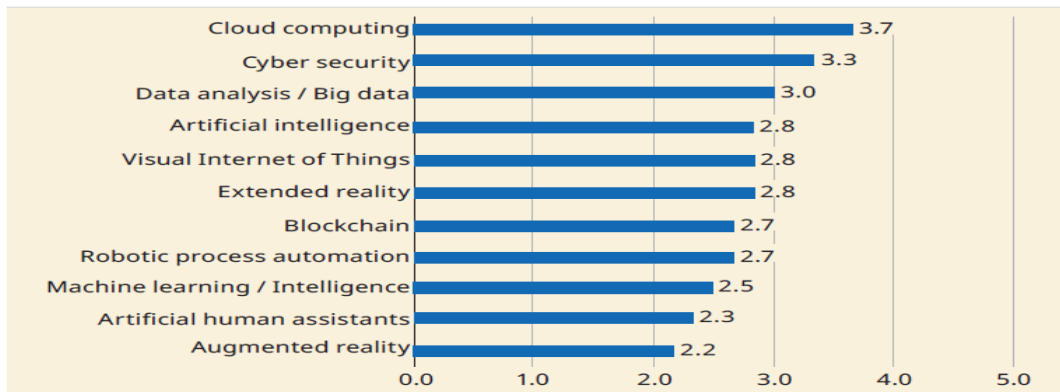
Figure 27: Level of adoption of selected emerging technologies
(1 - not at all utilized and 5 - utilized all the time)
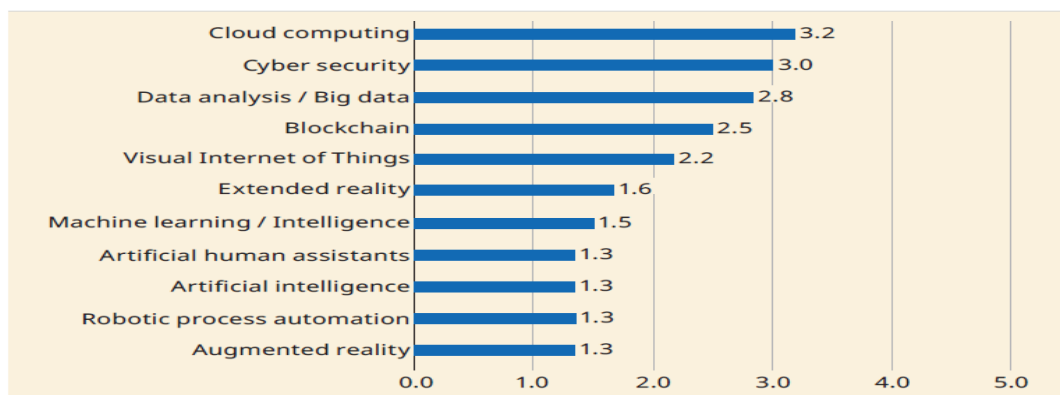
Figure 27 above shows the level of utilisation of emerging technologies. The three most utilised emerging technologies are: cloud computing (3.2), cyber security (3.0), and data analysis/big data (2.8). However, the level of utilisation on average is lower than the level of awareness. This could mean that it is one thing to be aware of a technology, but it is another thing to be utilising the technology. This is particularly the case for those technologies with an average utilisation level of less than 3.0.

c. Systems and Softwares Adoption

The respondents were asked to provide their inputs on the type of systems and software which they currently adopt in their work. Figure 28 shows the list of systems and software adopted by the respondents. The top 3 most popular systems or software adopted are office productivity tools (83.3%), accounting software applications UBS, SQL, QuickBooks (83.3%), and data analytics tools such as SPSS, EVIEW and STATA (66.67). The findings suggest that for these 6 respondents, the use of systems and software in their business is prevalent.

Figure 28: Types of systems and softwares adopted
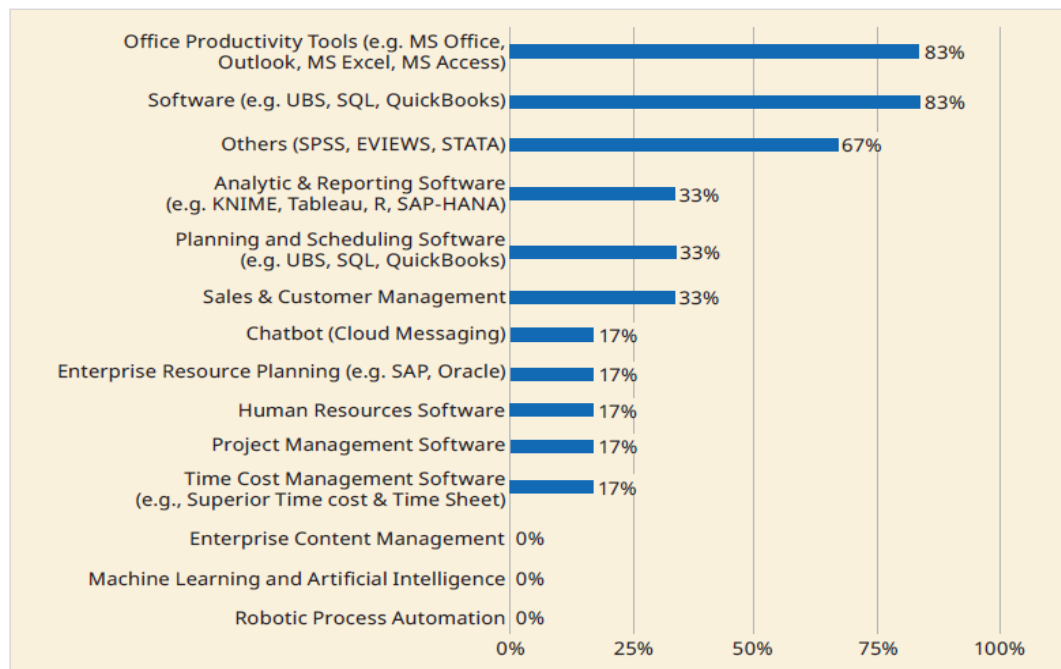
d. Computer-Assisted Audit Technique (CAAT) Adoption

The respondents were specifically requested to provide inputs on the adoption of Computer-Assisted Audit Techniques (CAAT). Figure 29 provides a summary of CAAT adoption. 83.33% of the respondents use generalized audit software in their operations. Interestingly, 66.67% of the respondents also use audit management software and statistical packages for data analytics, some of which are proprietary to their firms. This suggests that the use of audit software is imperative in the current landscape of auditing. Visualisation tools are also used by 50% of the respondents.

Figure 29: Types of computer-assisted audit technique (CAAT) adopted
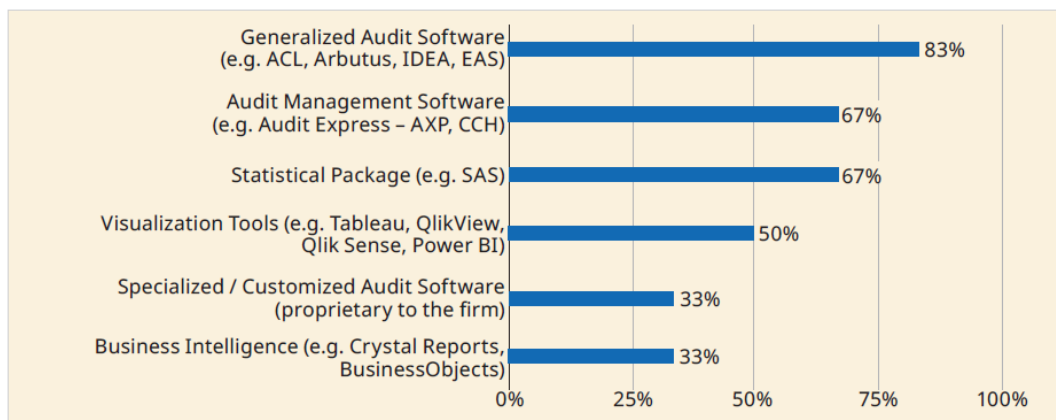
e. Technological Preparedness

The respondents were asked about their preparedness for technology adoption in three different dimensions such as the approach to technology, manpower skills and knowledge, and investment in technology. Figure 30 shows the respondents' input on five statements regarding their approach to technology. The respondents provided positive responses to the five statements and it can be concluded that the key motivation for adoption of IT system and software is to improve productivity and hence the profitability of their operations. This is particularly critical in the face of talent shortages in the accountancy sector and in HEIs in Cambodia.

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Figure 30: Approach to technology
(1 – fully disagree and 5 – fully agree)
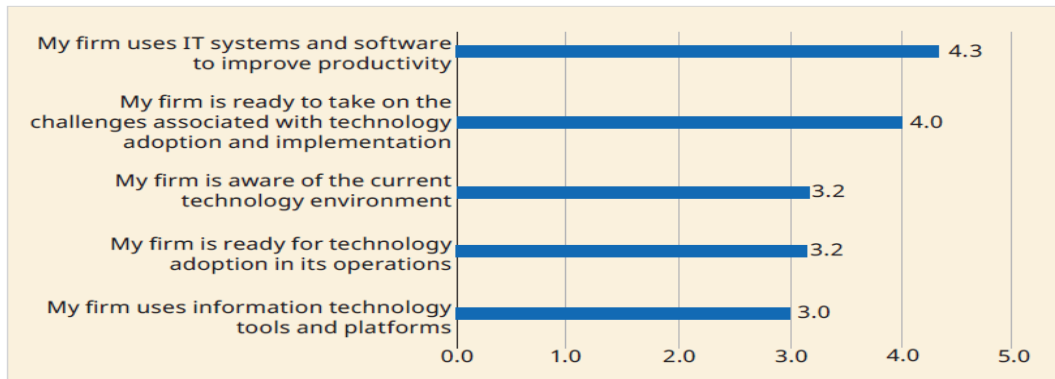
Figure 31 provides a summary of the feedback of the respondents with regard to their manpower skills and knowledge vis-à-vis the technological challenge. The responses are generally positive about the manpower's skills and knowledge. This is affirmed by the firms' view that staff's skills and competence are specifically related to whether the technology is easily accessible for solving workplace problems. The findings here may suggest that more can be done to upskill the staff through technology-related training.

Figure 31: Manpower skills and knowledge
(1 – fully disagree and 5 – fully agree)
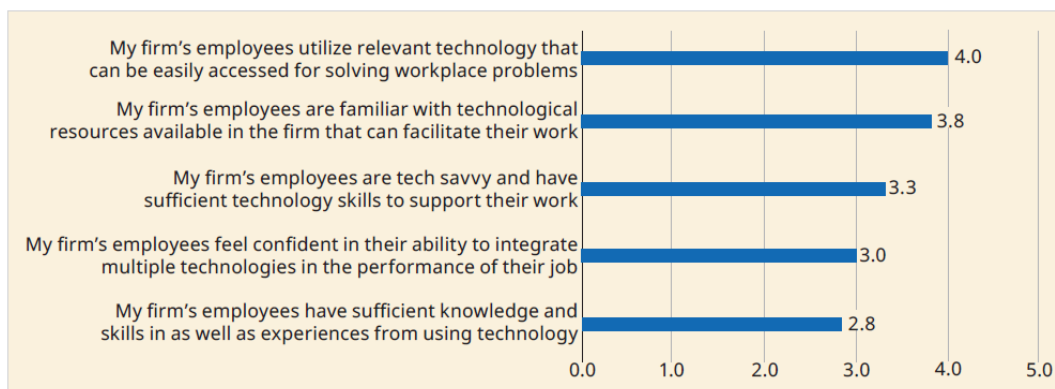
Figure 32: Investment in technology
(1 – fully disagree and 5 – fully agree)
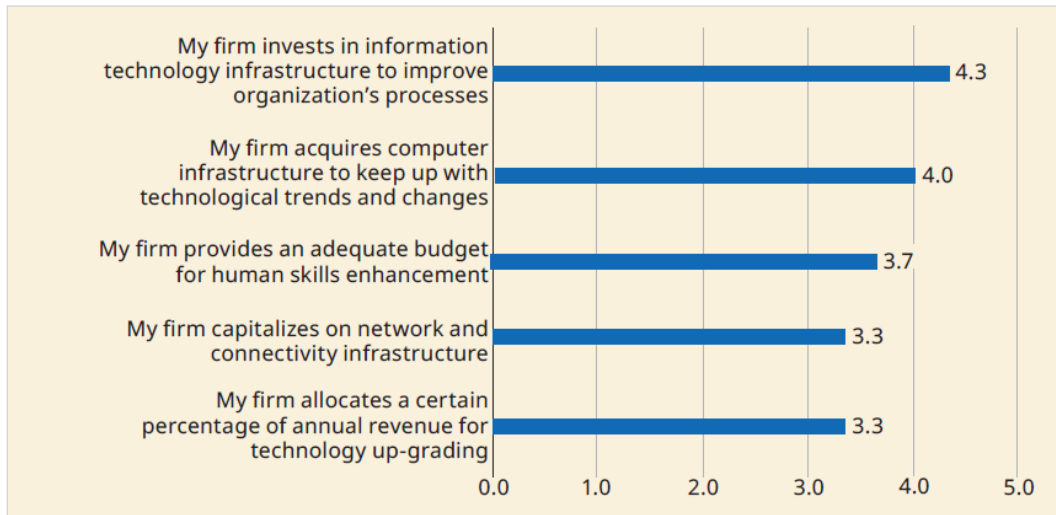
Figure 32 shows the respondents' feedback on their firms' investments in technology. The ratings are high, lying in the range of 3.3 to 4.3. The responses are consistent with the respondents' views about the adoption of technology and the need for manpower development in the field of technology. The findings suggest that the respondents are willing to invest in technology infrastructure and may have undertaken actions and planned strategies to enhance their organizations' capabilities in technology.

f. Planned Behaviour towards technology adoption

The respondents were further requested to provide responses to statements that help to assess their planned behaviour toward technology adoption. The planned behaviour covers four key aspects: attitude, subjective belief, perceived behavioural control and intention to engage. Figure 33 summarises the respondents' feedback on their attitude towards technology. It shows very positive responses from the respondents regarding their attitude towards technology. There is a strong belief that their firms will benefit from adapting to the technological advances in accountancy enjoy more value creation. The respondents believe that they will be rewarded for adapting to the technological advances.

Figure 33: Attitude towards technology
(1 – fully disagree and 5 – fully agree)

My firm will benefit from adapting to the technological advances in accounting	4.3
My firm can create more value as they adapt to the technological advances in accounting	4.2
My firm will find it rewarding to adapt to the technological advances in accounting	3.8
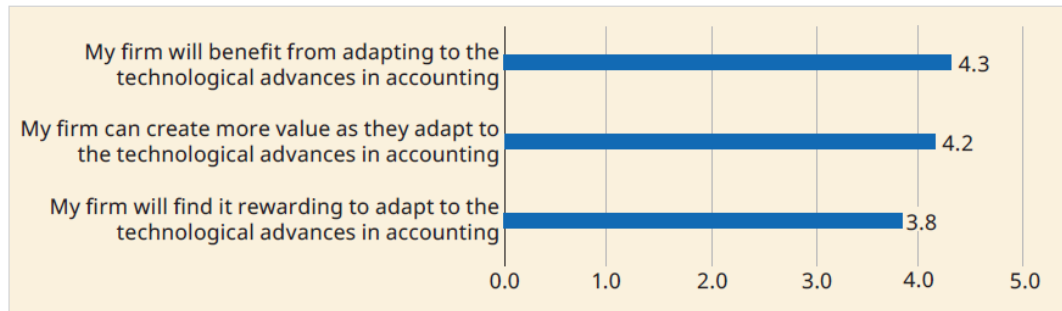
Figure 34: Subjective belief about technology

Management believes that regulators of the profession think that the profession should adapt to the technological advances in accounting	4.5
Management of the firm thinks that the profession should adapt to the technological advances in accounting	4.3
My firm's employees think that the profession should adapt to the technological advances in accounting	4.2
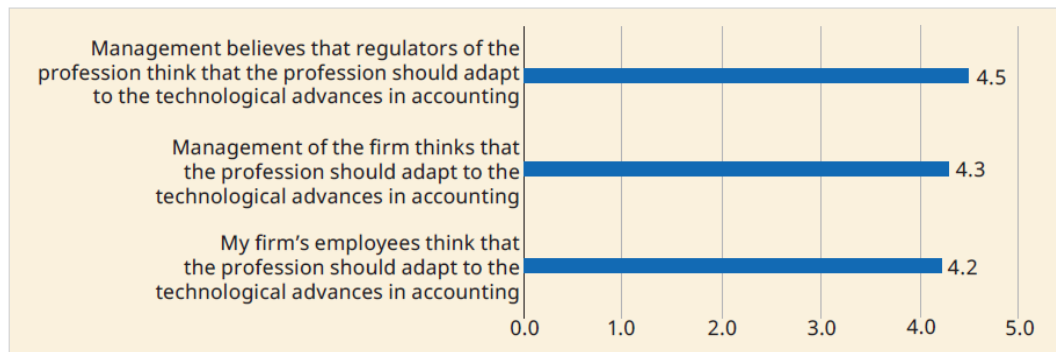
Figure 34 summarizes the ratings of the respondents on their subjective beliefs. There is a very strong subjective belief that regulators, the accountancy profession and staff think that the adoption of technological advances in accounting is imperative to the accountancy profession. It seems that there is a subjective belief that technological advancement cannot be stopped and firms must adapt to survive.

Figure 35 shows the planned behaviour of the respondents in tackling the adoption of technology for their firms. The respondents articulate their planned behaviour in a positive and affirmative manner. There is a general positive agreement on the planned actions. The most important action is supporting employees in terms of financial resources (3.7), access to technology, and professional development (4.0) to enable employees to upskill to face technological challenges. However, the level of planned

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behaviour responses is much lower than the attitude and subjective belief responses towards the technologies.

Figure 35: Planned behaviour for technology adoption
(1 – fully disagree and 5 – fully agree)
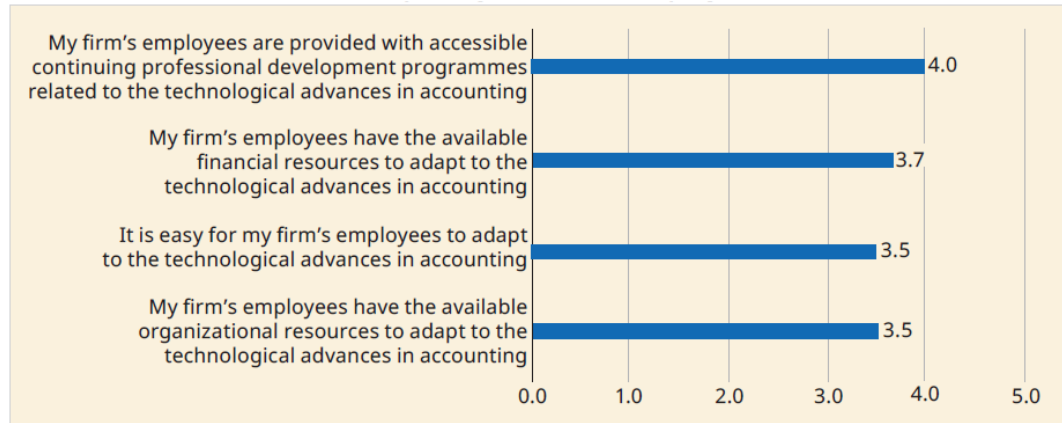
Figure 36: Intention to engage technology
(1 – fully disagree and 5 – fully agree)
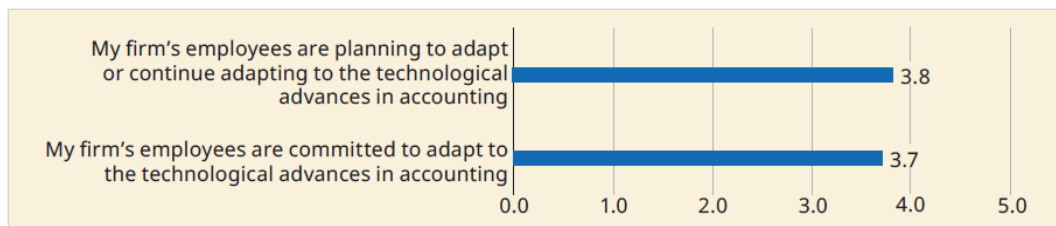
Figure 36 summarises the respondents' inputs on their intention to adopt technology in their business. The findings in Figure 36 are interesting. Even though there is a positive attitude toward adopting technology, a strong subjective belief that technology is crucial to the accountancy sector, and planned behaviour to engage in technology, there are relatively lower positive sentiments about the employees' intention to engage in technology. This could be a reflection of the shortage of technologically-inclined employees and the difficulty in upskilling them. The difficulty could be due to the unwillingness of the employees to learn new skills or the lack of opportunities to acquire new skills.

g. Expected Benefits of Technology Adoption

The respondents were further asked to articulate the expected benefits of technology adoption. The list of benefits was curated from the accounting literature and industry

dialogues. Figure 37 provides a summary of the respondents' feedback on the articulated expected benefits.

There is strong affirmation from the respondents of the well-documented benefits of technology adoption. The most compelling benefit is productivity and efficiency gains. A few of the respondents name other reasons for the adoption of technology. They include improved work quality and less reliance on manpower in getting work done.

Figure 37: Expected benefits of technology adoption
(1 – fully disagree and 5 – fully agree)
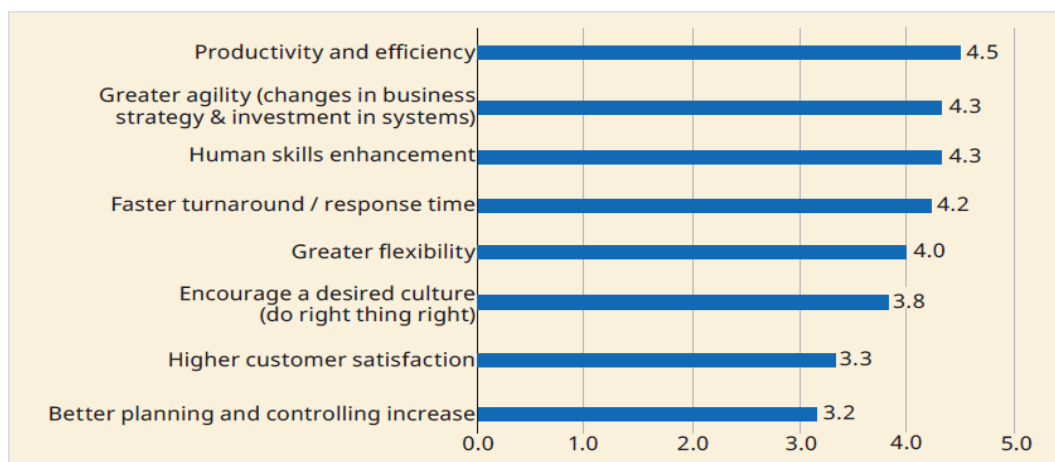
h. Challenges to Adoption of Technology

The respondents were asked a final question on the challenges to the adoption of technology? Figure 38 provides a summary of the responses.

From Figure 38, the top challenge is cultural readiness (3.5). The responses seem to suggest that there is significant resistance to the adoption of technology because it means change. The second most agreed challenge is high investment costs (2.7). There also seems to be concerns about the lack of clarity of standards, regulations or certifications (2.5) which do not correlate with articulated economic benefits. Inadequate skills (2.3) and the shortage of knowledgeable employees (2.3) are challenges which are well documented. Interestingly the lack of support from the government (1.7) as a source of challenge is the least of the concerns. Respondents indicate that the challenges can be overcome with proper attention and resources, particularly the training of employees.

Figure 38: Challenges to adoption of technology
(1 – fully disagree and 5 – fully agree)
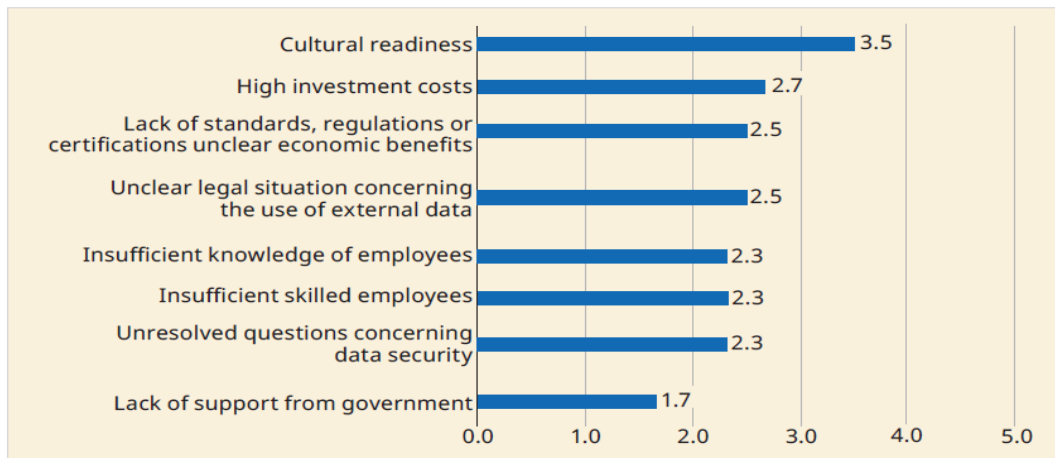
A few of the respondents name other challenges including the lack of a dedicated team to push technology adoption, high maintenance costs of hardware and software, the stability of service providers and continuity and sustainability of technology adoption. One possible solution to these challenges could be the establishment of a shared services platform that could be set up by vendors, professional bodies, or institutes of higher learning. This may be particularly useful for small and medium-sized accountancy firms.

3. CONCLUSION

In conclusion, there is a high level of awareness and utilization of particular technologies that are said to be most valuable to accountancy and auditing firms. These include cyber security, data analysis/big data, artificial intelligence and cloud computing. As expected, the level of adoption is lower than the extent of awareness. Accountancy and auditing firms have a positive attitude toward the importance of technology and approaches to it. The main challenges, however, are a lack of technologically skilled and qualified talent. Accountancy organizations are open to technological upskilling because they feel that technology adoption would bring several benefits. These benefits include increased productivity and efficiency, enhanced human abilities, and quicker turnaround/response times. In accountancy firms, the main hurdle to technology adoption is the firm's cultural readiness, as well as investment costs.

LEADERSHIP SKILLS REQUIRED BY MANAGERS IN DIGITAL AGE IN CAMBODIA

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ABSTRACT

With the digitalization, managers have to acquire new digital leadership skills in addition to the non-digital leadership skills. Because of this change, the study on the topic of leadership skills required by managers in Phnom Penh, Cambodia was conducted. In this research, there are two main questions: (1) What are the leadership skills required by managers in the digital age in Cambodia? And (2) What are the most important leadership skills required by managers in Cambodia? Also, the objectives of this research are to identify the leadership skills required by managers in Cambodia and to rank the importance of leadership skills required by managers in Cambodia. It was a quantitative-research, and the sample size was 144 managers from different levels. The data was analyzed by using descriptive statistics for both research objectives. In addition, this study found that the 3 levels of manager require these non-digital leadership skills: Problem Solving Skills, Solution Construction Skills, Planning Skills, Planning and Implementation Skills, Ability to Build Teams, Constraint Analysis, Motivation, Self-Awareness, Cause/Goal Analysis, Creative Thinking, Problem Definition, Solution Evaluation Skills, and Capacity to Develop Others and Wisdom. Moreover, for digital leadership skills, lower-level manager highly requires Communication Skills, Organizational Skills, Team Building Skills, and Flexibility and Adaptability. What is more, communication Skills, Technical Skills, Digital Literacy, Team Building Skills, Organizational Skills, and Flexibility and Adaptability are strongly required by the middle manager. Furthermore, the top manager mostly requires Flexibility and Adaptability, Communication Skills, and Team Building Skills.

Keywords: *Non-digital Leadership Skills, Digital Leadership Skills and Manager*

1. INTRODUCTION

The digital revolution is the foundation of the Fourth Industrial Revolution, in which technology is an intrinsic component of civilization and a link between the digital, physical, and biological worlds. The labour markets have been put under new strains as a result of the Fourth Industrial Revolution. Thus, lifelong learning, educational reform, and new skill retraining initiatives will be critical in ensuring that individuals have a viable economic opportunity to compete in the new workplace. In addition, companies have to hire new brilliant workers or train existing employees to gain all of the necessary knowledge to adopt Industry 4's latest technology, cited by Puja, K., Sumedha, D. & Khushboo, R. (2022).

As cited by Puja, K., Sumedha, D. & Khushboo, R. (2022), leaders are needed to be adaptable and ready to welcome and celebrate the change in the future work due to the rapid pace of change. The change will be viewed as an opportunity to grow and innovate by successful leaders during the fourth industrial revolution (Marr, 2019). Arora, Vaishali and Jain (2018) contemplated a list of requisite skills set by the concerned managers in the era of Industry 4.0, which includes critical thinking, social intelligence, adaptive thinking, emotional intelligence, analytical skills, decision making etc. In another study conducted by DDI (2017), leaders are expected to be horizontal thinkers, engagement builders, customer-connectivity drivers, motivators and extreme lean adopters.

In Cambodia, the Royal Government of Cambodia developed the Digital Government Policy 2022-2035 in 2022. It is stated that building digital human capital starts from building the capacity of leaders and civil servants in all ministries and institutions to adopt digital technology for the use, management, and development of digital government systems in response to the needs of the people. In addition, human resources skilled in digital technology must be trained, to foster the development of digital government with effectiveness, quality, and inclusion. At the same time, promoting digital literacy to students and citizens is a necessary priority aimed at fostering the adoption and use of digital technology, bridging the digital divide, increasing

competitiveness, and increasing the use of digital government services (Ministry of Post and Telecommunications, 2022).

Moreover, with the increasing pervasion of digital technology in our society and across the world, we are experiencing a progressive change within the business ecosystem. Business processes are changing and with them also the values in those companies that are facing a disruptive transition toward Industry 4.0. Its implementation in each company and ecosystem requires continuous innovation and education that not only relies and depends on people's abilities but also on the organizational culture of that ecosystem. The business culture itself is facing a transition and change in its values, with some new values, before not being prioritized, now rising to the surface of the priority list of many realities. Blštáková et al. considering the reshaping and changing process of the values of management of people in the companies that are approaching or embracing the industry analyzed the relationship between technological innovations and digitalization with value transformation influencing people management in the industry 4.0. (Corrado, R., Khat, S. & Corrado, E., 2021).

As Cambodia continues to grow and develop its economy, businesses must adapt to stay ahead of the competition and meet the changing needs of their customers. In this context, managers play a vital role in driving innovation, productivity, and growth within their organizations. Therefore, managers need to possess a range of leadership skills that enable them to navigate the complexities of a rapidly changing environment, manage diverse teams, and make informed decisions that drive business outcomes.

2. PROBLEM STATEMENT

There are different ways to manage an organization efficiently and effectively, and managers need to acquire various skills for their management and leadership. However, with the evolution of digitalization, managers have to learn new digital leadership skills together with the non-digital leadership skills in order to manage and lead their organizations in the new era. Although these skills are essential for managers, it is suspected that this topic has not been studied in Phnom Penh, Cambodia. Thus, in order to explore these skills for managers in Cambodia, the researchers will review related

literature on non-digital and digital leadership skills for managers and ask them to range these skills in order of importance for their management and leadership.

3. RESEARCH QUESTIONS

As the digital landscape continues to evolve and transform the way businesses operate, managers in Cambodia must possess the leadership skills necessary to navigate this rapidly changing environment. Thus, in this study, the researchers developed two research questions as follows:

1. What are the leadership skills required by managers in the digital age in Cambodia?
2. What are the most important leadership skills required by managers in Cambodia?

4. RESEARCH OBJECTIVES

The success of business organizations in Cambodia depends on the leadership skills of their managers. So, the researchers set two research objectives for this study as below:

1. To identify the leadership skills required by managers in Cambodia
2. To rank the importance of leadership skills required by managers in Cambodia

5. SIGNIFICANCE OF STUDY

This study provides many benefits. First, companies can use these research findings to recruit new managers with the leadership skills required in the digital age. Second, students know what leadership skilled to learn for their future employment. Third, researchers can use these findings for their future research.

6. LIMITATION

This research is carried out for managers who work in Phnom Penh only. The study only focuses on non-digital and digital leadership skills required by managers in the digital age.

7. LITERATURE REVIEW

Leaders need to be aware that social and digital technologies change the nature of work, and they need to adapt their way of working accordingly (Hunt, 2015). Furthermore,

leaders need to serve as role models, promote and perpetuate cultural values that encourage a supportive attitude towards change, implement appropriate governance and organisational structures, and ensure employees have profound digital know-how (Day, Fleenor, Atwater, Sturm, & McKee, 2014). Executives also need to remove obstacles to the use of new technologies and provide opportunities for employees to work with them (Bondarouk & Ruël, 2008). Moreover, executives should be the ones to discover ways of supporting a shift towards flexibility, the flow-driven use of digital tools, and a mindful relationship with digital technologies (Tarafdar, 2016). Gratton (2016) found that many people use digital technologies more often in their everyday life compared to at work, and, accordingly, they associate positive technology related influences with their daily lives rather than with their work (Gratton, 2016). Therefore, executives should take on the task of encouraging employees to establish mindful usage patterns for new technologies, considering the potential work-nonwork conflicts that may arise if employees feel permanently attached to work. According to Colbert et al. (2016), such mindful usage patterns are characterised by "[…] time for focused thinking, opportunities for recovery, and effective collaboration" (Colbert et al., 2016), cited by Milan, F. K. & Julia, M. (2020).

There are four main types of competencies that have been identified which are a) Technical skills: job related, b) Methodological competencies: skills for problem solving, c) Social competencies: attitude to cooperate and d) Personal competencies: individual values and motivation (Becker, 2013). Hecklau et al (2016) identified 4 sets of competencies which are: a) Personal competencies: flexible, open to change, ability to work in pressure, b) Social competencies: intercultural and language skills, networking skills and leadership skills, c) Methodological competencies: creativity, entrepreneurial thinking, analytical skills, decision making and d) Technical competencies: media skills, coding skills, process understanding. Grzybowska and Łupicka (2017) identified key managerial competencies for the future leaders and they are: a) Entrepreneurial thinking: ability to identify marketplace and opportunities, b) Creativity: ability to perceive in new ways, c) Problem solving: analytical and logical thinking, d) Conflict solving: self-control and empathy, e) Decision making: process of

making choices, f) Analytical skills: gather information and evaluate, g) Research skills: retrieve in-depth information and h) Efficiency orientation: efficient use of resources, cited by Puja, K., Sumedha, D. & Khushboo, R. (2022).

In Table 1, leadership skills considered in the existing literature are shown. Leadership skills were distinguished and addressed in general and leadership skills that were mentioned with a reference to digitalization. Closely looking at the underlying literature of the skills listed in Table 1 reveals that there is often no clear distinction between traits and skills as well as different skill dimensions. All the digitalization-related leadership skills are aspects such as becoming digitally mindful, partnering with "digital colleagues", digital literacy, as well as technology-related skills. In addition, communication skills, flexibility, and adaptability seem to be particularly interesting in the context of digitalization (Milan, F. K. & Julia, M., 2020).

Milan, F. K. & Julia, M. (2020) found that only minor differences can be identified in the top ten skill requirements between the different management levels. Accordingly, goal orientation and engagement (top management), assertiveness (middle management), flexibility (middle and lower management), ability to work in a team (lower management) and organisational skills (lower management) vary between the management levels. Interpreting these differences between management levels as different requirements for top managers might be jumping to conclusions, as it also might be that individual skills explicitly mentioned for lower and middle management positions are presupposed at top management. What is more, the sample of job advertisements for top management positions is relatively small. Interestingly, across all management levels, subject-specific knowledge is more frequently demanded than softer factors such as communication skills.

Source	Leadership Skills	
Marshall-Mies et al. (2000)	• Metacognitive Process	Not Concerning Digitalisation
Gartzia & Baniandrés (2016)	• Task Orientation	
Lord & Hall (2005)	• Social Expertise • Self-Monitoring • Emotional Regulation Skills • Emotional Empathy • Capacity to Develop Others	
Goleman (2004)	• Self-Awareness • Empathy	
Goleman (2004) Lord & Hall (2005)	• Self-Regulation	
Riggio & Reichard (2008)	• Emotional Control • Social Control • Emotional Expressiveness • Social Expressiveness • Social Sensitivity • Emotional Sensitivity	
Zaccaro et al. (1991) Mumford, Zaccaro et al. (2000)	• Social Perceptiveness	
Gartzia & Baniandrés (2016)	• People Orientation	
Marshall-Mies et al. (2000) Mumford, Marks et al. (2000) Mumford, Zaccaro et al. (2000)	• Social Judgment Skills	
Khan & Ahmad (2012)	• Ability to Build Teams	
Mumford et al. (2017)	• Problem Definition • Cause/Goal Analysis • Constraint Analysis • Planning Skills • Forecasting Skills • Idea Evaluation • Wisdom • Sensemaking/Visioning	
Marshall-Mies et al. (2000) Lord & Hall (2005) Mumford, Marks et al. (2000) Mumford, Zaccaro et al. (2000)	• Problem Solving Skills	
Marshall-Mies et al. (2000) Mumford, Marks et al. (2000)	• Solution Construction Skills	
Marshall-Mies et al. (2000)	• Planning and Implementation Skills • Solution Evaluation Skills	
Nelson, Zaccaro & Herman (2010)	• Adaptability	
Mumford et al. (2017) Mumford, Zaccaro et al. (2000)	• Creative Thinking	
Zaccaro et al. (1991) Mumford, Zaccaro et al. (2000)	• Behavioural Flexibility	
Lord & Hall (2005)	• Greater Adjustment to Others • Flexibility in Emotional and Motivational Orientations	
Goleman (2004) Khan & Ahmad (2012)	• Motivation	
Tarafdar (2016)	• Becoming Digitally Mindful • Empathy for the Varying Technology Preferences of their Human Co-Workers • Partnering with "Digital Colleagues"	Concerning Digitalisation
Hunt (2015)	• Digital Literacy	
Phelps (2014)	• Technical Skills • Team Building Skills • Organizational Skills • Flexibility and Adaptability	
Phelps (2014) Khan & Ahmad (2012)	• Communication Skills	

Table 1: Overview of Leadership Skills

8. METHODOLOGY

In this research, researchers have developed questionnaires based on the overview of leadership skills from Milan Frederik Klus & Julia Müller (2020) designed in google form for Master students to distribute to their managers to complete, and some students can do by themselves since they are managers. It took them two weeks, the last two weeks of March 2024, to do this work. For the sample size, Roscoe's (1975) suggested that a sample size greater than 30 and less than 500 is suitable for most behavioural studies; thus, the target sample size for this study was 200 managers. However, as a result, 147 respondents have answered the questionnaires, but after checking only 144 have completed answers. Then the data was imported into SPSS software Version 16 for analysis. The researchers used Descriptive Statistics: Crosstabulation, Frequencies, Percentage, and Mean to analyze the data for all research objectives.

9. DATA ANALYSIS AND DISCUSSION

9.1 Data Analysis

Based on Table 9.1, the respondents are both male and female: 74.3 % male, and 25.7 % female. Moreover, they hold different degrees: 20.1 % Bachelor degree, 73.6 % Master degree and 6.2% Ph. D degree. In addition, they are from the 3 levels of management: 33.3 % lower-level manager, 49.3 % middle level manager and 17.4 % higher level manager. Furthermore, they are from 2 main types of company: 31.9 % production and 68.1 % service.

Table 9.1: Percentage of Respondent Data

Gender	Frequency	Percent	Valid Percent	Cumulative
Male	107	74.3	74.3	74.3
Female	37	25.7	25.7	100.0
Total	144	100.0	100.0	
Education	Frequency	Percent	Valid Percent	Cumulative
Bachelor	29	20.1	20.1	20.1

Master	106	73.6	73.6	93.8
Ph.D	9	6.2	6.2	100.0
Total	144	100.0	100.0	
Position	Frequency	Percent	Valid Percent	Cumulative
Lower-Level Manager	48	33.3	33.3	33.3
Middle Level Manager	71	49.3	49.3	82.6
Higher Level Manager	25	17.4	17.4	100.0
Total	144	100.0	100.0	
Type of Company	Frequency	Percent	Valid Percent	Cumulative
Production	46	31.9	31.9	31.9
Service	98	68.1	68.1	100.0
Total	144	100.0	100.0	

According to Table 9.2, there are 3 levels of manager with the same and different required skills. Firstly, lower-level manager requires most of these top skills based on the Mean of each skill: Self-Awareness (3.88), Capacity to Develop Others (3.85), Problem Solving Skills (3.85), Solution Construction Skills (3.83), Motivation (3.83), and Planning and Implementation Skills (3.81). However, Emotional Expressiveness (2.96), Social Expressiveness (2.85), and Emotional Sensitivity (2.85) are less required. In addition, the other skills are somewhat required by lower-level manager.

Secondly, for middle level manager, they require most of these topic skills as ranked by the Mean of each skill: Problem Solving Skills (4.04), Solution Construction Skills (4.03), Planning Skills (4.01), Planning and Implementation Skills (3.99), Ability to Build Teams (3.96), Motivation (3.93), People Orientation (3.92), Problem Definition (3.92), Constraint Analysis (3.92), Solution Evaluation Skills (3.92), Capacity to Self-Awareness (3.89), Cause/Goal Analysis (3.89), Develop Others (3.86), Emotional Control (3.86), Self-Regulation (3.85), Creative Thinking (3.83), Social Judgment Skills (3.82), Wisdom (3.82), and Sensemaking/Visioning (3.80). Whereas, Social

Expressiveness is less required by the middle manager. Furthermore, they somewhat required other skills.

Thirdly, for higher level manager, the most top skills required by them as ranked by Mean are: Planning Skills (4.20), Ability to Build Teams (4.12), Problem Definition (4.12), Problem Solving Skills (4.12), Forecasting Skills (4.08), Creative Thinking (4.08), Constraint Analysis (4.04), Solution Construction Skills (4.04), Cause/Goal Analysis (4.00), Behavioural Flexibility (3.96), Self-Monitoring (3.92), Planning and Implementation Skills (3.92), Solution Evaluation Skills (3.92), Self-Regulation (3.84), and Adaptability (3.80). On the other hand, they less require Emotional Sensitivity (2.92), Emotional Expressiveness (2.88), and Social Expressiveness (2.88). Moreover, the other skills are somewhat required by the top manager.

In conclusion, the 3 levels of manager require most of these skills: Problem Solving Skills (3.99), Solution Construction Skills (3.97), Planning Skills (3.95), Planning and

Implementation Skills (3.92) Ability to Build Teams (3.91), Constraint Analysis (3.91), Motivation (3.87), Self-Awareness (3.86), Cause/Goal Analysis (3.86), Creative Thinking (3.86), Problem Definition (3.85), Solution Evaluation Skills (3.85), and Capacity to Develop Others (3.84), Wisdom (3.80). What is more, the other skills are somewhat required by them.

Table 9.2: Mean of Leadership Skills not Concerning Digital Skills

No.	Leadership Skills	N	Mean of LLM	N	Mean of MLM	N	Mean of HLM	N	Total Mean
1	Metacognitive Process	48	3.33	71	3.56	25	3.52	144	3.48
2	Task Orientation	48	3.58	71	3.68	25	3.64	144	3.64
3	Social Expertise	48	3.56	71	3.77	25	3.48	144	3.65
4	Self-Monitoring	48	3.71	71	3.73	25	3.92	144	3.76
5	Emotional Regulation Skills	48	3.62	71	3.68	25	3.76	144	3.67
6	Emotional Empathy	48	3.48	71	3.49	25	3.48	144	3.49
7	Capacity to Develop Others	48	3.85	71	3.86	25	3.76	144	3.84
8	Self-Awareness	48	3.88	71	3.89	25	3.76	144	3.86
9	Empathy	48	3.40	71	3.52	25	3.36	144	3.45
10	Self-Regulation	48	3.67	71	3.85	25	3.84	144	3.78
11	Emotional Control	48	3.69	71	3.86	25	3.76	144	3.78
12	Social Control	48	3.29	71	3.63	25	3.32	144	3.47
13	Emotional Expressiveness	48	2.96	71	3.23	25	2.88	144	3.08
14	Social Expressiveness	48	2.85	71	2.97	25	2.88	144	2.92
15	Social Sensitivity	48	3.10	71	3.25	25	3.24	144	3.20
16	Emotional Sensitivity	48	2.85	71	3.03	25	2.92	144	2.95
17	Social Perceptiveness	48	3.44	71	3.65	25	3.44	144	3.54
18	People Orientation	48	3.62	71	3.92	25	3.68	144	3.78
19	Social Judgment Skills	48	3.50	71	3.82	25	3.60	144	3.67
20	Ability to Build Teams	48	3.73	71	3.96	25	4.12	144	3.91
21	Problem Definition	48	3.60	71	3.92	25	4.12	144	3.85
22	Cause/Goal Analysis	48	3.75	71	3.89	25	4.00	144	3.86
23	Constraint Analysis	48	3.83	71	3.92	25	4.04	144	3.91
24	Planning Skills	48	3.73	71	4.01	25	4.20	144	3.95

25	Forecasting Skills	48	3.58	71	3.73	25	4.08	144	3.74
26	Idea Evaluation	48	3.50	71	3.65	25	3.72	144	3.61
27	Wisdom	48	3.79	71	3.82	25	3.76	144	3.80
28	Sensemaking/Visioning	48	3.71	71	3.80	25	3.72	144	3.76
29	Problem Solving Skills	48	3.85	71	4.04	25	4.12	144	3.99
30	Solution Construction Skills	48	3.83	71	4.03	25	4.04	144	3.97
31	Planning and Implementation Skills	48	3.81	71	3.99	25	3.92	144	3.92
32	Solution Evaluation Skills	48	3.71	71	3.92	25	3.92	144	3.85
33	Adaptability	48	3.75	71	3.73	25	3.80	144	3.75
34	Creative Thinking	48	3.79	71	3.83	25	4.08	144	3.86
35	Behavioural Flexibility	48	3.69	71	3.73	25	3.96	144	3.76
36	Greater Adjustment to Others	48	3.23	71	3.31	25	3.28	144	3.28
37	Flexibility in Emotional and Motivational Orientations	48	3.48	71	3.51	25	3.60	144	3.51
38	Motivation	48	3.83	71	3.93	25	3.76	144	3.87

As shown in Table 9.3, digital leadership skills are required by the three levels of managers. First, lower-level manager highly requires Communication Skills (4.18), Organizational Skills (3.94), Team Building Skills (3.90), and Flexibility and Adaptability (3.87), but, they rather required the other digital skills. Second, Communication Skills (4.12), Technical Skills (3.97), Digital Literacy (3.93), Team Building Skills (3.87), Organizational Skills (3.87), and Flexibility and Adaptability (3.85) are strongly required by the middle manager. On the other hand, they somewhat require other digital skills. Third, the top manager mostly requires Flexibility and Adaptability (4.20), Communication Skills (4.07), and Team Building Skills (3.84). On the contrary, they rather require the other digital skills. Thus, the three levels of managers mostly require Communication Skills (4.12), Flexibility and Adaptability (3.97), Digital Literacy (3.81), Technical Skills (3.81), Team Building Skills (3.88), and

Organizational Skills (3.85); however, the other digital leadership skills are somewhat required by them.

Table 9.3: Mean of Leadership Skills Concerning Digital Skills

No.	Leadership Skills	N	Mean of LLM	N	Mean of MLM	N	Mean of HLM	N	Total Mean
1	Becoming Digitally Mindful	48	3.46	71	3.63	25	3.44	144	3.54
2	Empathy for the Varying Technology Preferences of their Human Co-Workers	48	3.44	71	3.61	25	3.40	144	3.51
3	Partnering with "Digital Colleagues"	48	3.60	71	3.63	25	3.52	144	3.60
4	Digital Literacy	48	3.69	71	3.93	25	3.72	144	3.81
5	Technical Skills	48	3.77	71	3.97	25	3.40	144	3.81
6	Team Building Skills	48	3.90	71	3.87	25	3.84	144	3.88
7	Organizational Skills	48	3.94	71	3.87	25	3.64	144	3.85
8	Flexibility and Adaptability	48	3.87	71	3.85	25	4.20	144	3.97
9	Communication Skills	48	4.18	71	4.12	25	4.07	144	4.12

9.2 Discussion of Findings

This study found that there are many non-digital leadership skills and digital leadership skills required by the three level of management in Cambodia; however, Milan, F. K. & Julia, M. (2020) found only certain leadership skills need in the job announcement for the management levels.

First, the study found that lower-level manager requires both non-digital leadership skills: Self-Awareness, Capacity to Develop Others, Problem Solving Skills, Solution Construction Skills, Motivation, and Planning and Implementation Skills, and digital leadership skills: Communication Skills, Organizational Skills, Team Building Skills, and Flexibility and Adaptability, but they rather required the other digital skills. However, this study is consistent with certain skills only: ability to work in a team,

organizational skills, flexibility, and communication skills found by Milan, F. K. & Julia, M. (2020).

Second, middle level manager requires Problem Solving Skills, Solution Construction Skills, Planning Skills, Planning and Implementation Skills, Ability to Build Teams, Motivation, People Orientation, Problem Definition, Constraint Analysis, Solution Evaluation Skills, Capacity to Self-Awareness, Cause/Goal Analysis, Develop Others, Emotional Control, Self-Regulation, Creative Thinking, Social Judgment Skills, Wisdom, and Sensemaking/Visioning as non-digital leadership skills. However, they need Communication Skills, Technical Skills, Digital Literacy, Team Building Skills, Organizational Skills, and Flexibility and Adaptability as digital leadership skills. Thus, these findings are not totally in line with the findings of Milan, F. K. & Julia, M. (2020), but only consistent with flexibility and communication skills.

Third, these non-digital leadership skills: Planning Skills, Ability to Build Teams, Problem Definition, Problem Solving Skills, Forecasting Skills, Creative Thinking, Constraint Analysis, Solution Construction Skills, Cause/Goal Analysis, Behavioural Flexibility, Self-Monitoring, Planning and Implementation Skills, Solution Evaluation Skills, Self-Regulation, and Adaptability are required by the top management. Also, they need Flexibility and Adaptability, Communication Skills, and Team Building Skills as their digital skills. Hence, these findings are mostly not in line with the findings of Milan, F. K. & Julia, M. (2020), but only consistent with communication skills.

10. COCLUSION AND RECOMMENDATIONS

10.1 Conclusion

The respondents are 74.3 % male and 25.7 % female. Moreover, they hold different degrees: 20.1 % Bachelor degree, 73.6 % Master degree and 6.2% Ph. D degree. In addition, they are from the 3 levels of management: 33.3 % lower-level manager, 49.3 % middle level manager and 17.4 % higher level manager. Furthermore, they are from 2 main types of company: 31.9 % production and 68.1 % service.

There are 3 levels of managers with the same and different required skills. Firstly, lower-level manager requires most of these top skills: Self-Awareness, Capacity to Develop Others, Problem Solving Skills, Solution Construction Skills, Motivation, and Planning and Implementation Skills. However, Emotional Expressiveness, Social Expressiveness, and Emotional Sensitivity are less required. In addition, the other skills are somewhat required by lower-level manager.

Secondly, for middle level manager, the most of these topic skills that they require are Problem Solving Skills, Solution Construction Skills, Planning Skills, Planning and Implementation Skills, Ability to Build Teams, Motivation, People Orientation, Problem Definition, Constraint Analysis, Solution Evaluation Skills, Capacity to Self-Awareness, Cause/Goal Analysis, Develop Others, Emotional Control, Self-Regulation, Creative Thinking, Social Judgment Skills, Wisdom, and Sensemaking/Visioning. Whereas, Social Expressiveness is less required by the middle manager. Furthermore, they somewhat required other skills.

Thirdly, for higher level manager, the most top skills required by them are Planning Skills, Ability to Build Teams, Problem Definition, Problem Solving Skills, Forecasting Skills, Creative Thinking, Constraint Analysis, Solution Construction Skills, Cause/Goal Analysis, Behavioural Flexibility, Self-Monitoring, Planning and Implementation Skills, Solution Evaluation Skills, Self-Regulation, and Adaptability. On the other hand, they less require Emotional Sensitivity, Emotional Expressiveness, and Social Expressiveness. Moreover, the other skills are somewhat required by the top manager.

So, the 3 levels of managers require most of these skills: Problem Solving Skills, Solution Construction Skills, Planning Skills, Planning and Implementation Skills, Ability to Build Teams, Constraint Analysis, Motivation, Self-Awareness, Cause/Goal Analysis, Creative Thinking, Problem Definition, Solution Evaluation Skills, and Capacity to Develop Others and Wisdom. What is more, the other skills are somewhat required by them.

In addition, digital leadership skills are required by the three levels of managers. First, lower-level manager highly requires Communication Skills, Organizational Skills, Team Building Skills, and Flexibility and Adaptability, but, they rather required the other digital skills. Second, Communication Skills, Technical Skills, Digital Literacy, Team Building Skills, Organizational Skills, and Flexibility and Adaptability are strongly required by the middle manager. On the other hand, they somewhat require other digital skills. Third, the top manager mostly requires Flexibility and Adaptability, Communication Skills, and Team Building Skills. On the contrary, they rather require the other digital skills.

10.2 Recommendations

Based on the research findings, the researchers would like to give recommendations to universities and the three levels of managers as follows:

(1) For Non-digital Leadership Skills: the three level of managers should learn the non-digital leadership skills as below:

- o Lower-level managers should learn these top skills: Self-Awareness, Capacity to Develop Others, Problem Solving Skills, Solution Construction Skills, Motivation, and Planning and Implementation Skills

- o Middle level managers should learn these skills: Problem Solving Skills, Solution Construction Skills, Planning Skills, Planning and Implementation Skills, Ability to Build Teams, Motivation, People Orientation, Problem Definition, Constraint Analysis, Solution Evaluation Skills, Capacity to Self-Awareness, Cause/Goal Analysis, Develop Others, Emotional Control, Self-Regulation, Creative Thinking, Social Judgment Skills, Wisdom, and Sensemaking/Visioning, and

- o Higher level managers should learn these skills: Planning Skills, Ability to Build Teams, Problem Definition, Problem Solving Skills, Forecasting Skills, Creative Thinking, Constraint Analysis, Solution Construction Skills, Cause/Goal Analysis, Behavioural Flexibility, Self-Monitoring, Planning

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and Implementation Skills, Solution Evaluation Skills, Self-Regulation, and Adaptability.

(2) For Digital Leadership Skills: the three level of managers should learn the required digital leadership skills as following:

- o Lower-level manager should learn these skills: Communication Skills, Organizational Skills, Team Building Skills, and Flexibility and Adaptability, but they rather required the other digital skills

- o Middle managers should learn these skills: Communication Skills, Technical Skills, Digital Literacy, Team Building Skills, Organizational Skills, and Flexibility and Adaptability, and

- o Top manager should learn these skills: Flexibility and Adaptability, Communication Skills, and Team Building Skills.

Thus, the three levels of mangers will manage their business organizations efficiently and effectively with the required leadership skills in this competitive digital age.

(3) For Universities:

- o Universities should include both non-digital leadership skills and digital leadership skills as required by the three levels of managers in the digital age as in these research findings in their curriculum development. Thus, they will be able to produce potential managers for companies in Cambodia.

10.3 Future Research

Future researchers should use other research methods with different statistical tools on non-digital and digital leadership skills required by managers in specific level of management and industry. In addition, the study should extent to managers from companies around the country.

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LEADERSHIP ROLES AND BEHAVIORS OF CAMBODIAN DEANS

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ABSTRACT

Deans serve as academic facilitators between presidential initiatives, faculty governance, and student needs (Astin and Sherrei, 1980). One of the most essential skills of an academic dean is leadership. Leadership is a catalyst for scaling performance through followers' engagement and achieving more sustainable outcomes through creating a shared vision and strong cultural values for the organization, fulfilling unmet follower needs, and reducing emotional deficits. Given the importance of leadership, this study aims to shed light on the leadership roles and behaviors of Cambodian deans in managing their faculties. The overall research design is exploratory. This study uses a quantitative approach. Convenient and purposive sampling was chosen for data collection. The researcher adopted the Competing Values Leadership Instrument of CVF (Quinn, 1988) to approach 78 deans from 36 universities through Google form survey. Descriptive statistics was employed as an analysis method in this study. The results of this study reveal that Cambodian deans perform all leadership roles at rather high level. Among the eight leadership roles, they perform the mentor facilitator, director, producer, innovator, and monitor roles more frequently than broker and coordinator roles. Besides, the level of the leadership behavior performance is rather high. Cambodian deans perform fifteen leadership behaviors very frequently in managing their faculties. The results should be useful for both researchers and practitioners and may be used as guidance for actions to foster and develop effective deanship.

Keywords: Dean, Leadership, Leadership Role, Leadership Behavior

1. INTRODUCTION

Back to the late 1980s, Cambodia marked a turning of a central planning economy to a market economy in April 1989 (Diep, 2005). Cambodia has step by step developed its economy and social structure from the bottom after three decades of devastation and societal fragmentation from civil conflicts, colonization, genocidal Khmer Rouge and foreign sanctions, with the help of United Nations and foreign countries (Vu, 2015).

Historically, Cambodian higher education has gone through many ups and downs since the mid-20th century (Mak et al., 2019). Tragically, during the Democratic Kampuchea regime between 1975 and 1979, most Cambodian intellectuals, scholars, and academics were lost in the genocide. After the civil war was over in 1998, Cambodia has strived to develop and reform her higher education institutions (HEI) until now (Rany et al., 2012). The higher education landscape in Cambodia has transformed dramatically, moving from elite to early-stage of mass higher education (Un and Say, 2018). In 1997, the first private higher education institution was established. Later on, public higher education institutions introduced fee-paying programs (MoEYS, 2014). Today, the number of public and private higher education institutions has significantly increased to 132, supervised by 16 different ministries and institutions (MoEYS, 2023).

No	Ministries or Institutions	HEIs		Total
		Public	Private	
1	Ministry of Education, Youth and Sport	13	71	84
2	Ministry of Labor and Vocational Training	12	13	25
3	Ministry of National Defense	5	0	5
4	Ministry of Cults and Religions	3	0	3
5	Ministry of Agriculture, Forest and Fisheries	3	0	3
6	Ministry of Health	2	0	2
7	Ministry of Culture and Arts	1	0	1
8	Ministry of Interior	1	0	1
9	Office of the Council of Ministers	1	0	1
10	Ministry of Public Works and Transport	1	0	1
11	National Bank of Cambodia	1	0	1
12	Ministry of Social Affairs, Veterans and Youth Rehabilitation	1	0	1
13	Ministry of Mines and Energy	1	0	1
14	Ministry of Posts and Telecommunication	1	0	1

15	Ministry of Economy and Finance	1	0	1
16	Ministry of Land Management, Urban Planning and Construction	1	0	1
	Total	48	84	132

Table 1: Ministries or state institutions supervising Cambodian HEIs (MoEYS, 2023)

The HEI leadership in Cambodia is made up of the rector (for a university) or director (for an institute) and is supported by the 'necessary' number of vice-rectors/deputy directors. Procedures to select and appoint the rector/director and vice-rectors/deputy directors for the public and private HEIs are different. A public HEI rector is proposed by the minister of the technical supervising ministry to the Prime Minister and is appointed via a royal decree. Vice-rectors and deans are proposed by the technical supervising ministry to the Prime Minister and appointed by sub-decrees. As for private HEIs, the recruitment, appointment and termination of a rector/director shall be at the discretion of the board. The law does not set the term length of rectorship or a limit to rectorship terms. Such actually applies to every level of institutional administration (Un and Say, 2018). Considering a rapidly changing higher education environment, the roles and responsibilities of deans are continuously evolving depending upon academic field and type of institution. In general, deans manage their faculties on a day-to-day basis and implement decisions made by the rector.

1.1 Research Problem

Leadership is an elusive concept which has been given widespread attention in recent years, particularly in the higher education arena (Nix, 1989). Leadership has gained researchers' interest all over the world for decades. Many aspects of leadership have been a fertile area for research since the early years of the twentieth century (Northouse, 2013). However, the role of the academic dean has been widely understudied in the literature (Cleverley Thompson, 2016). By virtue of position within the academic organization, the dean's leadership roles and behaviors are of importance (Ehrle and Bennett, 1988). Due to the lack of empirical research and documentation in this area in Cambodia, there is a notable research gap in the literature.

1.2 Research Question

In order to fill this gap, the study is attempted to answer the question: To what extent do Cambodian deans perceive their leadership roles and behaviors in managing their faculties?

1.3 Research Objectives

The objectives of this study are as follows:

1. To identify the leadership roles frequently performed by the Cambodian deans
2. To identify the leadership behaviors frequently performed by the Cambodian deans in managing their faculties.

1.4 Scope and Limitation of Study

This study focusses on academic deans in different faculties in various higher education institutions in Cambodia and adopts the thirty-two leadership behaviors of the deans derived from the Competing Values Leadership Instrument for data collection. Determining the targeted population for the survey was a challenge, for no data on the total number of deans in Cambodian universities were available. The outcome of respondents is simply based on the level of access to available deans. The results of study could be limited to the experiences of the individuals in the sampled area. The findings and recommendations of this study may not be generalizable to all deans in Cambodia.

1.5 Significance of Study

This study would hopefully contribute to the building of new knowledge in the literature in this area in the Cambodian context. The profile of behaviors and roles which deans find useful in their leadership will contribute to the development of a model which faculties and universities could use in developing their potential academic deans.

2. LITERATURE REVIEW

2.1 Definitions

Leadership is the art of stimulating the human resources within the organization to concentrate on total organizational goals rather than on individual subgroup goals (Argyris and Cyert, 1980). According to Yukl (2008), leadership is defined as "the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives." It involves setting a clear vision, making sound decisions, motivating others, and fostering a positive and collaborative environment. A leader assumes responsibility, provides direction, and empowers others to achieve their full potential (Northouse, 2021).

The academic dean is the official head of the academic colleges or divisions within a university. This position fits in the reporting structure of a university underneath the provost or chief academic officer. They represent the faculty to the administration, oversee finance and budgets for the college, participate in a myriad of meetings and ceremonies for the college, resolve disputes among the faculty, and respond to student needs (Smethers and Jason Daniel, 2020). Deans play a crucial role in the leadership and management of faculties at every higher education institution.

Behavior is defined as an observable event which takes place in a certain place within a given context, at a given time and directed at some target (Fishbein & Ajzen, 2010). Leadership behavior refers to traits and actions that make an individual effective as a leader and can be learned (Mutupha, J.F. (2022). According to Erica Santiago (2022), leadership behaviors are actions and conduct that leaders incorporate into their management styles in order to effectively lead their teams, motivate them, and achieve their goals.

Leadership roles are operationally defined as the collection of eight roles that includes mentor, facilitator, innovator, broker, monitor, coordinator, producer and director which an effective project manager will demonstrate appropriately in a complex and rapidly changing environment (Denison et al.,1995).

2.2 Deanship

Organizations are usually composed of different parts occupied by different people undertaking different roles. For most organizations, these parts mainly include the strategic apex (top management), the middle line (middle management), the operating core (operation processes), the technostructure (analysts who design the system), and the support staff (Mintzberg, 1983). This study is focused on middle management, usually located between the strategic apex and the operating core in most organizations.

As middle management, deans generally perform a number of functions such as planning, management, acquiring resources, faculty development, development and review of academic programs, motivating and aligning others, research management, students' management, internationalization activities and at the same time be the morale officer, principal steward, lead mentor, and master of ceremonies (De Boer, Goedegebuure & Meek, 2010; Tucker & Bryan, 1988). Deans work in close collaboration with other teams of different schools, colleges, offices and units under the university to achieve the goals, vision and mission of the university. In some cases, an academic dean may also engage with external stakeholders – that is, individuals and organizations outside the school that have an interest in the department. For example, the dean may engage with alumni or liaise with their own counterparts at other schools to enhance the professional image of the department.

Tucker and Bryan (1988) noted: "While one could argue endlessly about whether being a dean is an art or a science, whether a dean is a leader or a manager, we hold that a dean is a leader and a manager who uses science in the performance of an art, an art that finally defies precise analysis." Deans require both academic and administrative leadership skills. They plan, direct and oversee all activities that fall under the administrative functions in their higher education institutions.

2.3 Leadership Roles

There are a number of theories regarding leadership roles. Mintzberg (1973) suggested three leadership/managerial roles: (1) information processing related; (2) decision

making related; and (3) interpersonal contact related. According to Quinn (1988), leadership roles are classified into eight roles: (1) mentor, (2) facilitator, (3) innovator, (4) broker, (5) monitor, (6) coordinator, (7) producer and (8) director. Leadership roles by Jessup (1990) include: (1) administrator, (2) advisor and (3) coach. However, Stephen (1998) suggested leadership roles with 13 sub-dimensions: (1) forecast thinking; (2) establishing high standards; (3) effective communication; (4) coaching; (5) encouraging teamwork; (6) effective delegation; (7) building consensus; (8) supporting reasonable risk taking; (9) rewarding performance; (10) developing and releasing employees; (11) managing diversity; (12) improving the organization; and (13) overall effectiveness. Besides, Gunnar and Torodd (1999) suggested four main leadership roles: (1) administrator; (2) producer; (3) integration; and (4) entrepreneur.

Quinn Model's Leadership Roles spanned across eight roles which are integrated into four quadrants in which each quadrant consists of two roles that are very close in terms of role's attributes versus roles in other quadrants. These four quadrants are separated by both x- and y-axis whereby x-axis continuum covering two extreme dimensions i.e. focus on internal or external environment. Y-axis continuum covering highly flexible or highly controlled/stable environment. The four quadrants include: (1) Relating to People, (2) Leading Change, (3) Producing Results and (4) Managing Processes. Each role is the opposing attributes against the role that is located on the opposite side e.g. director role attributes are opposite against the mentor role attributes; likewise, producer role is opposite against the facilitator role (Quinn, 1988).

In this study, Quinn's leadership roles are adopted as they are well-defined, well-balanced, and well-known among previous researchers (Cameron et al., 2006; Hooijberg & Petrock, 1993; Chen et al., 2008; Wakefield et al., 2008; Zafft et al., 2009).
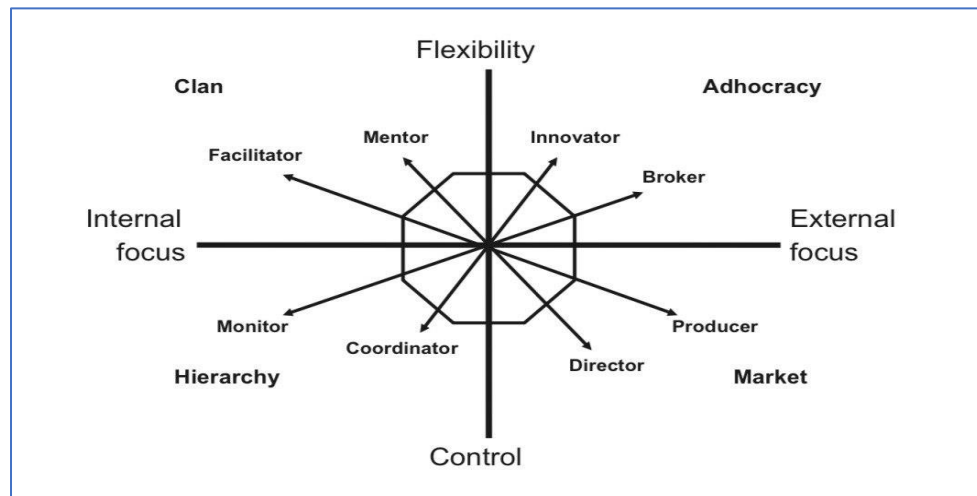
Figure 1: Quinn Model's Leadership Roles (Quinn, 1988)

More effective leaders are able to cope with multiple, contradictory and competing leadership roles or tasks and should strike a balance within them (Quinn, 1988; Hoijberg, 1996). While the assumption is that well managed organizations require a mix of leadership roles and underlying values. Organizations would thus rely on the skilled balancing-acts and performance of their leaders to solve complex and ill-defined organizational problems from both the external and internal environments. It is assumed that organizations and managers who focus on all these roles have higher levels of achievement (O'Neill & Quinn, 1993).

The highest performing leaders are those who have developed capabilities and skills that allow them to succeed in all the four quadrants. They are self-contradictory leaders in the sense that they can be hard and soft, entrepreneurial and controlled (Quinn, 1988; Hooijberg, 1996). However, this does not mean that all organizations must equally balance all the quadrants to be successful. For leaders it means that they have to develop specific skills and areas of expertise which also need to have some congruence with their organizational cultures and types (Cameron, Quinn, Degraff & Thakor, 2006). Quinn's Model of Leadership Roles suggests that a more effective leader will cover more roles e.g. three to four quadrants of roles from his or her repertoire compares to a less effective leader who can only cover one to two quadrants of roles. All the roles covered by a leader co-exist concurrently within the leader. However, when facing

different situations, some roles will be demonstrated highly while certain opposite roles will be retracted to a minimum level (Quinn, 1988).

2.4 Competing Values Framework (CVF)

The Competing Values Framework (CVF) was developed from a series of studies on indicators of organizational effectiveness (Quinn & Rohrbaugh, 1983). The framework deals with the complex and paradoxical roles of leaders and managers which builds around the four quadrants. Within each quadrant, two roles exhibit the characteristics associated with a particular theoretical model and managerial performance. The CVF integrates a number of theoretical traditions such as human relations, open system, rational goal and internal process theories clustered into eight different leadership roles (Quinn, 1988). The CVF provides a broadly applicable model to foster successful leadership, improve organizational effectiveness and promote value creation. It serves as a map, an organizing mechanism, a sense-making device, a source of new ideas and a learning system. Identifying the underlying dimensions of organization that exist in almost all human and organizational activity is one of the key functions of this framework (Cameron et al., 2006).

The CVF presents thirty-two key behaviors required of organizational leaders, resulting into eight roles that leaders might execute to create value in their organizations (Quinn, 1988; Hooijberg, 1996). The CVF has been found to be a useful tool for analyzing these competing leadership requirements and helping organization members better understand the similarities and differences of managerial leadership roles at various levels of hierarchy (DiPadova & Faeman, 1993). The CVF has also been studied and tested in organizations for more than 25 years by a group of thought leaders from leading business schools and corporations and has been recognized as "one of the 40 most important frameworks in the history of business" (Cameron et al., 2006). Many empirical studies have validated the CVF as a valuable and powerful instrument to assess leadership and organizational effectiveness (Cooper & Quinn, 1993; Hooijberg & Petrock, 1993). In this study, the CVF instrument is adopted to identify which

leadership roles and behaviors deans in Cambodian universities need to execute and balance in managing their faculties.

2.5 Leadership Behaviors

Behavior shown by leaders toward their subordinates plays an important role in how supportive a work setting is perceived (Cherniss, 1995). A leader's behavior is a powerful display of mannerisms that convey the expectations and values of the organization that sets the tone for the organizational climate (Grojean et al., 2004). A style is the result of several (repeated) actions. The leadership style can affect work engagement, leaders must show a resilient leadership style to tackle different changes within a variety of situations, behaving appropriately in each process (Yukl 2008).

In this study, leadership style will be treated as a behavioral category. The leadership behaviors are identified and defined through the leadership roles of CVF. The CVF presents thirty-two key behaviors required of organizational leaders, resulting into eight roles that leaders might execute to create value in their organizations. Amongst these 32 behavior statements, four statements represent each of the 8 leadership roles of the CVF. Within its four quadrants, the CVF defines the 8 leadership roles that organizational leaders need to execute and balance in managing their organizations (Quinn, 1988; Hooijberg, 1996).

3. METHODOLOGY

3.1 Research Design and Data Collection

The design of this study is a quantitative approach. Convenient and purpose sampling method was chosen for data collection. Data for this research were collected from deans in 36 universities in Cambodia from February to May 2024 using English questionnaire. The researcher used personal connection to approach 12 familiar deans. 70 surveys were distributed to 70 trained students to approach 70 deans of different universities in Cambodia through Google form survey. After checking data in the polls, 4 cases were not qualified. As a result, a sample of 78 deans was used for data analysis in this study. The coded data obtained were analyzed using the Statistical Package for Social Sciences

(SPSS) version 21. Descriptive statistics are employed as an analysis method in this study.

3.2 Sampling Method

Due to the unavailability of data on the total number of deans in Cambodia, it is a challenge to determine the target population for the survey. Data from MoEYS (2023) indicate that there are 132 higher education institutions of which there are approximately 36 universities throughout Cambodia. The number of faculties at each university varies. Assuming that universities have, on average, seven faculties, there would be a total population of approximately 252 deans in the country. Due to limitations of data accessibility, time, and cost, the researcher approached 78 deans as the sample size for this study.

3.3 Survey Development

The self-administered questionnaire was divided into two sections. The first section consists of eight facesheet questions required respondents to provide their demographic characteristics such as age, education, experience. The second section consists of thirty-two items to measure the thirty-two leadership behaviors of the deans derived from the measures of Competing Values Leadership Instrument of CVF (Quinn, 1988: 174) that have been theoretically developed and tested in previous studies. All items in this section were measured on a seven-point Likert-scale, ranging from 1 (never) to 7 (always) to indicate how often they performed the behaviors. The thirty-two leadership behavior statements presented to the deans were composed of four statements for each of the eight leadership roles of the CVF reflecting the roles and values associated with particular role type are coded as follows.

LEADERSHIP ROLES	CODE	ITEMS
MENTOR	MEN1	Listen to the personal problems of academic staff members and make an effort to help them
	MEN2	Show empathy and concern in dealing with academic staff members
	MEN3	Treat every faculty member in a sensitive and caring way
	MEN4	Show concern for the needs of academic staff members
FACILITATOR	FAC1	Facilitate consensus building in the faculty's decision making
	FAC2	Encourage participative decision making in the faculty

	FAC3	Encourage academic staff members to share ideas with you and with the others
	FAC4	Build teamwork among the academic staff members
INNOVATOR	**INN1**	Come up with new inventive ideas regarding teaching, learning, research and management matters in the faculty
	INN2	Experiment with new concepts and procedures
	INN3	Solve faculty problems in a creative and conventional way
	INN4	Search for innovations and potential improvements and encourages others to generate new ideas
BROKER	**BRO1**	Exert upward influence in the university to influence strategic decision making
	BRO2	Influence decisions made at higher levels in the university
	BRO3	Approach and consult people at the higher levels of the university
	BRO4	Persuasively sell new ideas to the central management of the university
MONITOR	**MON1**	Carefully review detailed reports and crosscheck information in detail
	MON2	Carefully compare records, files and reports to detect discrepancies
	MON3	Work with technical and information
	MON4	Analyse written plans and schedules
COORDINATOR	**COO1**	Protect continuity in the faculty's day-to-day operations
	COO2	Minimize the disruptions in daily practices to have an untroubled faculty
	COO3	Keep a close track of what goes on in the faculty (using control and monitor systems)
	COO4	Bring a sense of order to the faculty
PRODUCER	**PRO1**	Focus on results and performances of academic staff and foster a sense of faculty competitiveness to perform better than others
	PRO2	See that the faculty delivers on stated goals
	PRO3	Insist on intense hard work and high productivity and sincerely push the academic staff to meet the faculty objectives
	PRO4	Emphasize the faculty's achievements of stated purposes
DIRECTOR	**DIR1**	Define areas of responsibility for academic staff
	DIR2	Make sure everyone in the faculty knows where the faculty is going in terms of objectives and goals
	DIR3	Set clear objectives for the faculty and restate and reinforce your vision of the faculty's future
	DIR4	Clarify faculty policy priorities and future direction

Table 2: The Competing Values Leadership Instrument of CVF (Quinn, 1988: 174)
The researcher adopted and modified the mean score interpretation of 7-Likert scale

from Pimentel (2019) as in Table 3 below:

Likert Scale	Interval	Difference	Interpretation
1	1.00-1.85	0.85	Very low
2	1.86-2.71	0.85	Rather low
3	2.72-3.57	0.85	Low
4	3.58-4.43	0.85	Neither high or low
5	4.44-5.29	0.85	High
6	5.30-6.15	0.85	Rather high
7	6.16-7.00	0.84	Very high

Table 3: Mean score modified from Pimentel's Scale (2019)

4. DATA ANALYSIS

4.1 Description of the Sample

Respondents who participated in the study consisted of 78 deans from 36 universities in Cambodia. The distribution of universities and respondents based on characteristics can be seen in Table 4.

	University				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	National University of Management	10	12.8	12.8	12.8
	Royal University of Phnom Penh	4	5.1	5.1	17.9
	Build Bright University	5	6.4	6.4	24.4
	National Institute of Education	4	5.1	5.1	29.5
	Pannasastra University of Cambodia	3	3.8	3.8	33.3
	Cambodian University for Specialties	4	5.1	5.1	38.5
	University of Cambodia	4	5.1	5.1	43.6
	Paragon International University	4	5.1	5.1	48.7
	Svay Rieng University	3	3.8	3.8	52.6
	Royal University of Law and Economics	2	2.6	2.6	55.1
	Institute of Technology Cambodia	3	3.8	3.8	59.0
	National University of Battambang	3	3.8	3.8	62.8
	National University of Chea Sim Kamchaymear	1	1.3	1.3	64.1
	University of Puthisastra	2	2.6	2.6	66.7
	Phnom Penh International University	1	1.3	1.3	67.9
	International University	2	2.6	2.6	70.5
	Limkokwing University of Creative Technology	1	1.3	1.3	71.8
	Western University	1	1.3	1.3	73.1
	University of Management and Economics	1	1.3	1.3	74.4
	BELTEI International University	2	2.6	2.6	76.9
	AGA Institute	1	1.3	1.3	78.2
	Norton University	1	1.3	1.3	79.5
	Angkor University	1	1.3	1.3	80.8
	National Polytechnic Institute of Cambodia	1	1.3	1.3	82.1
	ACLEDA University of Business	1	1.3	1.3	83.3
	National Technical Training Institute	1	1.3	1.3	84.6
	IIC University of Technology	1	1.3	1.3	85.9
	National Tax School	1	1.3	1.3	87.2
	Preah Kossamak Polytechnic Institute	1	1.3	1.3	88.5

	Educational Development Institute	1	1.3	1.3	89.7
	University of Heng Samrin Thbongkhmum	1	1.3	1.3	91.0
	LSi Business School	1	1.3	1.3	92.3
	Chamroeun University of Poly-Technology	1	1.3	1.3	93.6
	Royal University of Fine Art	1	1.3	1.3	94.9
	Institute of Finance & Accounting	2	2.6	2.6	97.4
	National Meanchey Univerisity	2	2.6	2.6	100.0
	Total	78	100.0	100.0	

Table 4: Survey Data Respondents

No	Characteristics	Category	Frequency	Percent
1	Gender	Male	72	92.3
		Female	6	7.7
2	Marital Status	Single	7	9.0
		Married	70	89.7
		Prefer not to say	1	1.3
3	Age	Under 30 years	2	2.6
		30-40 years	21	26.9
		41-50 years	30	38.5
		51-60 years	22	28.2
		Over 60 years	3	3.8
4	Education	Master Degree	43	55.1
		Doctoral Degree	35	44.9
5	Years in University	Less than 5 years	7	9.0
		6-10 years	23	29.5
		11-20 years	24	30.8
		Over 20 years	24	30.8
6	Years as Dean	Less than 5 years	35	44.9
		6-10 years	28	35.9
		11-20 years	12	15.4
		Over 20 years	3	3.8
7	Number of Staff and Lecturers	Less than 10	18	23.1
		Between 10 and 30	29	37.2
		Between 31 and 50	16	20.5
		Over 50	15	19.2
8	Age of University	Less than 3 years	4	5.1
		Between 3 and 5 years	4	5.1
		Between 6 and 10 years	9	11.5
		More than 10 years	61	78.2
9	Legal Form	Public university	39	50.0
		Private university	38	48.7
		Others	1	1.3
Number of effective data			78	100%

Table 5: Summary of Distribution of Respondents in the Sample

Among 78 respondents in the dataset, almost all of the respondents were male (92.3%) with only 7.7% reporting that they were female. The data reveals that out of 78 respondents, 89.7% of the respondents were married, followed by single at 9%. The deans were of varied ages: 38.5% in the category of "41-50 years", followed by 28.2%

in "between 51-60 years. Regarding their academic backgrounds, 55.1% received their highest education level as Masters and 44.9% as doctoral degrees. 30.8% of the respondents had worked for their university for the category of "11-20 years" and "over 20 years."

Most deans in Cambodia have unlimited terms in their positions, and they may remain as dean until they get retired. Regarding staff and lecturer numbers at the faculty level, 37.2% of the faculties had between 10 and 30 staff and lecturers, and followed by 23.1% of less than 10. Of the 36 universities, 78.2% of the universities had been in existence for over 10 years, 11.5% for between 6 and 10 years. From those who responded to the survey, 50% were from public universities while the remaining 48.7% were from private universities.

4.2 Descriptive Analysis

4.2.1 Leadership Behaviors

The findings of the study showed that all items of leadership behaviors have a mean score in the range between 5.7821 to 4.9487. This outcome on the performance of the 32 leadership behaviors is high. "FAC3" received the highest score of 5.7821 among the 32 items while "BRO4" received the lowest mean score at 4.9487, but higher than midpoint of 4.

They somewhat less frequently perform a number of leadership behaviors which according to CVF implies that they less frequently perform "BRO4: persuasively sell new ideas to the central management of the university", "COO3: keep a close track of what goes on in the faculty (using control and monitor systems)", "BRO2: influence decisions made at higher levels in the university", "COO4: bring a sense of order to the faculty", and "INN2: experiment with new concepts and procedures", "BRO1: exert upward influence in the university to influence strategic decision making", and "MON2: carefully compare records, files and reports to detect discrepancies."

Based on the results, the Cambodian deans don't often persuasively sell new ideas to the central management of the university, keep a close track of what goes on in the

faculty (using control and monitor systems), influence decisions made at higher levels in the university, bring a sense of order to the faculty, experiment with new concepts and procedures, exert upward influence in the university to influence strategic decision making, and carefully compare records, files and reports to detect discrepancies.

	N	Mean		Std. Deviation	Variance
	Statistic	Statistic	Std. Error	Statistic	Statistic
FAC3	78	5.7821	.15229	1.34500	1.809
MEN4	78	5.7564	.14390	1.27091	1.615
FAC2	78	5.7179	.15580	1.37602	1.893
FAC4	78	5.6795	.16167	1.42786	2.039
DIR2	78	5.6667	.16390	1.44749	2.095
MEN3	78	5.6667	.15768	1.39262	1.939
MEN2	78	5.6410	.14249	1.25847	1.584
DIR1	78	5.6026	.15734	1.38957	1.931
MEN1	78	5.5513	.17181	1.51741	2.303
DIR3	78	5.5385	.17088	1.50921	2.278
DIR4	78	5.5128	.16699	1.47484	2.175
BRO3	78	5.4615	.17851	1.57655	2.486
INN3	78	5.4487	.15766	1.39244	1.939
MON3	78	5.4231	.17741	1.56686	2.455
FAC1	78	5.4103	.14874	1.31362	1.726
PRO1	78	5.3974	.15521	1.37075	1.879
INN4	78	5.3974	.16458	1.45352	2.113
MON1	78	5.3846	.17043	1.50524	2.266
PRO4	78	5.3846	.16345	1.44358	2.084
PRO3	78	5.3590	.16522	1.45918	2.129
INN1	78	5.3590	.16421	1.45025	2.103
COO1	78	5.3077	.16656	1.47100	2.164
MON4	78	5.3077	.16953	1.49725	2.242
PRO2	78	5.2821	.15580	1.37602	1.893
COO2	78	5.2308	.17496	1.54519	2.388
MON2	78	5.1795	.17668	1.56042	2.435
BRO1	78	5.1667	.16964	1.49820	2.245
INN2	78	5.1154	.16114	1.42319	2.025
COO4	78	5.1026	.18662	1.64822	2.717

BRO2	78	5.0769	.18136	1.60170	2.565
COO3	78	5.0256	.19904	1.75791	3.090
BRO4	78	4.9487	.18147	1.60274	2.569
Valid N (listwise)	78				

Table 6: Mean score and standard deviation of 32 leadership behaviors in the sample

One-Sample Test						
	Test Value = 4					
					95% Confidence Interval of the Difference	
				Mean		
	t	df	Sig. (2-tailed)	Difference	Lower	Upper
INN1	8.276	77	.000	1.35897	1.0320	1.6860
INN2	6.922	77	.000	1.11538	.7945	1.4363
INN3	9.189	77	.000	1.44872	1.1348	1.7627
INN4	8.491	77	.000	1.39744	1.0697	1.7252
BRO1	6.877	77	.000	1.16667	.8289	1.5045
BRO2	5.938	77	.000	1.07692	.7158	1.4381
BRO3	8.187	77	.000	1.46154	1.1061	1.8170
BRO4	5.228	77	.000	.94872	.5874	1.3101
PRO1	9.004	77	.000	1.39744	1.0884	1.7065
PRO2	8.229	77	.000	1.28205	.9718	1.5923
PRO3	8.225	77	.000	1.35897	1.0300	1.6880
PRO4	8.471	77	.000	1.38462	1.0591	1.7101
DIR1	10.186	77	.000	1.60256	1.2893	1.9159
DIR2	10.169	77	.000	1.66667	1.3403	1.9930
DIR3	9.003	77	.000	1.53846	1.1982	1.8787
DIR4	9.059	77	.000	1.51282	1.1803	1.8453
COO1	7.851	77	.000	1.30769	.9760	1.6394
COO2	7.035	77	.000	1.23077	.8824	1.5792
COO3	5.153	77	.000	1.02564	.6293	1.4220
COO4	5.908	77	.000	1.10256	.7309	1.4742
MON1	8.124	77	.000	1.38462	1.0452	1.7240
MON2	6.676	77	.000	1.17949	.8277	1.5313
MON3	8.021	77	.000	1.42308	1.0698	1.7763
MON4	7.714	77	.000	1.30769	.9701	1.6453
FAC1	9.481	77	.000	1.41026	1.1141	1.7064
FAC2	11.026	77	.000	1.71795	1.4077	2.0282
FAC3	11.702	77	.000	1.78205	1.4788	2.0853

FAC4	10.388	77	.000	1.67949	1.3576	2.0014
MEN1	9.029	77	.000	1.55128	1.2092	1.8934
MEN2	11.516	77	.000	1.64103	1.3573	1.9248
MEN3	10.570	77	.000	1.66667	1.3527	1.9807
MEN4	12.206	77	.000	1.75641	1.4699	2.0430

Table 7: Individual t-test for each item of leadership behaviors in the sample

Individual t-test was also conducted on the thirty-two items of leadership behaviors, which received higher score than the midpoint. From Table 6, it is noted that all p-values of the thirty-two items of leadership behaviors are less than 0.05, so all scores of the leadership behaviors are higher than midpoint of 4.

In order to evaluate the perception of deans on leadership behaviors, the scores of the thirty-two items corresponding to the leadership behaviors were accumulated. The mean of 5.4026, which is higher than midpoint, and t-test of 10.123 (p=0.000, less than 0.01) suggested that the mean is higher than the midpoint at 1 percent significance level.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
TBehavior	78	5.4026	1.22372	.13856

One-Sample Test						
	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
TBehavior	10.123	77	.000	1.40264	1.1267	1.6786

Thus, the deans view themselves as performing all the thirty-two leadership behaviors at rather high level. While the deans view themselves as executing fifteen leadership behaviors of CVF rather frequently as they managed their faculties, there are still some variations on the extent to which these behaviors are executed. It is notable that some behaviors were performed even more frequently than others.

The results could imply that the Cambodian deans exhibit peculiar behavioral complexity: they are very dynamic, all round, multifaceted and that their faculties are well-managed although they perform different and even contradictory leadership behaviors. According to CVF, balancing different behaviors as the deans do would

imply that they are high performing leaders who are able to deal with different leadership requirements. As such their faculties would therefore seem to be well-run.

4.2.2 Leadership Roles

The scores of the four statements corresponding to each of the leadership roles were accumulated in order to compare each of the leadership roles of Cambodian deans in the sample of the study to enable the researcher attain the overall score of each dean for each role. The roles that attained higher scores are the ones that the deans perceive themselves to be performing most frequently and would thus be the way they perceive their leadership of the faculties. The findings of the study showed that all items of leadership roles have mean scores in the range between 5.6538 to 5.1635. On a scale of 1 (lowest) to 7 (highest), it is noted that the least score is 5.1635 which is still quite high on that scale.

Based on the mean scores, the outcome suggests that the deans view themselves as performing all the eight leadership roles of CVF quite frequently. According to CVF, they are effective deans. While the deans view themselves as executing all the eight roles quite frequently, it is notable that some roles were performed even more frequently than others. There are some variations on the extent to which these roles are executed. Ideally, effective leaders need to balance these contradictory roles. However, due to individual differences, organizational contexts and different constraints or barriers, leaders could emphasize on some roles more than others

The deans viewed themselves as performing the mentor, facilitator, and director roles most frequently than the other roles. This suggests that they mostly viewed themselves as focused on defining responsibilities in their faculties, building consensus and showing care for their faculty members. They least performed the broker, coordinator, monitor, and innovator roles which according to the CVF implies that they do not view themselves as quite active in reviewing detailed reports or dealing with technical and detailed information nor as carefully comparing records and reports to detect any discrepancies such as analyzing written plans and working with technical information, exercising upward influence to the higher level in the university in order to influence strategic decision making, approaching and consulting people at the higher levels of the

university, and persuasively selling new ideas to the central management of the university.

Descriptive Statistics					
	N	Mean		Std. Deviation	Variance
	Statistic	Statistic	Std. Error	Statistic	Statistic
TMEN	78	5.6538	.14196	1.25372	1.572
TFAC	78	5.6474	.14580	1.28770	1.658
TDIR	78	5.5801	.15155	1.33843	1.791
TPRO	78	5.3558	.14913	1.31705	1.735
TINN	78	5.3301	.14919	1.31765	1.736
TMON	78	5.3237	.15679	1.38470	1.917
TCOO	78	5.1667	.16198	1.43057	2.047
TBRO	78	5.1635	.15894	1.40374	1.970
Valid N (listwise)	78				

Table 8: Mean score and standard deviation of leadership roles in the sample

Individual t-test was also conducted on the 8 items of leadership roles, which received higher score than the midpoint. Table 8 shows that all p-values of the eight items of leadership roles are less than 0.05, so all scores of the leadership roles are higher than midpoint of 4.

One-Sample Test						
Test Value = 4						
					95% Confidence Interval of the Difference	
			Sig. (2-tailed)	Mean Difference		
	t	df			Lower	Upper
TINN	8.915	77	.000	1.33013	1.0330	1.6272
TBRO	7.320	77	.000	1.16346	.8470	1.4800
TPRO	9.091	77	.000	1.35577	1.0588	1.6527
TDIR	10.427	77	.000	1.58013	1.2784	1.8819
TCOO	7.203	77	.000	1.16667	.8441	1.4892
TMON	8.443	77	.000	1.32372	1.0115	1.6359
TFAC	11.299	77	.000	1.64744	1.3571	1.9378
TMEN	11.650	77	.000	1.65385	1.3712	1.9365

Table 9: Individual t-test for each item of leadership roles in the sample

In order to evaluate the perception of deans on leadership role, the scores of the eight items corresponding to the leadership role were accumulated. The mean of 5.4026, which is higher than midpoint, and t-test of 10.123 (p=0.000, less than 0.01) suggested that the mean is higher than the midpoint at 1 percent significance level.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
TROLE	78	5.4026	1.22372	.13856

One-Sample Test						
	Test Value = 4					
					95% Confidence Interval of the Difference	
			Sig. (2-tailed)	Mean Difference	Lower	Upper
	t	df				
TROLE	10.123	77	.000	1.40264	1.1267	1.6786

Table 10: Mean, standard deviation, and one sample t-test for leadership role in the sample

Thus, the deans view themselves as performing all the eight leadership roles at rather high level. While the deans view themselves as executing three leadership roles of CVF rather frequently as they managed their faculties, there are still some variations on the extent to which these behaviors are executed. It is notable that some roles were performed even more frequently than others. The results could imply that Cambodian deans are self-contradictory leaders in the sense that they can be hard and soft, entrepreneurial, and controlled. They have skills and capabilities to cope with multiple, contradictory and competing leadership roles or tasks. Cambodian deans have congruence with their organizational cultures and types. According to Quinn's Model of Leadership Roles, Cambodian deans are rather high performing leaders. Well-managed organizations require a mix of leadership roles and underlying values. When facing different situations, some roles will be demonstrated highly while certain opposite roles will be retracted to a minimum level. As such their faculties would seem to be well-run.

5. CONCLUSION

From the perception of 78 respondents in the sample, the study reveals that Cambodian deans perform all roles in the four quadrants of roles from their repertoire at rather high level. They perceive themselves as performing the mentor, facilitator, director roles more frequently than producer, innovator, monitor, coordinator, and broker roles. The roles that attained higher scores are the ones that the deans perceive themselves to be performing most frequently and would thus be the way they perceive their leadership of the faculties. The results could imply that the Cambodian deans are rather highly effective as they exhibit muti-roles in their leadership although they perform different and even contradictory leadership roles in managing their faculties. The study also reveals that the deans perceive themselves as performing all the 32 leadership behaviors at rather high level. This outcome on the performance of the leadership behaviors shows that the deans perform most of the leadership behaviors very frequently. It is also notable that 15 leadership behaviors were performed even more frequently than others.

No.	Items	Leadership Behaviors of Cambodian Deans
1	FAC3	Encourage academic staff members to share ideas with you and with the others
2	MEN4	Show concern for the needs of academic staff members
3	FAC2	Encourage participative decision making in the faculty
4	FAC4	Build teamwork among the academic staff members
5	DIR2	Make sure everyone in the faculty knows where the faculty is going in terms of objectives and goals
6	MEN3	Treat every faculty member in a sensitive and caring way
7	MEN2	Show empathy and concern in dealing with academic staff members
8	DIR1	Define areas of responsibility for academic staff
9	MEN1	Listen to the personal problems of academic staff members and make an effort to help them
10	DIR3	Set clear objectives for the faculty and restate and reinforce your vision of the faculty's future
11	DIR4	Clarify faculty policy priorities and future direction
12	BRO3	approach and consult people at the higher levels of the university
13	INN3	Solve faculty problems in a creative and conventional way
14	MON3	Work with technical and information
15	FAC1	Facilitate consensus building in the faculty's decision making

Table 12: List of 15 Leadership Behaviors of Cambodian Deans

Cambodian deans exhibit peculiar behavioral complexity: they are very dynamic, all round, multifaceted and that their faculties are well-managed although they perform different and even contradictory leadership behaviors.

6. RECOMMENDATIONS

Deans as middle managers are playing an important role in the success of their faculties. Promoting professional deanship will result in more effectiveness for the university. Based on the findings of this study, the researcher would like to give some recommendations to Cambodian deans and the university management as follows:

Deans should try to do all roles to enhance their faculty management. Due to less frequently performed roles in managing their faculties, they should be more active in reviewing detailed reports or dealing with technical and detailed information, carefully comparing records and reports to detect any discrepancies, analyzing written plans and working with technical information, exercising upward influence to the higher level in the university in order to influence strategic decision making, approaching and consulting people at the higher levels of the university, and persuasively selling new ideas to the central management of the university.

Some leadership behaviors are less frequently performed by Cambodian deans. They should strengthen their leadership behaviors such as persuasively selling new ideas to the central management of the university, keeping a close track of what goes on in the faculty (using control and monitor systems), influencing decisions made at higher levels in the university, bring a sense of order to the faculty, experimenting with new concepts and procedures, exerting upward influence in the university to influence strategic decision making, and carefully comparing records, files and reports to detect discrepancies. Moreover, the university management should provide resources and skills needed so that they can perform all the leadership behaviors more frequently in managing their faculties effectively.

7. FUTURE RESEARCH

Due to the time constraint, some limitations are inevitable for the current study. Future researchers should enlarge sample size. Moreover, they should study the differences

between male and female deans in terms of their leadership roles and behaviors. Moving forward, researchers should study the effectiveness of leadership roles and behaviors in the context of Cambodian deans.

8. ACKNOWLEDGEMENTS

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IMPACT OF LEADERSHIP DEVELOPMENT ON STUDENT PERFORMANCE: Case Study of Academic Report Writing for Master Program School of Graduate Studies, National University of Management

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ABSTRACT

Leadership styles significantly impact performance in business and educational settings, especially among students. Organizations are recognizing the importance of leadership development and training to produce future leaders, especially in higher education. The Royal Government of Cambodia has implemented the Higher Education Quality and Capacity Improvement Project (HEQCIP) to enhance staff members' professional abilities. The National University of Management has a Master and Ph.D. program for postgraduate students, but only 60–70% of research papers and theses are completed by the end of the academic year. This study aims to investigate the impact of leadership development on student report writing performance at SGS-NUM by supporting 306 master program students who are writing academic reports for their fulfilling masters. In addition, the factor analysis and structure equation model are performed using AMOS version 21. The result of construct factor analysis (CFA), such as CMIN/DF, RMR, GFI, CFI, TLI, and RMSEA are acceptable indexes. Further, to fulfill validity and reliability, AVE, CR, Cronbach alpha, and discriminant validity meet the rules. Based on the CFA, the Structure Equation Model (SEM) is applied, indicating leadership development. Indicators such as coaching, delegation, and empowerment have influenced the student report writing performance of master program graduates at the School of Graduate Study. Except for training and participation, they have insignificantly influenced the student's report writing performance. The results informed the policymakers at SGS-NUM to advise the instructors as well as the students to coach research methodology better than training for the students, especially in terms of delegation and empowerment in arranging the topic and guideline process.

Keywords: leadership, leadership development, student performance

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1. INTRODUCTION

People's leadership styles have been shown to have an impact on how well they do, both at business and in the classroom. Although it is mostly unknown, it does exist in educational settings, despite being widely acknowledged and found to function in professional settings. Research from studies like Chen et al. (2022), Balwant et al. (2018), Raza and Sikandar (2018), and Priyadarshini et al. (2019) have demonstrated that people's leadership styles affect other people, particularly students. Chen et al.'s (2022) study found that a school principal's leadership style has an impact on students' performance, particularly on student success.

According to a study by Balwant et al (2018), there is a connection between students' academic success and transformative instructor leadership. Raza and Sikandar (2018) discovered in another study that there was a clear correlation between students' performance and the leadership styles of their professors. Although significantly different, the studies of Priyadarshini et al. (2019) produced similar results; the study discovered that student leadership had an impact on students' academic achievement, which prompted the authors to advocate for higher education institutions to support students in 14 in developing their leadership abilities. Having said that, there is no doubt that this study is significant since it contributes to our existing understanding of the issue and helps identify the leadership types of students.

Organizations are realizing the value of leadership development and training as a means of producing future leaders, particularly in higher education. Developing common characteristics of entire groups or social systems, including team member trust or improving incentive structures to promote cooperative conduct, is the main goal of this training. Since leadership development affects worker performance, it should be concentrated on line companies like banks, industries, government buildings, hotels, and Universities.

In order to accomplish the Sustainable Development Goals (SDGs), the Royal Government of Cambodia has improved the standard of public healthcare, education,

science, technology, vocational training, nutrition, gender equality, and social protection. It has also fostered growth, employment, equity, and efficiency. To enhance staff members' professional abilities, the Higher Education Quality and Capacity Improvement Project (HEQCIP) was put into place by the Ministry of Education, Youth, and Sport (MoEYS). To guarantee efficient leadership and management of education at all levels, MoEYS has been collaborating with development partners such as the European Union, the Global Partnership for Education (GPE), the United States Agency for Development (USAID), the Swedish International Development Cooperation Agency (SIDA), and UNICEF.

National University of Management has one school for program running in post graduate study, which is called School of Graduate Studies, the school trains the graduates in Master and Ph.D. Program since its inception in 2006, the graduate school has provided the specialization, such as Master of Business Administration (MBA) programs including: Management, Marketing, International Business and Business Law. Business Law, Bank Management and Logistics & Supply Chain Management. Nowadays, there are 600 students for master program in 10 majors.

In the third term of the master's program, students can choose to graduate in one of two ways: either by selecting a topic for their thesis or by selecting a topic for both their research paper and graduation test. Only 60–70% of research papers and theses are completed by the end of the academic year. In addition, several of them have been dropped from their program for running behind schedule due to administrative issues (SGS report, 2023). In other words, (according to the author's survey from early 2024) the late summitting on time as a result of their research methods lacking the understanding of research technique.

Based on the above issues, the present study helps the decision makers or plan makers at SGS-NUM to solve the above issues by investigating the impact of leadership development on the student report writing performance at SGS-NUM, such as to assess the effectiveness of leadership development implementation, and analyze its impact on

student report writing performance. The research questions include identifying leadership development's impact on performance.

2. LITERATURE REVIEW

According to Van Velsor et al. (2010), leadership development is the collective ability of organization members to participate in leadership roles and processes in an effective manner. The characteristics and behaviors that define a person's effectiveness as a leader are referred to as leadership behavior. This conduct is the method by which an individual may direct, influence, and lead the activities of others to achieve particular objectives (Indeed, 2019). Using decision-making processes that give others, even subordinates, a say over decisions that will impact them is known as participatory leadership (G. Yukl, 2013). A happy or affectionate mood that develops as a result of assessing a person's work experience is known as job satisfaction (Zhu, 2013).

Dimension and Sub-dimension Leadership Development and Job Performance

Variables	Sub-dimension	Citation
Coaching	Open communication	(Park et al., 2008) (Ali et al., 2018)
	Works together with students and make better decision.	
	Pays attention to the student's needs.	
	Opens to new ideas and exploration of multiple solutions.	
	Provide resources, gives feedback, sets goals.	
	Pays attention to the student's needs.	
Training & Development	Opportunities for promotion in the school.	(Nguyen, 2021)
	Opportunities for developing personal skills at work.	
	Opportunity to use the ability at work.	
	Good training from the trainer.	
	Encourage me to express my concerns.	

	Listen to my suggestion tentatively.	(Yukl, 2013)
	Records my ideas and suggestions.	
	Look for ways to build on ideas and suggestions.	
Participation	Be tactful in expressing concerns about my suggestion.	
	Listens to dissenting views without getting defense.	
	Utilizes suggestions and deal with concerns.	
	Shows appreciation for suggestions.	
	Encourage me to express my concerns.	
	Listen to my suggestion tentatively.	
	Records my ideas and suggestions.	
Delegation	Makes SO accept overtime positively.	(Al-Jammal et al., 2015)
	Raises amount of work achieved.	
	Gives SO a chance to adopt with different conditions at organization.	
	Makes SO aware all the time of work.	
	Improves the perspective form student to student.	
	Helps SO to achieve my work in limited time.	
	Gives me a chance to depend on myself in achieving work.	
	Increases degree of effort and interest in achieving the objective at the organization.	
Empowering	Authority to make autonomous decisions	(Ukil & Ullah, 2016)
	Knowledge sharing	
	Access to the information	
	Satisfied with the reward systems that SO receive.	

	Important for work.	
	Confident about ability to do the job.	
	Autonomy in determining how to do the job.	
	Having great deal of control over what happens.	
Job performance	Look forward to working every day.	(Nguyen, 2020)
	Feeling satisfied with the current job.	
	Feeling excited and interested in my work every day	
	Feeling my contribution is valuable.	
	Complete the assigned task in the work.	
	Meeting and fulfill all formal requirements of the job.	
	Fulfilling all responsibilities required by the job.	
	Not Ignore aspects of the work	

Hypothesis development

There are five hypothesis development such as coaching, training, participation, delegation, empowerment and its impact on student or job performance as the following:

Coaching and Job Performance

Coaching is used to pinpoint an employee's areas of weakness or the solution to a challenging assignment when they encounter difficulties or complex challenges. According to Chambers (2006), coaching has grown in importance as a method of raising performance. Coaches determine what can be improved and how it can be improved in a two-way conversation that turns out to be non-one-way. Similar to this, coaching involves treating staff members like people in order to help them achieve both personal and company goals (Agarwal et al., 2009). Giving people the resources,

information, and chances, they require to grow and succeed is the process of coaching (Peterson, 2011).

H1: Coaching has a positive and significant impact on job performance.

Training and development, and job performance

Workers who lack the information and abilities that may be acquired via training may not feel committed or motivated. This deficiency might potentially have an impact on organizational performance and cause conflict with the attainment of organizational goals. Organizations must therefore close the performance gap between intended and actual (Sahinidis & Bouris, 2008). Employee skill development and training are intended to enable high performance. Dessler (2014) defines training as the process of imparting to new hires the fundamental skills required to carry out their tasks. Management development, according to Dessler (2014), is any effort to enhance management performance, either now or in the future, through knowledge transfer, attitude modification, or skill enhancement.

H2: Training and Development has a positive and significant impact on job performance.

Participation and job performance

Making decisions is one of the managerial responsibilities. "Participative leadership style involves shared decision making and join influence, both of which are necessary for bringing change in the organization," according to Fatima et al. (2017). A leader who practices participatory leadership makes an attempt to get others' help while making crucial choices (G. Yukl, 2013). When a leader invites staff members to weigh in on a significant issue, they are more likely to feel appreciated (Somech, 2005). Over the past few decades, there has been a rising interest in researching employee engagement levels and their impact on workers' performance. The act of employees directly contributing to an organization's mission and goals by using their own ideas, skills, and efforts to solve issues and make choices is known as employee involvement (Gill, 2009). According to Chen and Tjosvold's (2006) study on American and Chinese managers, participation management is about giving workers a voice in decision-making so they feel empowered to voice concerns and have an impact on the course of

the business. Participation often results in improved work performance and less staff turnover.

H3: Participation has a positive and significant impact on job performance.

Delegation and Job performance

It was demonstrated by Idowu & Olarewaju (2017) that authority delegation significantly affects worker effectiveness. According to Idowu and Olarewaju (2017), authority delegation also raises staff morale in any company by giving them a sense of self-worth and inclusion among the organization's leaders (Al-Jammal et al., 2015). For companies, delegation of authority is an essential topic. Al-Jammal et al. (2015) state that authority delegation affects the manager, the workforce, and the organization. They believed that the effects of power delegation on an organization aid in attaining a competitive edge, a rise in output, and job completion effectiveness.

H4: Delegation has a positive and significant impact on job performance.

Empowerment and Job performance

Numerous research has demonstrated the connection between work performance and empowerment (Abbas & Yaqoob, 2009). In their research, Bartram & Casimir (2007), for instance, found that empowerment significantly improved performance and satisfaction. Rajalingam et al. (2015) discovered that employee performance is impacted by empowering tools including Power, Knowledge, Information Sharing, and Rewards. It was also discovered that the mediating variable, performance appraisal, was mediating the connection between employee performance and empowerment. To suggest a connection between employee performance and empowerment, the study modified the concept assessment used in earlier research.

H5: Empowerment has a positive and significant impact on job performance.

Conceptual Framework

Bases on the literature review, coaching, training, participation, delegation and empowerment have been considered as the independent variables, while the student report writing has been taken as the dependent variable.
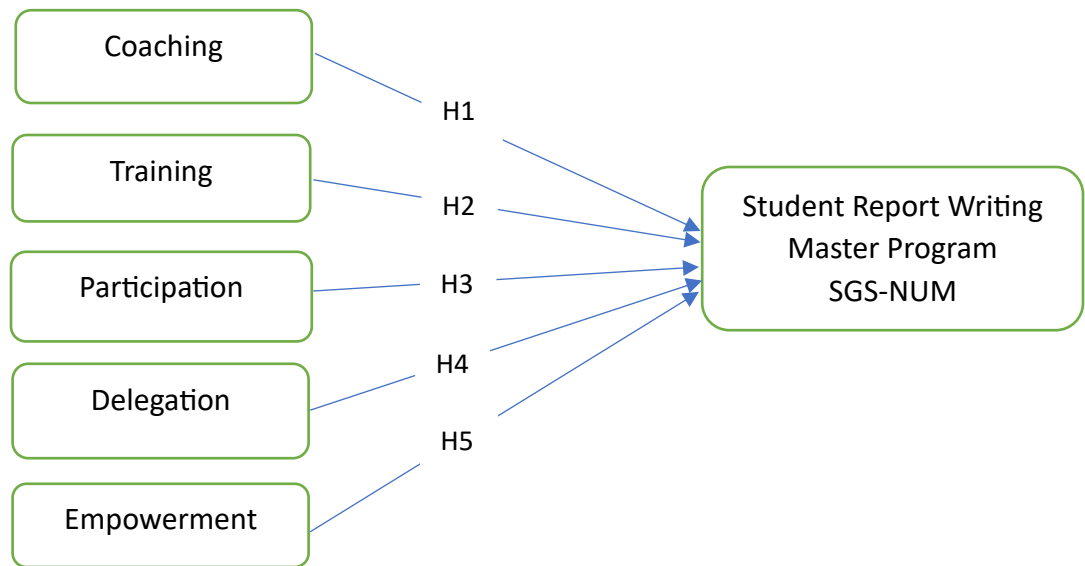
H01: Coaching has no positive and significant impact on student report writing performance at SGS-NUM.

H02: Training and Development has no positive and significant impact on job performance on student report writing performance at SGS-NUM.

H03: Participation has no positive and significant impact on student report writing performance at SGS-NUM.

H04: Delegation has no positive and significant impact on student report writing performance at SGS-NUM.

H05: Empowerment has a positive and significant impact on student report writing performance at SGS-NUM.

3. METHODOLOGY

This chapter provides an explanation of the methodology used in a study, divided into five sections. It covers the type of analysis, sample size, data sources, statistical tools, data collection procedure, study coverage, and a concluding remark.

Types of Analysis

The study uses quantitative analysis to examine the problems of leadership development for report writing, focusing on the impact of leadership development on student performance at School of Graduate Studies (SGS), National University of Management in Cambodia.

Sample size and Sampling

To carry out the present study School of Graduate Studies, National University of Management, the sample size has been determined on the basis of the following restricted population i.e., the batch 25 student for 600 based on the Yamane Taro (1967) formula: $n = \frac{N}{1+N(e)^2}$, where, n = sample size of the study, N= Population (Batch 25 students) and e = Margin of error (0.04). The result from calculating as 306 students. Bases on Sekaran and Bougie (2013) stated that the sample size larger than 30 and less than 500 are appropriate for most research.

Sources of data

This study uses both primary and secondary data to analyze leadership development and its impact on job performance. Secondary data is collected from books, research journals, and government policies. A survey questionnaire is designed, divided into four parts: personal profile, screening questions about professional development, and measuring constructs using a 5-point Likert Scale. The study aims to understand the relationship between leadership development and the student performance.

Statistical tools

According to (Tranmer & Elliot, 2008), a multiple linear regression analysis is used to predict the values of a dependent variable, given a set of explanatory variables. This study uses to multiple regression analysis to run the predictors of leadership development components such as coaching, training & development, participation, delegation, and empowerment on job performance (dependent variable) and job satisfaction, structured as the mediating variable.

$$Y = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

Where X represents the four independent variables and Y defined as dependent variable.

> Y = Job Performance
>
>> X_1 = Coaching
>>
>> X_2 = Training & Development
>>
>> X_3 = Participation
>>
>> X_4 = Delegation
>>
>> X_5 = Empowerment
>
> β_0 = Y-intercept (Value of Y when all X_i = 0)
>
> $\beta_{1,2,3,4\&5}$ = Slop coefficients of each independent variable
>
> $\in$ = Random Error

SEM is a confirmatory technique that uses Confirmatory Factor Analysis (CFA) to evaluate latent concept measurement models. Before modeling the interrelationships of all latent constructs in a structural model, researchers must conduct CFA for each one. Prior to evaluating Validity and Reliability, it is imperative to analyze Uni-dimensionality. Typical fit indices consist of:

> • Chi-square divided by degrees of freedom (CMIN/DF*).
>
> • Root means square error of approximation (RMSEA*).
>
> • Goodness of fit Index (GFI*).
>
> • Comparative fit index (CFI*).
>
> • Tucker-Lewis's index (TLI *).
>
> * Parameters/Values of particular interest

It's important to note that these fit indices are not independent of each other and should be considered together to assess model fit. Additionally, the choice of fit indices can vary depending on the research question and the specific model being tested.

4. DATA ANALYSIS

For the section is data process and analysis. Referring to the objectives of study, the data analysis is divided in three parts: First, personal profiles of the respondents, second weighted arithmetic mean for weighting five scales in variables. The multiple regression **Personal Profiles.**

Table 1. Result of Personal Profiles

Variables		Respondents	
		Frequency	Percent
Gender	Male	103	33.7
	Female	203	66.3
	Total	306	100
Major	MBA	186	60.8
	MECO	25	8.2
	MIB	22	7.2
	MKT	19	6.2
	MPA	54	17.6
	Total	306	100
Training REM	Yes	284	92.8
	Maybe	16	5.2
	No	6	2.0
	Total	306	100
Writing Proposal	No	17	5.6
	Maybe	37	12.1
	Yes	252	82.4
	Total	306	100
Types of Report	Paper	212	69.3
	Thesis	94	30.7
	Total	306	100.0

Author's own computation

To assess an effectiveness of leadership development and student report writing performance at SGS-NUM.

Based on the current result of weighted arithmetic mean shown in the table 4.2. Training, Participation, delegation, empowerment and student performance are satisfied; except, Coaching is fairly satisfied level.

Table 2. Result of Weighted Arithmetic mean and Correlation Matric

Variables	Mean	SD	PER	CO	TR	PA	DE	EM
Performance	3.9051	.73499	1	703**	.778**	.740**	.842**	.862**
Coaching	4.1328	.77347		1	.792**	.832**	.793**	.728**
Training	4.1260	.75649			1	.838**	.872**	.794**
Participation	4.0877	.75338				1	.861**	.784**
Delegation	3.9764	.74507					1	.837**
Empowering	3.9337	.74339						1

Author's own computation

Based on 306 respondents, the weight arithmetic mean and standard deviation were measured. The results in Table 4-2 indicate that academic report writing performance in terms of Coaching, Training, Participation, Delegation and Empowering tended to be at "agree" level ($\bar{X} = 3.90 - \bar{X} = 4.13 \ and \ SD < 1$) i.e. all the respondents' behavior understood the questions in the factors are nearly the same. Additionally, the correlation matrix's results are applied to all variables discovered throughout the formal factor analysis and reliability test phases. All of the variables have a significant relationship, according to the results.

Assessing Measurement Model

Once the CFA procedure for every measurement model is completed, the researcher needs to compute certain measures which indicate the validity and reliability of the construct and summarize them in a table. As has been said earlier, the assessment for uni-dimensionality, validity, and reliability for measurement models are required prior to modeling the structural model. The author would like to suggest the following format for reporting the CFA results:

Uni-dimensionality: This requirement was achieved through the item-deletion procedure for low factor loading items. The new model is run and the item deletion process is repeated until the fitness indexes achieved the required level. Also, all factor-loadings have positive values. All processes have been demonstrated. All items have positive factor loading.

Before the multiple regression applied by SEM, the model measurement was assessed by using AMOS 21 for 240 sample size to confirm the model that applies in the present study as the following:

      1. To check the model of good fitness (CFA)

      2. To evaluate the strength of the construct reliability (C.R.) and the average variance extracted (AVE).

The following are the rule of Confirmatory Analysis Factor index (Kenny, 2020; Shi et al, 2018)

Category	Index	Meaning	Index Value	Citation
Absolute fit measure normed/relative Chi-Square)	CMIN/Df	Determine the discrepancy between the fitted and sample covariance matrix by minimizing the sample size impact on the model	< 3	Kline, 1998 Homburg/Giering, 1966
CFI (comparative fit index)	CFI	NFI revised form wherein Discrepancy between the hypothesized model and data is computed by considering the sample size	> 0.90 > 0.95	Fan et al., 1999 Homburg/Baumgartner, 1998 (Hu & Bentler, 1999) (Fan et al., 2011)
TLI (Tucker Lewis index)	TLI	Modified NFI model enabling model examination with smaller sample size	>0.90	Brown, 2006

		Define model efficiency to fit population covariance matrix with unknown but optimal chosen parameters		
Root mean square of approximation	RMSEA	Define model efficiency to fit population covariance matrix with unknown but optimal chosen parameters	<10	Browne & Cudeck,1993; Hu & Bentler, 1999; Kline, 2016

First Goodness of Fit (GOF)

The result of CFA shown that the model of the equation is reasonable (Phillip Hyland, 2014) Chi-square (x) = 892.67, df= 390, at p = 0.000 <. 001, CMIN/DF = 2.289 <3; CFI = .951 >. 95, TLI = .946 <.95, RMR= .017 <. 05, RMSEA= .065 >.10. To make better of GOF indices, the Standardized Residual Covariance is applied by checking Modification Indices for covariance that is suggested linkage between errors that higher value in the same latent variable.

Figure 1. the first of GOF

Author's own computation

217
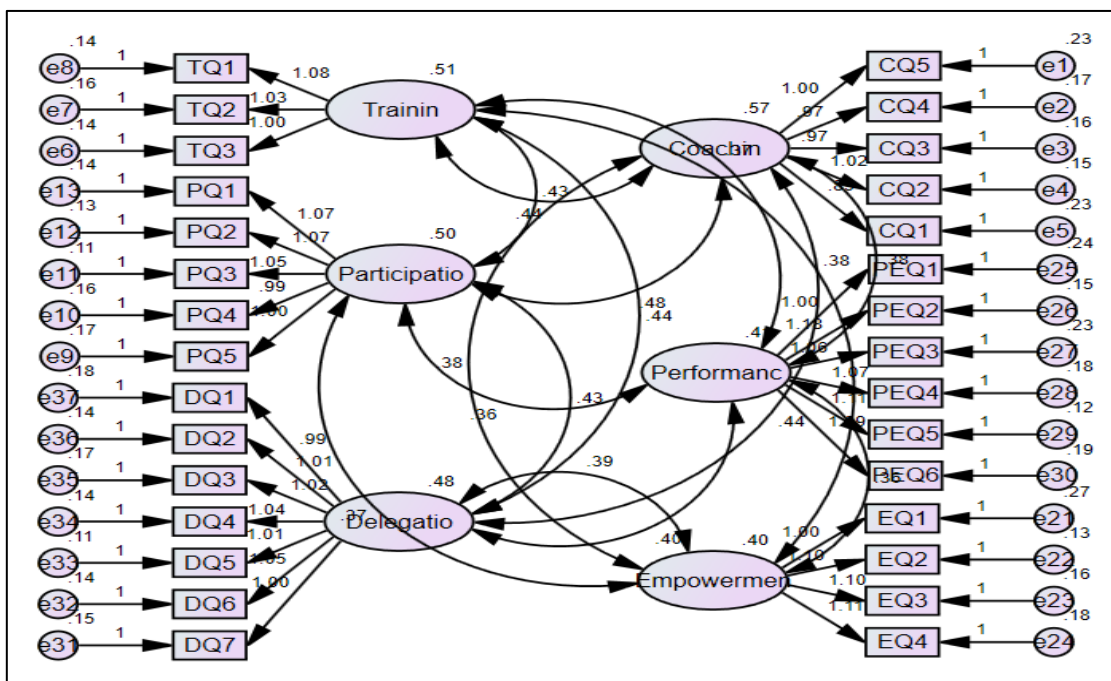
If the Fitness Index (CMIN/df, RMR, CFI, TLI, RMSEA) is still not achieved (on standardized index) after low factor loading items have been removed, look at the Modification Indices (MI). High value of MI (above 15) indicates there are redundant items in the model (The MI indicate a pair of items which is redundant in the model). To solve the redundant items, the researcher could choose one of the following.

Table 3(a). Result of modification Index

		M.I.	Par. Change	Comment
e36	<--> e37	42.230	0.065	MI > 20 indicates item are redundant
e29	<--> e30	31.647	0.057	

Author's own computation

Second Goodness of Fit Calculation

The result of CFA shown that the model of the equation is reasonable (Phillip Hyland, 2014) Chi-square (x) = 813.27, df= 388, at p = 0.000 <. 001, CMIN/DF = 2.096 <3; CFI = .959 >. 95, TLI = .954 >.95, RMR= .018 <. 05, RMSEA= .060 > .10. To make better of GOF indices, the Standardized Residual Covariance is applied by checking Modification Indices for covariance that is suggested linkage between errors that higher value in the same latent variable.

Figure 3(b) Result of Second FOG
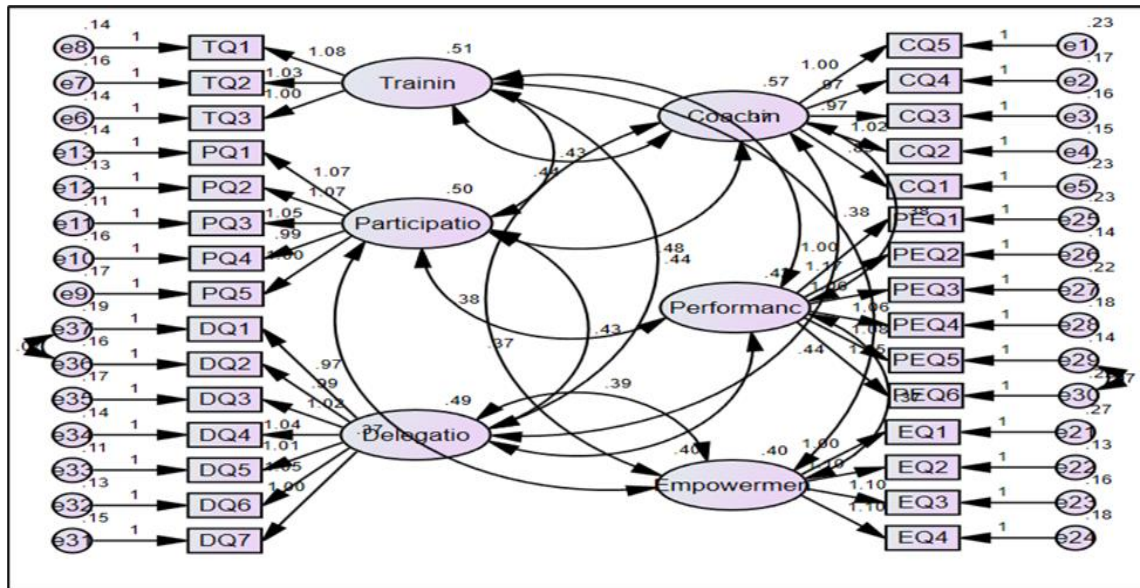
Author's own computation

Table 4. Result of Comparing of the both GOF

GOF Index	1st GOF	2nd GOF	Index	Citation
Chi-Square (x^2)	1243.487	1148.760	Significant	(Bagozzi &Yi., 1988) (Kline, 1998)
CMIN/ df & p-value	892.67*** (2.289 <3)	813.27***	Ratio (x^2/df) = 2.096 < 3)	
CFI	.951 >.95	.959 >.95	Reasonable fit model	(Hu & Bentler, 1999) (Fan et al., 2011)
TLI	.946 <.95	.954 >.95	Reasonable fit model	(Hu & Bentler, 1999) (Brown, 2016)
NFI	.91 > .90	.925 >.90	Good model fit	(Browne and Cudeck, 1989)
RMR	.047 < .05	.017 < .05	Good model fit	(Browne and Cudeck, 1989)
RMSEA	.065 > .10	.060 > .10	Good model fit	(Hu & Bentler, 1999); (Kline, 2016)

Author's own computation

To Assess the Validity and Reliability for a Measurement Model

Reliability is the extent of how reliable is the said measurement model in measuring the intended latent construct. The assessment for reliability for a measurement model could be made using the following criteria.

Internal Reliability: The Internal Reliability indicates how strong the measuring items are holding together in measuring the respective construct. This reliability is achieved when the value of Cronbach's Alpha exceeds 0.7 (calculated in SPSS).

Composite Reliability (CR): The Composite Reliability indicates the reliability and internal consistency of a latent construct. A value of CR > 0.6 is required in order to achieve composite reliability for a construct. (CR is calculated using the given formula).

Average Variance Extracted (AVE): The Average Variance Extracted indicates the average percentage of variation explained by the measuring items for a latent construct. An AVE > 0.5 is required for every construct (AVE is calculated using the given formula).

Discriminant Validity: The application of the Fornell-Lacker criteria (1994) to evaluate discriminant validity is the second requirement. Using this approach, the correlation of latent constructs is compared with the square root of the average variance extracted (AVE) (Hair et al (2014). The formula of AVE and CR are as the following:

$$AVE = \frac{\sum K^2}{n}$$

K= factor loading of every item and n = number of items in a model.

$$CR = \frac{(\sum K)^2}{[\sum(K)^2 + (\sum 1 - K^2)]}$$

Ƙ = factor loading of every item and n = number of items in a model

Table 5. Result of Validity and Reliability

Construct	Items	Factor Leading	AVE >0.50	CR >0.60	α >0.70
Coaching	CQ1	0.817	0.743	0.935	0.935
	CQ2	0.897			
	CQ3	0.88			
	CQ4	0.873			
	CQ5	0.843			
Training	TQ1	0.9	0.790	0.918	0.918
	TQ2	0.88			
	TQ3	0.885			
Participation	PQ1	0.895	0.790	0.949	0.950
	PQ2	0.904			
	PQ3	0.916			
	PQ4	0.868			
	PQ5	0.862			
Delegation	DQ1	0.838	0.769	0.958	0.959
	DQ2	0.868			
	DQ3	0.864			
	DQ4	0.891			
	DQ5	0.903			
	DQ6	0.895			
	DQ7	0.878			
Empowering	EQ1	0.773	0.720	0.911	0.909
	EQ2	0.89			
	EQ3	0.87			

	EQ4	0.858			
Performance	PEQ1	0.802	0.718	0.938	0.940
	PEQ2	0.895			
	PEQ3	0.828			
	PEQ4	0.853			
	PEQ5	0.882			
	PEQ6	0.823			

Author's own computation

Discriminant Validity

Referring to Hair et al (2014) introduced the technique to measure the discriminant validity, the value of AVE square root of all constructs (variables) should be larger than the correlation of latent constructs. For the current study, the constructs of coaching, training, participation, delegation, empowering, and student writing report performance at SGS-NUM are larger than its correlations with other latent constructs as shown in the following table.

Table 6. Result of Discriminant test

	CQ	TQ	PQ	DQ	EQ	PEQ
Coaching	**0.861**					
Training	0.809**	**0.888**				
Participation	0.781**	0.842**	**0.888**			
Delegation	0.826**	0.835**	0.876**	**0.876**		
Empowerment	0.835**	0.835**	0.832**	0.834**	**0.848**	
Student performance	0.781**	0.807**	0.803**	0.847**	0.837**	**0.847**

Author's own computation   ** Correlation is significant at the 0.01 level.

Leadership Development and Student Report Writing Performance at SGS-NUM

After the reliability statistical analysis, the result found that the model of equation is suitable to perform the multiple regression. In the current study, the indicators of the independent variable, coaching, training, participation, delegation and empowering, for measuring the student report writing performance which is taken as dependent variable, as shown in the table 4.6.

Table 7. Result of SEM regression

Variables			β	C.R.	P-value	Interpretation
Coaching	⇒	Performance	.086	3.321	.000	Rejected
Training	⇒	Performance	.019	.714	.475	Accepted
Participation	⇒	Performance	.004	.132	.895	Accepted
Delegation	⇒	Performance	.413	10.945	.000	Rejected
Empowerment	⇒	Performance	.434	9.955	.000	Rejected

Author's own computation

Referring to the statistical regression analysis path between leadership development and the student report writing performance at SGS-NUM in table 4.6. shown it is revealed from the corresponding regression coefficient and its 'C.R.' and 'p' value. The regression coefficient of coaching is 0.085 where the 'C.R.' and 'p' value are 3.321 and 0.00. The SEM regression results indicate that the dependent variables, i.e., student report writing performance had been significantly influenced by independent variable, coaching and the level of significance was less than five percent (5%). Hence, based on the above results, the null hypothesis "Ho1: Coaching has no significant impact on student report writing performance at SGS-NUM, Cambodia" is rejected. In other words, it can be concluded that Coaching has a significant influence on student report writing performance at SGS-NUM, Cambodia.

Referring to the statistical regression analysis path between leadership development and the student report writing performance at SGS-NUM in table 4.6. shown it is revealed from the corresponding regression coefficient and its 'C.R.' and 'p' value. The regression coefficient of coaching is 0.019 where the 'C.R.' and 'p' value are .714 and .475. The SEM regression results indicate that the dependent variables, i.e., student report writing performance had been significantly influenced by independent variable, coaching and the level of significance was larger than five percent (5%). Hence, based on the above results, the null hypothesis "Ho2: Training has no significant impact on student report writing performance at SGS-NUM, Cambodia" is accepted. In other

words, it can be concluded that training has insignificant influence on student report writing performance at SGS-NUM, Cambodia.

With reference to table 7, the statistical regression analysis path between leadership development and the performance of SGS-NUM students in writing reports is displayed. It can be seen from the relevant regression coefficient and its 'C.R.' and 'p' values. The training regression coefficient is .004, with 0.132 and .895 for the "t" and "p" values. The findings of the SEM regression show that the independent variable, training, had no substantial impact on the dependent variables, or the students' report writing performance, with insignificance level of larger than five percent (5%). Therefore, the null hypothesis "Ho3: Participation has no significant impact on student report writing performance at SGS-NUM, Cambodia" is accepted. In other word, it concluded that participation has no influenced on the student report writing performance at SGS-NUM. The statistical regression analysis path between SGS-NUM students' performance in writing reports and their leadership development is shown in table 4.6. The appropriate regression coefficient and its 'C.R.' and 'p' values demonstrate this. Regression coefficient for participation is 0.413, with "C.R." and "p" values of 10.945 and .000, respectively. With a significance level of less than five percent (5%), the results of the SEM regression demonstrate that the independent variable, delegation, had a significant influence on the dependent variables, or the students' report writing performance. In other word, the null hypothesis "Ho4: Delegation has no significant impact on student report writing performance at SGS-NUM, Cambodia" is rejected. Hence, it is concluded that the study determined that student report writing has been impacted by delegation. Table 7 displays the statistical regression analysis path between the leadership growth of SGS-NUM students and their report writing performance. This is shown by the proper regression coefficient and its 'C.R.' and 'p' values. The regression coefficient of delegation is .434, and the corresponding "C.R." and "p" values are 9.955 and .000, respectively. The findings of the SEM regression shown that empowerment, the independent variable, significantly influenced the dependent variables, which were the students' report writing abilities, at a significance level of less than five percent (5%). The null hypothesis "Ho5: Empowerment has no significant impact on student report

writing performance at SGS-NUM, Cambodia" is rejected. Stated differently, the study found that empowerment has a detrimental effect on students' report writing.

5. CONCLUSION IMPLICATION AND RECOMMENDATIONS

Bases on the SEM regression results, the current study found that the leadership development, indicators, such as coaching, delegation and empowerment have influenced the student report writing performance for Master program graduate at School of Graduate Study. Except, training and participation has insignificantly influenced on the student report writing performance.

Coaching, delegation and Empowering

1. Make more academic mentors or peer coaches available to students so they may help them with the report-writing process and offer regular feedback. In order to guarantee that students receive the assistance they require, the university should set up an organized coaching framework.

2. Include more group-based assignments that require students to give tasks to one another inside their groups. This method directly improves report-writing quality by strengthening individual accountability and leadership skills.

3. Provide students the freedom to select the subjects for their reports or the approaches they will use, as this promotes student responsibility for their academic work. Academic reports that are more intelligent and skillfully written may result from this empowerment.

Training and Participation Methods:

1. Examine training materials and methods to make sure they are applicable to real-world situations and closely relate to the abilities required for report writing. Workshops that are interactive and skill-based may be more beneficial than conventional lecture-based instruction.

2. In order to make sure that students are actually participating in the process rather than just attending, participation techniques should place a greater emphasis on

active engagement in academic assignments, such as writing workshops or peer review sessions.

The School of Graduate Studies of National University of Management can improve student performance in academic report writing by modifying these leadership techniques.

Limitation and Future Research

According to the above implications, the limitation and the future research in the current study is really performed as the following: The present study determined 306 samples from the students who write the both paper and thesis for graduate Master Program at SGS_NUM in the future the researcher will increase more sample size, the result will be better than this.

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MODERATING EFFECT OF GREEN TRANSFORMATIONAL LEADERSHIP ON THE RELATIONSHIP BETWEEN GREEN HUMAN RESOURCE MANAGEMENT AND SUSTAINABLE ORGANIZATIONAL PERFORMANCE IN CAMBODIA

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ABSTRACT

This study is attempting to look into the relationship between Green HRM and sustainable organizational performance with a moderating role of Green Transformational Leadership in Cambodia. The study uses a quantitative approach to analyze the effect of moderating role of green transformational leadership on the relationship between green human resource management and sustainable organizational performance. The key variables in this study: (1) dependent variable is sustainable organization performance, (2) Three independent variables are green human resource management, and (3) moderating variable is green transformational leadership. The convenience sampling technique is used to collect data from the employees who are working in private and public organizations in Phnom Penh. The sample size is 384. A pilot study is conducted for the sample size of 32 to examine the validity and reliability of the instruments for data collection. The hierarchical multiple regression to analyze the moderating effect of green transformational leadership on the relationship between green human resource management and sustainable organization performance. The results of the study are expected to help leaders, managers, and employees of the organizations deep understand the importance of the leadership role on moderating of the green human resource management practices to the sustainable organization performance.

Keywords: *Green, Green Human Resource Management, Green Transformational Leadership, and Sustainable Organization Development.*

1. INTRODUCTION

1.1 Background

In the environmental context, customers will react to practices conducted by business leaders and managers that lead to environmental damages (Shampa & Jobaid, 2017). Customers tend to buy products with the trusted green performance offered by companies. Indeed, customers hop for green practices in businesses in leadership, human resource management practices, and employees' behavior (Cahyadi et al., 2022). Within thousands of businesses today, sustainability plans are growing steadily due to the threats and uncertainties that climate change has caused our world. The support of senior management is crucial in the implementation of its sustainability management by an organization. Companies need to carry out an environmental audit that can focus on recycling and help society and its people. It will help the workers and members of organizations to understand the use of natural resources and promote eco-friendly goods (Rekha Deka, 2023).

Green Human Resource Management (Green HRM) is a crucial element of the globally trending topic of Green Management. Ren et al. (2017) explained this novel HRM approach as a "phenomenon relevant to understanding relationships between organizational activities that impact the natural environment and the design, evolution, implementation, and influence of HRM systems. Green HRM encompasses implications regarding hiring and retaining environmentally friendly employees and ways to retain them (Susanto et al., 2022). According to Baykal and Bayraktar (2022), the growing awareness about environmental sustainability has given way to the concept of Green HRM. The importance of Green HRM stems from the fact that it is a critical component of an environment-oriented strategic plan to build, maintain, and strengthen sustainable development (Farooq et al., 2021). Companies proactively engaging in Green HRM can create a "Green" image, and this green image can prevent negative impacts of adverse events. Actually, Green HRM practices can be accepted as predictors of green environmental performance impacting a supply chain, production, culture, strategies, and even employee behaviors (Benevene and Buonomo, 2020). Even though initially it may be difficult to initiate and implement the Green HRM practices at the first level, it

can fulfill the prime objectives of an organization such are cost control, ensuring corporate social responsibility, talent acquisition and gaining competitive advantage over the rivals through environment consciousness and preservation of natural and ethical values (Hosain & Rahman, 2016).

To implement this sustainable corporate strategy, organization need strong leadership and a well-planned process (Glavas, Seng & Cooperrider, 2010). Corporate leaders are increasingly prioritizing this sustainability issues as they are being aware and sometimes being pressurized by government policies to incorporate the "green" into the corporate strategy. But, still most of the practitioners in the human management field are not comfortable with the concept of green and specially in developing countries (Sheikh, Islam & Rahman, 2019). Given the critical value of employees' green behavior, scholars have begun to explore what management measures organizations can use to motivate employees to pursue green practices. Current scholarly research on corporate employees' green behaviors has focused on individual traits (Tariq et al., 2020), leadership traits (Wang et al., 2018), and organizational climate (Zientara & Zamojska, 2018). In particular, green transformational leadership and Green HRM practice have attracted much attention as two sharp tools of green management (Chen & Wu, 2022).

1.2 Problem Statement

Human resources are complex and unlike other production factors, they require good management, training and development of their inherent abilities and potential. In particular, conducting Green HRM will affect employees' behaviors, attitudes, perceptions, and motivations related to sustainability (Ahmed et al., 2022). According to Hosain and Rahman (2016), there are some challenges of using Green HRM practices in an organization such as there are some employees in every organization who are not equally motivated to adopt Green HRM practices, developing and maintaining a culture of Green HRM is a lengthy and time-consuming process, it requires a high investment and may bring a low return at the initial stage of implementation, recruiting and training employees about Green HRM is a challenging job to do, it is very difficult to appraise the green performance of employees' behavior, it is difficult to transform employee attitude to Green HRM from traditional HRM in a short period of time, and a major

challenge for HR professionals is to select and develop future green leaders is to create a green working structure, set up green working processes, providing green tools and creating expected green thinking for their employees.

The issue of how a firm or the whole society can achieve sustainability through green management is still debate and vague which opens the window of further research on how firms can create a sustainable competitiveness green management. Implementation of corporate green management initiatives requires a high level of technical and managerial skills among employees to develop innovation-focused environmental initiatives and programs that have a significant impact on the sustainable competitive advantage of the firms (Hosain & Rahman, 2016). In Cambodia, the limitation faced in this study is a lack of information and awareness about the topic and a restricted number of firms were applying Green HRM in their operations.

1.3 Research Questions

Organizations are increasingly focusing on the significance of adopting new methods, such as integrating business environment sustainability into human resource management strategies. This study will look into the relationship between Green HRM and Sustainable Organizational Performance with a moderating of Green Transformational Leadership. The questions of this study are:

1. What are the key concepts of Green HRM practices and Green Transformational Leadership?
2. What does the relationship between Green HRM practices and Sustainable Organizational Performance?
3. How does the Green Transformational Leadership moderate the relationship between Green HRM and Sustainable Organizational Performance?

1.4 Objectives of Study

Green HRM offers an essential way for an organization to develop human capital (HR) that can improve environmentally friendly goals. These objectives are implemented through recruitment, training, assessment, and incentive systems to enhance their

organizational performance so they know the role of the environment and sustainable development. The main objectives of this study are:

1. To understand the key concept of Green HRM practices and the role of green transformational leadership,
2. To find out the significant relationship between key factions of Green HRM practices and the sustainable organizational performance,
3. To analyze the moderating effect of green transformational leadership on the relationship between Green HRM and Sustainable Organizational Performance.

1.5 Significance of Study

The results of the study are expected to help leaders, managers, and employees of the organizations deep understand the importance of green management for sustainable organizational performance. The study of moderating effect of green transformational leadership on the relationship between Green HRM practices and sustainable organizational performance can help private and public organizations to develop eco-friendly and environmental learning among the employees, ensure healthy working environment and raise employee morale, stimulate innovation and growth, maximize use of resource and reduce wastes, increase company image, save costs and gain competitive advantage through ensuring corporate social responsibility.

2. LITERATURE REVIEW

2.1 The Concept of Green

Green refers to making efforts to improve the climate, increase energy efficiency, or reduce pollution caused by business activities. The primary purpose of going green is to minimize the potential negative impact that energy consumption and pollution can have on the climate and environment (Tawk, 2022). Green means environmental. "Green or Greening" has at least four meanings in the context of managing people at work or human resource management. (1) Preservation of the natural environment: all the things in the world which are neither caused nor controlled by human beings and they included land, forests, plants, animals, and other natural phenomena are referred to as the natural environment. To keep it in its original form and protect it from harm, loss, or negative

change; (2) Conservation of the natural environment: to be very careful in the way of using it in order to let it last as long as possible, to use it at the minimum level so that future generations will be able to utilize it; (3) Avoidance or minimization of environment pollution: to stop contaminating the water, air, atmosphere, etc. through unpleasant and poisonous substances and wastes. To guard against outcomes that will ultimately endanger the planet/earth where humans and non-human are living; (4) Generation of gardens and looking-like natural places: to create parks and places which have plants, trees, and grass (Opatha, 2013).

2.2 Green Human Resource Management (GHRM)

The main Green HRM practices generally include recruitment and selection, training and development, performance management and appraisal, compensation and reward, empowerment and participation, and management of the organizational culture (Husain, 2021). The term Green RHM is mainly used to refer to the contribution of human resource policies and practices towards the broader corporate environmental agenda. It also refers to using every employee to support sustainable practices and increase employee awareness and commitment on the issues of sustainability and climate change issues (Tawk, 2022). Green HRM is the most important element of organizational sustainability. Experts defines the term "Green HRM" in many ways but all these definitions emphasize the sustainability in using organization resources.

Accordint to Mampra (2013) defined Green HRM as the use of HRM policies to promote the sustainable use of organizational resources and promote the grounds of environmentalism which further enhance the employee morale and satisfaction. Others define Green HRM as formulating and practicing the human resource policies and philosophies in such a way which will promote a concern for environment among the employees and which will ensure the sustainable use of organizational resources such as electricity, paper, oils, water, etc. (Zoogah, 2011). Green HRM will make sure that organization is causing no harm while performing business or at least causing minimum harm to the environment where there is no alternative to doing so. Green HRM will make employees and management understand not to disturb the natural harmony for any short-term gain. At lower level Green HRM deals with employees to be sustainable in

their personal day to day life while using organizational resources and at higher level Green HRM encourage the policy makers and stakeholders of the organizations to formulate environment friendly regulations and policies (Mandip, 2012).

2.3 Green Transformational Leadership (GTL)

The concept of green leadership entails the capacity to sway individuals and organizations to attain ecological sustainability objectives over an extended period. Green leadership can be defined as a leader who encourages subordinates to attain environmental goals and inspires stakeholders to surpass an anticipated level of environmental performance (Egri & Herman, 2000). The green transformational leadership (GTL) defined as a leader with clear vision, charisma, individual inspiration, motivation and unconditional support to employees towards gaining the set environment goals (Mittal & Dhar, 2016). According to Younis and Hussain (2023), the role of green transformational leadership as a leadership behavior with a primary focus on cultivating the growth of employees' capabilities, all in alignment with the organizational objectives. Green transformational leadership champions employees in their pursuit of new knowledge, active engagement in green processes, and participation in environmentally responsible activities, fostering the enhancement of their organizational performance.

2.4 Sustainable Organizational Performance (SOP)

Organizational performance refers to a company's outcomes or actual outputs, which may be compared to the company's intended outputs, goals, and objectives. Financial performance (return on investments), shareholder return (economic value added), and product/service market performance (market share/sales) are all aspects of organizational performance (Gavrea, et al., 2011). Hidir et al. (2021) also defined the organizational performance as a form of achievement level indicator that will be achieved and reflects the success of an organization. It is a form of outcome accomplished by individual behavior in the organization. Sustainability is defined as opportunity for businesses to provide long lasting solutions that will help enhance the socio-economic landscape while continuing to create jobs and economic wealth well

into the future. The term sustainability, sustainability development, corporate sustainability and corporate social responsibility are frequently interchangeable. It is defined as the development that meets the present without compromising the ability of future generations to meet their own needs. It is well defined that there are three components for sustainability development being environmental protection, economic growth and social equity. Sustainable development is indeed mostly identified by referring to this creation of a balance between profit, planet and people (Kumar, 2023). Sustainability has become a more integral part of many companies' operations in recent years. McKinsey & Company survey of executives in a range of industries and regions found 43 percent of organizations are now trying to align sustainability efforts with their overall business goals, mission or values (Talent Intelligence, 2023). Researchers around the planet are currently violating various management practices that could promote the achievement of Green HRM objectives and above all affect the environmental sustainability of the association (Bagader and Adelhadi, 2021). Several studies have proven the relationship between Green HRM practices and organization performance (Aburahma et al., 2020). According to Khammadee and Ninroon (2022), applying Green HRM will significantly improve organizational performance since it is essential to successfully implement a strategy in an organization's environmental management practices. In the efforts to practice Green HRM in organizations, it takes the form of performance management, rewards, organizational cultural innovation, and training and development (Anwar & Abdullah, 2021). Investment in Green HRM practices in organizations will drive employee performance directly and indirectly through organizational performance (Astuti et al., 2023).

For organizations to maximize the impact of Sustainable Organizational Performance (SOP) on their organizational activities, they must ensure that organizational SOPs can result from implementing ideas about the positive effect of stakeholders on long-term organizations (Sun et al., 2022). Zhao et al. (2021) argue that SOP can be maintained when organizational goals and policies can be supported by prioritizing social, economic, and environmental aspects. For organizations to maximize the impact of SPO on their organizational activities, their managers must also ensure that they require

economic, social, and environmental movements to have a positive effect on their internal community (employees) and external community (society) (Deshpande & Srivastava, 2022).

2.5 Theoretical Reviews

2.5.1 Resource Based View (RBV) Theory

The theory adopted in this study is Resource Based View Theory (RBV) developed by Covin and Lumpkin (2011) focuses mostly on inner resources of company, such as assets, skills and competences, and on how these may be exploited to generate competitive advantage. Human resource management skills are seen as internal resources with the major goal of Green HRM to develop, inspire and provide chances for better business conduct for the competitive benefit of the organization. It is believed to create an organization superior than rivals within the market if HR implement RBV-strategies to develop and support increased competitive efficiency (Barinua & Stanley Dike, 2022).

2.5.2 AMO Theory

The Ability, Motivation, and Opportunity (AMO) theory states that the three fundamental components of HR practices are ability, motivation, and opportunity (Appelbaum et al., 2000). When it comes to skills, a variety of techniques are used, including as hiring and selection procedures as well as training and development programs, to make sure that employees have the knowledge and abilities required to carry out a particular job. In a similar vein, incentives, both monetary and non-monetary, are used to encourage people to meet their performance goals. These incentives are based on performance evaluation. The term "opportunity" also refers to a group of rules that promote employee involvement in a range of activities through greater commitment, information sharing, and individual freedom. To promote collaboration with consumers and suppliers, staff green training capability must be increased (Appolloni & Shahzad, 2022).

Using the Resource-Based View (RBV) and the Ability-Motivation-Opportunity (AMO) theories (Singh et al., 2020) investigated how Green HRM interacts with the

relationships among Green Transformational Leadership, green innovation, and environmental performance. The results of the study, which used questionnaires to gather information from 309 SMEs in the manufacturing sector, suggest that Green HRM practices mediate the effect of green transformational leadership on green innovation. Additionally, it was discovered that green HRM indirectly affects a company's environmental performance through green innovation. Yusouf et al. (2018) investigated how Green HRM practices in the hotel industry enhance environmental performance. The resource-based view theory-based research approach of the study looked at the relationship between Green HRM practices and environmental performance in Malaysia's hotel industry (green recruitment and selection, green training and development, green performance appraisal, and green compensation). Partial least squares structural equation modeling was utilized to analyze the data for the study, which covered 206 hotels in total. The investigation's conclusions revealed that while green recruiting and selection, green training and development, and green compensation were significantly correlated with environmental performance, green performance appraisal did not (Goni et al, 2023).

2.6 Relationship Between Green HRM and SOP

The relationship between Green HRM practices and Sustainable Organizational Performance refer to the relationship between green recruitment and selection, green training and development, green performance appraisal, green compensation and sustainable organizational performance.

2.6.1. Relationship between Green Recruitment and Selection and Sustainable Organization Performance

Green recruitment is the process of recruit and select new talent who are aware of sustainable process, environmental system and familiar with words of conservation and sustainable development (Husain, 2021). According to Nawangsari and Sutawidjaya (2019), Green recruitment is a method of obtaining individuals who are compatible with current jobs in a firm using an online procedure, and the hire applicants may uphold environmental principles. Green recruitment and selection are a crucial component of

Green HRM as it highlights the need to establish environmentally conscientious employees that can assist them enhance their employee performance (Mousa & Uthman, 2019). The green recruitment and selection are the process that emphasizes environmental value and makes it a central component of the organization. Husain (2021) argued that green recruitment has not any particular definition, but somehow it means recruitment without the use of paper the minimizes the environmental impact. To complete the paper free recruitment process digital method like online application form, online interview or telephonic interviews are conducted to decrease the waste of paper, fuel consumption related to interview travel. These practices diminishing the rate of environmental degradation. Thus, green recruitment and selection process attract candidates with knowledge, abilities, personality and habits in line with environmental programs of the organization and can help sustainable organizational performance.

H_{1a}: Green recruitment and selection have significant impact on sustainable organizational performance in Cambodia.

2.6.2. Relationship between Green Training and Development and Sustainable Organization Performance

Green training and development refer to a set of programs that encourage employees to build environmental skills and handle environmental issues that are critical to achieving environmental objectives (Jabbour, 2011). According to Zoogah, 2011), green training and development train employee working methods that reduces waste, proper utilization of resources, conservation of energy and reduces the causes of environmental degradation, it provides opportunity to engage employees in environmental problem solving. Through proper and adequate training and development sessions of employees, organization can attain a sustainable and clean environment. Attitude's development, knowledge, skills, capabilities and behaviors of workers that stops the erosion of environmental associated attitudes and skills comes beneath the shelter of green training and development (Sidra, 2022). Zakaria (2012) stated that the exploratory learning and the skill development are the strong mediums of motivating innovations in the firms. To train employees has also been found to have an exceptional impact on the worker's attitude and involvement in eco-friendly activities (Bissing Olson et al., 2013). Green

performance appraisal is a system for assessing employee performance in the context of environmental management. Green performance management, according to Delmonico et al. (2018), creates green performance indicators to establish a set of green criteria for all members in performance appraisals, covering topics like environmental incidents, environmental responsibility, reducing carbon emissions, and communicating environmental concerns and policies (Tang et al., 2018). Green performance management involves linking performance evaluation to green goals and tasks specified in the job description (Mehta & Chugan, 2015). Green performance management, which involves a remuneration system, is a practice that motivates employees to be involved in green activities with promotion, appraisal, and rewards (Ercantan & Eyupoglu, 2022). Performance management is a systematic process for improving organizational performance by developing the performance of individuals and team (Armstrong, 2006). Performance management usually involves evaluation of an employee and teams basing on certain agreed criteria and goals. Green performance management requires crating green performance standards for individual workers and analyzing their progress toward those behaviors that support the sustainable organizational performance (Ercantan & Eyupoglu, 2022).

> H_{2a}: *Green training and development have significant impact on sustainable organizational performance in Cambodia.*

2.6.3. Relationship between Green Compensation and Benefits and Sustainable Organization Performance

Green compensation is a financial and non-financial compensation system that attempts to recruit, retain, and encourage people to contribute to environmental goals (Latan et al., 2018). Green compensation and reward management is a system of motivation to strengthen employee conduct through green skills development and success in the context of environmental programs through green skills development and success in the context of environmental programs through monetary incentives, non-monetary incentives or public incentives based on praise (Ullah & Jahan, 2017). Green compensation and reward are another potentially powerful tool for supporting environmental management activities this may help to make effort for the attainment of

environmental goals (Milliman & Clair, 1996). Ramus (2002) examined through his research that rewards motivated the environmental behavior and attitude of employee. Employees may be more motivated by non-monetary incentives such as green pay and recognition and appreciation. Incentives may be more effective metric than other HRM strategies for matching employee performance with corporate goals (Barinua & Stanley Dike, 2022).

> **H_{3a}**: *Green recruitment have significant impact on sustainable organizational performance in Cambodia*

2.7 Moderating Role of GTL and Green HRM

Green Transformational Leadership (GTL) influences organizational performance in different manners, including worker commitment and trust, as well as the financial well-being of the organization and positive ecological outcomes (Jabbour and de Sousa Jabbour, 2016). The organizational performance is keenly associated with the characteristics of leader and the leadership has a vital role in boosting the environmental performance (Cheung & Wong, 2011). Considering the theoretical basis of the RBV theory, the leaders play a crucial role in moving, inspiring, and encouraging the employees of the organization, and that leadership role can upsurge the outcomes and productivities of the organizations in efficiently ways. Thus, green transformational leaders play a key role in improving sustainable organizational performance (Perez et al., 2023).

Stinglhamber et al. (2015) highlight green transformational leadership's role in providing mentorship to subordinates, encouraging the cultivation of a supportive environmental mindset, and addressing their needs. Singh et al. (2020) also have underscored green transformational leadership's inclination to place trust in their followers' green competencies and value their contributions to environmental initiatives. Furthermore, green transformational leadership plays a crucial role in shaping the formulation of supportive Green HRM practices and policies, thereby influencing sustainable organizational performance (Younis and Hussain, 2023).

The existing literature pointed out the transformational leadership is fundamental element in achieving the organizational outcomes (Rehaman & Shahid Yaqub, 2021).

Chen and Chang (2013) define green transformational leadership as behaviors of leaders who motivate followers to achieve environmental goals and inspire followers to perform beyond expected levels of environmental performance. Then, scholars often refer to green transformational leadership as environmental transformational leadership, green transformational leadership style, and environmental specific transformational leadership (Cahyadi et al., 2023). According to Chen and Chang (2013), green transformational leaders influence employees through their green plans, visions, goals, beliefs, and ideas. The relationship between green transformational leadership and Green HRM has been demonstrated in the studies of Sing et al. (2020).

From the explanation of Saeed et al. (2019) on measures of Green HRM practices that include green recruitment and selection, green training and development, green performance management, green compensation and rewards, green empowerment, and green knowledge (Cahyadi et al., 2023). Transformational leaders drive greater levels of commitment, trust, and performance of the organization. The dimensions of transformational leadership that is intellectually inspired impacts the efficacy of the employees and the performance of the organization. A green transformational leadership style plays a significant role in helping the organization deliver its ecological vision and strategies, which ultimately leads to the ecofriendly performance of the organizations.

2.8 Empirical and Methodological Reviews

Mawla (2018) empirically examines the part of Green Recruitment & Selection regarding the outcomes and performance of manufacturing industries, whereas organizational performance is used as dependent variable and as an independent variable, Green Recruitment & Selection was used. The data was collected from 72 participants from which 26 were females and 46 were males. The research method that was applied in this research was random and Purposive sampling. Result shows the significant interconnection amidst dependent and independent variable. It was observed that practices regarding Green Recruitment & Selection are in spot and they play their part in grabbing more educated and knowledgeable applicants. It has been recommended that firm's particularly rectifying industries must reassure that they keep

in point practices regarding Green Recruitment & Selection with demand to maintain and enhance their works or outcomes and act in accordance along ethical standards and statutory.

Muna (2019) conducted study to determine the influence of Green HRM on competitive advantage of Jordanian education organizations. In terms of green recruitment and selection, training and development, compensation and rewards in Jordanian education institutions, the study aimed to explore the link between the Green HRM and competitive advantage of the organization. A questionnaire was created to collect data in order to meet the study's objectives. The questionnaire was given to 9 educational groups in Jordan. The study discovered that using Green HRM techniques increased educational institutions' competitive advantage in Jordan.

Aboramadan (2020) empirically studies the impacts of Green HRM on environmental performance in higher education. As an independent variable, Green HRM practices were used and as a dependent variable, environmental performance was used. The findings present significant relationship between dependent variable and free (independent) variable. The details were collected from 208 employees who work in higher education organizations of Palestine. Self-administered questionnaire was used. A technique that is used in this research study was PLS-SEM. A result shows that it put ups to the common writings of Green HRM. It comes up with the restricted frame of understanding at Green HRM too. It is recommended that Green HRM was an important predictor of employee extra-role and in-role GIWB and Green attitude.

Mohammad, et al. (2021) conducted research to determine the impact of Green HRM practices on an organization's overall environmental performance and how businesses may enhance their environmental performance by implementing Green HRM practices through green employee empowerment. The research was based on a questionnaire survey with 340 replies form manufacturing companies; important respondents were one from each industry, limited to senior management, HR managers, quality managers, or manufacturing employees. By showing a relationship between Green HRM practices and their environmental performance results in manufacturing organizations, the study conceptually contributed to the Green HRM literature. By examining the indirect effects

of Green HRM practices on Organization's Environmental Performance via Green Employee Empowerment, this study adds to the body of knowledge. According to the data, Green HRM practices may lead to green empowerment among employees in order to enhance environmental performance.

Almeer (2022) studied organizational sustainability in the market; improving the organizational performance is essential. This study investigated the impact of Green HRM in improving the organizational performance in the retail industry in Bahrain. A quantitative approach determined the relationship with the help of dispersion of questionnaires among 416 employees in the retail sector in the kingdom of Bahrain. In this study, SPSS version 25.0 was used to analyze data. The result showed that green performance appraisal, green recruitment and selection, and green training and development have a significant relationship with the organizational performance. As a result of this study, the organization must establish their HRM through green recruitment and selection, green performance management, and green training and development to enhance it organizational performance.

Goni (2023) investigates the moderating role of green transformational leadership on the relationship between Green HRM and environmental performance in the hotel industry in Nigeria. The main objective was to examine the effect of green HRM on environmental performance, and also evaluate whether such relationship could be improved with the existence of green transformational leadership style. Convenience sampling technique was used to collect data from 649 staff of the hotels out of the 670 copies of questionnaire distributed, and PLS-SEM was used for the analysis. The results showed that Green HRM has a direct positive effect on environmental performance, and green transformational leadership was not significant in moderating the relationship. The findings of this study provide an insight into how hotels management in Kano, Nigeria can contribute positively to the environment by ensuring that all employees and managers were adequately staffed, trained, and inspired with green initiatives to work in a way that improves the environment. The study concluded that hotels management in Nigeria should emphasize Green HRM practices because it helps to improve the environment.

Table 2.1: Summary of literature studies of the Relationship between Green HRM Practices, Green Transformational Leadership and Sustainable Organizational Performance.

Independent Variable (IV)	Dependent Variable (DV)	Moderating Variable (MV)	Authors
Green HRM	Environmental Performance	Green Transformational Leadership	Kuwata Mohammed Goni, Yusrinadini Zahirah Binti Md. Isa, Tahirah Binti Abdullah (2023)
Green HRM	Employee Engagement with Environment Initiative	Leadership Behavior	Omar Mohammed Ali Ababneh (2021)
Green HRM	Employee Green Behavior	Personality Attributes	Omar Mohammed Ali Ababneh (2021)
Green HRM	Green Employee Empowerment	Individual Green Values	Zahid Hameed, Ikram Ullah Khan, Tahir Islam, Zaryab Sheikh, Rana Muhammad Naeem (2020)
Green HRM	Environmental Performance	Environmental Knowledge Awareness and Attitude	Adedapo Oluwaseyi, Ojo, Christine Nya-Ling Tan, & Maznil Alias (2020)
Green HRM	Green Employee Empowerment OCBE Individual Outcomes Non-Green Work Attitudes	Organizational Pride Individual Green Values, Human Capital Employee Discretion Commitment to Ethics Equity Sensitivity	Zahid Hameed, Ikram Ullah Khan, Tahir Islam, Zaryab Sheikh, Rana Muhammad Naeem (2020)
Green HRM	Green Innovation	Employee's Environmental Benefits	Sanjay Kumar Singh, Manlio Del Giudice, Roberto Chierici,

			Domenico Graziano (2020)
Green HRM	Environmental Performance	Individual Green Values	Faheem Hul Gilal, Zubaida Ashraf, Naeem Gul Gilal, Rukhsana Gul Gilal, Nisar Ahmed Channa (2019)
Green HRM	Employee Green Recovery Performance	Environmental Specific Leadership Style Serving Culture	Trong Tuan Luu (2018)
Green HRM	Organizational Performance	Organizational Culture Labor Market Legal Regulatory Environment	Muslim Amin, Wan Khairuzzaman Wan Ismail, Siti Zaleha Abdul Rasid and Richard Daverson Andrew Selwemani (2013)

Source: Author (2023) & Narayanamma et al. (2022)

Based on literature review of moderating effect of green transformational leadership on the relationship between green recruitment and selection, green training and development, green compensation and benefits and sustainable organizational performance, the moderating hypotheses are formulated as follows:

H_{1b}: *Green transformational leadership have moderating effect on the relationship between green recruitment and selection and sustainable organizational performance in Cambodia.*

H_{2b}: *Green transformational leadership have moderating effect on the relationship between green training and development and sustainable organizational performance in Cambodia.*

H_{3b}: *Green transformational leadership have moderating effect on the relationship between green compensation and benefits and sustainable organizational performance in Cambodia.*

2.9 Theoretical Framework

The moderating role of Green Transformational Leadership on the relationship between Green HRM and Sustainable Organizational Performance can be developed as the following theoretical framework:
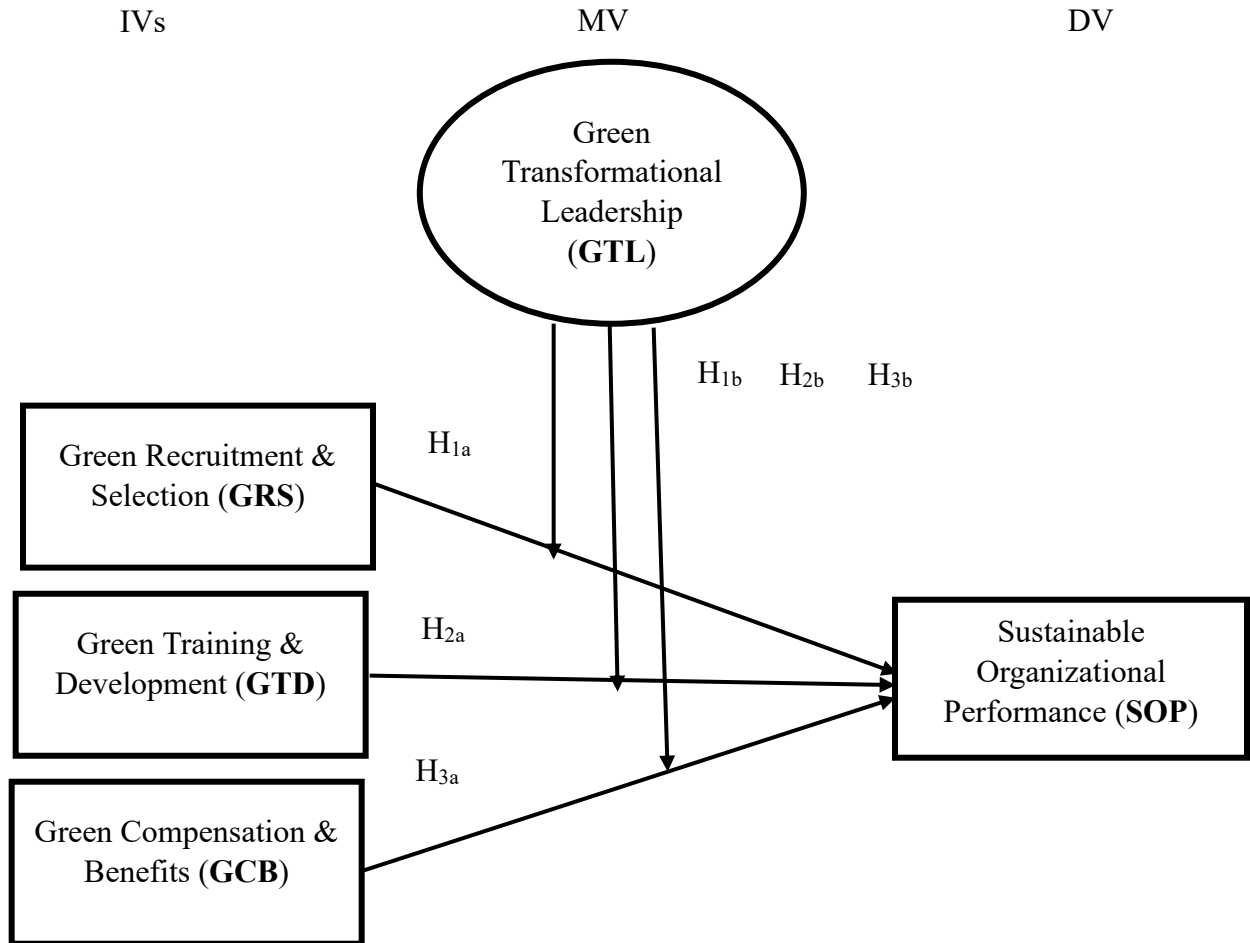

Figure 2.1: Conceptual Framework

The specific models for hypotheses are formulated as follows:

H_{1a}: $SOP = \beta_0 + \beta_1 GRS + \varepsilon$

H_{2a}: $SOP = \beta_0 + \beta_1 GTD + \varepsilon$

H_{3a}: $SOP = \beta_0 + \beta_1 GCB + \varepsilon$

H_{1b}: $SOP = \beta_0 + \beta_1 GRS + \beta_2 GTL + \beta_3 (GRS*GTL) + \varepsilon$

H$_{2b}$: SOP = β_0 + β_1GTD + β_2GTL + β_3 (GTD*GTL) + ϵ

H$_{3b}$: SOP = β_0 + β_1GCB + β_2GTL + β_3 (GCB*GTL) + ϵ

Where:

> β_0 is a constant;
>
> β_1, β_2, and β_3 are parameters in the models;
>
> ϵ is error term.

3. METHODOLOGY

3.1 Research Design

Research design is a way of gather information, define ad validate the research study that explain how researcher identify answer to the research questions (Kumar, 2019). According the research questions and objectives, this study explanatory with a quantitative approach to analyze the effect of moderating role of green transformational leadership on the relationship between green human resource management and sustainable organizational performance. A structural equation modeling analysis tests the relationship between independent, moderating, and dependent variables. The study employed survey and cross-sectional research approach to gathering data from a representative sample of organizational employees on the spot or a single point in time from the respondents.

3.2 Measurement and Instruments

The study adapted existing scales to measure the key variables by using multiple items on 5-point Likert scale, the respondents indicated how strongly they disagreed or agreed with each topic (1=strongly disagree; 5=strongly agree).

- **Dependent Variable (DV):** *Sustainable Organizational Performance (SOP)* is adapted 4 items from Baeshen et al. (2021)**.**
- **Moderating Variable (MV):** *Green Transformational Leadership (GTL)* is adapted 6 items from Chen & Chang (2013).

- **Independent Variable (IV₁):** *Green Recruitment and Selection (GRS)* is adapted 3 items from Shah (2019), Oselmis (2020), and Baykal & Bayraktar (2022).
- **Independent Variable (IV₂):** *Green Training and Selection (GTS)* is adapted 6 items from Shah (2019), Oselmis (2020), and Baykal & Bayraktar (2022).
- **Independent Variable (IV₃):** *Green Compensation and Benefits (GCB)* is adapted 5 items Shah (2019), Oselmis (2020), and Baykal & Bayraktar (2022).

Table 3.1: Research Instruments

Code	Questionnaire Items	Source
DV	**Sustainable Organizational Performance (SOP)**	
SOP1	Sustainable organizational performance for financial and non-financial	Baeshen et al. (2021)
SOP2	Continuous organizational performance for organizational image	
SOP3	Sustainable organizational performance as a measure of environmental performance	
SOP4	Sustainable oriented leader	
MV	**Green Transformational Leadership (GTL)**	
GTL1	The leadership inspires the organizational members with environmental plans	Chen & Chang (2013)
GTL2	The leadership provides a clear environmental vision for the organizational members	
GTL3	The leadership gets the organizational members to work together for the same environmental goals	
GTL4	The leadership encourages the organizational members to achieve environmental goals	
GTL5	The leadership acts by considering the environmental beliefs of organizational members	
GTL6	The leadership stimulates the organizational members to think about green ideas	
IV₁	**Green Recruitment & Selection (GRS)**	
GRS1	Our company includes the criterion of green awareness in its human resource employment policies	Shah (2019), Oselmis (2020),
GRS2	Our organization attracts candidates who attach importance to applying green criterial in order to create a green employer brand	

GRS3	My company has a communication environment that enables the dissemination of green knowledge, skills and goals	Baykal & Bayraktar (2022)
IV₂	**Green Training & Development (GTD)**	
GTD1	My company identifies who needs training in environmental management	Shah (2019), Oselmis (2020), Baykal & Bayraktar (2022)
GTD2	My company uses environmental protection elements as the main themes of green education	
GTD3	My organization provides environmental management training to improve the awareness, skills and knowledge of employees on environmental management	
GTD4	Our company sets green goals, objectives and tasks for each employee throughout the organization	
GTD5	Green criteria are used to evaluate employee performance in my company	
GTD6	My company monitors whether the green targets are being met and whether the green targets are being met	
IV₃	**Green Compensation & Benefits (GCB)**	
GCB1	Our compensation system recognizes and rewards contributions to environmental protection	Shah (2019), Oselmis (2020), Baykal & Bayraktar (2022)
GCB2	My company rewards green skill acquisition	
GCB3	My company rewards participation in green education programs	
GCB4	My company rewards contributions to environmental management through non-monetary rewards such as paid leave, special leave, gifts to employees and their families	
GCB5	My company recognizes employees' green initiatives by promoting and praising them throughout the organization	

3.3 Data Collection

The study employed two sources of data, primary and secondary data. For primary data will be collecting from the experience at first hand, it is not been reported or published. Generally, primary data has not been altered and changed by human beings so that its validity could be greater than secondary data (Kabir, 2016). In this study, questionnaire will be distributing via a copied link to each participant, and then all cases will be

recording automatically in an online administrative program. For secondary data will be collecting from a source in which it had already been report or published such as electronic journals, textbooks, website and other relevant documents. The secondary data use to support data analysis and especially the findings.

3.4 Sampling Method and Sample Size

Sampling design is determined before data are collected which can be used to make inference about population or to make generalization in related to existing theory, and this depends on choice of sampling method (Taherdoost, 2016). There are two sampling methods such as probability and non-probability sampling method. However, in this study uses non-probability sampling method which does not afford any basis for estimating the probability that each item in the population has of being included in the sample. The convenience sampling technique is used to collect data from the targeted population of potential employees who are working in public and private organizations in Cambodia. For sample size, according to Kumar (2019) refers to a number of people from whom the researcher specific data. Roscoe (1975), proposed the rules of thumb for determining sample size that appropriate for most research is larger than 30 and less than 500 (Sekaran & Bougie, 1016). Another well-known for sample size determination among behavioral and social science researchers is Krejcie and Morgan (1970), they suggested that a sample size of 384 is sufficient for population of 1,000,000 or more. In this study, when the population size is unknown or considered large, the sample size for a survey can be determined using the following formula based on a standard normal distribution:

$$n = Z^2 * p * (1 - p)/ E^2$$

Where:

n = sample size

Z = Z-value (Z = 1.96 for a 95% confidence level)

P = estimated proportion of the population (if unknown, use 0.5)

E = margin of error (0.05)

$n = 1.96^2 * 0.5 * (1 - 0.5)/ 0.05^2 = 3.8416 * 0.250/ 0.0025 = 384.16.$

The sample size of this study is 384**,** that also meet the standard requirement from the Krejcie and Morgan table of sample size (Sekaran & Bougie, 1016).

3.5 Data Analysis Approach

The SPSS-24 statistic software is used to analyze the collected data. Frequency, descriptive statistics, reliability, validity, and normality will be tested for the first step of analysis. The second step of the analysis is to test the moderating effect of the green transformational leadership (GTL) on the relationship between green human resource management practices (GRS, GTD, and GCB) and the sustainable organization performance (SOP). This study uses the hierarchical multiple regression to analyze the moderating effect of green transformational leadership, like standard multiple regression, hierarchical multiple regression is a type of statistical method that allowing to test hypothesis on the relationship between multiple independent variables and a dependent variable with effected by a moderating variable. Hierarchical regression model means that the independent variables are not entered into the regression simultaneously, but it steps. Hierarchical regression allows for nested models where predictors are entered in an order specified by the researcher, it can provide insights into the relative importance of variables by participating the variable explained, and it can help unpack complex interactions among variables.

However, before conducting hierarchical multiple regression analysis, there are five assumptions that will be checked: (1) Dependent variable check to ensure that it is measured at a continuous scale (interval scale), (2) Multiple independent variables check to ensure that the measure of variables either at the continuous or nominal level (interval or categorical), (3) Linearity check to ensure that the linear relationship between the dependent variable and independent variables using the regression plots between each independent and dependent variable, (4) Multicollinearity check the ensure that the correlation coefficients of all independent variables though tolerance/variance inflation factor (VIF) values, and (5) Normality check to ensure that the residuals are approximately normally distributed through a histogram with superimposed normal curve and a P-P Plot.

To conduct moderating analysis of Green Transformational Leadership on the relationship between Green Recruitment and Selection, Green Training and Development, Green Compensation and Benefits, and Sustainable Organization Performance, there are four following steps:

- *Step 1:* Compute the standardized values of all independent variables and moderating variables (ZGRS, ZGTD, ZGCB and ZGTL);

- *Step 2:* Determine interaction variables by multiplying standardized value of each independent variable with the moderating variable (ZGRS*ZGTL; ZGTD*ZGTL and ZGCB*ZGTL); and

- *Step 3:* Run regression of the dependent variable (SOP) on the independent variables (GRS, GTD, GCB), moderating variable (GTL), and interacting variables (ZGRS*ZGTL; ZGTD*ZGTL and ZGCB*ZGTL).

- *Step 4:* Interpret the results. *First,* look at the Model Summary that is to see the R-Square value that indicates the proportion of the variance in the dependent variable (SOP) can be explained by the independent variables (GRS, GTD, and GCB). *Second*, look at the one-way ANOVA examines the means of groups in question and evaluates whether any of them are statistically significant different from another, if p-value less than 0.05. *Third*, look all p-values for GRS, GTD, GCB, GTL, and all Interaction Variables (ZGRS*ZGTL; ZGTD*ZGTL and ZGCB*ZGTL) to check the moderating effects of GTL on the relationship between GRS, GTD, GCB, and SOP, if p-values less than 0.05 are statistically significant moderating effect of GTL, and if p-values higher than 0.05 that are not statistically significant moderating effect of GTL.

3.6 Pilot Study

The purpose of conducting a pilot study is to examine the feasibility of an approach that intended to be used in a larger-scale study. For this study, the sample size of 32 is used to conduct a pilot test for examining the validity and reliability of the instruments that are essential in data collection. Therefore, the correct data will be determining true the results of research quality.

3.6.1 Descriptive Validity

Descriptive Validity is a research term that refers to the accuracy and objectivity of the information gathered. The form of validity is important because description is a major objective in nearly all qualitative research.

Table 3.2: Gender of the respondents

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	13	40.6	40.6	40.6
	Male	19	59.4	59.4	100.0
	Total	32	100.0	100.0	

Table 3.2 showed that, among 32 of the respondents, there are 13 (40.6%) as female and 19 (59.4%) as male.

Table 3.3: Degree of Education

Education		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	6	18.8	18.8	18.8
	High school	1	3.1	3.1	21.9
	Master	25	78.1	78.1	100.0
	Total	32	100.0	100.0	

Table 3.3 presented the qualification of the respondents, there are 6 (18.8%) have Bachelor degree, 1 (3.1%) have high school, and 25 (78.1%) have Master degree.

Table 3.4: Organization of the respondents

Organization		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Own Company	4	12.5	12.5	12.5
	Other	4	12.5	12.5	25.0
	Private company	18	56.3	56.3	81.3
	Public organization	6	18.8	18.8	100.0
	Total	32	100.0	100.0	

Table 3.4 presented the organization of the respondents, among 32 of the respondents, there are 4 (12.5%) owned companies, 4 (12.5%) others, 18 (56.8) private companies, and 6 (18.8%) public organizations.

Table 3.5: Position of the respondents

	Position				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Owner	2	6.3	6.3	6.3
	Employee	20	62.5	62.5	68.8
	Low level manager	3	9.4	9.4	78.1
	Middle manager	6	18.8	18.8	96.9
	Top manager	1	3.1	3.1	100.0
	Total	32	100.0	100.0	

Table 3.5 presented the position of the respondents, among 32 of the respondents, there are 2 (6.3%) company owners, 20 (62.5%) employees, 3 (9.4%) low level managers, 6 (18.8%) middle managers, and 1 (3.1%) top manager.

Table 3.6: The Importance of Sustainable Organization Performance

	The Importance of Sustainable Organization Performance				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	32	100.0	100.0	100.0

Table 3.6 showed that all the respondents (100%) agreed that sustainable organization performance is very important for the organization.

Table 3.7: The Importance of Green Human Resource Management

	The Importance of Green Human Resource Management				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	32	100.0	100.0	100.0

Table 3.7 showed that all the respondents (100%) agreed that green human resource management is very important for sustainable organization performance.

Table 3.8: The Important Role of Green Transformational Leadership

	The Important Role of Green Transformational Leadership				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	32	100.0	100.0	100.0

Table 3.8 showed that all the respondents (100%) agreed that the role of green transformational leadership is very important to influence the relationship between

green human resource management practices and the sustainable organization performance.

3.6.2 Questionnaire-Items Validity

Validity is a measure of the research instruments. A test for the validity of the questionnaire is using Pearson correlation significant value, that is done by correlating each item's questionnaire score with the total item scores. Item-item questionnaire that significantly correlated with total score indicates that the item is valid. The validity decision is based on the significant value less than 0.05. If the value higher than 0.05 then the instrument is declared invalid. The following table shows the output of validity test of Pearson correlation value between each item and the total item scores.

Table 3.9: The Validity of the Questionnaire Items

SOP: Sustainable Organization Performance (DV)	N	Pearson Correlation	Sig. (2-tailed)	Comment
SOP1: Sustainable organizational performance for financial and non-financial	32	.522	.002	Valid
SOP2 Continuous organizational performance for organizational image	32	.657	.000	Valid
SOP3: Sustainable organizational performance as a measure of environmental performance	32	.729	.000	Valid
SOP4: Sustainable oriented leader	32	.583	.000	Valid
GTL: Green Transformational Leadership (MV)	N	Pearson Correlation	Sig. (2-tailed)	Comment
GTL1: The leadership inspires the organizational members with environmental plans	32	.632	.000	Valid
GTL2: The leadership provides a clear environmental vision for the organizational members	32	.647	.000	Valid
GTL3: The leadership gets the organizational members to work together for the same environmental goals	32	.646	.000	Valid
GTL4: The leadership encourages the organizational members to achieve environmental goals	32	.639	.000	Valid
GTL5: The leadership acts by considering the environmental beliefs of organizational members	32	.668	.000	Valid

	N	Pearson Correlation	Sig. (2-tailed)	Comment
GTL6: The leadership stimulates the organizational members to think about green ideas	32	.722	.000	Valid
GRS: Green Recruitment and Selection (IV$_1$)	**N**	**Pearson Correlation**	**Sig. (2-tailed)**	**Comment**
GRS1: Our company includes the criterion of green awareness in its human resource employment policies	32	.790	.000	Valid
GRS2: Our organization attracts candidates who attach importance to applying green criterial in order to create a green employer brand	32	.668	.000	Valid
GRS3: My company has a communication environment that enables the dissemination of green knowledge, skills and goals	32	.776	.000	Valid
GTD: Green Training and Development (IV$_2$)	**N**	**Pearson Correlation**	**Sig. (2-tailed)**	**Comment**
GTD1: My company identifies who needs training in environmental management	32	.694	.000	Valid
GTD2: My company uses environmental protection elements as the main themes of green education	32	.789	.000	Valid
GTD3: My organization provides environmental management training to improve the awareness, skills and knowledge of employees on environmental management	32	.688	.000	Valid
GTD4: Our company sets green goals, objectives and tasks for each employee throughout the organization	32	.772	.000	Valid
GTD5: Green criteria are used to evaluate employee performance in my company	32	.731	.000	Valid
GTD6: My company monitors whether the green targets are being met and whether the green targets are being met	32	.735	.000	Valid
GCB: Green Compensation and Benefits (IV$_3$)	**N**	**Pearson Correlation**	**Sig. (2-tailed)**	**Comment**
GCB1: Our compensation system recognizes and rewards contributions to environmental protection	32	.689	.000	Valid
GCB2: My company rewards green skill acquisition	32	.733	.000	Valid

	32	.646	.000	Valid
GCB3: My company rewards participation in green education programs	32	.646	.000	Valid
GCB4: My company rewards contributions to environmental management through non-monetary rewards such as paid leave, special leave, gifts to employees and their families	32	.581	.000	Valid
GCB5: My company recognizes employees' green initiatives by promoting and praising them throughout the organization	32	.744	.000	Valid

The results of validity test showed that all items of SOP, GTL, GRS, GTD, and GCB are significantly valid at 0.05.

3.6.3 Reliability of the Variables

The first step of this study is conducted the pilot test of 32 sample size to calculate reliability of Cronbach's alpha. The most common reliability is internal consistency of the scale (Hair et al., 2006) and according to the rule of thumb for reliability estimation, if Cronbach's alpha is 0.70 or higher suggests good reliability. If the Cronbach's alpha is 0.60 to 0.70 is considered acceptable reliability. The results shown as table below.

Table 3.10: The Reliability Cronbach's Alpha of Variables

Variable	Cronbach's alpha	No. of Items	Comment
SOP: Sustainable Organizational Performance	0.835	4	Good
GTL: Green Transformational Leadership	0.944	6	Excellent
GRS: Green Recruitment & Selection	0.874	3	Good
GTD: Green Training & Development	0.914	6	Excellent
GCB: Green Compensation & Benefits	0.935	5	Excellent

All variables are considered excellent and good reliability, Cronbach's alpha is higher than 0.70.

4. CONCLUSION

The study of moderating effect of green transformational leadership is aimed to find out how the role of leadership in Cambodia promote the green behavior of human resources in organization in order to sustain long-term performance. The study targeted to 384 employees of both public and private organizations in Cambodia to find out their perceptions on green environmental performance in the organization and how management and leadership clear understanding and motivating them to implement green organization. The study uses quantitative approach through survey questionnaires and apply hierarchal multiple regression to analyze the data. The results of the study are expected to help leaders, managers, and employees of the organizations deep understand the importance of the leadership role on moderating of the green human resource management practices to the sustainable organization performance. This study also helps private and public organizations to develop eco-friendly and environmental learning among the employees, ensure healthy working environment and raise employee morale, stimulate innovation and growth, maximize use of resource and reduce wastes, increase company image, save costs and gain competitive advantage through ensuring corporate social responsibility.

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FACTORS AFFECTING THE STUDENT RETENTION ON IT PROGRAM:
Case Study at NUM

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ABASTRACT

The purpose of this study is to identify the factors affecting the student retention on Information Technology program at National University of Management in Cambodia. Data were collected from respondents of 158 whose are students have studied in IT major and structural equation modeling (SEM) is method for data analysis. Results show that the usefulness, perceived value, teaching quality, and financial support are factors that positively affect the student retention. This research also found that there is no significant difference between males and females with respect to the relationship between usefulness, perceived value, and teaching quality on student retention. But, the influence of financial support on retention is stronger for males than for females.

Keywords: *Retention, Information Technology, Perceived Value*

1. INTRODUCTION

Higher education is considered to be a necessary condition to stimulate employment opportunities, social justice, and economic progress (Sneyers & De Witte, 2017). As different economic sectors and society as a whole undergo digital transformation, the importance of STEM (science, technology, engineering, and mathematics) subjects, including computer science, is growing. Developments in the labor market and societal demands require an increasing number of high-achieving students to graduate within the Science, Technology, Engineering, and Mathematics fields (Xie et al., 2015). Going to college involves students in continuous decision-making processes. The big initial decision is the choice of one's major area of study, which would (presumably) lead to one's future occupation (career decision making). According to OECD (2011), individuals with a tertiary level of education have a greater chance of finding a job and earn more than those who do not have a university degree. Student dropout has become a serious issue in the higher education system of several universities due to its increasing frequency (Montmarquette et al., 2001). Several studies (De Witte & Rogge, 2013; Rouse, 2005) find that dropping out from school has significant consequences in terms of income for both individuals and society. According to Eurostat data, in 2016 more than 3 million young Europeans dropped out of university. Although the information technology (IT) sector is among the fastest growing ones (European Institute for Gender Equality 2017), with an estimated 500.000 unfilled vacancies for computer science professionals by 2020 (European Commission 2018). There are two types of factors that can help predict whether students would drop out or graduate from high school: factors associated with the individual characteristics of students, and the factors associated with the institutional characteristics of their families, universities, and communities (Rumberger & Ah Lim, 2008).

Currently, there is a growing demand for computer science (CS) professionals; the U.S. Bureau of Labor Statistics predicts that by 2020 one of every two STEM (Science, Technology, Engineering, and Mathematics) jobs will be in CS, and nearly three out of four will require significant CS skills and knowledge (U.S. Bureau of Labor Statistics

2014). But, the problem of preparing young people for careers in computer, information science, and technology (we use the term CS) has attracted considerable attention, as the number of CS degrees started to decline about 10 years ago (Zwedin, 2014). Research in CS student attrition indicates that the largest dropout point occurs in the first two years of their studies (Huang & Brainard 2001). Approximately 40 % of those who embark on a CS course eventually leave without a degree, although this varies from about 30% to 60% by institution (Ohland et al., 2008).

Apart from this, students that are majoring in IT at NUM, Cambodia, at 2022-2023 have the drop out rate of 11.22% (figure 1) which can be considered as a problem that are needed to be solve. Because of this, we investigate which factors that influence students' intention to stay on bachelor programs in IT major at Faculty of Information Technology, NUM.

The paper is organized as follows. The literature on determinants of students' intention is overviewed in the next section. The third section provides information on variables, data, and the model used in this paper. Thereafter, the results of the analysis are presented, followed by the conclusion with policy recommendations.
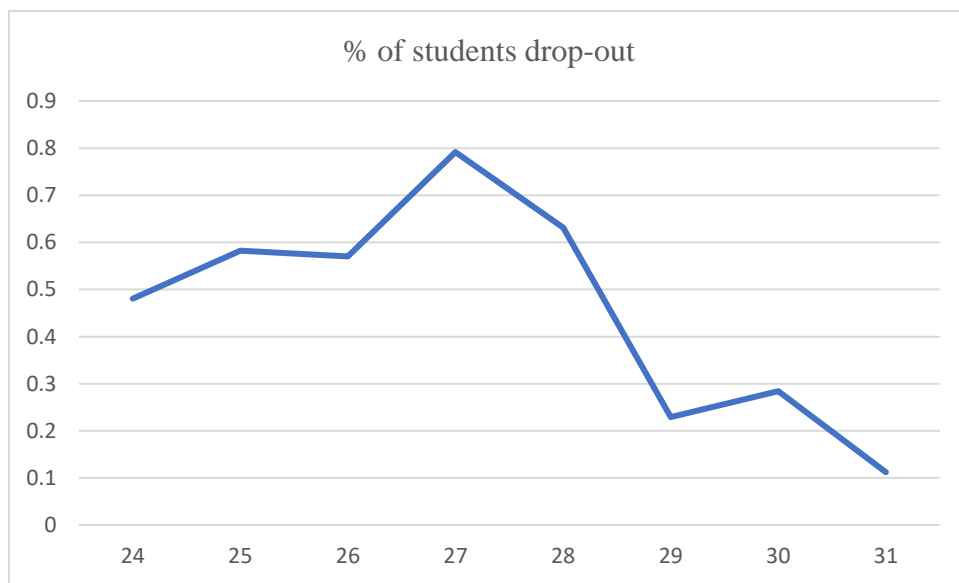

Figure 1: Percentage of students drop-out

2. LITERATURE REVIEW

Student retention is a pressing concern for institutions of higher education, according to Tinto (1993) The main customers of the university are students, who are the main customers of the university. The academic achievements of its students are not the only factors that determine the existence of a university. The student retention rate reflects the student's confidence in his or her university. Students' trust in the quality of education provision from the university which they have decided to enter from the beginning is indicated by a high student retention rate. There are aspects of service that need to be addressed immediately by the university, which undermines the commitment of students to continue their education. Determining retention for community college settings is, therefore, an intriguing notion in itself. The retention rate at the community college level is phrased as a persistence rate and deals more with the consideration of students goals other than graduation rates.

The advancement of academic accomplishment and student retention is influenced by numerous factors, both internal and external (Bean, 1983) External factors derive from the personal and family of the students themselves, while external factors derive from universities, lecturers in the class, and the academic advisor. Motivation comes from us. Motivation speaks of determination, effort, and persistence. The performance of a student depends on himself or herself. Even though this is the case, students are also human beings who are influenced by the emotional aspects that can affect their attitudes and actions. Both direct and indirect environments can affect the atmosphere of emotions. The immediate environment refers to the families of students, who can contribute to the creation of an environment that influences the spirit of students in pursuing their education, especially if students and their families share a close bond, both physically and/or psychologically. The indirect environment of students is related to the university's condition as a "second home" for him or her as a learner. Student success in achieving academic achievement can be influenced by the quality of the university, the competence of lecturers, and the role of academic advisors as mentors.

2.1 Degree's usefulness

The degree to which a person believes that using a particular system would enhance his or her job performance is called the PU. The degree of one feels enmeshed or stuck within an organization, according to Mitchell and Lee (2001) In the current competitive and globalized higher education market, the reputational fallout of low student retention and high student attrition figures can be damaging to institutions, even if they don't complete their education (Quinn et al., 2005) The student's perceived value is one of the primary reasons for enrolling in a study program (Xu, 2013) Students ratings of the usefulness of science disciplines are positively associated with earning a STEM degree, according to Maltese and Tai (2011).

H_1: The degree's having a high perceived usefulness has a positive effect on CS student retention.

2.2 Perceived values

Learning the perceptions and experiences of the early cohorts helped create the program's model of support. Effective programs can be designed by understanding the experience of program support from the perspective of individuals with lived experience in foster care. The start of the program was fueled by the understanding that successful transition to adulthood by youth aging out of the foster care system required attention to seven life domains—education, finances, housing, health, relationships, identity, and life skills. It is related to the fact that CS programs can contribute to students' positive emotions and be enabling to their retention in those programs. Students are expected to stay in school longer if they feel connected to the academic and social community of their major (Barker et al. 2009).

H_2: Level of feelings (personal values) have an effect on CS student retention.

2.3 Teaching Quality

To achieve quality teaching and learning emanating from quality assurance, Stensaker (2008) has argued that there needs to be movement beyond definitions and technical processes, with attention placed on good teaching and learning practice, which should

then underpin statistical improvement. Learning and teaching factors that encourage student persistence with their studies are some of the smaller issues for student retention. Teachers may ask what they can do to enhance the possibility of students continuing with their studies, even though factors such as personal and course selection are beyond their control.

Student retention really needs attention from a university because this can be contagious, both to fellow students at the university and also to prospective students who have the potential to approach or stay away. This can be contagious, both to fellow students at the university and also to prospective students who have the potential to approach Hennig-Thurau et al. (2001) demonstrate that the quality of instruction and the student's emotional attachment to the institution are crucial for the student's loyalty to the institution. Pedagogical activities may be a barrier to the success of CS students to become connected from the CS program (Blickenstaff, 2005) Learning performance, entering a STEM major, and staying in a STEM major are all related to different teaching and learning methods.

H_3: Quality teaching has an effect on CS student retention.

2.4 Financial Supports

State aid may be offered to students to cover college expenses and waive the registration fee. Family and/or personal income determines eligibility, with different rates applicable to students who reside at the parent's residence and those who reside on their own. The average monthly expenditure of college students is between one-quarter and one-third covered by such student aid (McCoy et al., 2010b). There are factors that may contribute toward sacrifice perceptions that have been identified regarding the impact of student loans and financial support on retention considerations for university students. Tinto (1993) argues that economic factors are usually secondary in the decisions of most students. He offers the reason for this: the impact of funding on college retention influences decisions to attend college more than to attend university (eg, attending college; where and when to study; and in what form, ie, part-time or full-time. Other studied the relative effects of scholarships and loans on retention, continuous enrollment, and graduation. Overall, they found that most rigorous research suggests

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that financial support has a positive effect on student retention (Hossler et al, 2009). Additionally, there is a connection between family financial support and retention: "strong family ties were often the key to student retention in those early days." Financial support from the family can influence whether it is possible to continue studying or not (Cotton et al, 2017).

H4: Financial supports have a positive effect on CS student retention.

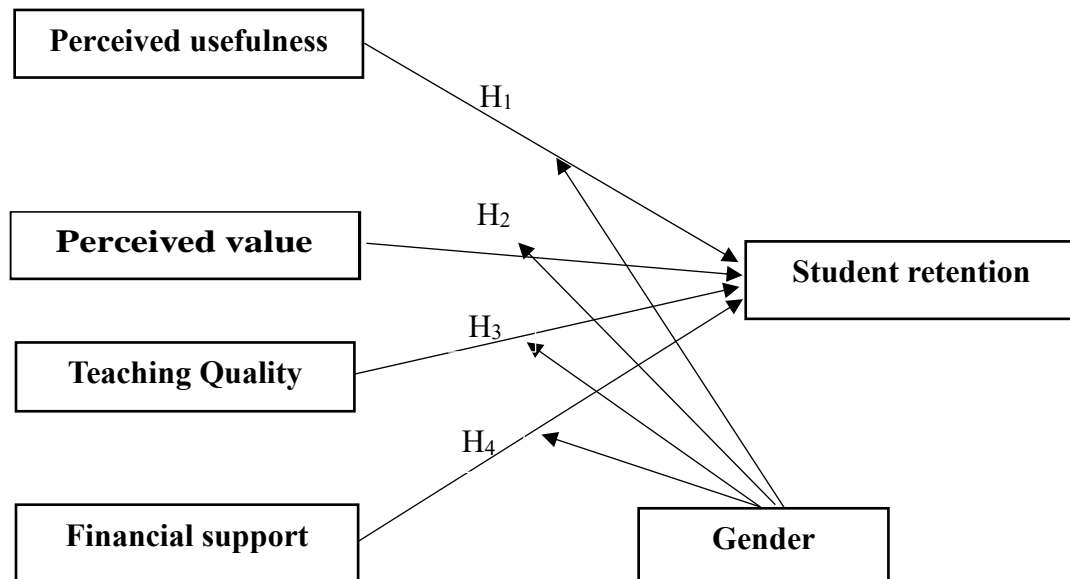## 2.6 Conceptual Model of Student Retention

Figure 2: Proposed model of student retention

3. METHODOLOGY

In this study, SEM method was selected due to its potential for theory development (Gefen et al., 2021) and the capability of simultaneously assessing the multiple and interrelated dependence relationships. Structural equation modeling is designed with the two-phase model (i) measurement model and (ii) structural model.

Figure 2 presents the integrated research model in this study. Initially, the methodology adopted for this research will be explained so as to present, secondly, the measuring instruments of the concepts and the results of preliminary analyses.

3.1 Questionnaire design and main survey

A structured instrument was used to collect data including multi-item measures using a seven-point Likert scale with strongly disagree (1)-strongly disagree and (7)-strongly agree: (a) perceived valued (Biggers et al.,2008), (b) teaching quality (Biggers et al.,2008), (c) degree's usefulness (Joo et al., 2011), (d) financial supports (discuss with experts), and (d) students' intention (Litzler and Young, 2012).

Based on the guidelines from the above authors, 21 questionnaire items were collected. By depending on the collected data, the pre-testing was performed and then 3 items were eliminated. Therefore, 18 items were employed in the main survey. We also translated all items into Khmer language and conducted translation confirmation procedures. With "three or more indicators per factor, a sample size of 100 will usually be sufficient for convergence," and a sample size of 150 "will usually be sufficient for a convergent and proper solution" (Anderson & Gerbing, 1984). The collected and validated respondents of 158 who have studied IT program in National University of Management, Phnom Penh, Cambodia.

3.2 Data analysis

Table 1 results of the skewness and kurtosis tests generally suggest the data is normally distributed as the values for all the indicators of the various constructs fall within the recommended ±2 threshold (George & Mallery, 2010).

TABLE 1. Mean, Standard Deviation, Kurtosis, and Skewness Statistics

Constructs	Mean	Standard Deviation	Kurtosis	Skewness
Usefulness				
uf1	5.696	1.104	0.916	-0.465
uf2	5.487	1.087	1.204	-0.374
uf3	5,399	1.100	1.126	-0.350
Value				
va1	4.734	1.370	0.259	-0.501
va2	4.082	1.655	-0.885	-0.090
va3	3.835	1.700	-1.007	0.064
va4	4.215	1.507	-0.395	-0.474

Teaching quality				
tq1	4.551	1.218	0.079	-0.451
tq2	4.506	1.271	-0.142	-0.477
tq3	5.082	1.071	1.295	-0.292
tq4	4.804	1.137	1.357	-0.713
tq5	5.000	1.156	1.713	-0.651
tq6	4.589	1.341	0.774	-0.673
tq7	4.456	1.417	-0.089	-0.508
Financial support				
f1	4.171	1.451	-0.477	-0.366
f2	4.089	1.465	-0.540	-0.143
f3	3.817	1.600	-0.764	0.057
Retention				
re1	5.335	1.367	0.394	-0.597
re2	5.203	1.349	0.028	-0.470
re3	5.291	1.278	0.027	-0.358
re4	5.166	1.427	0.496	-0.685

3.3 Reliability and Validity Tests

Test for reliability of each construct was assessed using the composite reliability (CR) and Cronbach Alpha scores. For a construct to be considered reliable in a model, it must have a CR score and Cronbach alpha value of above 0.7 (Fornell and Larcker, 1981; Nunally, 1978). Results of these tests as shown in Table 2 indicate that the CR and alpha score for each construct is above 0.70, which falls within the acceptable reliability range.

Convergent validity test was conducted using the average variance extracted (AVE). Using the formula proposed by Hair et al. (1998), the AVE was computed by dividing the sum of the squared standard loadings by the sum of the squared standard loadings plus the sum of indicator measurement errors. Results as shown in Table 3 indicate that convergent validity is assured as the AVE scores for all the constructs were above the recommended threshold of 0.50 (Fornell and Larcker, 1981).

TABLE 2. Variable Statistics, Factor Loadings, Composite Reliability, and AVE

Constructs	Factor Loadings	Cronbach Alpha	CR	AVE
Usefulness uf1 uf2 uf3	 0.735 0.867 0.879	0.865	0.846	0.688
Value va1 va2 va3	 0.652 0.841 0.751	0.787	0.617	0.565
Teaching quality tq1 tq2 tq3 tq4 tq6	 0.712 0.787 0.717 0.665 0.698	0.833	0.784	0.514
Financial support f1 f2 f3	 0.736 0.881 0.823	0.850	0.725	0.665
Retention re1 re2 re3 re4	 0.819 0.908 0.852 0.850	0.917	0.859	0.736

3.4 Measurement Model

Further, discriminant validity test was done to ascertain how distinct and uncorrelated the constructs are. The Fornell–Larcker criterion (Fornell and Larcker, 1981) prescribes that all AVEs should be higher than the squared inter-construct correlations. Results of this test as presented in Table 3 demonstrate that discriminant validity is satisfactory as the AVE scores for the constructs were greater than the squared cross-correlations of the constructs.

TABLE 3. Correlation Matrix

Factor	usefulness	value	Teaching quality	Financial support	Retention
usefulness	1				
Perceived value	0.394	1			
Teaching quality	0.422	0.396	1		
Financial Support	0.118	0.184	0.270	1	
Retention	0.422	0.428	0.403	0.333	1
Square root (AVE)	0.829	0.752	0.717	0.815	0.858
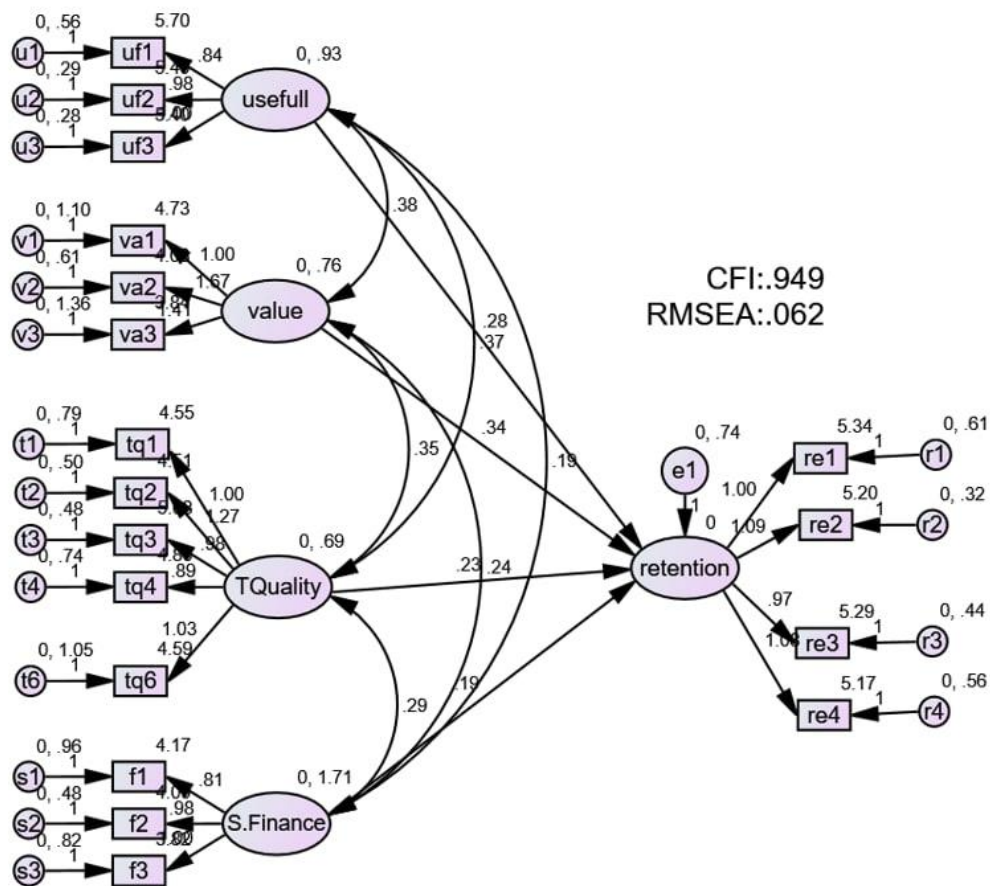
Figure 1

TABLE 4. Model Fit Indices for Measurement Model

Fit Indices	Accepted Values	Model Results	Remarks
Comparative Fit Index [CFI]	> 0.90 Bentler and Bonett (1980)	0.949	Good
Root Mean Square of Approximation (RMSEA)	< 0.08 Byrne (2001)		
		0.062	Good

One measurement model was estimated (see Table 4). In the first measurement model, the fit indexes (Comparative Fit Index [CFI] = 0.949 and root mean square error of approximation [RMSEA] = 0.062) suggest that the model fits the data.

3.5 Structural model and results

Results obtained from SEM appear in Figure 1 and Table 5. Figure 1 shows those standardized path coefficients considered significant for the relationships in the final model and presents the variance explained for each dependent variable. Table 5 provides an overview of our supported and unsupported hypotheses and lists significant, but not hypothesized, paths.

TABLE 5. Path coefficients and their significance

Hypothesis	Path	Co-efficient	P-Value	Result
H1	Usefulness → Retention	0.284	0.006***	Supported
H2	Value → Retention	0.337	0.007***	Supported
H3	T. quality → Retention	0.231	0.075*	Supported
H4	Financial sup. → Retention	0.186	0.005***	Supported

TABLE 6. Test for moderating effects of gender

Path	P-Value	Δdf
Usefulness → Retention	0.805	1
Value → Retention	0.891	1
T. quality → Retention (*larger in male than female*)	0.042**	1
Financial sup. → Retention		
	0.465	1

*** Significance at 1%
 ** Significance at 5%
  * Significance at 10%

The first set of hypotheses (table 5) examines the influence of usefulness, perceived value, teaching quality, and financial support on student retention. All hypotheses, which predict that the usefulness (β = 0.284; p < 0.01), perceived value (β = 0.337; p <

0.01), teaching quality ($\beta = 0.231$; $p < 0.1$), and financial support ($\beta = 0.186$; $p < 0.01$) positively influence student retention at 1%, 1%, 10%, and 1%, respectively.

The second results (table 6) examine the influence of usefulness, perceived value, teaching quality, and financial support on student retention which moderated by gender, respectively. As results, there are nonsignificant between the usefulness, perceived value, and financial support with the student retention. It means that there is no moderating effect of gender on the relationship between the usefulness, perceived value, and financial support with the student retention. On the other hand, the influence of teaching quality on the student retention was found to be significantly stronger for males than females ($p = 0.042 < 0.05$).

4. CONCLUSION

This study examined the factors and barriers that IT program students ranked as significant predictors of their decision to complete their degree. Four types of factors were used: degree's usefulness, perceived value, teaching quality, and financial support were investigated in relation to student retention in IT program studies. The results indicate that all these factors have a positive effect on retention. Overall, the results suggest that degree's usefulness, perceived value, teaching quality, and financial support are considered crucial for retention in IT program studies.

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