PREPARING CAMBODIA'S WORKFORCE FOR A DIGITAL ECONOMY

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DIGITAL INSIGHTS

THE KONRAD-ADENAUER-STIFTUNG

Freedom, justice and solidarity are the basic principles underlying the work of the Konrad-Adenauer-Stiftung (KAS). The KAS is a political foundation, closely associated with the Christian Democratic Union of Germany (CDU). As co-founder of the CDU and the first Chancellor of the Federal Republic of Germany, Konrad Adenauer (1876-1967) united Christian-social, conservative and liberal traditions. His name is synonymous with the democratic reconstruction of Germany, the firm alignment of foreign policy with the trans-Atlantic community of values, the vision of a unified Europe and an orientation towards the social market economy. His intellectual heritage continues to serve both as our aim as well as our obligation today. In our European and international cooperation efforts, we work for people to be able to live self-determined lives in freedom and dignity. We make a contribution underpinned by values to helping Germany meet its growing responsibilities throughout the world.

KAS has been working in Cambodia since 1994, striving to support the Cambodian people in fostering dialogue, building networks and enhancing scientific projects. Thereby, the foundation works towards creating an environment conducive to social and economic development. All programs are conceived and implemented in close cooperation with the Cambodian partners on central and sub-national level.

Digitalization is impacting all areas of life today. This holds especially true for the economy, which is undergoing a rapid transformation. Consequently the nature of work and the labor market are already changing and are about to change even more in the near future. In response to the challenges faced by companies in the process of moving from analog to digital, new positions emerge designed to tackle obstacles and steer the business towards innovation. There is a growing demand for jobs like Chief Digital Officer, Data Scientist or Digital Strategy Manager to analyze all available information, align the business strategy accordingly and ensure economic success online.

So what kinds of skills are needed in a digital economy? This is one aspect the study at hand gives some valuable insights into. Certainly manual labor is going to play a lesser role as automatization progresses. However, that doesn't mean that the human factor will no longer be required. In fact, social competence and the ability to interact with people can be identified as key skill that employers will look for even more in the future. Preparing a country's workforce for the digital economy is no small task and has to be addressed by companies as much as the government alike.

As a German think tank Konrad-Adenauer-Stiftung understands that modernization is a complex and sometimes difficult process. Also in Germany there are a lot of digitalization issues which are not yet resolved, for example many companies still struggle to find sufficiently qualified employees who are skilled in analyzing and interpreting Big Data. But obviously each nation is facing different problems which need individual solutions. Hence we are glad to support this study because it is not only interesting from an academic point of view but also provides concrete recommendations for the administration, businesses and workers how to get Cambodia ready for the digital future. We hope that it will be a useful tool for creating a prosperous modern economy.

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Executive Summary

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The skills needed in a digital economy

1. Content skills (which include ICT literacy and   active learning), cognitive abilities (such as creativity and mathematical reasoning) and process skills (such as active listening and critical thinking) will be a growing part of the core skills requirements for many industries in the future.

2. Social skills—such as persuasion, emotional intelligence and teaching others—will be in higher demand across industries.

3. A wide range of occupations will also require a higher degree of cognitive abilities—such as creativity, logical reasoning and problem sensitivity—as part of their core skill set.

The current skill gaps in Cambodia

1. Foreign language, technical or practical skills, customer handing, oral communication, problem solving, and teamwork skills are generally lacking in the labor market.

2. When it comes to specific skill sets to work effectively in a digital economy, three skill sets are currently missing.

   a. Managing online information: the ability to search for, identify, evaluate and communicate online data (selected by 90% of the firms surveyed)

   b. Online collaboration: the ability to use tools such as cloud storage, productivity applications, calendars, web meetings, learning environments (selected by 82% of the firms surveyed)

   c. Analytics: the ability to develop, format, modify and represent data using advanced spreadsheet formulas and functions to extrapolate trends and patterns (selected by 49% of the firms surveyed)

Employee's readiness to embrace digital transformation

1. Only half of the employees surveyed understand what a "digital economy" entails.

2. Half of them think their ICT skills are   at most "average".

3. The majority (82%) of the staff surveyed say they use basic technologies (internet, email, and Microsoft office) extensively in their current work but less than 40% say they do video calling, use online storage and productivity tools.

4. Similarly, most staff say they are able to perform basic ICT related tasks such as searching for information online, downloading/saving a photo, using emails and Microsoft Word, using messaging apps, completing online application forms, installing/uninstalling software, and using file sharing applications but only a few are capable of doing more advanced tasks such as assessing whether the information online is true, fixing basic computer software issues, designing a website/blog, and writing code.

5. More than 72% of the employees say they cannot depend on their company to upskill them.

6. All employees surveyed own a smart phone, 77% owns a laptop and 75% has a bank account.

Company's preparation for a digital economy

1. Around half of the companies say digital infrastructure plays a large part in their business operation and rates their existing digital infrastructure as "good".

2. The majority of the firms (83%) believe that digital technologies will significantly transform their industry in the next ten years.

3. However, only 42% believes that the effect of such transformation will have a positive outcome on their company while 44% are not sure how it will play out.

4. Only 22% of the companies say preparing for the digital transformation is one of the priorities for their management and only 17% have a clear and coherent strategy to prepare for the digital transformation.

5. The lack of human resources with the right skills, limited digital infrastructure, lack of leadership, insufficient funding, lack of local suppliers of technologies and lack of supportive policies are the commonly stated barriers preventing companies from taking advantage of digital trends.

6. To prepare for the digital economy, most firms say they are likely to invest in improving their existing products and services and in improving the capacity of their staff. However, almost half of the firms say they do not have a clear training plan.

Recommendations

For the government

> Invest in ICT infrastructure to facilitate deeper ICT integration in the education system. Seek private sector and development partner's support to connect more schools to electricity, internet and equip them with computer and other necessary learning equipment.

> Closely monitor the implementation progress of the policy of higher education vision 2030. Keep track of achievement and challenges to ensure the country is on course to achieve the set objectives.

> Closely monitor and evaluate the New Generation Schools pilot projects. Scale up across the country if proven successful.

> Gradually build up a large pool of ICT trainers for schools across the country.

> Build a steady supply of local professionals with advanced digital skills for the labor markets. This includes programming, analytics, robotics, and network security professionals.

> Develop a nation-wide initiative to retrain teachers to use innovative teaching methods by integrating ICT.

> Work with industry and introduce work integrated learning curriculums which expose students to authentic work environments as the foundation of their course experience.

> Reimagine vocational training for the digital economy by broadening its appeal beyond the traditional low and medium skilled occupations.

> Provide incentives to firms to invest in digital infrastructure and upskilling their staff.

> Promote entrepreneurship and innovation by creating a healthy competitive marketplace and by tackling the barriers faced by small and growing businesses.

> In a longer term, the government should monitor emerging labor market trends and explore ways of developing labor market programs and safety nets to help ensure inclusive growth and job quality in the digital economy.

For companies

> Develop a coherent digital strategy, which takes into consideration business operation, human resource planning and development and future investment. A well thought out digital strategy will help companies be prepared and make the most out of the rapid digital transformation.

> Invest in research and development. To thrive in a digital economy, companies must stay competitive and innovative. This entails research into new technologies to enhance business's efficiency, improve decision making, increase worker's productivity, and improve existing products and services or introduce new ones.

> Utilize government support. Companies should identify and make use of existing forms of government support available for technology transfer or skills development.

> Redefine human resource management. Traditional ways of managing company's human resources will not work in a digital economy. To attract and retain talents, firms should consider allowing more flexibility, promoting creativity and creating an open and conducive work environment for staff.

> Work with industry partners to reskill or upskill existing staff and develop a clearer view on future skills and employment needs.

For workers and workers-to be

> In an ever increasingly competitive job market, existing workers and future workers must take personal responsibility for one's own lifelong learning and career development.

> There needs to be a general understanding that regardless of discipline, graduates will need to be technically proficient, with higher-level cognitive skills in, for example, analytics, applications, network management, security and privacy. Problem solving, creativity, communication, collaboration, adaptability and initiative will increasingly need to be all part of the package.

> There are excellent free online resources that everyone can use to improve their existing skills or acquire new ones. The following platforms offer a wide variety of useful subjects and topics to learn:

  - Coursera (www.coursera.org)
  - edX (www.edx.org)
  - Udemy (www.udemy.com)
  - Udacity (www.udacity.com)
  - Khan Academy (www.khanacademy.org)

Introduction

For the last two decades Cambodia has been one of the fastest growing countries in Asia with an average annual GDP growth rate of 8.1%.[1] Economic progress in recent years has allowed Cambodia to invest in physical and social infrastructure, attract foreign direct investment, create jobs and lift millions of its people out of poverty.

Despite the good progress, Cambodia's long-term growth prospects might be hampered by its low competitiveness. The 2018 Global Competitiveness Report ranks Cambodia as one of the least competitive countries in ASEAN. Hampered by a poorly educated workforce, inefficient institutions, a lack of infrastructure and low levels of business sophistication and innovation, Cambodia ranked 110 out of 140 economies — falling from 109 in the previous year's report.[2]

It is clear that Cambodia can no longer depend on the same old growth drivers. For the last two decades, Cambodia has relied on garments, rice, tourism and construction as its growth-supporting industries. This provides limited sectoral diversity and exposes the economy to demand disruptions and price shocks. To sustain long-term healthy growth, Cambodia needs to diversify and modernize its economy.

To increase competitiveness and seize the opportunities of the rapid technological evolutions, Cambodia's government announced a plan in 2018 to be ready to transition into a digital economy by 2023. A digital economy is the one in which economic processes, transactions, interactions and activities are based on digital technologies, which include electronic tools, systems, devices and resources that generate, store or process data.

The digitization of the economy creates benefits and efficiencies as digital technologies drive innovation and fuel job opportunities and economic growth. However, the benefits of a digital economy are not automatic. For a digital economy to thrive, there are a number of enabling factors including a favorable regulatory environment, sound supporting digital infrastructure, and strong human capital.

This research focuses on the human capital aspects of Cambodia's transformation toward a digital economy. A well-functioning digital society requires that individuals obtain certain capabilities and skills so they can function effectively as digital citizens, consumers and employees who can use digital technology, handle large amounts of data and act with a high degree of flexibility and creativity.

Digital skills are becoming increasingly important throughout the workforce. Jobs previously considered low tech and requiring low levels of digital skills are being drawn into the digital age. Workplaces need skilled workers to survive in a constantly changing digital environment. If businesses and organizations cannot keep up with technological development, they risk losing customers and revenue to digitally empowered competitors. To drive growth and remain resilient, employers need workers who can use digital tools efficiently and creatively and adjust to the accelerated pace of change.

Research Questions and Objectives

This research aims to contribute to a debate on a more integrated approach to human capital development to prepare for a digital economy. The goal is to provide a greater understanding of Cambodia's workforce and how ready they are to work in a digital economy by assessing the existing skill gaps in the context of a digital economy and exploring policy options to effectively equip the workforce with appropriate digital skills for enhanced workplace participation and sustainable economic productivity. In essence, the research attempts to address the following questions:

> What skill sets will be needed in a digital economy?

> What are the current skill gaps in Cambodia?

> How ready are employees to embrace digital transformation?

> What companies are doing to prepare for a digital economy?

Research Method

This research employs a mixed methodology drawing on the combined strengths of a structured employer and employee survey, secondary data mining, stakeholder interviews and case studies.

Desk Research

An extensive review of the existing literature was conducted to understand the digital economy in local, regional and international contexts and to inform the survey design. Key reports from trusted institutions such as the World Economy Forum, World Bank, and McKinsey, journal articles, news reports and documents published by local government were consulted. The review allowed the researcher to learn about the global and regional trends of a digital economy, the challenges for digital transformation especially for developing countries, the skill sets needed in a digital economy, the current status and development of Cambodia's digital economy. A list of key materials consulted is included in the reference list.

Employer Survey

While the desk review provides overall understanding, especially at country and regional levels, about key challenges in digitalization and skills sets needed in digital economy, a survey with employers was also conducted to understand these issues at firm level. In this survey, an online questionnaire was used to find out about the digital infrastructure in companies, how well equipped are their human resources with digital skills, and how they prepare for the future of digitalization. A total of 61 firms from various industries completed the online survey. See the breakdown list of firms in figure 1 and 2 below.
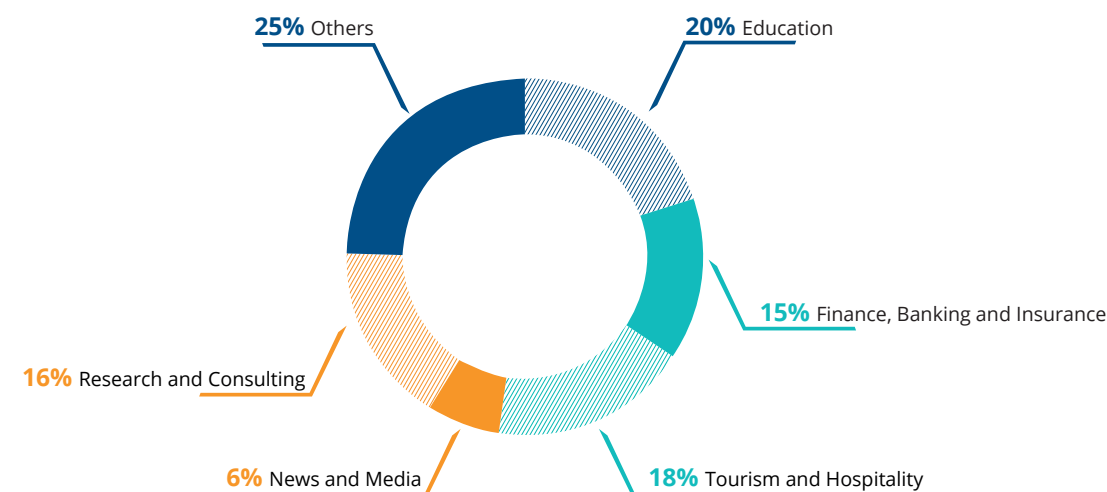
Figure 1: Number of firms surveyed (by industry type)

- 25% Others
- 20% Education
- 15% Finance, Banking and Insurance
- 18% Tourism and Hospitality
- 6% News and Media
- 16% Research and Consulting
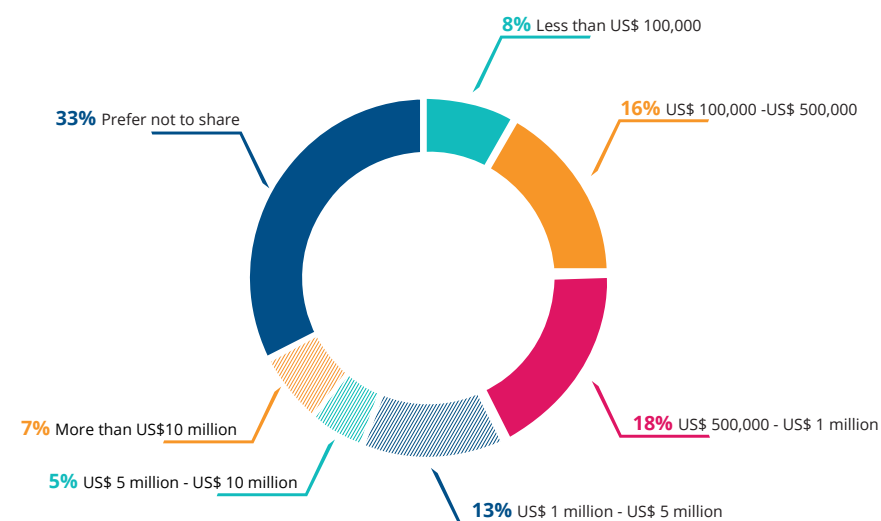
Figure 2: Number of firms surveyed (by annual revenue)

- 8% Less than US$ 100,000
- 16% US$ 100,000 -US$ 500,000
- 18% US$ 500,000 - US$ 1 million
- 13% US$ 1 million - US$ 5 million
- 5% US$ 5 million - US$ 10 million
- 7% More than US$10 million
- 33% Prefer not to share

1. ADB (2016)
2. World Economic Forum (2018)

Employee Survey

The researcher also surveyed 100 employees from various industries to assess their understanding of the digital economy, the extent to which they use technology at work and how ready they are to work in a digital economy. Half of the survey participants are female and 66% have a bachelor degree while 32% holds a master degree. The average age of the participants is 29, with the youngest aged 22 and the oldest aged 40. 93% of the participants works full time and about 50% have worked in their current company between one and three years. The participants work in different departments including Customer Service/ Care/Support, Finance/Accounting, Human Resources, Information Technology, Legal, Marketing/Advertising, Production, Research & Development, Sales/Retails/Business Development, Development/Fundraising.

Legend (chart 1):
- No formal education
- Primary/secondary school
- Bachelor degree
- Master degree
- Ph.D
- Vocational training

Legend (chart 2):
- Less than 1 year
- 1-3 years
- 4-6 years
- 7-10 years
- 10 years or more

Legend (chart 3):
- Customer Service/Care/Support
- Finance/Accounting
- Human Resources
- Information Technology
- Legal
- Marketing/Advertising
- Maintenance/Operation
- Production
- Research & Development
- Sales/Retails/Business Development
- Development/Fundraising
- Other

Figure 3: demographic of participant employees

Stakeholder Interviews

To get a deeper understanding on the issues, the researcher also conducted one to one interviews with key stakeholders including business leaders, representatives from the Ministry of Post and Telecommunication, Ministry of Education, Ministry of Economy and Finance, experts from the World Bank and ILO. The interviews were mainly to obtain additional insights on key issues identified from the survey. For a full list of stakeholders interviewed, please refer to Annex 1.

What Is A Digital Economy?

According to the OCED, "digital economy" is an umbrella term used to describe markets that focus on digital technologies. It refers to the full range of our economic, social and cultural activities supported by the Internet and related information and communications technologies.[3]

The digital economy permeates all aspects of society, including the way people interact, the economic landscape, the skills needed to get a good job, and even political decision-making. The internet and its accessory activities including information and communication technologies have given birth to new products, services, jobs, enterprises and even markets.

Besides the internet and the internet of things, several new inventions have altered the way we live and economically engage. Artificial intelligence, machine to machine communication, sensor technology, robotics, big data, cloud computing, 3D printing etc., indicate that the role of digital technologies in economic activities are going to rise.

Today, digital economy is worth US $11.5 trillion globally, equivalent to 15.5% of global GDP and that has grown two and a half times faster than global GDP over the past 15 years, almost doubling in size since the year 2000.[4] The lion's share of that value is produced in the world's largest economies, with 35% in the United States, 13% in China, 8% in Japan and around 25% collectively in the European Economic Area. Assuming current growth rates of digital investments over the next 10 years, the report estimates that by 2025 the digital economy will be US $23 trillion globally, or 24.3% of global GDP.[5]

The digital economy fosters growth and productivity and supports inclusive development in a number of ways. The adoption of digital technologies by a large number of consumers, firms and governments raises the productivity of capital and labor and enables the participation in global value chains.[5] Digital technologies allow companies and government to offer products and services more effectively and efficiently.

3. OCED (2012)
4. Ibid.
5. Ibid.
6. Miller, B. and R.D. Atkinson (2014)

The digital economy also contributes to a more inclusive society by lowering transaction costs, reducing information asymmetries and increasing the access of a whole range of markets and services to previously marginalized groups.[7]

The rise of the digital economy is not without its challenges, however. Digitalization can disrupt the job market by creating new jobs, destroying old ones, and altering the composition of existing jobs. Workers who are fast to embrace digital skills will benefit from the trends but those who are slow or are unable to adapt will lose out in the job market. As such, digitalization might lead to unemployment and worsen existing disparities in the income distribution.

The non-traditional features inherent to the digital economy also present new challenges to policy makers. The cross-border production and consumption of digital goods and services, for example, challenges public policies on taxation and trade that are traditionally geographically based. The rise of the "gig" economy[8] such as Uber and Grab challenge labor and social policies, such as health insurance, training, and working conditions, that are designed to be implemented by firms and organizations in many countries.

Data exchanges across borders and national jurisdictions raise issues around data ownership and privacy. There are debates on who own the data that are shared on digital platforms such as Facebook and Twitter and who should be responsible to keep those data secured. Governments' and businesses' increasing reliance on digital systems also leaves them more vulnerable to cyberattack. Without strong defense mechanisms, critical infrastructure such as financial systems, power plants, traffic systems, health care facilities can be virtually attacked which if unmanaged will lead to social and economic catastrophe.

Digitalization poses particular challenges for developing countries. Maximizing the benefits of the digital economy depends on a basic level of ICT infrastructure that many developing economies still lack. As such, developing countries need to engage in strategic planning to maximize the development impact of digitalization. Countries that fail to do so run the risk of falling behind in their international competitiveness and may find it increasingly difficult to improve the wellbeing of their populations.

How Technology Is Changing The Nature Of The Work And Labor Market

The advance of technology has significantly changed the job market and the nature of work. The mobile internet has

7. World Bank (2018)
8. A gig economy is a free market system in which temporary positions are common and organizations contract with independent workers for short-term engagements

applications across business and the public sector, enabling more efficient delivery of services and opportunities to increase workforce productivity. With cloud technology, applications can be delivered with minimal or no local software or processing power, enabling the rapid spread of internet-based service models.

The use of remote sensors, communications, and processing power in industrial equipment and everyday objects will unleash an enormous amount of data and the opportunity to see patterns and design systems on a scale never before possible.[9]

Advanced robots with enhanced senses, dexterity, and intelligence can be more practical than human labor in manufacturing, as well as in a growing number of service jobs, such as cleaning and maintenance.[10]

Progress in artificial intelligence, machine learning, and natural user interfaces (e.g. voice recognition) are making it possible to automate knowledge-worker tasks that have long been regarded as impossible or impractical for machines to perform.[11]

A range of technological advances in manufacturing technology promises a new wave of productivity. For example, 3D printing allows on-demand production, which has far-ranging implications for global supply chains and production networks.[12]

New technologies are enabling workplace innovations such as remote working, co-working spaces and teleconferencing. Organizations are likely to have an ever-smaller pool of core full-time employees for fixed functions, backed up by colleagues in other countries and external consultants and contractors for specific projects.

While these impending changes hold great promise for future prosperity and job creation, many of them also pose major challenges requiring proactive adaptation by corporations, governments, societies and individuals. As whole industries adjust and new ones are born, many occupations will undergo a fundamental transformation.

Nearly 50% of 321 global companies surveyed by the World Economy Forum expect that automation will lead to some reduction in their full-time workforce by 2022, based on the job profiles of their employee base today.[13] However, 38% of businesses surveyed expect to extend their workforce to new productivity-enhancing roles, and more than a quarter expect automation to lead to the creation of new roles in their enterprise.[14]

9. World Economic Forum 2016
10. Ibid.
11. Ibid.
12. Ibid.
13. Ibid.
14. Ibid.

It is estimated that the current trends could lead to a net employment impact of more than 5.1 million jobs lost to disruptive labor market changes over the period 2015–2020, with a total loss of 7.1 million jobs— two thirds of which are concentrated in the Office and Administrative job family—and a total gain of 2 million jobs, in several smaller job families such as Business and Financial Operations, Management, Computer and Mathematical, Architecture and Engineering and Sales and Related.[15]

Table 1: Potential job loss and gain by job category

Job category	Net employment (thousand)
Office and Administrative	–4,759
Manufacturing and Production	–1,609
Construction and Extraction	–497
Arts, Design, Entertainment, Sports and Media	–151
Legal	–109
Installation and Maintenance	- 40

Job category	Net employment (thousand)
Business and Financial Operations	+492
Management	+416
Computer and Mathematical	+405
Architecture and Engineering	+339
Sales and Related	+303
Education and Training	+66

Source: World Economic Forum 2016

15. Ibid.

Digital technologies should make it possible to produce more goods and services with less labor, which will expose some workers to the risk of unemployment or lower wages. However, higher productivity also translates into lower prices and new products, and higher final demand and higher employment, and possibly higher wages, thus compensating for the initial disruption. What makes this process challenging for policies and workers is its timing: the labor-saving effects of digital technologies hit employment quickly but new job opportunities emerge slowly.

The McKinsey also estimated that between 400 million and 800 million individuals could be displaced by automation and need to find new jobs by 2030 around the world. New jobs will be available but people will need to find their way into these jobs. Of the total displaced, 75 million to 375 million may need to switch occupational categories and learn new skills.[16]

What Skills Are Needed In A Digital Economy?

Digital technologies are reshaping business models and firms' human resource management. Most employers surveyed by the World Economic Forum expect that, by 2022, the skills required to perform most jobs will have shifted significantly. In many industries and countries, the most in-demand occupations or specialties did not exist 10 or even five years ago, and the pace of change is set to accelerate. According Accenture, 65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist. 95% of thought leaders, business executives, NGOs, and influencers in education across Asia, Europe and America believe they need new skills to work and stay relevant.[17]

Jobs enabled by digital technologies will require different skills. Some of these skills are technical, such as software development, web management, etc., but others have little to do with technology. For instance, higher frequency of digital information in firms calls for better planning and quicker responses, more co-operation across teams as well as stronger leadership. According to the World Bank, individuals will need three sets of skills to function productively in the economy of the future[18] :

> Higher-order cognitive skills—"the ability to understand complex ideas, deal with complex information processing, adapt effectively to the work environment, learn from experience, engage in various forms of reasoning, to overcome obstacles by critical thought."

> Technical skills, including ICT skills—"those abilities needed to carry out one's job, such as the ability to repair a water leakage for a plumber, the knowledge to operate a machine for a worker at a factory, or the knowledge to work with a software for a person at a bank. ICT skills refer to the effective application of ICT systems and devices and range from ICT specialists who have the ability to develop, operate and maintain ICT systems, to basic ICT users, who are competent users of the mainstream tools needed in their working life."

> Interpersonal skills—"a broad range of malleable skills, behaviors, attitudes and personality traits that enable individuals to navigate interpersonal and social situations effectively."

According to the World Economic Forum's Future of Jobs report, content skills (which include ICT literacy and active learning), cognitive abilities (such as creativity and mathematical reasoning) and process skills (such as active listening and critical thinking) will be a growing part of the core skills requirements for many industries in the future.[19] Social skills—such as persuasion, emotional intelligence and teaching others—will be in higher demand across industries than narrow technical skills, such as programming or equipment operation and control.[20]

The same report concludes that a wide range of occupations will require a higher degree of cognitive abilities—such as creativity, logical reasoning and problem sensitivity—as part of their core skill set. More than half (52%, the blue bar of figure 4) of all jobs expected to require these cognitive abilities as part of their core skill set in 2020 do not yet do so today, or only to a much smaller extent. In another 30% of jobs (dark blue bar), demand for these skills is currently already high and will remain so over the 2015–2020 period. Only 18% of jobs requiring high cognitive skills today are expected to do so less in the future (the gray bar).[21]

At the other end of the scale, among all jobs requiring physical abilities less than one third (31%) are expected to have a growing demand for these in the future, about as many as the proportion of jobs in which physical abilities are anticipated to decline in importance (27%). The skills bundle with the most stable demand across all jobs requiring these skills today or in the future are technical skills: nearly half (44%) of all jobs requiring these skills today will have a stable need for them in the coming years.

Figure 4: : Changes in demand for core work-related skill 2015-2020
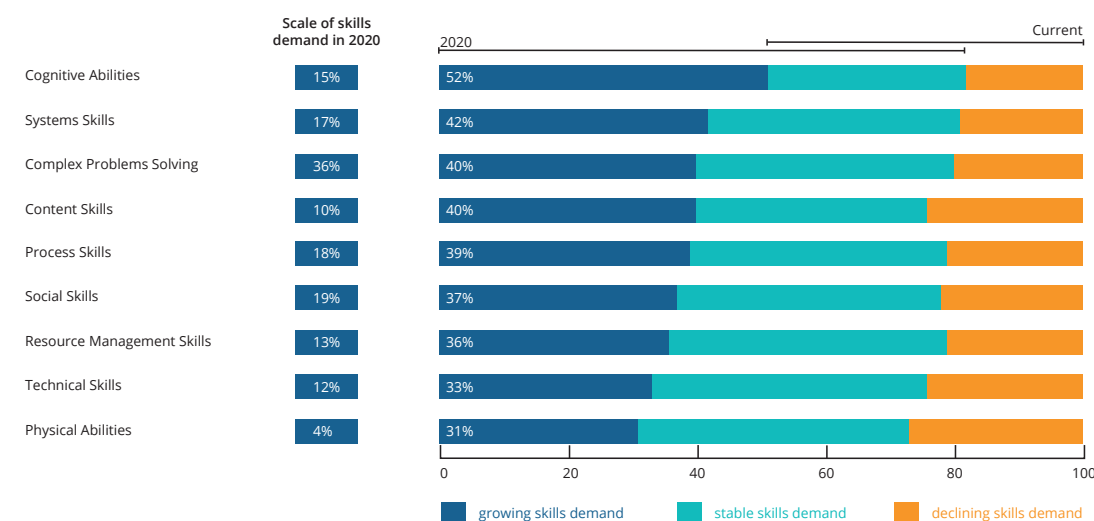
Source: *Future of Jobs Survey, World Economic Forum 2016*

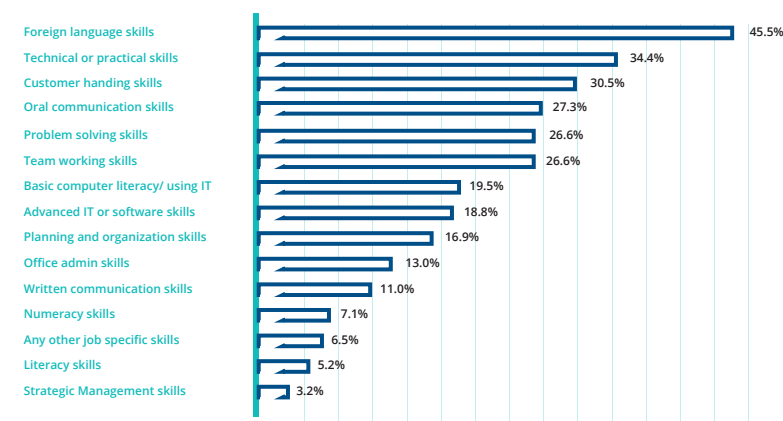## What Are The Current Skill Gaps In Cambodia?

The lack of skills in the labor market has risen steadily in recent years. Based on an employer skills need survey conducted by National Employment Agency (NEA) in 2017, 47.9% employers stated that they experienced recruitment difficulties, of which around 53.1% was caused by a low number of applicants with required skilled and the lack of work experience or qualification.[22]

The recruitment difficulties issues are the most pronounced in the accommodation sector, 62.8% of construction employers stated that they had difficulty recruiting staff. It is followed by health (61.4%), education (53.0%), food and beverage (52.1%), logistics, warehousing and transportation (52.0%), finance and insurance (51.8%). The least affected by recruitment difficulties are followed by construction (36.7%), ICT (33.9%), garment, footwear and apparel (33.8%), and rubber and plastics (7.3%).[23]

When it comes to skills that employers look for, foreign language, technical or practical skills, customer handing, oral communication, problem solving, and team work skills come out on top (Figure 5).[24] Jobseekers who do not possess the skills demanded by employers will find it particularly difficult to find a job. Whereas improving skills that employers are looking for, increase the possibility to get jobs.

Figure 5: : Types of skill shortage

Source: *Employer Survey, 2018*

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16. McKinsey 2018
17. Accenture 2017
18. World Bank 2016

19. World Economic Forum 2016
20. Ibid.
21. Ibid.

22. National Employment Agency 2018

23. National Employment Agency 2018
24. Ibid.

The NEA's survey provides a good overview of the general lack of skills in Cambodia's labor market. The findings of this research complement the report by providing more insights into the shortage of skills needed for the digital economy. Based on the survey of 61 companies, 71% of the firms say their staff have good technical skills but only 30% and 20% say the same thing for soft skills and ICT skills respectively (Figure 6). Technical skills in this research is referred to the core competency of the staff need to perform his or her role such accounting skill for an accountant, teaching ability for a teacher. Soft skills are the personal attributes (interpersonal skills, problem solving, teamwork….) employees need to succeed in the workplace while ICT skills are skills needed to use efficiently the elementary functions of information and communication technologies to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the internet. Around 94% of the companies surveyed agree that their employees will need further training to perform their work effectively in the future (Figure 7). Almost everyone acknowledges that searching for and hiring people good soft skill and ICT skills is challenging (Figure 8).

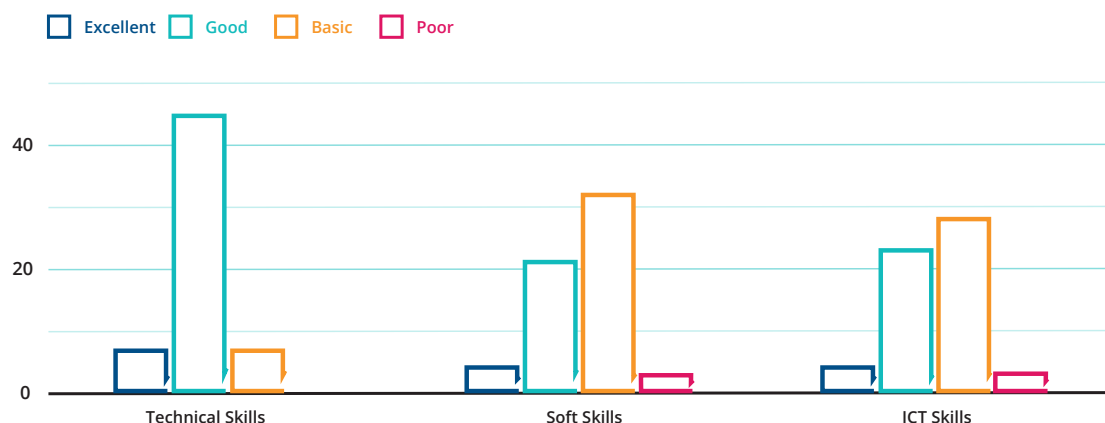*Figure 6: Employers' rating of their staff's skills*

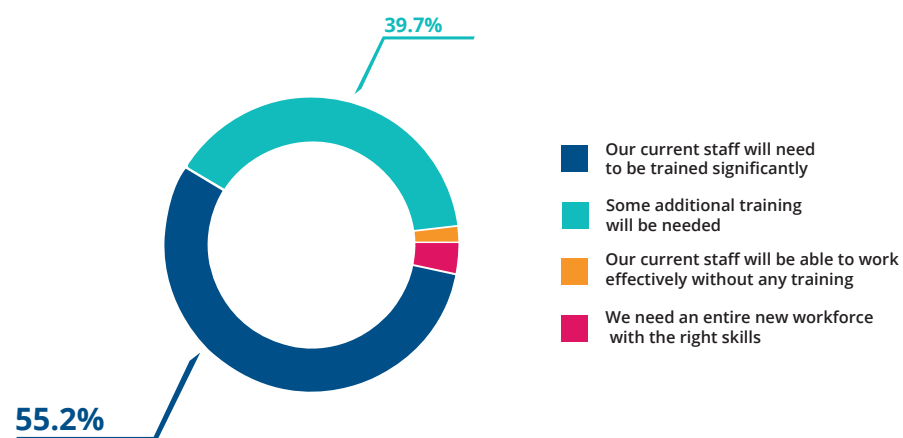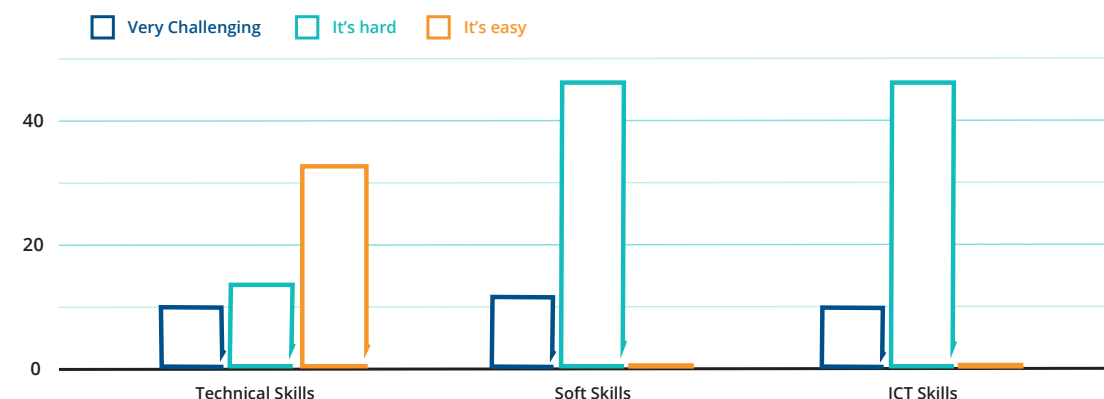*Figure 7: The perceived need for staff training to prepare for a digital economy*

Figure 8: How hard it is to hire staff with the right skills

When asked which ICT skills will be important for their general staff in the next 10 years, 49% of the firms surveyed choose "analytics" which refers to the ability to develop, format, modify and represent data using advanced spreadsheet formulas and functions to extrapolate trends and patterns, 82% say "online collaboration" which entails using tools such as cloud storage, productivity applications, calendars, web meetings, learning environments and 90% choose "managing online information" which refers to the ability to search for, identify, evaluate and communicate online data (Figure 9)

Figure 9: ICT skills needed for future (% of firms surveyed)
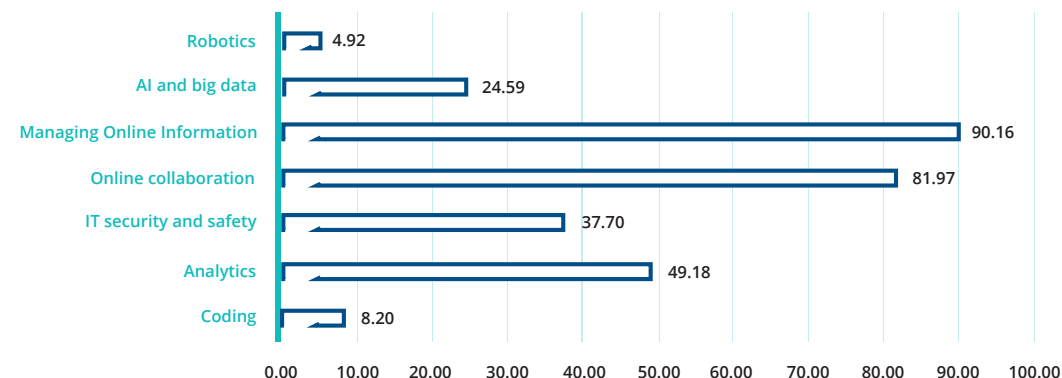
How Ready Are Employees To Embrace Digital Transformation?

To answer this question, the researcher surveyed 100 employees from various sectors to access their understanding of the concept and their readiness to work in a digital economy. When given the definition of the term "digital economy", only 53% of the participants are confident to say that they understand what it means. Employees with higher level of education generally tend to say they understand the concept.

Despite their low understanding of the term, the majority of the staff surveyed says they use technologies extensively in their current work (figure 10). The most common forms of technology they use include internet, emails, and Microsoft office. Only around half the employees say they use virtual communication channels, cloud storage or productivity tools (figure 11).

Figure 10: : *How often staff use technologies in their work*

- 42.2%
- 12.7%
- 40.2%

Legend:
- It's everything I do
- I use it frequently
- I use it sometimes
- I rarely use it
- I never use it
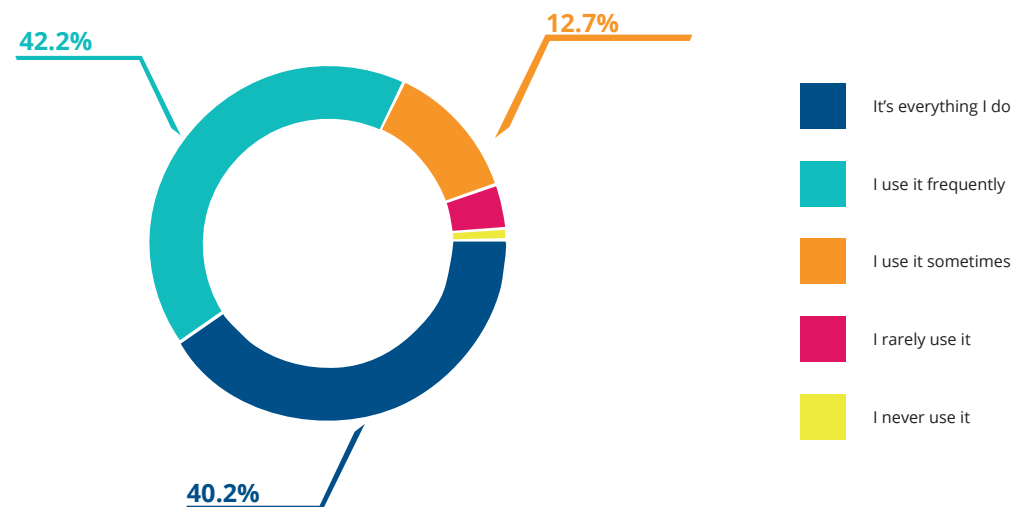
Figure 11: *Common technologies staff use at work*
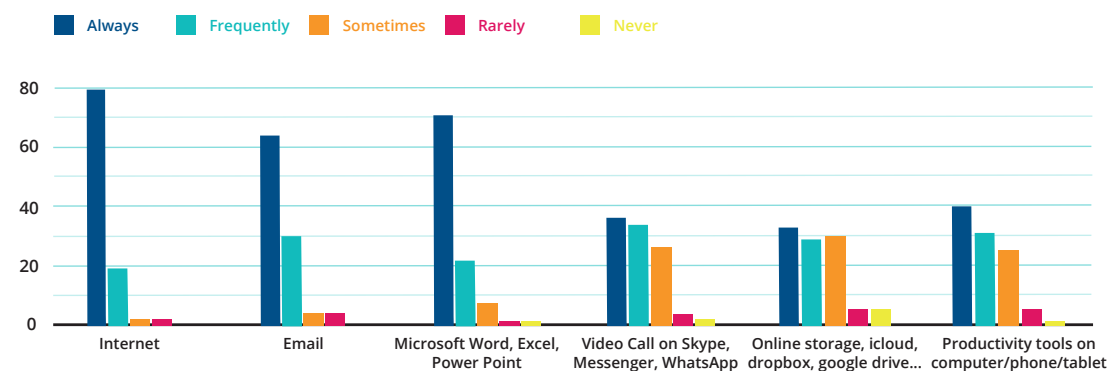
Legend: Always, Frequently, Sometimes, Rarely, Never

Categories: Internet, Email, Microsoft Word, Excel, Power Point, Video Call on Skype, Messenger, WhatsApp, Online storage, icloud, dropbox, google drive..., Productivity tools on computer/phone/tablet

Most staff say they are able to perform basic ICT related tasks such as searching for information online, downloading/ saving a photo, using emails and Microsoft Word, using messaging apps such as WhatsApp, Line, Telegram, Viber, completing online application forms, installing/uninstalling software, using file sharing applications such as Dropbox, Onedrive, Google Drive. The responses become fewer and fewer when it comes to more advanced ICT skills such as assessing whether the information online is true, fixing basic computer software issues, designing a website/blog, and writing code (figure 12)

Figure 12: ICT tasks staff are able to perform

■ Yes ■ N o
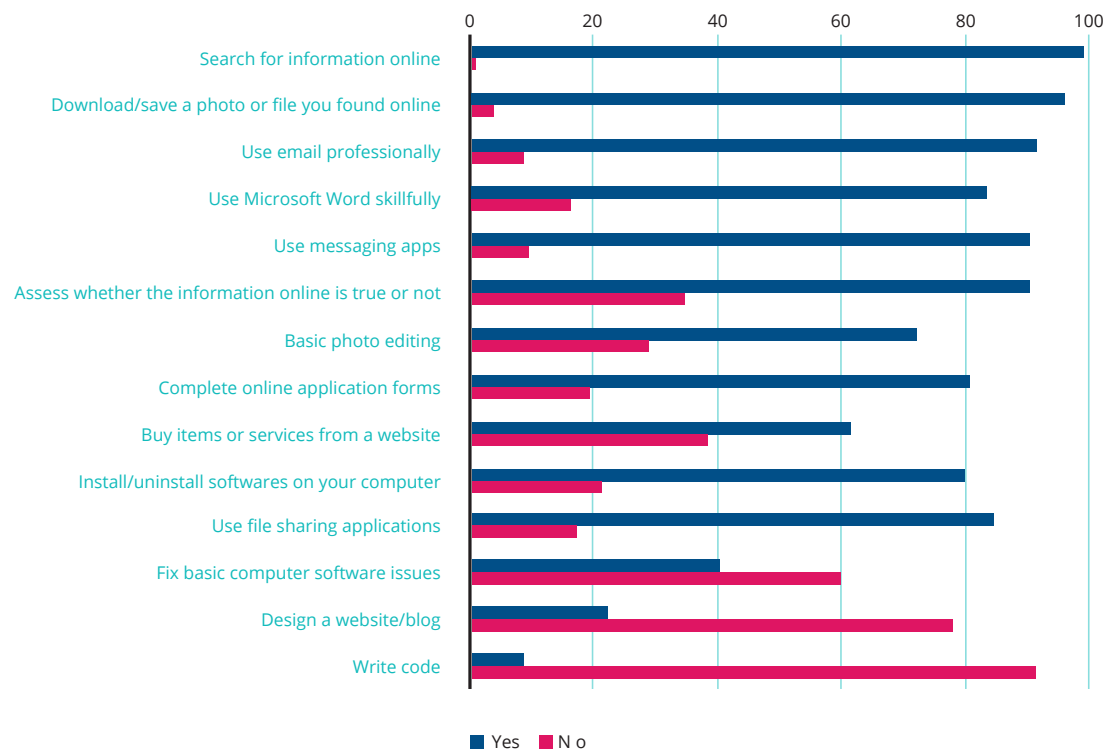
When asked to rate their skill, more than half of the employees surveyed think their technical core competency and ICT skills is at most "average". Around 72% and 80% say they are at least "good" with soft skills and English language respectively (figure 13). More than 72% of the employees say they cannot depend on their company to upskill them. They have to find ways to improve their skills by themselves. But almost half of survey participants complained that it is hard to find training on all of these skills except for English training (figure 14).

Figure 13: Employee's skill self-assessment

■ Very good ■ Good ■ Average ■ Poor ■ Very poor
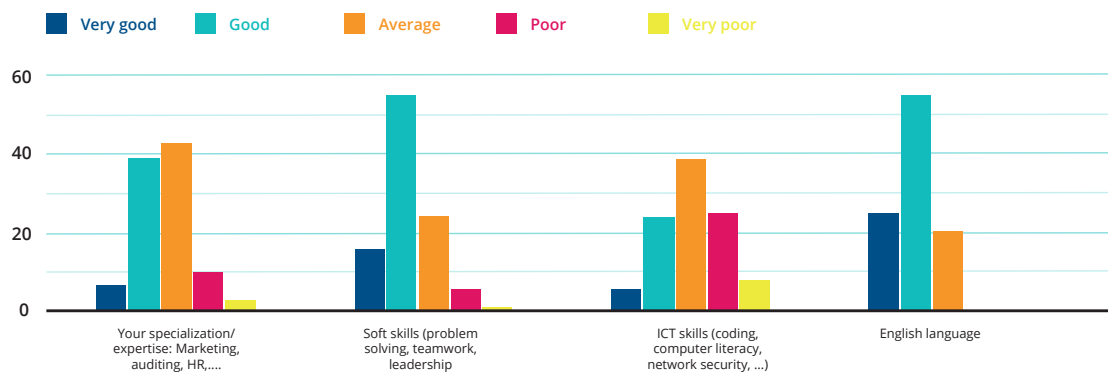
Figure 14: How hard is it to find training

■ Hard ■ Easy
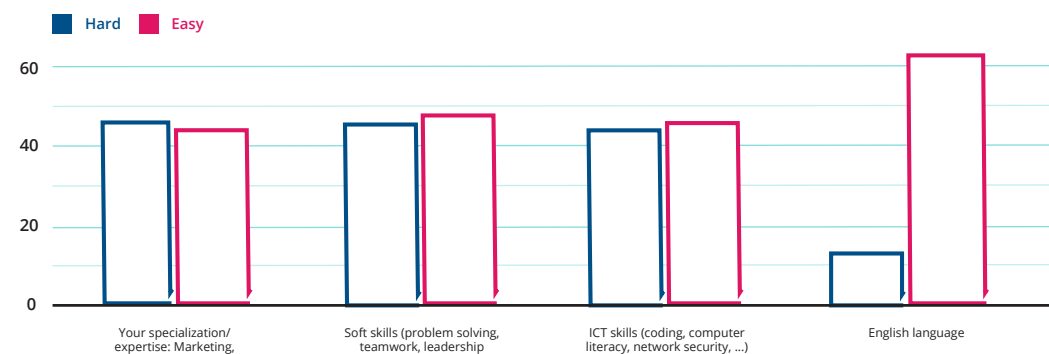
The research also finds that each and every employee surveyed owns a smart phone, 77% own a laptop and 75% have a bank account. This suggests that the majority of employees have the means to adapt to new technologies when they come available (figure 15)

Figure 15: Digital stuff that employees own

- Smart phone: 101 (99%)
- Tablet: 21 (20.6%)
- Laptop: 79 (77.5%)
- Desktop: 33 (32.4%)
- Camera: 23 (22.5%)
- Bank account: 77 (75.5%)
- Credit card or debit card: 42 (41.2%)
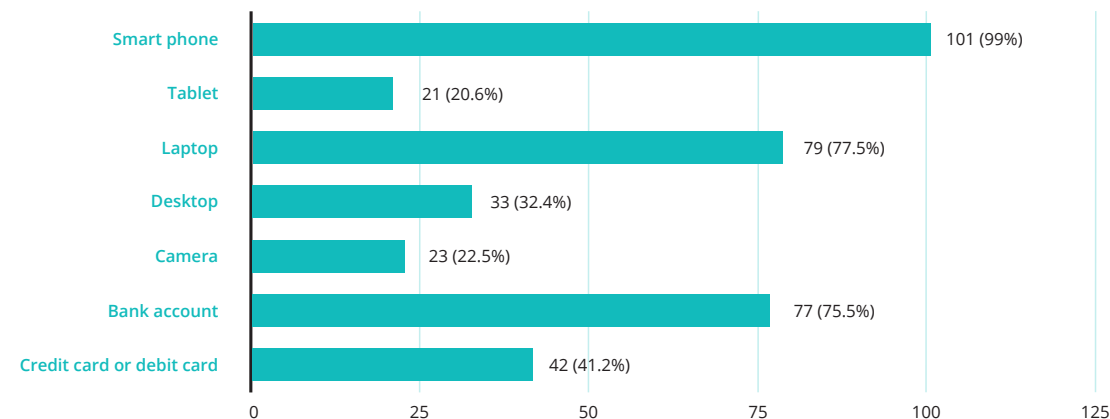
WHAT ARE COMPANIES DOING TO PREPARE FOR A DIGITAL ECONOMY?

Around half of the companies says digital infrastructure plays a large part in their business operation (figure 16). Digital infrastructure in this research refers to quality of the internet, computer network, security system, data center, website, software, mobile and web applications, etc. 54% of the firms surveyed rate their existing digital infrastructure as "good", and 30% rated "basic". The most common technologies they use include Point of Sale (POS) system, social media, website, and email marketing (figure 17).

Figure 16: the extent to which companies use digital technologies for their businesses

- **It's everything we do**
- **Digital technologies play a LARGE part in our business operation**
- **Digital technologies play a MODERATE part in our business operation**
- **Digital technologies play only a SMALL part in our business operation**
- **We do not use digital technologies at all**

29.3%
15.5%
48.3%

Figure 17: The use of digital technologies among firms

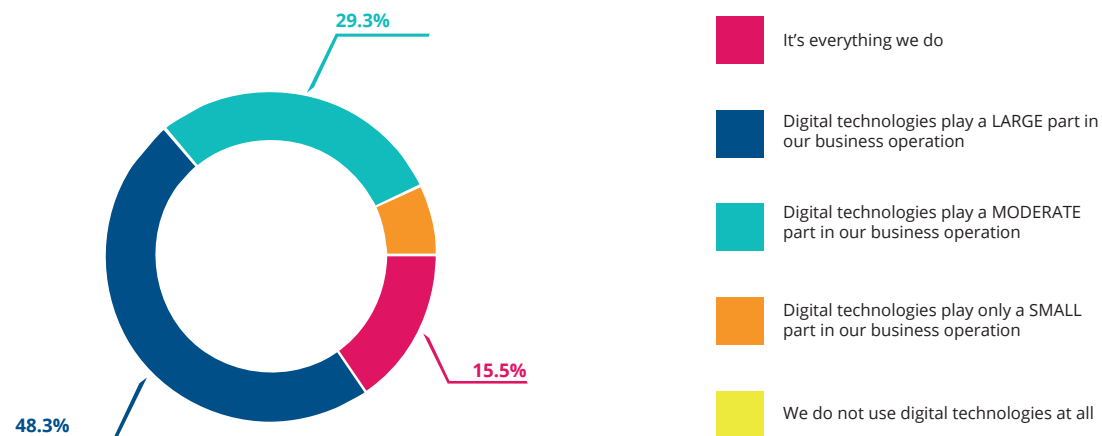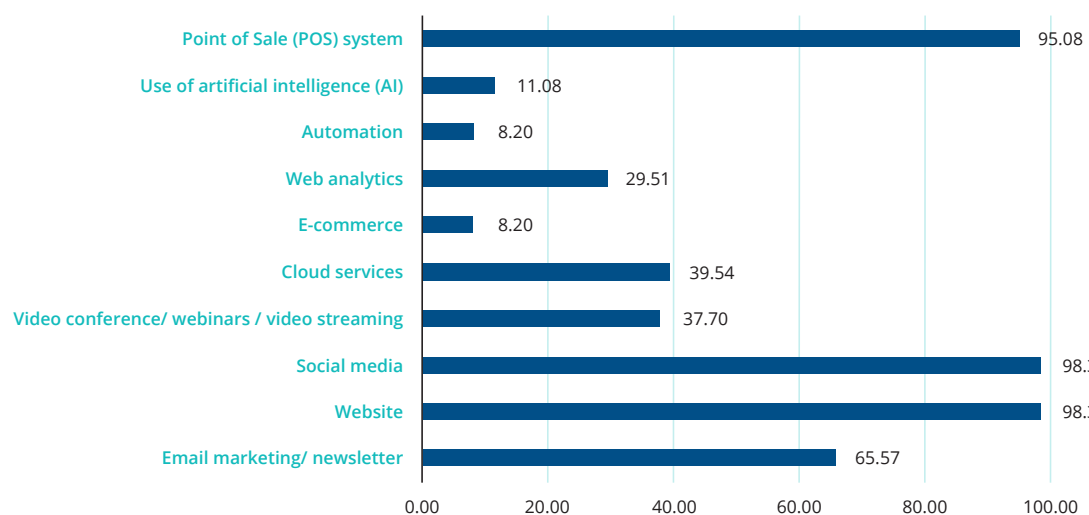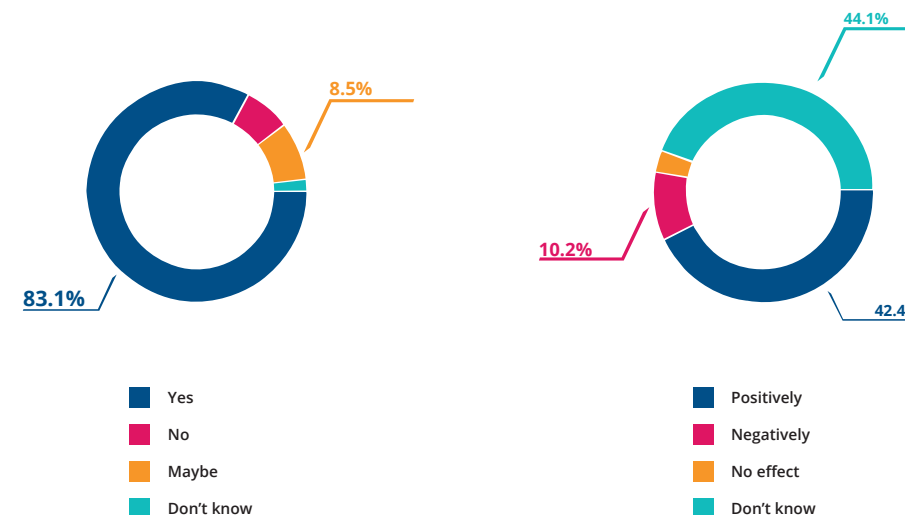|	
Point of Sale (POS) system	95.08
Use of artificial intelligence (AI)	11.08
Automation	8.20
Web analytics	29.51
E-commerce	8.20
Cloud services	39.54
Video conference/ webinars / video streaming	37.70
Social media	98.36
Website	98.36
Email marketing/ newsletter	65.57

The majority of the firms (83%) believe that digital technologies will significantly transform their industry in the next ten years. However, only 42% believe that the effect of such transformation will have a positive outcome on their company while 44% is not sure how it will play out (figure 18). This is because the net effect of digital transformation on companies will largely depend on how well prepared they are in grabbing the opportunities brought by the technology.

Figure 18: Perceived effect of digital technologies

8.5%
83.1%

- **Yes**
- **No**
- **Maybe**
- **Don't know**

44.1%
10.2%
42.4%

- **Positively**
- **Negatively**
- **No effect**
- **Don't know**

Only 22% of the companies say preparing for the digital transformation is one of the priorities for their management and only 17% have a clear and coherent strategy to prepare for the digital transformation (figure 19). The lack of human resources with the right skills, limited digital infrastructure, lack of leadership, insufficient funding, lack of local supplier of technologies and lack of supportive policies are the commonly stated barriers preventing companies from taking advantage of digital trends.

Figure 19: Is preparing for the digital transformation a firm's priority?

37.3%
39%
22.2%

- **Yes**
- **No**
- **To some extent**
- **Don't know**

28.8%
54.2%
16.9%

- **Yes**
- **No**
- **To some extent**
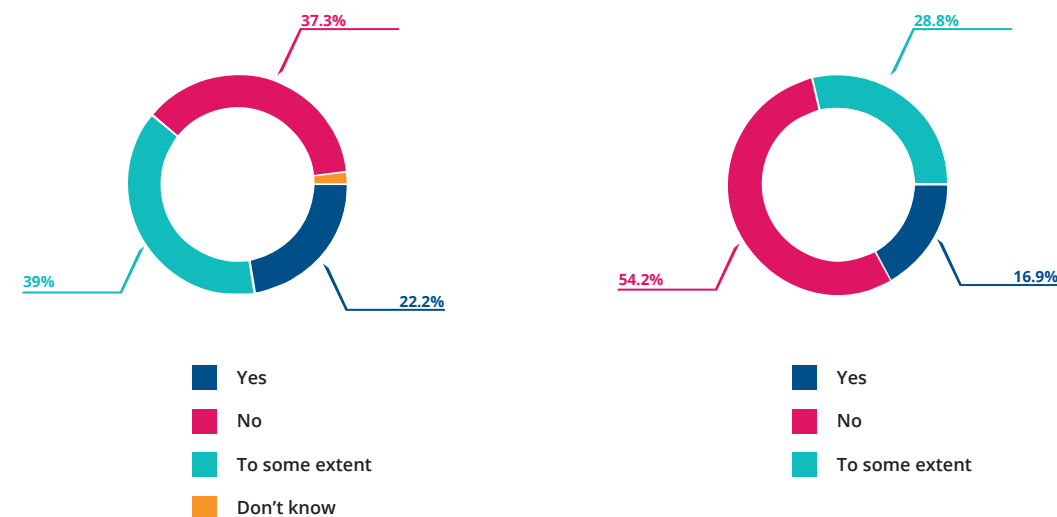
When asked what technologies will be important for their business in the next 10 years, a majority of the firms chooses software for specific business function (i.e. sale, HR, marketing, production and procurement) and analytics tools and solutions for business. Only a few firms foresee the use of virtual reality or robotics (figure 20).

Figure 20: Anticipated technologies needed for future business
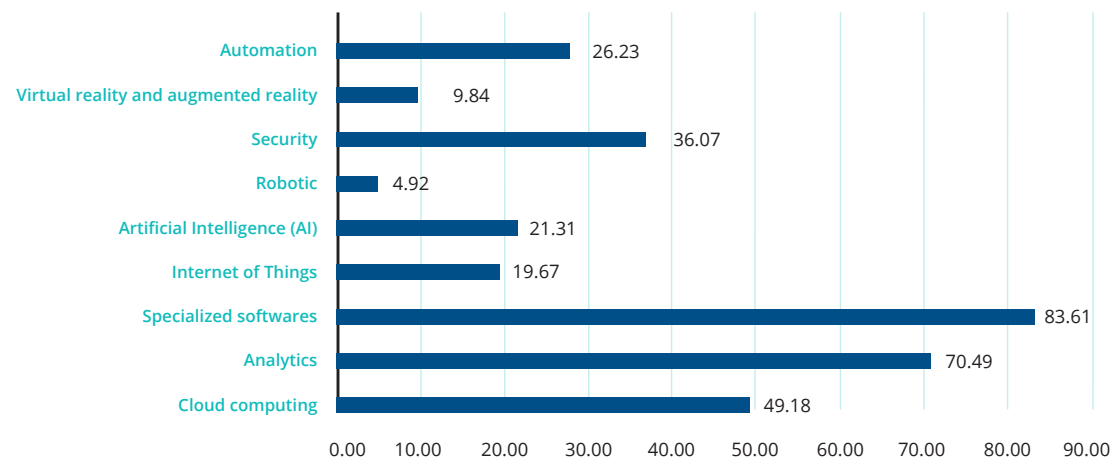
Technology	Value
Automation	26.23
Virtual reality and augmented reality	9.84
Security	36.07
Robotic	4.92
Artificial Intelligence (AI)	21.31
Internet of Things	19.67
Specialized softwares	83.61
Analytics	70.49
Cloud computing	49.18

To prepare for the digital economy, most firms say they are likely to invest in improving their existing products and services and in improving the capacity of their staff (figure 21). However, almost half of the firms say they do not have a clear training plan and around 30% say they will provide on the job training (figure 22). Almost everyone expresses a concern that their staff will leave the company after receiving the training.
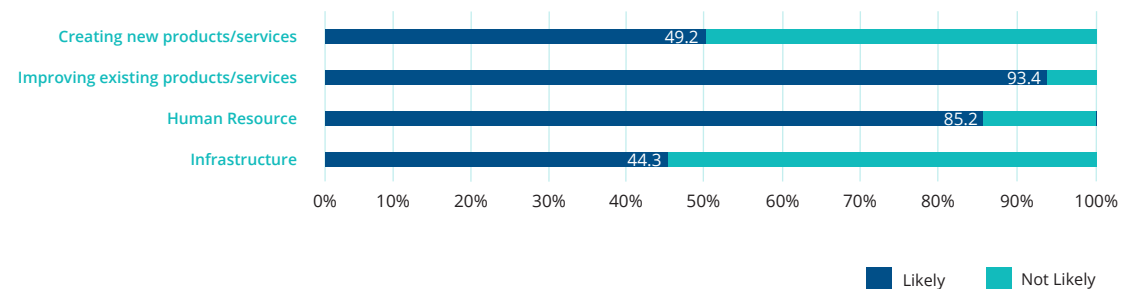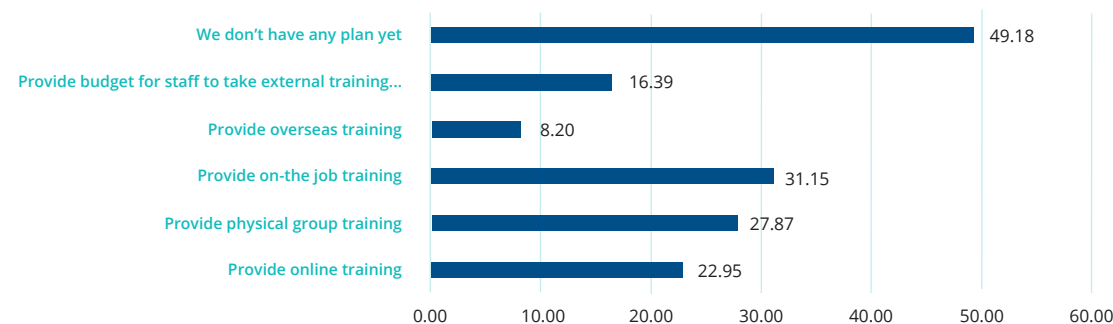
Figure 21: Areas firms are likely to invest

Area	Likely
Creating new products/services	49.2
Improving existing products/services	93.4
Human Resource	85.2
Infrastructure	44.3

Legend: ■ Likely ■ Not Likely

Figure 22: Firm's future training plan

Plan	Value
We don't have any plan yet	49.18
Provide budget for staff to take external training...	16.39
Provide overseas training	8.20
Provide on-the job training	31.15
Provide physical group training	27.87
Provide online training	22.95

Case study 1: Little Fashion

Established in late 2010, Little Fashion is local brand which has grown from a humble beginning to become a leading online fashion destination in Cambodia. The e-commerce store currently employs 50 people and sells a variety of products ranging from clothes to electronics to household items. The founder wants the shop to be the Amazon of Cambodia.

As an e-commerce company, digital technology is at the core of its business. It has a sophisticated website and about 100 tools to manage sales, customer relationships and supply chain. All of the tools are built in house. The store also offers a variety of e-payment options but the majority of transactions are still settled by cash.

According to the founder, the company found it hard to hire staff with advanced ICT skills and soft skills. "We'll need more programmers in the future but there is not enough supply. It's very competitive to get people with advanced digital skills. They want to work for big international companies," said co-founder Mr. In Vichet.

The owner believes that Cambodia is moving fast towards becoming a digital economy and his company is ready to embrace the transformation. In the next five years, the company has plans to invest in expanding its logistic infrastructure, train staff and use AI to better understand customer's buying behavior.

Case study 2: Brown Café and Bakery

Brown is the most well-recognized locally owned café in Cambodia. Started in 2009 by four siblings, Brown now has 19 shops across the country and employs 700 people. The café is known among young adults for its well-designed shop environment and good quality coffee.

As a coffee chain, Brown values hospitality skills among its sale and customer service staff but requires basic digital literacy for its office staff. Highly specialized ICT tasks such app development are outsourced to external partners.

According to its co-owner, Brown takes staff development very seriously. Its HR department conducts regular training need assessment to identify skill gaps. Both in-house and external trainings are then offered to staff that need them.

On the technology front, Brown currently uses a Point of Sale (POS) system, delivery order system, loyalty program, and inventory management software. The café uses Facebook and Instagram as its main marketing channel. The company is ready to embrace new technologies to improve its operation and customers' experience.

In the coming years, the company will introduce the 2nd generation of its mobile app with additional features and improved user experience, implement its cardless loyalty program and will make use of big data to understand customer's demography and buy habits.

What The Government Is Doing To Prepare Its Workforce For A Digital Economy?

The government realized that ICT literacy is an important foundation in developing a digital economy and has taken various initiatives to equip the workforce of the future with the required digital capacity. This section explores the progress and remaining challenges in building digital literacy.

One of the earliest efforts to integrate technology in education was in 2004 when Cambodia's Ministry of Education, Youth and Sport (MoEYS) developed a Policy and Strategies on Information and Communication Technology in Education with three main goals (1) to increase access to basic education for all, both formal and non-formal, using ICT as one of the major tools for learning, teaching, searching and sharing information (2) improve quality of basic education and promote independent and lifelong learning, especially for post-primary education, (3) produce workforce with the ICT skills to ensure that Cambodia can compete and cooperate in an increasingly interconnected world.[25]

Building on the ICT policy and strategies, MoEYS published the Master Plan for ICT in Education 2009-2013 to (1) increase access to basic education, tertiary education and life-long learning, both formal and non-formal, by using ICT as alternative education delivery media; (2) improve the relevance and effectiveness of basic education by harnessing the potential of ICT as a major tool to enhance the quality of teaching and learning; (3) develop the ICT-based professional skills needed by graduates for employment in a knowledge-based society and (4) increase the effectiveness and efficiency of Ministry and school management.[26] The achievement of the master plan is currently being reviewed and the plan's successor is being developed.

In 2015, MoEYS published the curriculum framework for general education and technical education to guide other stakeholders for developing other relevant and significant documents such as student textbooks, teaching-learning aids, guidelines for teaching and learning methods, and indicators of student learning outcomes. Among other things, the framework incorporates the new subjects of Information and Communications Technology (ICT) in the curriculum from grade 4 through grade 12 (see table 1) and introduces the modernization of teaching methodology in all levels of education.[27]

Table 1: Distribution of subjects and study hours per week

Subject	Grade											
	1	2	3	4	5	6	7	8	9	10	11	12
Khmer Study	11	11	11	9	9	9	7	7	7	5	5	5
Mathematics	7	7	7	6	6	6	7	7	7	6	6	6
Health Education	1	1	1	1	1	1	1	1	1	1	1	1
Foreign Languages	2	2	2	2	2	2	6	6	6	6	6	6
Physical Education	2	2	2	2	2	2	2	2	2	2	2	2
Computer	-	-	-	1	1	1	2	2	2	1	1	1
Science	3	3	3	3	3	3	6	6	6	-	-	-
Social Studies	3	3	3	3	3	3	7	7	7	-	-	-
Arts Education	1	1	1	1	1	1	1	1	1	-	-	-
Local Life Skills	-	-	-	2	2	2	1	1	1	-	-	-
Home Economics	-	-	-	-	-	-	-	-	-	1	1	1
Physics	-	-	-	-	-	-	-	-	-	4	4	4
Earth-Environmental Science	-	-	-	-	-	-	-	-	-	2	2	2
Chemistry	-	-	-	-	-	-	-	-	-	3	3	3
Biology	-	-	-	-	-	-	-	-	-	3	3	3
History	-	-	-	-	-	-	-	-	-	2	2	2
Geography	-	-	-	-	-	-	-	-	-	2	2	2
Moral-Civics	-	-	-	-	-	-	-	-	-	2	2	2

Note: Author's own table created using data from MoEYS

25. Ministry of Education Youth and Sport 2004
26. Ministry of Education Youth and Sport 2009
27. Ministry of Education Youth and Sport 2015

Despite having made some progress, Cambodia still lags behind in ICT's infrastructure in education due to the lack of ICT trainers, network infrastructure and technological equipment. According to the Global Education Monitoring Report, only 8% of public primary and secondary schools has access to stable electricity to support ICT integration in classrooms and only 7% are connected to the internet in 2014.[28] Moreover, Cambodia also has a very low learner to computer ratio, where 500 or more secondary pupils shared a computer.[29]

To address these issues, MoEYS in 2016 published the New Generation School Policy to provide guidance to educators and students to better understand new methods of learning, enhance the presence of educational innovation throughout the school system and empower the education system to effectively compete with other education systems in the ASEAN region where there is an urgent need for a work force with 21st Century skills.[30] The policy has seven specific objectives:

> Create autonomous public schools governed by strict rules of performance accountability linked to high investment.

> Create new governance boards that will hold schools accountable for their Performance.

> Create an accreditation system that will facilitate Oversight Board decision-making about a school's adherence to New Generation School core principles.

> Provide new institutional freedoms (i.e., operational autonomy) to drive innovation in the way educational services are formulated and delivered.

> Enable the education system to be more efficient and socially equitable with respect to the teaching and learning process by instituting a rationalized resource allocation system that enhances educational services.

> Improve teaching standards through new approaches that include competitive teacher recruitment; performance-based incentives; intensive capacity-building in educational technology; STEM and problem-based learning methodologies; and explicit teacher career paths linked to professional development opportunities (e.g., teacher scholarships for future study).

> Expand educational services for Cambodian youth that include career counseling services, differentiated

28. UNESCO 2016
29. Ibid.
30. Ministry of Education Youth and Sport 2016

learning channels (e.g., project work, subject clubs), mobile learning, and life skills education.

According to ICT Development Policy 2020, the government also aims to develop ICT human resources by increasing the percentage of students finishing high schools to have basic ICT skills and the percentage of human resource having ICT professional skills.[31]

Table 1: ICT Development Policy 2020: Developing ICT human capacity

Goal	Target by 2020
% of high school graduates with basic ICT skill	100%
% of ICT skills workforce of the total skill workforce	15%
Number of ICT specialist for research and development	30 people in a million
Number of ICT researcher in ICT sector	10 people in a million

Source: Employer Survey, 2018

While higher education institutions are generally better equipped than primary and secondary education institutions, the use of ICT tools in teaching and learning is still limited by regional standard. An analysis of the current situation in higher education reveals an alarming mismatch between education and employment. According to various reports, the areas of study that are popular among Cambodian university students are social sciences and business related majors. Only a small percentage of students are studying science, engineering and agriculture; areas of study considered to be key skills to foster the growth of the Cambodian economy. Further, there are concerns about the quality of higher education provision across the country. According to a study in 2013, approximately 48% of fresh ICT graduates didn't have enough ability to work effectively.

In order to promote ICT specialization, the National Institute of Posts Telecommunications and Information Communication Technology (NIPTICT) was established in January 2014 under supervision of the Ministry of Posts and Telecommunications of Cambodia (MPTC) and was mandated to promote formal education, training, research and development of posts, telecommunications and information communication technology. ICT Innovation Center (IIC), the first facility of its kind in Phnom Penh, is also being constructed to accelerate the development of the country's human capital, boost research and innovation, and multiply the number of startups in the technology sector. The center was funded through The

31. MPTC 2016

National R&D Fund, which was created in July 2017 to aid the development of the ICT sector. Each telecom firm in the country has to contribute one percentage of their gross revenue to the reserve.

Efforts to promote STEM education include the annual STEAM festival organized by STEM education organization for Cambodia and MOEYS to provide all students from public and private schools the opportunity to showcase their expertise and share their love of STEM. Another initiative is the STEM Academy Bus Program, a bus with STEM exhibits travelling across the country to promote and encourage students in the secondary schools to be more interested and focus more attention on professional studies, professional research and innovation-related science, technology, engineering and mathematics.

There have also been a few strong public-private collaborations in recent years to promote digital education. One of those partnerships is SmartEdu which was established in 2016 to trigger positive change and empower Cambodians through education. In collaboration with the Ministry of Posts and Telecommunications and the Ministry of Education, Youth and Sport, Smart Axiata aims to nurture resilient leaders for Cambodia in the new digital era through the SmartEdu Scholarship Program and the SmartEdu University Student Development Program.

Development Innovations (DI) is a six-year USAID-funded project that helps civil society organizations, technology companies, social enterprises and young innovators to design and use information and communications technology (ICT) solutions and employ innovative processes to tackle Cambodia's development challenges. The projects range from digital skills courses to business incubators and accelerators, and social media campaigns to youth professional development programs.

With universities in the country generally failing to teach research skills and promote innovation, these new initiatives seek to fill gaps in students' academic and professional formation, particularly for R&D, innovation and the promotion of entrepreneurial and startup culture.

Recommendations

Strong human capital is the foundation of a strong digital economy. A well-functioning digital society requires that individuals obtain certain capabilities and skills so they can function effectively as digital citizens, consumers and employees who can use digital technology, handle large amounts of data and act with a high degree of flexibility and creativity. This research reveals that companies in Cambodia are increasingly dependent on technologies to do their business but only a few have clear strategies to prepare for a digital economy. This is due to the lack of understanding, internal leadership, financial capacity, availability of local technologies and enabling policies. While currently employees are able to perform basic ICT tasks, they will need to be upskilled to be equipped with more advanced digital hard skills and digital soft skill such as managing online information, online collaboration and analytics, which will be in high demand. Successful workforce development for the digital economy will require concerted effort by all stakeholders. This section proposes some key roles that each stakeholder can play to contribute to this effort.

Suggestions for the Government

> Invest in ICT infrastructure to facilitate deeper ICT integration in the education system. Seek private sector and development partner's support to connect more schools to electricity, internet and equip them with computers and other necessary learning equipment

> Closely monitor the implementation progress of the policy of higher education vision 2030. Keep track of achievement and challenges to ensure the country is on course to achieve the set objectives

> Closely monitor and evaluate the New Generation Schools pilot projects. Scale up across the country if proven successful

> Gradually build up a large pool of ICT trainers for schools across the country

> Build a steady supply of local professionals with advanced digital skills for the labor markets. This includes programming, analytics, robotics, network security, etc.

> Develop a nation-wide initiative to retrain teachers to use innovative teaching methods by integrating ICT

> Work with industry and introduce work integrated learning curriculums which expose students to authentic work environments as the foundation of their course experience.

> Reimagine vocational training for the digital economy by broadening its appeal beyond the traditional low and medium skilled occupations

> Provide incentives to firms to invest in digital infrastructure and upskilling their staff

> Promote entrepreneurship and innovation by creating a healthy competitive marketplace and by tackling the barriers faced by small and growing businesses.

> In a longer term, the government should monitor emerging labor market trends and explore ways of developing labor market programs and safety nets to help ensure inclusive growth and job quality in the digital economy.

Suggestions for Companies

> Develop a coherent digital strategy, which takes into consideration business operation, human resource planning and development and future investment. A well thought out digital strategy will help companies be prepared and make the most out of the rapid digital transformation.

> Invest in research and development. To thrive in a digital economy, companies must stay competitive and innovative. This entails research into new technologies to enhance business's efficiency, improve decision-making, increase worker's productivity, and improve existing products and services or introduce new ones.

> Utilize government support. Companies should identify and make use of existing forms of government support available for technology transfer or skills development

> Redefine human resource management. Traditional ways of managing company's human resources will not work in a digital economy. To attract and retain talents, firms should consider allowing more flexibility, promoting creativity and creating an open and conducive work environment for staff.

> Work with industry partners to reskill or upskill existing staff and develop a clearer view on future skills and employment needs. The more rapid changes in the economy means individuals will need regular upskilling throughout their working lives. Within a broader digital skills strategy, employers must plan to up-skill existing workers in order to take advantage of growth opportunities and adapt to the digital economy. By assessing their capabilities and then implementing training, companies will develop employees who are more capable of taking control of their roles, need less supervision and are more engaged.

Suggestions for Workers and Workers-To Be

> In an ever increasingly competitive job market, existing workers and future workers must take personal responsibility for one's own lifelong learning and career development.

> There needs to be a general understanding that regardless of discipline, graduates will need to be technically proficient, with higher level cognitive skills in, for example, analytics, applications, network management, security and privacy. Problem solving, creativity, communication, collaboration, adaptability and initiative will increasingly need to be all part of the package.

> There are excellent free online resources that everyone can use to improve their skills or learn new things. The following platforms offer a wide variety of useful subjects and topics to learn:

  o   Coursera (www.coursera.org)
  o   edX (www.edx.org)
  o   Udemy (www.udemy.com)
  o   Udacity (www.udacity.com)
  o   Khan Academy (www.khanacademy.org)

Conclusion

The findings of this research are aligned with the existing literature on how digital technology is redefining work and workforce development across the globe. New skill sets for managing online information, online collaboration and analytics will be in high demand for Cambodia's digital economy. Currently, employees lack sophisticated technology skills to be competitive and companies are not doing enough to upskill their staff. The opportunities for economic growth and societal progress in a digital economy for Cambodia are enormous, but depend crucially on the ability of all stakeholders to initiate reform in education systems, labor market policies, business approaches to developing skills, and employment arrangements. Active labor market policies, lifelong learning and more responsive educational systems are more critical than ever in the digital economy. Catalyzing positive outcomes of this new economy will require bold leadership and an entrepreneurial spirit from businesses and government, as well as an agile mindset of lifelong learning from employees.

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ANNEX 1: LIST OF STAKEHOLDER INTERVIEWS

No	Institution	Person consulted
1	Little Fashion	Co-founder and CEO
2	G-Gear	CEO
3	Manulife	Chief Agency
4	Brown Café and Bakery	Co-founder
5	CamAsean Institute	President
6	World Express Tour and Travel Company	President
7	SmallWorld	Co-founder
8	Joonaak Delivery	Co-founder
9	Cambodia Association of Travel Agents.	President
10	Brain Scan Cambodia	Branch Director
11	Sophira Corporation Co Ltd	Founder and Director
12	Young Entrepreneur Association in Cambodia	President
13	International Labor Organization	Skill Development Specialist
14	World Bank	Senior Economist
15	Royal University of Phnom Penh	Vice Rector
16	Ministry of Post and Telecommunication	Director of ICT Policy Department
17	Ministry of Education	Deputy Director of High Education Department
18	Ministry of Economy and Finance	Department Director