

**SKILL GAPS IN FINANCIAL TECHNOLOGY COMPANIES IN  
NEPAL**

**A Thesis Submitted to  
Master's Programme in Labour Studies,  
Faculty of Humanities and Social Sciences, Tribhuvan University,  
in Partial Fulfilment of the Requirements for the  
Degree of Master of Arts in Labour Studies**

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A handwritten signature in black ink, appearing to be 'Sajan Bartaula', written over a horizontal dotted line.

Sajan Bartaula

21 September 2023



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च. नं./Ref. No

## LETTER OF RECOMMENDATION

This thesis entitled "Skill Gaps in Financial Technology Companies in Nepal" has been prepared by Mr. Sajan Bartaula (Admission Batch 2020-2022) under my supervision for the partial fulfilment of the requirements for the Degree of Master of Arts in Labour Studies. Hence, I recommend the thesis to the Evaluation Committee for final evaluation and approval.

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(Supervisor)

21 September 2023



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### LETTER OF APPROVAL

The thesis entitled "Skill Gaps in Financial Technology Companies in Nepal" prepared and presented in Partial Fulfilment of the Requirements for the Degree of Master of Arts in Labour Studies by Mr. Sajan Bartaula (Admission Batch 2020-2022) has been evaluated and approved.

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## Abstract

In Nepal, financial technology (fintech) companies have predominantly centred their operations within the payment domain, operating under the labels of Payment Service Operators (PSO) and Payment Service Providers (PSP), as regulated and licensed by the Nepal Rastra Bank. Fintech uses skilled human resources for its development and operation. The skill gaps among the IT employees working for fintech companies in Nepal have received little attention. This study aims to investigate the current status of skill gaps among IT employees in fintech companies in Nepal. Additionally, its purpose includes shedding light on the underlying causes of skill gaps, consequential effects, and anticipated coping strategies. This study employs a mixed-methods design, combining structured questionnaires administered to 57 out of 61 companies whose respondents were IT managers, as well as an interview inquiry with the 18 participants working in senior and entry-level positions.

Analysis of the data using the Kruskal-Wallis test reveals statistically significant differences in skill gaps among entry-level, mid-level, and senior-level IT employees across 15 distinct disciplines. Post hoc tests further reveal significant disparities in skill gaps between entry-level employees compared to their mid-level and senior-level counterparts. While variations between mid and senior-level employees exist, they fluctuate between significant and non-significant differences. The highest level of skill gap is found to be at entry-level among the three groups. The results depict a small minority of entry-level employees performing their jobs at the required level. The major causes of the skill gap at entry-level include the education system not aligning with market requirements, limited exposure to real-life problems, ineffective internships, and training and certifications. The causes of the skill gap for mid and senior employees include changes in skill requirements, a high

turnover rate, remote working, and training and certifications. The effects of skill gaps at individual levels are reduced productivity, hindering self-development, promotion, earnings, and work-life balance. The effects of skill gaps at the company level are a decrease in output and productivity, a delay in the launch of new products, an increase in operation costs, outsourcing, and a decrease in profitability.

***Keywords:*** skill gaps, fintech, employee, IT

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## Table of Contents

Declaration	
Letter of Recommendation	
Letter of Approval	
Abstract .....	i
Acknowledgements .....	iii
Table of Contents .....	v
List of Tables .....	x
List of Figures .....	xi
Abbreviations and Acronyms .....	xiii
Chapter I: Introduction.....	1
Introduction.....	1
Background .....	1
The Context of Nepal.....	5
Statement of the Problem.....	7
Objectives .....	9
Significance of the Study .....	9
Limitations of the Study.....	9
Chapter II: Literature Review .....	11
Sources and Methods .....	11
Concept and Definition .....	13

Financial Technology.....	13
Payment Service Provider.....	13
Payment Service Operator .....	13
Skill.....	14
Skill Gaps.....	14
Information Technology (IT) Employee.....	14
Level of Employees .....	14
Theoretical Review .....	15
Human Capital Theory.....	15
Skill Theory .....	15
Theory of Career Mobility .....	16
Structural Change Theory .....	16
Empirical Review.....	17
International Studies .....	17
National Studies .....	24
Research Gap .....	25
Conceptual Framework.....	26
Chapter III: Research Methodology.....	28
Research Sites and Population.....	28
Sources of Data.....	28
Primary Sources of Data .....	29

Secondary Sources of Data .....	29
Research Design.....	29
Complete Enumeration for Quantitative Study.....	30
Sampling for Qualitative Study .....	30
Research Instruments .....	31
Quantitative Design .....	31
Qualitative Design .....	32
Data Collection .....	32
Data Management and Analysis .....	33
Ethical Considerations .....	33
Chapter IV: Results and Analysis .....	35
Profile of the Fintech Companies .....	35
Scale of Fintech Companies by Number of Employees .....	37
Distribution of IT Employees by Level and Sex .....	38
Monthly Minimum Salary.....	40
Minimum Qualification for Different Level of Employees .....	40
Key Services and Disciplines.....	40
Discipline by In-house .....	41
Discipline by Outsourcing .....	42
Turnover Rate and Status of Vacancies .....	43
Hard Skills Requirements and Extent of Skill Gaps .....	44

Programming.....	47
Mobile Technology Development .....	48
Web Development .....	50
Software Development.....	51
Cloud Computing.....	53
Platform Administration .....	54
Cyber Security .....	55
DevOps .....	57
Networking Technologies.....	58
Data Science and Data Analysis .....	59
Enterprise Application .....	60
e-Business/ Digital Marketing .....	62
Digital Skills/Media.....	63
Contact Centre Support.....	64
Project Management .....	65
Hard Skill Gaps by Employee Group .....	67
Hard Skill Gaps within Employees Group by Types of Company .....	69
Hard Skill Gaps in Employees' Group by Size of Company.....	72
Causes and Effects of Hard Skill Gaps .....	75
Causes of Skill Gaps in Entry-level Employees .....	75
Causes of Skill Gaps in Mid-Level Employees .....	77

Causes of Skill Gaps in Senior-level Employees.....	78
Effects of the Skill Gaps in Employee.....	79
Effects of the Skill Gaps in Company.....	80
Coping Strategies Used by Companies for Minimising Skill Gaps.....	82
Coping Strategies Anticipated from the Stakeholders.....	83
Chapter V: Discussion and Conclusion.....	85
Extent of Skill Gaps.....	85
Causes of Skill Gaps.....	85
Effects in an Employee and Companies.....	86
Coping Strategies.....	87
Other Findings.....	88
Geographic Location and Size of Company by Employees.....	88
IT Workforce Composition by Sex.....	88
Wages/Salary.....	88
Minimum Qualification and Turnover.....	89
Key Services and Disciplines.....	89
Recommendations for Future Research.....	90
Conclusion.....	91

References

Appendices

## List of Tables

Table 1 Frequency of Participated Fintech Companies .....	36
Table 2 Minimum Income Range by Level of Employee.....	40
Table 3 Kruskal-Wallis Test (H-Test) for Assessing the Significant Difference of Skill Gap Between Employee Group .....	46
Table 4 Kruskal-Wallis Test for Comparison of Skill Gaps Within Employee Groups by Types of Company .....	71
Table 5 Kruskal-Wallis Test for Comparison of Skill Gaps Within Employee Groups by Size of Company .....	74
Table 6 Causes of Skill Gaps in Entry-level Employees .....	75
Table 7 Causes of Skill gaps in Mid-level Employees .....	77
Table 8 Causes of Skill Gaps in Senior-level Employees.....	78
Table 9 Effects of Skill Gaps in Employee.....	79
Table 10 Effect of the Skill Gaps in Company .....	81
Table 11 Coping Strategies Anticipated from the Stakeholders to Minimise the Skill Gaps .....	83

## List of Figures

Figure 1 Bibliometric Network Analysis of Skills and Fintech Using ProQuest Database (2023) .....	12
Figure 2 Conceptual Framework of the Study .....	27
Figure 3 Embedded Mixed Method Design.....	30
Figure 4 Geographical Location of the Fintech Companies .....	36
Figure 5 Size of company by Employee at Work .....	37
Figure 6 Employee Number at Work by Types of company .....	37
Figure 7 Share of Employees by Level.....	38
Figure 8 Distribution of Employment by Level and Sex.....	38
Figure 9 Distribution of Employment Across Companies by Level and Sex.....	39
Figure 10 Key Discipline of Fintech Companies.....	41
Figure 11 Discipline by In-house.....	42
Figure 12 Discipline by Outsourcing .....	43
Figure 13 Turnover Rate in Fintech Companies.....	44
Figure 14 Extent of Skill Gaps in IT Employees in Fintech Companies in Nepal .....	45
Figure 15 Extent of Skill Gaps in Programming .....	48
Figure 16 Extent of Skill Gaps in Mobile Technology Development .....	49
Figure 17 Extent of Skill Gaps in Web Development .....	51
Figure 18 Extent of Skill Gaps in Software Development .....	52
Figure 19 Extent of Skill Gaps in Cloud Computing.....	53
Figure 20 Extent of Skill Gaps in Platform Administration .....	55
Figure 21 Extent of Skill Gaps in Cyber Security .....	56
Figure 22 Extent of Skill Gaps in DevOps .....	57
Figure 23 Extent of Skill Gaps in Networking Technologies.....	59

Figure 24 Extent of Skill Gaps in Data Science and Data Analysis .....	60
Figure 25 Extent of Skill Gaps in Enterprise Application .....	61
Figure 26 Extent of Skill Gaps in E-Business/Digital Marketing.....	62
Figure 27 Extent of Skill Gaps in Digital Skills/Media.....	64
Figure 28 Extent of Skill Gaps in Contact Centre Support.....	65
Figure 29 Extent of Skill Gaps in Project Management .....	66
Figure 30 Comparison of Mean and Median Score of Skill Gaps by Employees Level and Discipline .....	68
Figure 31 Extent of Skill Gaps in Entry-level Employee by Type of Company .....	69
Figure 32 Extent of Skill Gaps in Mid-Level Employee by Type of Company .....	70
Figure 33 Extent of Skill Gaps in Senior-level Employee by Type of Company.....	71
Figure 34 Extent of Skill Gaps in Entry-level Employee by Size of Company .....	72
Figure 35 Extent of Skill Gaps in Mid-Level Employee by Size of Company .....	73
Figure 36 Extent of Skill Gaps in Senior-level Employee by Size of Company .....	74
Figure 37 Frequency of Training by Time Duration .....	82



### Abbreviations and Acronyms

ADB	Asian Development Bank
<i>Adj. Sig</i>	Adjusted Significance
ASEAN	Association of Southeast Asian Nations
BLS	Bureau of Labour Standard
CBS	Central Bureau of Statistics
CEDEFOP	European Centre for Development of Vocational Training
CTEVT	Centre for Technical and Vocational Education and Training
df	degree of freedom
Fintech	Financial Technology
GoN	Government of Nepal
<i>H</i>	Kruskal Wallis test
ICLS	International Conferences on Labour Statisticians
ICT	Information and Communication Technology
ILO	International Labour Organisation
IMF	International Monetary Fund
IPS	Interbank Payment System
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupation
IT	Information Technology
KII	Key Informant Interview
<i>M</i>	Mean
<i>Max</i>	Maximum
<i>MD</i>	Median
<i>Min</i>	Minimum

MoICT	Ministry of Information Communication and Technology
<i>N</i>	Population
NLFS	Nepal Labour Force Survey
NRB	Nepal Rastra Bank
OECD	Organisation for Economic Cooperation and Development
<i>p</i>	Level of significance
PSO	Payment Service Operator
PSP	Payment Service Provider
QR	Quick Response
SAARC	South Asian Association for Regional Cooperation
<i>SD</i>	Standard deviation
SDG	Sustainable Development Goal
SPSS	Statistical Packages for Social Science
SQL	Structured Query Language
TVET	Technical and Vocational Education and Training
U.S.	United States
U.S.A.	United States of America

## **Chapter I: Introduction**

### **Introduction**

The advent of disruptive technologies has brought high-tech systems to the market. The launch of cutting-edge technologies in the financial technology (fintech) sector has promoted cashless transactions, which have challenged cash-based transactions. The report published by the Bank for International Settlements (BIS), the bank for central banks, shows a tremendous increase in digital transactions, though cash has remained and played a crucial role in transactions. The choice of transaction has changed due to evolving fintech, which has revolutionised the transaction domain. The trend in the adoption of fintech is increasing tremendously. These fintech companies use highly skilled professionals for their daily operations and innovative development. These employees play a pivotal role in providing fintech services to end users through a digital platform. The skills that the fintech market demands and the skills supplied by job seekers should align in such a way that there should not be market friction. The hard skill gaps of employees should be assessed for the fintech ecosystem function promptly. There is limited study on the issue of the skill gaps in fintech companies. This study uses a mixed method to assess the extent of hard skill gaps, underlying causes, and consequential effects, focusing on information technology (IT) employees in fintech companies in Nepal.

### **Background**

Fintech, a great leap forward in financial services, has gotten much attention in recent decades after the accessibility of smart phones and the engagement of a wide range of the public across the world. In its simplest terms, fintech refers to providing financial services through innovative technology (Arner et al., 2015; Schueffel, 2016). It is a very promising sector to create banking and financial inclusion. It uses highly

specialised professionals and technicians for its development and operation. The productivity of such employees becomes crucial for the effective execution of financial services. Though there is a higher rate of unemployment, shortages of skilled human resources and skill gaps within the existing human resources have been common phenomena in developing countries and emerging economies (McGuinness & Ortiz, 2016). Technological advancement, changes in workforce demographic, and globalisation have become the key driving forces behind the recent phenomenon of skill gaps (Flanagan et al., 2017). The digitalisation of the financial sector and the upgrading of the traditional banking system to a modern and innovative financial system through technological advancement have posed the challenge of skill-related gaps and shortages of skilled human resources.

According to the International Labour Organisation [ILO], (2018) skills is defined as the innate or learned ability to apply knowledge acquired through experience, study, practice, or instruction and to perform tasks and duties required by a given job. Skill mismatches, a discrepancy between the skills that are sought by employers and the skills that are possessed by individuals, have become the most debated issue in industrialised and developing economies. When workers' abilities are insufficient compared to what employers want, this is referred to as a skill mismatch (Handel, 2003). The different forms of skill mismatch are educational mismatch (which may be either horizontal or vertical), skill gaps, skill shortages, and skill obsolescence (McGuinness et al., 2018). Numerous studies have been conducted in the skill domain. The academia and government are enthusiastic about finding the root causes and fixing them through a well-developed skill development plan and projecting the demand and supply sides. Skill shortages and skill gaps, two major forms of skill mismatches, ultimately affect the gross domestic product of the nation.

In the existing world of work, crucial determinants for any person to get employed are skills and qualifications. The trade-off of skills and qualifications for tasks and duties fixes wages in the labour market. However, the labour market is in constant flux with adaptation, mobility, institutional settings, and policies (Flek & Večerník, 2005)

During the agrarian era, the required skill sets were farming and animal husbandry, whereas during the mercantilism era, trade began to flourish and trading capability emerged as the major skillsets. During the first industrial revolution, manual work sets in the industry were dominant. With the advent of technology, it caused structural changes in the production function and demanded new skill sets. The technological advancement sought various innovative machines to replace the repetitive tasks conducted by humans. In Great Britain's textile factories, company owners introduced weaving machines to replace the repetitive tasks previously carried out by laborers. Just a few of these machines were able to replace the majority of textile workers. In response, labourers resorted to destroying these machines, sparking what is now famously known as the Luddite movement. In 1970, similar sort of worker displacement was observed after the computers was introduced in the United States of America. The skills gap has persisted to be a problem in many nations and is widely believed to contribute to a poor employment situation (Jayaram & Engmann, 2017).

At present, the workforce faces challenges from rapid technological advancement and artificial intelligence. Arner et al. (2015) state that the evolution of fintech is threefold: Fintech 1.0 (1866–1967) is characterised by building the infrastructure that will support globalised financial services; Fintech 2.0 (1967–2008) is characterised by switching from analogue to digitalization of finances; and Fintech 3.0 is characterised by regulatory change that opens up the market to new providers

and start-ups after the global financial crisis. The Fintech 3.5 has evolved in Asia and Africa recently with more innovative fintech. Smart phones had facilitated the mode of transaction.

Now is the era of the fourth industrial revolution, and the fintech industry is an integral part of this revolution. In recent years, the fintech sector has been experiencing rapid expansion, and this trend is expected to persist in the future. According to Allied Market Research, the global fintech technology market was valued at \$110.57 billion in 2020 and is projected to reach \$698.48 billion by 2030, growing at a compound annual growth rate (CAGR) of 20.3% from 2021 to 2030. Several factors are contributing to the growth of the fintech industry. Despite the move towards digital, contactless, and fast payments, the data above shows that there is still a demand for cash (IMF, 2022). A similar trend is highlighted by BIS (2023). The increasing adoption of digital technologies and mobile devices has made financial services more accessible and convenient, leading to a rising demand for fintech solutions. Additionally, fintech has disrupted traditional financial services by providing innovative and cost-effective solutions that are customised to the specific needs of consumers. The development of mobile money in the regions of Latin America, Africa, and Asia shows there is high potential capacity for investing in this sector (Tidjani, 2020). Such an investment in the fintech sector in any country will create direct jobs, indirect jobs, induced jobs, and jobs created due to the value chain. Fintech can greatly contribute to achieving targeted programmes such as sustainable development goals (SDGs) by providing innovative solutions and financial services that promote financial inclusion, access to credit, and investment opportunities for underprivileged populations. Furthermore, the COVID-19 pandemic has accelerated the growth of the fintech industry, as many people turned to digital financial services

due to lockdowns and social distancing measures. The pandemic has also highlighted the importance of having resilient and adaptable financial systems, which fintech can offer. The fintech industry is expected to continue expanding, driven by technological advancements, increasing demand for digital financial services, and the emergence of new fintech startups and solutions. However, 87 percent of the companies state they have skill gaps or expect to within a few years (McKinsey & Company, 2021) and fintech companies obviously is not an exception.

### *The Context of Nepal*

Nepal aspires to become a developing nation by 2026 and is on track to become financially and economically prosperous. The history of the Nepali banking sector starts with the establishment of Nepal Bank Limited in 1937 A.D. After the restoration of democracy in 1990 and the post-liberal period, Nepal experienced significant growth in banking institutions (Nepal Rastra Bank [NRB], 2020). Currently, two-thirds of Nepalis have bank accounts. According to the Central Bureau of Statistics (CBS), in 2021, of 6,660,841 households, 4,862,885 households have smart phones, and 2,514,510 households enjoy internet facilities, a tremendous increase compared to the last census of 2011.

Fintech in Nepal is at a nascent stage and in an evolving phase. The data shows a tremendous increase in fintech-based users. Most of the services provided by fintech are related to payment services. The majority of micro, small, and medium enterprises are using the fintech related applications. It has become popular among young account holders. The user's segment in innovation technologies like Quick Response (QR) payment, mobile banking, connect Interbank Payment System (IPS), and digital wallet is increasing tremendously. The data over the period of one year from 2021 to 2022 shows that the number of transactions conducted through connect-

IPS has doubled, and the number of QR-based transactions has increased more than three times from 5.5 million to 26.95 million. And a 10-fold increase in mobile banking from 1,754,566 to 18,307,255 in a period of six years during 2016–2022. Whereas the number of internet banking users had increased three times, from 515,465 to 1,684,310. However, there is no disaggregated data on the use of mobile banking by age, gender, or geographical proximity. There is a strong and positive association between mobile and internet access and the number of deposit accounts, which was used as a measure for financial inclusion (Niraula & Adhikari, 2019).

The expansion of the fintech sector means an expansion of financial inclusion. The legal and regulatory framework for fintech in Nepal is developed by the NRB. According to the NRB (2021), there are 37 licensed institutions in the payment sector, consisting of 27 Payment Service Providers (PSPs) and 10 Payment Systems Operators (PSOs). In mid-July 2021, all 27 commercial banks, 13 development banks, and 11 finance companies were authorised by NRB to function as PSPs. The trend of PSPs and PSOs is increasing, as is the demand for IT professionals in fintech companies.

Fintech utilises highly skilled professional to low-skilled human resources across the discipline. The trend shows the rapid expansion of fintech in Nepal with financial transactions as well as the number of users. Certainly, Nepal may face shortages in skilled and experienced human resources, and the skill gaps persist among the existing pool of resources.

### **Digital Nepal Framework**

The Digital Nepal Framework was introduced by the Government of Nepal (GoN) in 2018, emphasising the major eight domains along with eighty initiatives. In regards to skills, two major initiatives are of twofold: the digital skill development



initiative and talent and skills development. Given the strong linkages between financial inclusion and economic prosperity, Nepal is poised to benefit considerably from the use of fintech, broadening access to financial services to nearly the entire country's unbanked population. Apart from that, attract investments in fintech by encouraging the growth of start-ups and telecom companies to offer services to drive financial inclusion.

In sum, Nepal's fintech sector is expanding significantly and revolutionising the financial landscape of the nation. It is essential for bridging the gap between specific skill sets and industry expectations as fintech companies continue growing and incorporating innovative technologies. Thus, uncovering the skill gaps among the employees is a must for the overall development of the sector. Fintech is a structural transformation of the traditional financial system into digital and paperless financial system which demands the new skillsets and uses the latest innovative technologies (Arner et al., 2015).

### **Statement of the Problem**

Globally, the fintech sector has seen a very fast rise in terms of investments, new companies, and innovative products over the last decade, and the growth of the companies will be dependent on their ability to recruit and retain the right talent (Walters, 2022). It has been observed that type and level of skills required by the industry is changing faster than ever (Doherty & Stephens, 2023). With the evolution of fintech 3.5, access to fintech in developing nations is increasing tremendously. The fintech companies and user segments have increased significantly over the last 5 years (NRB, 2020). The fintech uses skilled human resources, which primarily include IT employees. The right talent who can perform the work at the required level only

ensures the growth of the company and can be assessed by identifying the extent of skill gaps.

A review by McGuinness & Ortiz (2016) shows that the literature on firm-level skill gaps remain underdeveloped compared to other measures of mismatch. The ongoing literature trend shows the domain of skills within fintech is less covered (Sahabuddin et al., 2023). In Ireland, Doherty & Stephens (2023) found the industry's demand for skills is evolving at an unprecedented pace, surpassing previous rates of change. The skill sets delivered by the academic institutions and the skill sets demanded in market is not aligned in Canada for fintech accounting and business (Bott, 2018). The fintech companies in Nepal are evolving, emerging and in a nascent stage. The fintech sector has primarily focused in the payment domain. Skill gaps among employees in the ICT industry have been identified (SEEP Nepal, 2018). Research has been conducted in use of fintech for different purposes in Nepal. The notable studies pertaining to the fintech sector of Nepal are: trend of digital payment and users by NRB (2021); the adoption of fintech in grocery stores by Maharjan et al., (2022); the purposes of online shopping by Dhungana et al. (2022); and financial inclusion by Niraula & Adhikari (2019). However, these studies are focused on the general trend of adoption of fintech in Nepal, which has not covered the issue of skill gaps in terms of the nature and extent of skill gaps, and their underlying causes, and their effect on employees and fintech companies. To fill the research gap, this research will answer the following questions:

- i. What are the salient features of skill gaps in the fintech companies in Nepal?
- ii. Why are there skill gaps among the IT employees working in the fintech companies in Nepal?

- iii. What are the effects of skill gaps on IT employees and fintech companies in Nepal?

### **Objectives**

The objectives of this research are:

- i. To examine the salient features of skill gaps in fintech companies in Nepal
- ii. To explain the causes of skill gaps among IT employees working in fintech companies in Nepal
- iii. To assess the effect of skill gaps on IT employees and fintech companies in Nepal

### **Significance of the Study**

There is a dearth of literature on skill gaps in fintech companies in the context of Nepal. Therefore, the nature, extent, causes, and effects of the skill gaps among IT employees are still unknown. Studies conducted in other countries show that skill gaps in the IT sector are a widespread phenomenon (Ahmeti, 2022; Bergin et al., 2019; Bott, 2018; Nghia, 2018). Since fintech is also a part of the IT industry, we can infer that the fintech sector of Nepal cannot be an exception to this problem. In this context, the findings of this study will provide important insight into the problems of skill gaps facing by the fintech companies in Nepal and helps mitigating the problem of skill gaps.

### **Limitations of the Study**

The limitation of the study are as follows:

1. The study was limited to fintech companies operating in the Kathmandu Valley. Those companies that have headquarters in a foreign nation, are

dysfunctional, or completely outsource their IT disciplines were excluded from the study.

2. This study has only included the PSP and PSOs licensed by the NRB.
3. The vendors and other company working in fintech sector has been excluded in the study.
4. This study has focused on hard skill gaps.

## **Chapter II: Literature Review**

The purpose of this chapter is to review existing literature in order to update the current state of knowledge on skill gaps in fintech companies and find research gaps. This review is organised under the following sections: sources and methods, conceptual and theoretical review, empirical review, and research gap. Finally, the conceptual framework of the research is presented.

### **Sources and Methods**

Relevant literature for review was searched online as well as in online and offline library sources. Particularly, Tribhuvan University Central Library (TUCL) is the main offline source. The online sources included digital repository TUCL, Google Scholar, Jstor, Science Direct, Semantic Scholar, Springer, Taylor & Francis, etc.

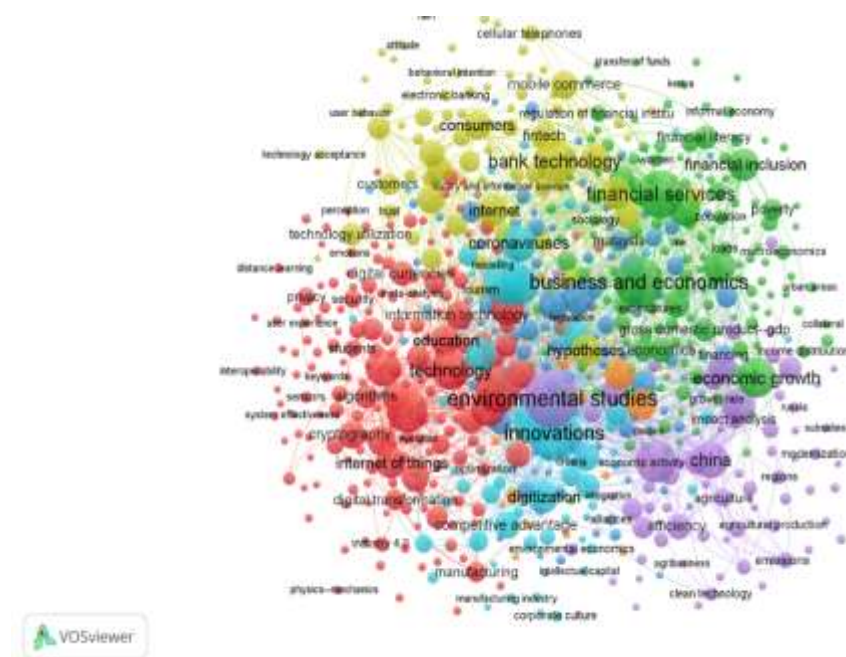
For the literature search, search terms were identified and used. The search terms used in the ProQuest database are: "Skill gap\*" OR "labour shortages" OR "manpower shortages" OR "human resource\* scarcity" OR "skill shortage\*" OR "talent" OR "skill\*" OR "talent shortages" OR "upskilling" OR "reskilling" OR "retention of talents" OR "education" OR "training" OR "education and training" OR "skill\* training" OR "skill and training" OR "talent training" OR "skill sets", "Fintech\*" OR "financial technology" OR "fintech sector". In other databases, the search terms used were "skill gaps", "fintech companies" and "fintech sector".

Thus, obtained articles from ProQuest database was used for conducting the bibliometric analysis (Figure 1). The timeframe of 2010–2023 was assigned in an advanced search to find the trend and recent key literature. The network and font size show there is a nominal occurrence of skills related research in the fintech domain. The bibliometric analysis of Sahabuddin et al. (2023) also reinforced the aforementioned work, as his analysis of the evolution of fintech research over time

using the literature published from 2010–2021 shows the increasing trend of fintech literature along with the other technological domains, block chain, and artificial intelligence. In addition to this, financial inclusion due to fintech has gained significant attention in recent years. The research on the domain of skills is very nominal in the global arena. Similarly, the related research is very nominal in the developing and least developed countries. The small fintech word represented less occurrence.

**Figure 1**

*Bibliometric Network Analysis of Skills and Fintech Using ProQuest Database (2023)*



Apart from this, relevant literature was scanned without assigning a time frame. The database includes subscribed resources, free resources, and open-access resources provided by the key literature was identified, and existing knowledge thus extracted was filled in the literature matrix in MS Excel. A literature matrix or catalogue was prepared to consist of the perspective, research design, sample size, methods, sources, research gaps, and conclusion. The methodological, contextual, theoretical, and population gaps were listed. In addition to this range of evidence from

periodic and global reports of the International Labour Organisation (ILO), International Monetary Fund (IMF), World Bank, Asian Development Bank (ADB), CEDEFOP (European Centre for Development of Vocational Training), Nepal Rastra Bank (NRB), NGOS (Non-governmental organisation), Confederation of Nepalese Industries (CNI), FNCCI (Federation of Nepalese Chambers of Commerce & Industry), SEEP Nepal, and relevant websites.

## **Concept and Definition**

### ***Financial Technology***

Financial technology (Fintech), a portmanteau of financial technology, is the term used to describe the application of the latest technology in the financial industry to provide innovative financial services, products, and solutions to beneficiaries (Arner et al., 2015; Ozili, 2018; Schueffel, 2016). It uses software and digital platforms to offer the financial services. NRB (2021) defines fintech as the use of technology in financial and banking services. Fintech companies include both PSOs and PSPs.

### ***Payment Service Provider***

“PSP is the institution that provides payment-related services to beneficiaries. It also refers to the institution that makes the payment for goods, services, assets, or other liabilities between the institution and beneficiaries, transfers money within the country and abroad, or conducts payment transactions electronically.” (NRB, 2020)

### ***Payment Service Operator***

PSO is the institution that performs payment-related operations, management, and clearing. It also refers to the institution that operates clearing house, electronic cards, and other electronic (online) payment networks (NRB, 2020).

### ***Skill***

Skills is defined as

The innate or learned ability to apply knowledge acquired through experience, study, practice or instruction, and to perform tasks and duties required by a given job. (International Labour Organization, 2018, p. 129)

### ***Skill Gaps***

Skill gaps, a form of skill mismatch, measure the extent to which workers lack the skills necessary to perform their current job (McGuinness & Ortiz, 2016). The combination of skill gaps and skill shortages is commonly known as skill deficiency or skill problems (Cappelli, 2015). The study primarily centres on addressing skill gaps, particularly emphasising hard skills, also referred to as technical skills, that are essential for effective job performance.

### ***Information Technology (IT) Employee***

The thematic occupations of information, communication, and technology professionals and workers are kept under sub-major groups 25 and 35 as specific professions (ILO, 2008). Other unit groups are kept accordingly in the respective group. The ICT employees are mainly known and referred to as IT employees. The UNESCO Institute for Statistics (2015) has provided a framework for assembling, compiling, and analysing cross-nationally comparable statistics on education. Under heading 06, it has described the education related to ICT.

### ***Level of Employees***

In this study, entry-level means employees who are freshers to the field, possessing up to two years of experience. Mid-level refers to those with two to five years of experience, while senior-level pertains to individuals who have accumulated more than five years of experience in the field.



## **Theoretical Review**

In this section, relevant theories explaining skill development, management, and variation of skills by level of job, career mobility, and the effects of structural change in skills are reviewed. Since concrete theories explain skill gaps.

### ***Human Capital Theory***

Garry Becker and Thomas Schultz propound that education and training are the investments that could add productivity. The human capital theory is an economic theory that suggests investing in education, training, and other forms of human capital can lead to increased productivity and economic growth (Becker, 2009). According to the theory, individuals who acquire human capital can earn higher wages and contribute more to the economy. This is because human capital enhances an individual's productivity, which in turn increases their value to employers. The theory suggests that governments and businesses should invest in education and training programmes to improve the skills and productivity of workers, leading to increased economic growth and prosperity.

### ***Skill Theory***

Robert Katz's skill theory proposes that effective managers possess three key skills: technical skills, human skills, and conceptual skills. Technical skills refer to knowledge and proficiency in a specific field, while human skills refer to the ability to work well with others and communicate effectively. Conceptual skills refer to the ability to think abstractly, understand complex systems, and make strategic decisions. The importance of each skill varies depending on the level of management, with top-level managers requiring more conceptual skills and lower-level managers requiring more technical and human skills, and a combination of these three skills is necessary for managerial success (Katz, 2009).

### ***Theory of Career Mobility***

The theory of career mobility, propounded by Nachum Sicherman, suggests that given an occupation of origin, more educated individuals are more likely to move to a higher-level occupation. Career mobility theory explains how individuals progress through different stages of their careers over time (Sicherman & Oded, 1998). It highlights the importance of education, training, and networking in facilitating career advancement and recognises the role of societal factors in shaping career trajectories. The theory distinguishes between vertical and lateral mobility and emphasises the value of proactive career planning and seeking out new opportunities. This theory provides a framework for understanding the factors that influence career advancement and can guide individuals and organisations in making strategic decisions about career development and talent management.

### ***Structural Change Theory***

Structural change theory in economics suggests that economic growth and development are driven by changes in the structure of the economy. As economies develop, there is a shift in the allocation of resources towards more dynamic, high-productivity sectors that require higher levels of education and skill, and that offer higher wages. This process of structural change is not automatic and requires a supportive policy environment to promote education and skills development, facilitate technological innovation, and support the development of new industries and sectors. Structural change theory provides a framework for understanding how economies grow and develop over time and the importance of adapting to changes to ensure long-term growth and development.

## **Empirical Review**

Globally, the skill gaps assessment has gotten attention in various sectors, but there is very little literature conducted focusing on fintech. In Nepal, skill gaps in fintech companies were found to be very limited. The empirical study conducted internationally and nationally is discussed below.

### ***International Studies***

McGuinness et al. (2018) extensively conducted a literature review on skill mismatches. His study found most of the literature in the field of skill mismatches has been conducted on the national level and primarily focused on the industries and manufacturing units. Further, he found literature regarding the skill gaps in underdeveloped in comparison to other form of skill mismatch.

McGuinness & Ortiz (2016) utilized data from the 2006 Irish National Employment Survey to establish that effective identification of skill gaps within companies relies significantly on two factors: sectoral-level collective bargaining and a robust human resource infrastructure. These skill gaps were identified as a crucial driver of both training expenses and labour costs. Jackson & Chapman (2012) conducted an investigation into the specific characteristics of non-technical skill gaps among graduates of Australian undergraduate business programs. They discovered that graduates lacked essential components of the managerial skill set. Tether et al. (2005) utilised data from the United Kingdom to determine that more than 20% of companies experienced delays in introducing new products due to skill gaps. Additionally, approximately 33% of firms considered skill gaps to be a hindrance when implementing new work practices.

The study conducted by Akana (2021) using the data from Federal Reserve bank of Philadelphia found changing US customer payment habit pattern which

shows person to person and digital payment increases from six to eight percent. Imam et al. (2022) founded ASEAN regions offer more promising prospects for the growth of fintech services compared to the SAARC regions, where the opportunities appear to be comparatively limited. Carletti et al. (2020) have indicated globally the rising trend of the financial organizations to shift to fintech trends after the COVID-19 to meet the business operations for attracting valuable customers by address the preferences through the integration of state-of-the-art technologies in a study conducted in the United Kingdom.

Babu et al. (2023) conducted the rank analysis among the Asian tourist coming to India from Sri-Lankan, Bangladesh, Bhutan, Pakistan, Nepal, Malaysia, and Thailand. His study shows fintech product mainly used in developing countries are mobile banking, insurance, online banking and mobile payment. Furthermore, results show fintech users are male belonging to age category above 35 years. The major fintech product used in Kenya is mobile banking (Soutter et al., 2019). This result shows the mostly used fintech product in developing nations are mobile banking and digital wallets.

Doherty & Stephens (2023) conducted research in hard and soft skill need in fintech sector of Ireland. They found 13 distinct disciplines in hard skills and six different in soft skills. The study found type and level of skills required by industry is changing faster than ever before. The study also found the level of competence required in hard skill is decreasing due to increased inhouse training and skill development programmes. Ahmeti (2022) examined effect of skill gaps in IT sector of Kosovo using both the qualitative and quantitative data. His study noticed mismatch in both hard and soft skills. The employees found harder to retain the workers. The study also found that formal educational institutions were not providing students with

all the essential skills needed for securing employment. As a result, students felt compelled to pursue supplementary training to enhance their employability prospects. Moreover, universities acknowledged during interviews that they encountered difficulties in aligning their program curricula with evolving market demands due to the rapid pace of change in this sector. And companies were bridging the skill gaps through training programs.

Bott (2018) examined the fintech skill gaps in Ontario, Canada. The study found skill demanded and skills in curriculum, focusing in accounting and business. The results unveiled, with statistical significance, that business and accounting educators had a weak level of consensus with bank employers regarding the key hard skills that are most relevant in the industry. In the global fintech talent report, Walters (2022) conducted study in world's nine key fintech hub and found forecast for organizations operating in the global fintech market was very positive. However, their growth depended on their ability to recruit and retain the right talent.

In the fintech talent study conducted by the Hongkong University and associates in 390 fintech companies and found fifty-one percent of the companies believed that increasing the supply of fintech courses for both university students and industry professionals could help increase the supply of local fintech professionals. Bergin et al. (2019) found in low-income countries, a considerable portion of young individuals lacked even the most basic skills necessary for the labour market during their past research. They also identified significant skill gaps among these young workers when they entered the workforce. Utilizing data from the ILO School-to-Work Transition Survey, which encompassed 15 to 29 year olds in 34 countries, the study found that underqualified workers, as defined through subjective criteria,

constituted as much as 36.4% of all young employees who had completed their education and up to 46.2% of those who were own account workers.

Nghia (2018) conducted a study in Vietnam, the final-year students and recent graduates were severely lacking in the skills to effectively perform their work duties. The study was conducted in 257 university graduates and 525 final year students of which 25 percent belong to STEM discipline. Shende (2016) conducted a literature review on skill gap parameters with reference to financial service industry. The study found industry need efficient employee who can work with “on-the-job” approach. The study relying on other previous literature categorised parameters which were grouped under the professional and personal parameters. Technical skills are categorised under the personal parameters. The study concludes the need for critical evaluation of all parameters on large scale.

Barthel et al. (2016) stated that skill gaps constituted a major constraint on development at three levels. At an individual level, skill gaps restricted possibilities for employment and hindered advancements in one's living circumstances. On an organizational level, these gaps impeded productivity, potentially increasing expenses, diminishing quality, and limiting the company's prospects for growth. Furthermore, at the national level, skill gaps hindered a country's competitiveness and constrained its potential for economic and social development. Gayatri et al. (2023) found that hard skills in the ICT will be in demand. The supply will be outnumbered by 6,00,000 (more in number). Supply side will be in higher side. But the concern is the mismatch and gap in digital skills remain the main problems.

Ziberi & Ukshini (2021) conducted study in Republic of Kosovo applying quantitative methods. The main focus of the study is on skill mismatch on Kosovo. This study conclude that enterprise find difficult to ensure right skills and trained

universities graduates. And has policy recommendation for government regarding the paid internship, universities gap skill. However, this study is not sector specific. It had holistically kept all the enterprises (micro, small and medium) in same categories. The stratified random sampling would better capture the data accurately.

In their empirical study, Radermacher et al. (2014) investigated software companies in the United States of America (USA) and Europe. Their findings indicated that recent graduates had faced challenges related to a range of skills and abilities. These difficulties included using configuration management systems and other software tools, communicating effectively with colleagues and clients, writing unit tests for their code, and applying other relevant skills. Moreover, the research revealed that a deficiency in project experience and problem-solving abilities had hindered graduates' employability. Furthermore, the study recommended adjusting the curriculum to align better with industry expectations.

McMurtrey et al. (2008) conducted study in the mid-South region of the USA during the past decade found that the most crucial skill identified was soft skills. However, it was also evident that technical skills played a vital role, with an emphasis on database knowledge, programming language proficiency, object-oriented understanding, and web development skills. These technical competencies remained highly significant for entry-level IT professionals.

Kheira (2021) found talent gap as one of the key constraints in Middle East and Africa (MENA) region. In 2016, the joint study conducted by Wamda and PAYFORT, within the MENA region, found that startups—especially those operating at the forefront of cloud computing, cybersecurity, machine learning, or artificial intelligence—faced challenges in attracting and retaining the talent they needed to succeed.

Mei et al. (2018) conducted a study in China on the development of the fintech industry and the status of talent training. Their paper suggested to academia the need to explore new teaching methods, specifically emphasizing school-enterprise cooperation, to ensure the provision for protection of good talents for the development of fintech. Jiang et al. (2021) conducted with database from past decade in the USA and found in response to the disruption caused by fintech, companies turned to an upskilling approach. This approach demanded a combination of finance and software skills, elevated levels of education, and extended professional backgrounds when recruiting for positions exposed to the fintech industry.

Wu et al. (2022) delivering tech talent with the relevant experience or engaging in training projects will help new hires feel supported, while they also gain the relevant knowledge that their peers had gained through experience. Xu (2020) paper proposed that the project-driven teaching method could contribute to the path of talent development in fintech sector. Jamil & Seman (2019) has urged intervention in education for enhancing the skills in fintech ecosystem in Malaysia. Shino et al. (2022) asserted that the university had the potential to function as a competent and competitive human resource developer in the financial sector through the incorporation of fintech into its curriculum. The study also emphasized the importance of integrating Sharia fintech into university curricula and noted that Islamic universities had ability to implement fintech into their curriculum.

Xiao (2022) highlights higher vocational education should focuses on the integration of industry and education as talent cultivation mechanism, and seek to cultivate high-quality and differentiated complex financial talents from the curriculum, competitions, and projects. Karkkainen et al. (2018) put stressed that for the full transformative potential of fintech to be enabled, there was a need for an



updated educational curriculum that balanced knowledge and understanding of finance and technology. The role of university to prepare graduates with the skills necessary to confront unpredictable and highly intricate scenarios (Nagarajan & Edwards, 2015).

In software industry of Bosnia and Herzegovina, Halilbasic (2021) found the evidence of skill gaps were prominent in technical skills found primarily due to inadequate curricula. The survey revealed that 78.1% of 166 employers held the opinion that there should be a substantial increase in practical training, the organization of practical work, and mandatory internships during students' studies which would better prepare graduates for the transition from education to employment within the software industry. 82 percent of respondents opined curricula should align with market requirements.

Santoso & Putra (2017) used grounded theory to analyse the alignment between the demand for IT graduates in the job market and the profiles of IT graduates produced by higher education institutions. The findings pointed out that a mismatch was due to the emergence of new skillsets and might materialize if higher education institutions did not respond quickly to workforce trends.

The information disseminated by the website are included regarding the fintech. More than 60% of fintech companies in India report a shortage of skilled employees, mainly in IT, engineering and sales services.<sup>1</sup> According to the Talent shortages in the fintech sector has been characterised as “a global plague”.<sup>2</sup>

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<sup>1</sup> According the news published in the Time of India  
<https://timesofindia.indiatimes.com/readersblog/storiesbyashmita/major-skill-gap-created-by-indias-rapid-adoption-of-fintech-42948/>

<sup>2</sup> <https://www.relocatemagazine.com/talent-management-enterprise-talent-shortage-in-fintech-a-global-plagued-sapsted-0123>

### *National Studies*

The study conducted by ADB (2013) pointed out that Nepal had been lacking reliable, up-to-date, multisector labour market data at both the macro and local levels. Furthermore, study found there had been a notable absence of specific assessments regarding skill gap disparities, as well as studies on the attitudes and aspirations of both employees and employers. It was also noted that there was an anticipated growth in demand for IT support, which fell within the service sector.

The firm-level survey carried out by SEEP Nepal (2018) in 238 firms on skill-related issues, of which 47 enterprises were working in the ICT sector, found that 66 percent of the respondents believed that skill was a limiting factor for their growth. The report also discovered that there were no significant skill gaps in the employees. Though nearly half of the firms reported a lack of skills in the graduates they had hired and an unavailability of skilled professionals for their company. Sixty percent of the firms identified gaps in core work skills and business-related skills, which typically included project management skills, a lack of practical knowledge, and a lack of business development. Furthermore, the report identified that firms had used in-house training and mentorship programs to address these issues. However, this study did not capture the issues by level of employees. Additionally, the cause and effect of skill gaps and related issues were not identified. This study was not specific to the fintech sector.

According to Bazarbash (2020), fintech in Nepal is mainly used for utility payments, and it had offered advantages that could promote mobile payments among tourists and help Nepal in overcoming its geographical limitations. NRB (2021) stated in its payment oversight report on the adoption of the fintech user in digital payments which had increased tremendously. Niraula & Adhikari (2019) examined digital

finance services as a means of promoting financial inclusion and found a significant and positive relationship between mobile and internet access and the number of deposit accounts used, which served as a proxy for measuring financial inclusion, using multiple regression analysis. Aryal (2020) conducted research on the working conditions of fintech workers and found that they were not in compliance with a good working environment.

The research carried out by Nepali (2021) had found that the combination of fintech and ICT had facilitated the implementation of crowdfunding, which could potentially serve as an alternative source of finance in Nepal. However, a significant barrier to its development had been the lack of regulatory guidance. Singh Kunwar & Thakur (2019) evaluated the attitudes of 222 young customers in Nepal regarding the benefits of mobile banking and found that these attitudes were positively influenced by the perceived ease of use and usefulness.

Maharjan et al. (2022) had studied the adoption of online grocery buying during the COVID-19 lockdown and had found that most youth had been attracted to it. As well two-thirds of the respondents had experienced issues with fintech adoption due to slow internet and a lack of knowledge about its uses. The study conducted by Dhungana et al. (2022) using the non-probability method showed that consumer attitudes and online purchase intentions were significantly influenced by consumer lifestyle and prior online shopping experience.

### **Research Gap**

Research on the skill gaps in fintech companies in the least developed countries is still rare in the global context. In Nepal, the literature review shows the ongoing literature trend on fintech is primarily focused on its adoption, trend analysis of user segments, its impact on financial inclusion, and challenges and opportunities

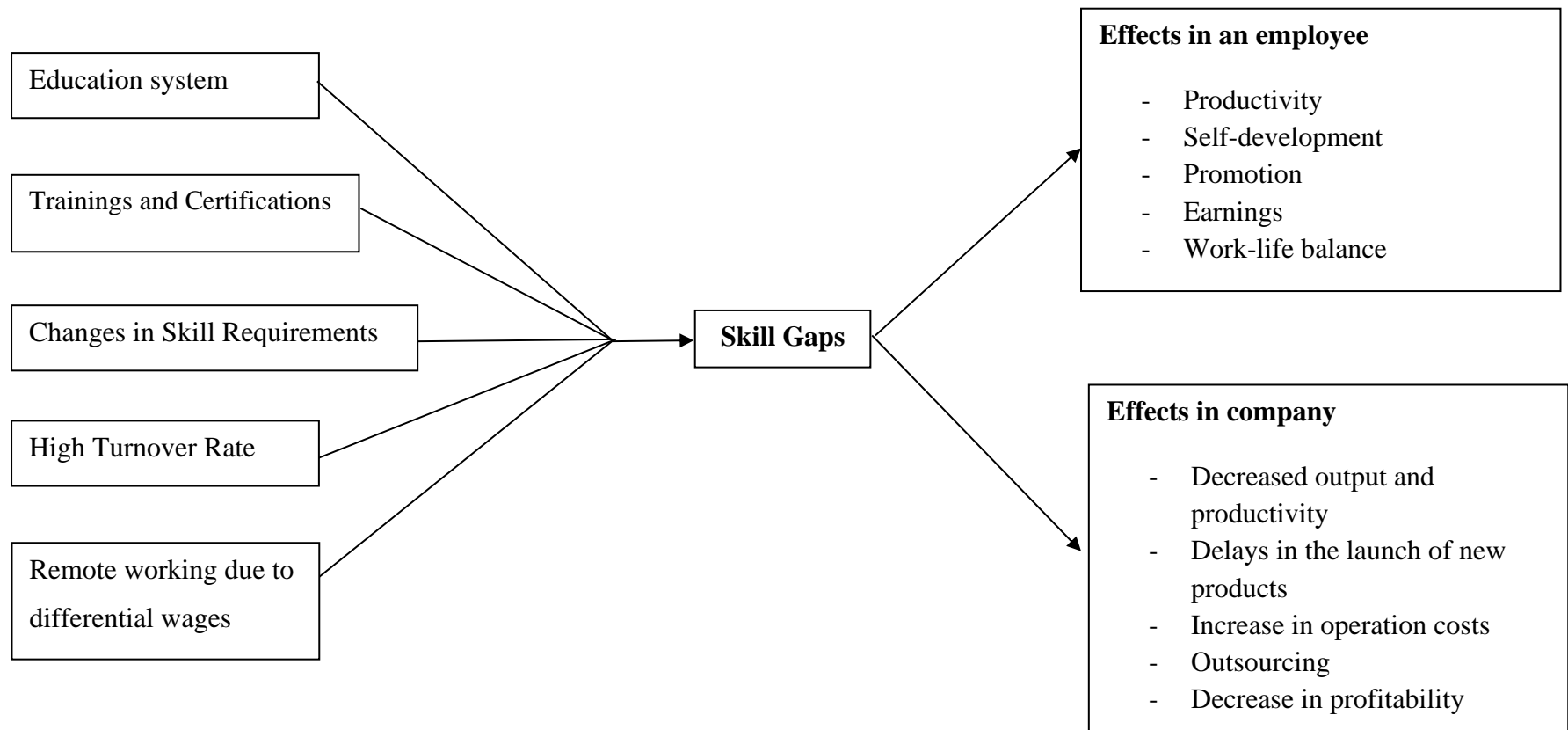
for its development. But it has received little attention in the field of requirements of skills for employability, skill gaps, and their underlying causes and effects.

### **Conceptual Framework**

The conceptual framework is designed to show the relationship between the causal variable and the consequential variable. The causal variables are responsible for causing the skill gaps, and the consequential variable is the effect of skill gaps. The consequential variables are categorised at the company level and at the individual level. The conceptual framework of the study, which shows the causal and consequential variables, is shown in Figure 2.

**Figure 2**

*Conceptual Framework of the Study*



*Causal variable*

*Consequential variable*

### **Chapter III: Research Methodology**

This chapter deals with the research methodology of the study, focusing on the research site and population, sources of data, research design, research instruments, data collection, data management and analysis, ethical considerations, and limitations of the study.

#### **Research Sites and Population**

The study was conducted as an organisational study, primarily focusing on the fintech companies in Nepal. A list obtained from NRB shows that almost all the fintech companies are located in three districts of Kathmandu Valley: Kathmandu, Lalitpur, and Bhaktapur. Therefore, this study has focused on fintech companies situated in Kathmandu Valley.

Nepal Rastra Bank (NRB), an autonomous central bank of Nepal, is responsible for issuing licenses and regulating fintech companies. According to the Payment System Oversight Report 2021/22 published by NRB (2022), there are 37 licensed institutions in the payment sector, consisting of 27 Payment Service Providers (PSPs) and 10 Payment Systems Operators (PSOs). As of mid-July 2022, all 26 commercial banks (20 after the merging of some banks), 13 development banks, and 15 finance companies were authorised by the NRB to function as PSPs. 72 of the 85 fintech companies are located in Kathmandu Valley. Of the 72 companies, those that are dysfunctional, foreign, or completely outsource the IT discipline were excluded. It was found that only 61 companies operate internally, which was the target of this study. But four companies did not respond. In total, 57 fintech companies were assessed for interviews.

#### **Sources of Data**

The study used both primary and secondary data.

### ***Primary Sources of Data***

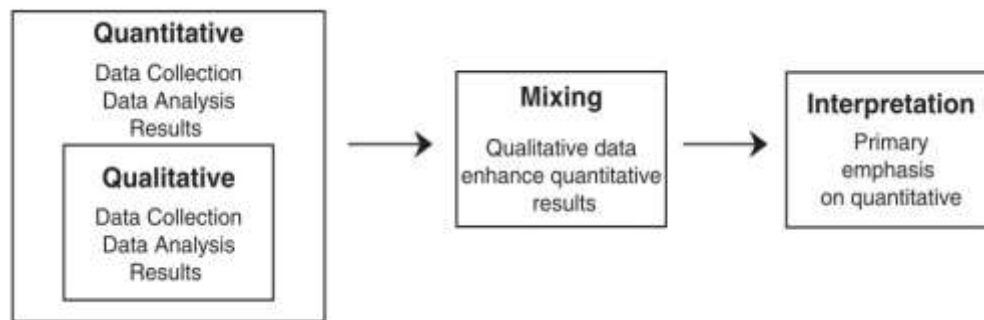
The primary sources of data were acquired from fintech companies through quantitative and qualitative research methods. Quantitative data was obtained through a survey of 57 fintech companies located in Kathmandu Valley. The purpose of the quantitative study was to measure the extent of skill gaps, the underlying causes of skill gaps, and the effects of the skill at an individual level and in fintech companies. Qualitative data was acquired through key informant interviews (KIIs) with representatives of selected fintech companies and entry-level employees. The purpose of qualitative data was to enrich quantitative research tools and understand the experiences of fintech companies and employees about key services and IT disciplines, the causes and effects of skill gaps, and coping strategies to minimise the skill gaps.

### ***Secondary Sources of Data***

The secondary sources used were published journals, articles, institutional and government reports. The Nepal Labour Force Survey, demand assessment done by the Asian Development Bank, and Skill for Employment Programme Nepal are analysed for the research. In addition to this, ILO, ADB, WB, NRB, National Industrial Survey, Overseas Development Institute, United Kingdom, and relevant documents.

### **Research Design**

This is a cross-sectional embedded mixed research design (Clark et al., 2008) (Figure 3). In this design, quantitative and qualitative research methods were used simultaneously. However, some qualitative data was collected before the quantitative survey commenced. This method was required in order to enrich quantitative research tools.

**Figure 3***Embedded Mixed Method Design*

*Source: Creswell and Plano Clark (2007)*

### **Complete Enumeration for Quantitative Study**

As mentioned above, all the fintech companies located in Kathmandu Valley were enumerated in this study. The managers and employees could provide accurate information on skill requirements (Brunello & Wruuck, 2021). For assessing the skill gaps, employers should be questioned to specify the cases where the existing workforce does not have the required qualifications, experience, and/or specialised skillsets to fulfil the firm's skill needs for an occupation (European Centre for the Development of Vocational Training (CEDEFOP), 2010). So, information for the quantitative study was sought from IT heads, IT managers, chief technology officers, and human resource managers of fintech companies. Further, each of the fintech company had a mechanism for the regular record-keeping of the appraisal and competence matrix. They had the current and past state of information to report the skill gaps among each category of employees in distinct discipline. The list of companies involved in the study is presented in the Appendix E.

### **Sampling for Qualitative Study**

For the qualitative study, a total of 18 participants were selected, representing different types of fintech companies. Of the 18 participants, 12 were senior employees



and 6 were entry-level employees. Each of the types of companies included two participants. While for entry-level employees, those who were working at fintech companies for 0 to 2 years and for senior employees for more than 5 years were selected for interviews. The list of participants included in the study is presented in Appendix F.

## **Research Instruments**

### ***Quantitative Design***

Skill mismatch can be measured using two approaches: the subjective method and the objective method (Senkrua, 2021). This study has used a subjective approach to measure the skill gaps as perceived by senior-level employees. Indo-German Programme for Vocational Education and Training has conducted a skill gap analysis in threefold:

- i. Skill requirements of the market
- ii. Skills delivered by job seekers
- iii. Skill Gaps (Skill Requirements of the Market—Skill Delivered by the Job Seekers)

A similar procedure was used to assess the skill gaps using the five-point Likert scale. A closed-ended, structured questionnaire was used for the data collection. The mode of collection was face-to-face. The development of the questionnaire in the Nepali context was done on the basis of various questionnaires as developed and tested by the FIT ICT Skill Audit 2018 prepared by the North West Regional Skill, Ireland, fintech talent study Hong Kong, skill gaps in the IT sector of Kosovo, SEWS Canada, and Reflex questionnaire of Ireland. A FIT ICT Skill Audit was conducted to identify the skill needs in the fintech sector. It was done for the National Skills Strategy to provide an opportunity for employers and higher education

institutions to meet emerging skill needs. The survey questionnaire is presented in Appendix D.

### ***Qualitative Design***

A set of discussion guidelines was prepared for the interview in consultation with the supervisor. The guideline for key informant interview is presented in Appendix C. The guidelines were prepared with the main focus on the experiences of the research participants on the

- Skill gaps in the fintech companies
- Salient features of the gaps
- Underlying factors for skill gaps
- Effects of skill gaps
- Coping Strategies

### **Data Collection**

The quantitative data collection was conducted using an online platform called KoboToolBox. It offers researchers an efficient and useful means to collect data. It speeds the data collection process, improves data quality, and makes data analysis faster as it has a user-friendly interface, a customizable questionnaire design, and robust data management features. The questionnaire was developed in English, and the interview was conducted in face-to-face mode.

The qualitative information was collected through KII and recorded in a voice recorder on the Android phones, and note-taking was done at the same time. Interviews were conducted in Nepali, and all the recorded information was transcribed and translated into English. The KII was conducted in face-to-face mode. Data collection was conducted by the researcher himself during June–August 2023.

### **Data Management and Analysis**

The quantitative data file from the KoboToolbox server was downloaded to csv format, edited, and transferred to Statistical Packages for Social Science (SPSS) for tabulation. In SPSS, variable and value labels were attached to the data file. Quantitative data was collected and analysed with SPSS, STATA, and MS Excel. Data are analysed with the help of descriptive statistics. The data are presented in tabular and visual forms. Statistical tests like the Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted to check the normality data of each discipline. Kruskal-Wallis tests (McKight & Najab, 2010) and post hoc tests (Elliott & Hynan, 2011) were conducted in order to determine the significance of distribution of the skill gaps among employee groups.

Qualitative data were managed in MAXQDA software, themes were generated, and data were presented in narrative form in order to supplement the quantitative findings. Mendeley was used for managing secondary sources of information, citations, and referencing.

### **Ethical Considerations**

The data acquisition certificate issued by the Master's Degree Programme in Labour Studies was introduced to inform the respondent during the time of data collection and letter is shown in Appendix A. The consent of the respondent, informants, and interviewee was obtained before the data collection. The thesis work followed the American Psychological Association (2020) style of citation, referencing, and formatting. and is bound by the Statistical Act of Nepal, 2079. The thesis has undergone the plagiarism test as mentioned in the Anti-Plagiarism Software Management and Operation Procedure, 2078, arranged by the Tribhuvan University

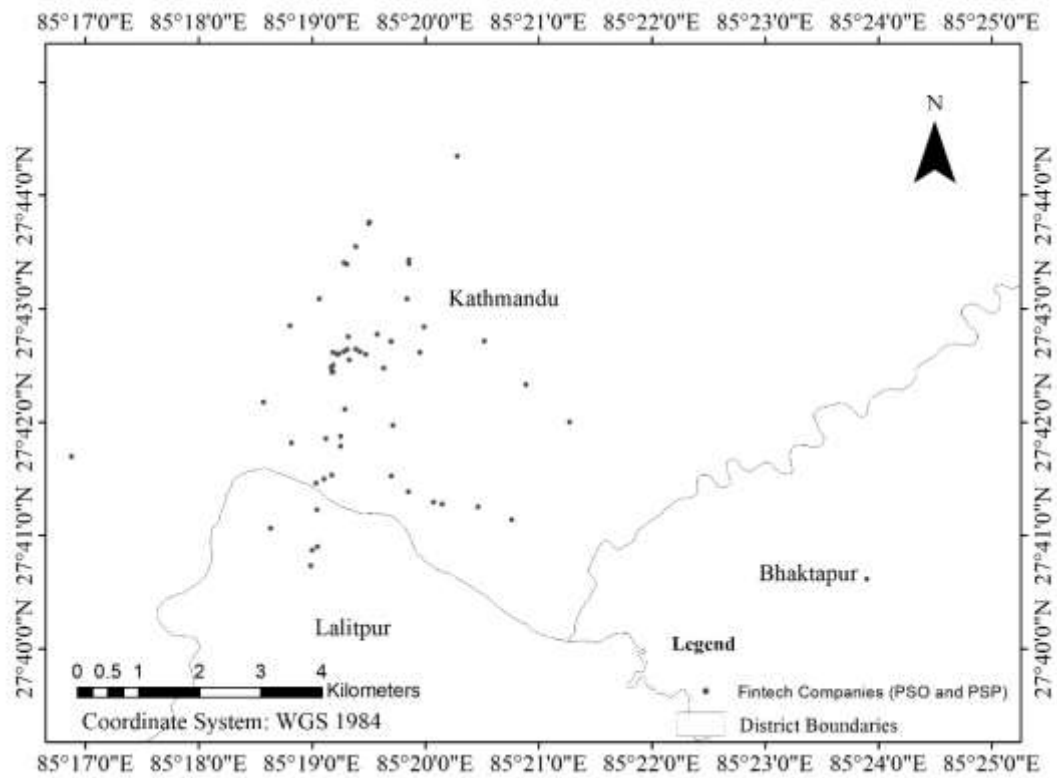
Central Library. Thus, the produced certification test report was incorporated into the thesis submission.

## **Chapter IV: Results and Analysis**

This chapter deals with the results and findings of the study. The chapter is organised under the following sections: profile of the fintech companies based on employee distribution, employees' turnover rate, key services offered, IT disciplines conducted internally or outsourced, extent of skill gaps among employee groups, underlying causes of skill gaps at each level of employees, the consequential effect of skill gaps at an individual and company level, and coping strategies.

### **Profile of the Fintech Companies**

Out of 61 companies, 4 did not report. In total, 57 companies were included in the study, with 51 located in Kathmandu, 5 in Lalitpur, and 1 in the Bhaktapur district (Figure 4). The respondents were senior IT employees holding positions of IT head, Chief Information Technology Officer, and IT manager. Among the 57 respondents, 53 were male and 4 were female. The survey focused on 6 payment sector operators (PSOs) (10.5 percent), 15 payment service providers (PSPs) (26.3 percent), 20 commercial banks (35.1 percent), 7 development banks (12.3 percent), and 9 financial institutions (15.8 percent), as presented in Table 1.

**Figure 4***Geographical Location of the Fintech Companies***Table 1***Frequency of Participated Fintech Companies*

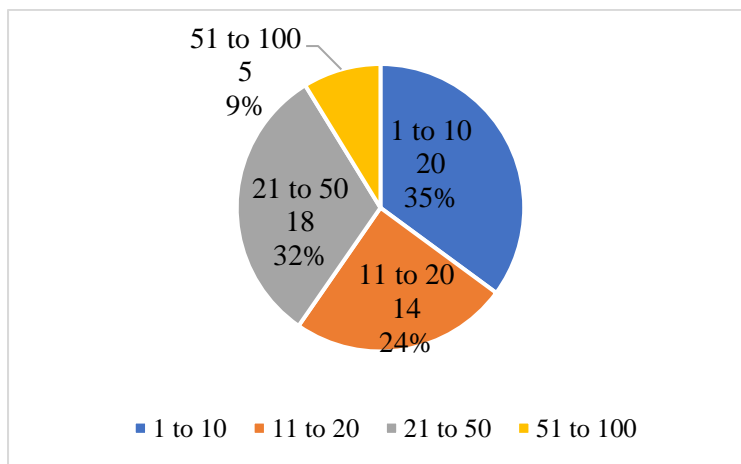
Types of company	<i>N</i>	<i>N (responded)</i>	%
Commercial Bank as PSP	20	20	35.1
Development bank as PSP	7	7	12.3
Finance Company as PSP	11	9	15.8
Payment Service Operator (PSO)	6	6	10.5
Payment Service provider (PSP)	17	15	26.3
Total	61	57	100.0

### Scale of Fintech Companies by Number of Employees

The fintech company by number of IT employees is shown in Figure 5. 35 percent of companies have fewer than 10 employees at work. 32 percent of companies have between 21 and 50 employees at work. A quarter of the companies had a workforce ranging between 11 and 20 employees. Nine percent of the companies have a workforce of more than 51 and 100 employees.

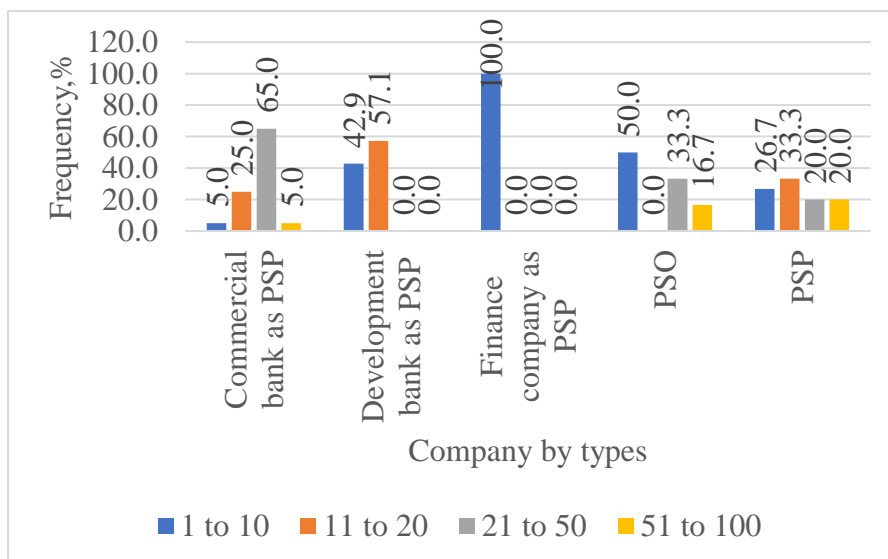
**Figure 5**

*Size of company by Employee at Work*



**Figure 6**

*Employee Number at Work by Types of company*

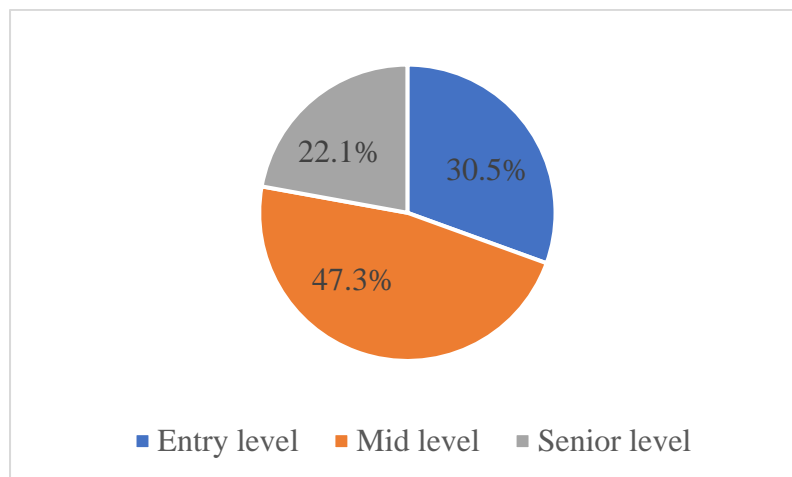


### Distribution of IT Employees by Level and Sex

Figure 7 demonstrates that entry-level, mid-level, and senior-level positions have a share of 22.1 percent, 47.3 percent, and 30.5 percent of the total IT employees, respectively. IT employees' composition by sex shows male dominance at all levels (Figure 8). The study found the ratio of female to male employees is 1 in 4 at the entry-level, 1 in 5 at the mid-level, and 1 in 15 at the senior-level.

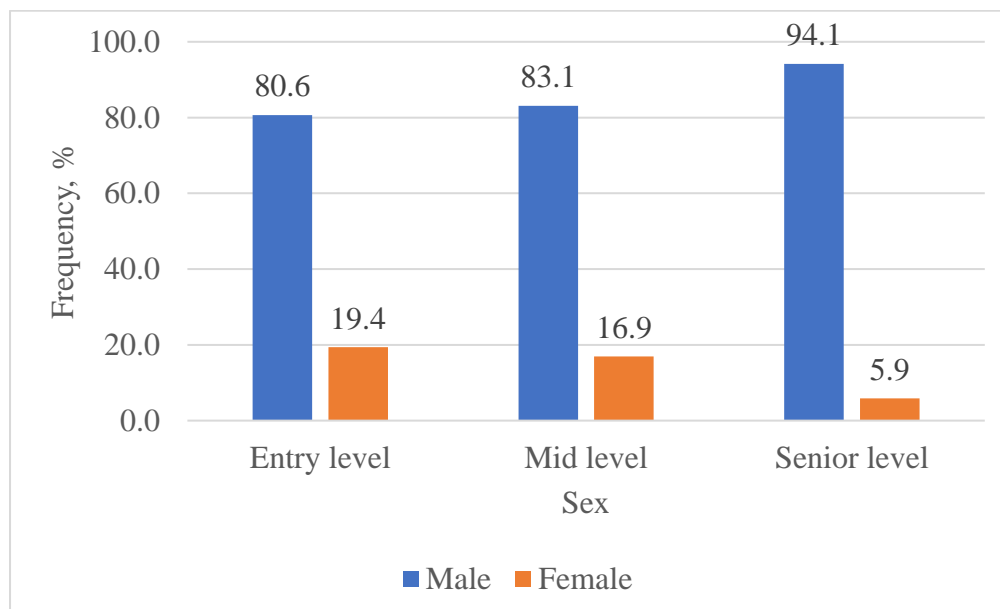
**Figure 7**

*Share of Employees by Level*



**Figure 8**

*Distribution of Employment by Level and Sex*



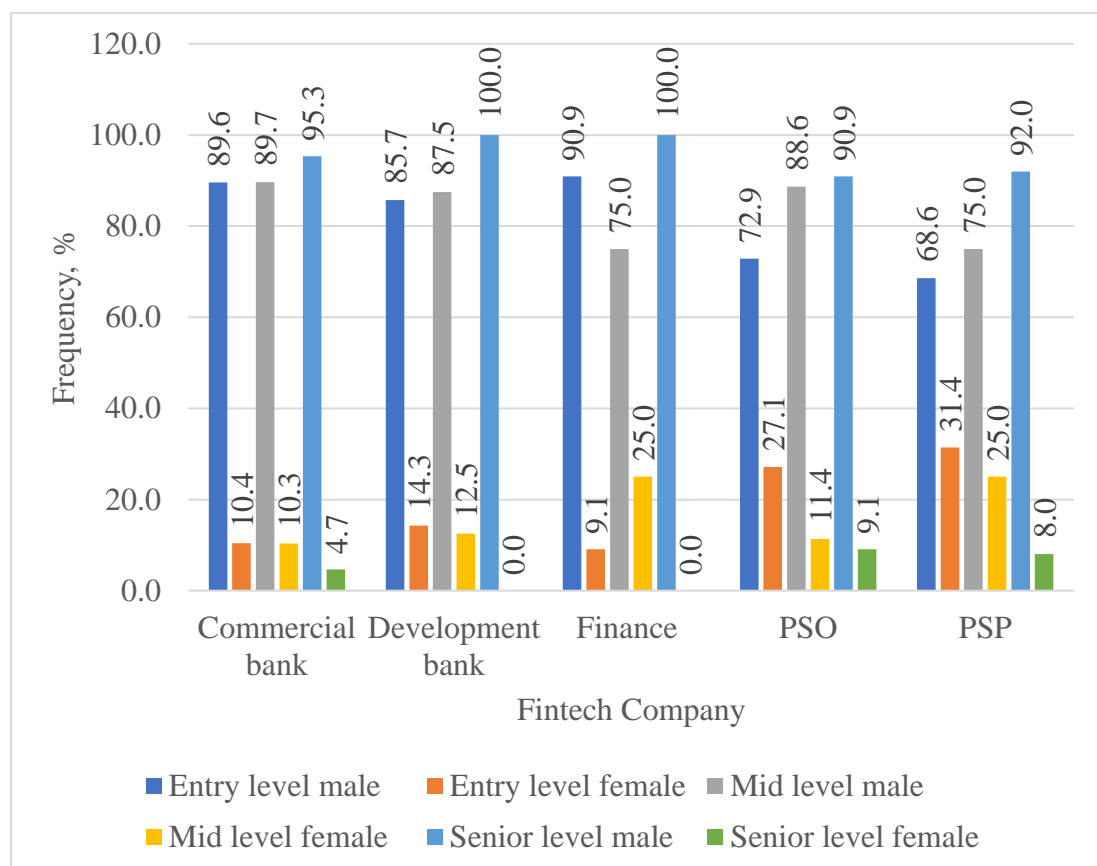


The disaggregated result of IT employees by sex and company is presented in Figure 9, which depicts that there is no participation of females in senior-level positions in the finances and development banks, whereas in commercial banks, representation is 4 percent. The senior-level female employees in PSO and PSP are less than 10 percent. In all the companies, the representation of senior-level male IT employees is more than 90 percent.

At the mid-level, female representation in both the PSO and finance is 25 percent. Comparatively, females at the entry-level have good representation in PSO and PSP, which account for 27 percent and 31.4 percent, respectively.

**Figure 9**

*Distribution of Employment Across Companies by Level and Sex*



### Monthly Minimum Salary

40 of 57 companies reported a minimum salary for their employees. The study reveals that the minimum salary for IT employees in these companies spans a range of 12,000 to 50,000 for entry-level positions, 25,000 to 90,000 for mid-level positions, and 32,000 to 250,000 for senior-level positions. The median minimum salary for entry-level employees is 25,000; for mid-level employees, it is 50,000; and for senior-level employees, it stands at 97,500. The distribution of the minimum salary and the median of the minimum salary across the levels of employees is presented in Table 2.

**Table 2**

*Minimum Income Range by Level of Employee*

Minimum income	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>MD</i>	<i>SD</i>
Entry-level	40	12,000	50,000	28,000.00	25,000	9298.470
Mid-level	38	25,000	90,000	51,947.37	50,000	16,574.072
Senior level	42	32,000	250,000	98,380.95	97,500	48,050.762

### Minimum Qualification for Different Level of Employees

The minimum qualification required for entry-level employability includes a bachelor's degree in fields related to information technology, engineering, and computer sciences. For mid-level positions, a bachelor's degree along with two years of relevant experience is the criterion, while for senior-level roles, a bachelor's degree and a minimum of five years of experience are required.

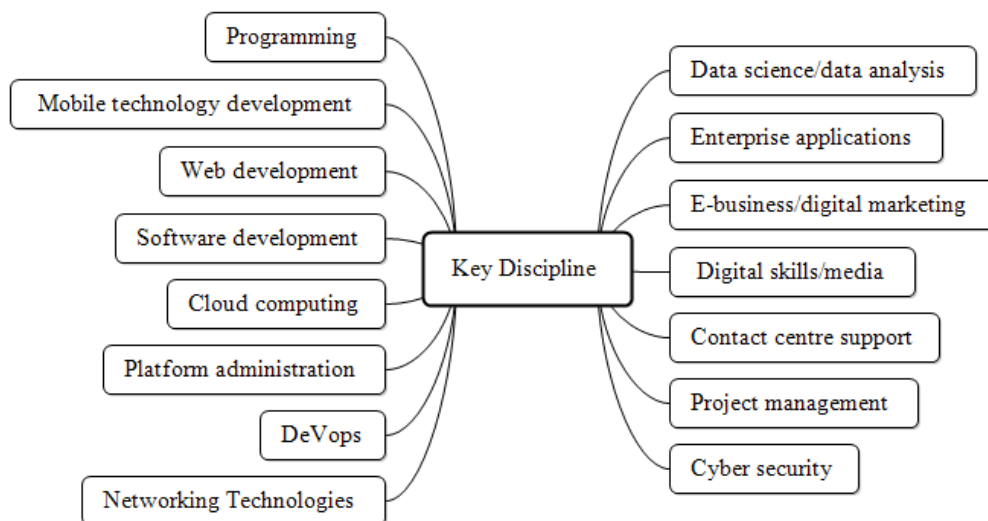
### Key Services and Disciplines

The major services provided by the fintech companies in Nepal are in the payment domain. The PSP and PSO reported their services were in accordance with

the Unified directives of the NRB and the Act of Nepal. All the PSPs reported that they provide payment services. The PSP uses the digital wallet platform. The services provided by the bank and financial institutions include digital banking, internet banking, and ATM services. The PSO provides the payment switch to all the PSPs operating in Nepal. The services provided by the PSO include connect IPS, clearing services and card services to the banks. The major IT discipline in which fintech companies offer employment is shown in Figure 10.

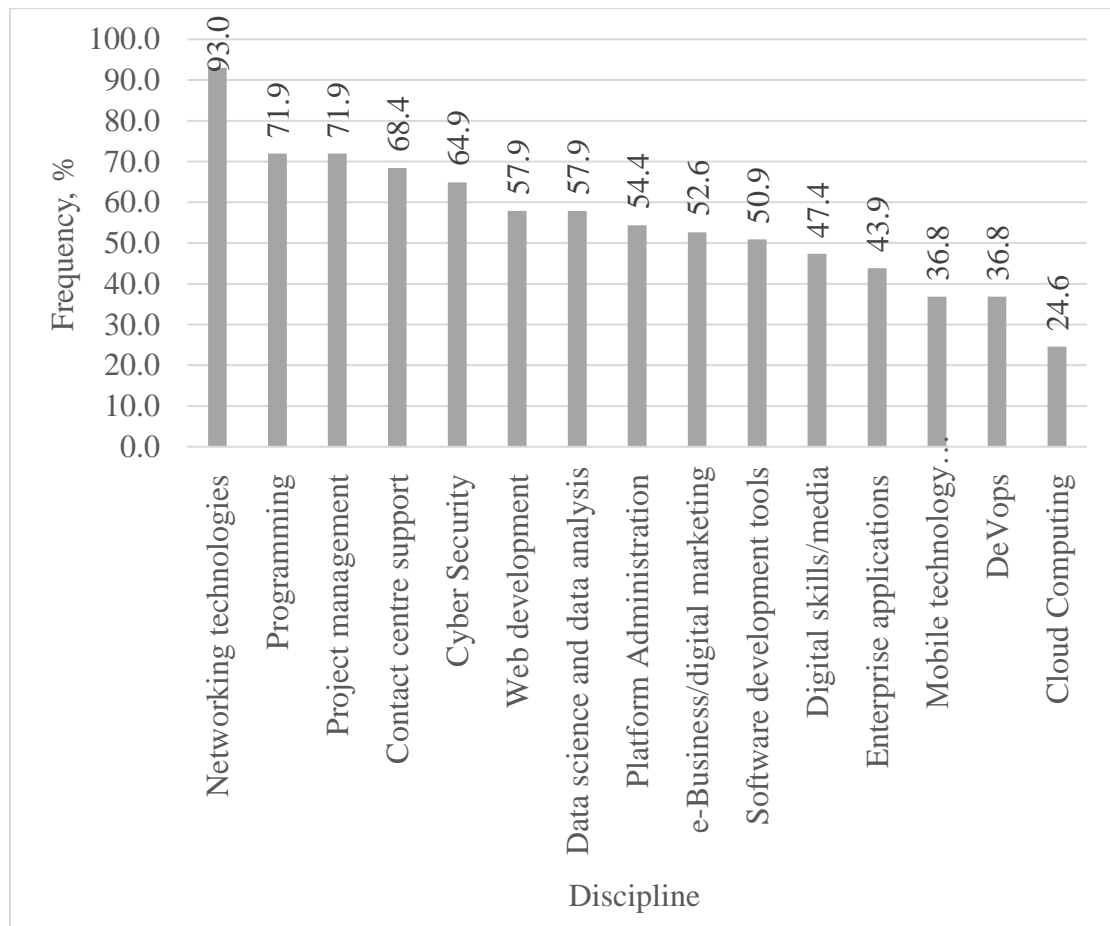
**Figure 10**

*Key Discipline of Fintech Companies*

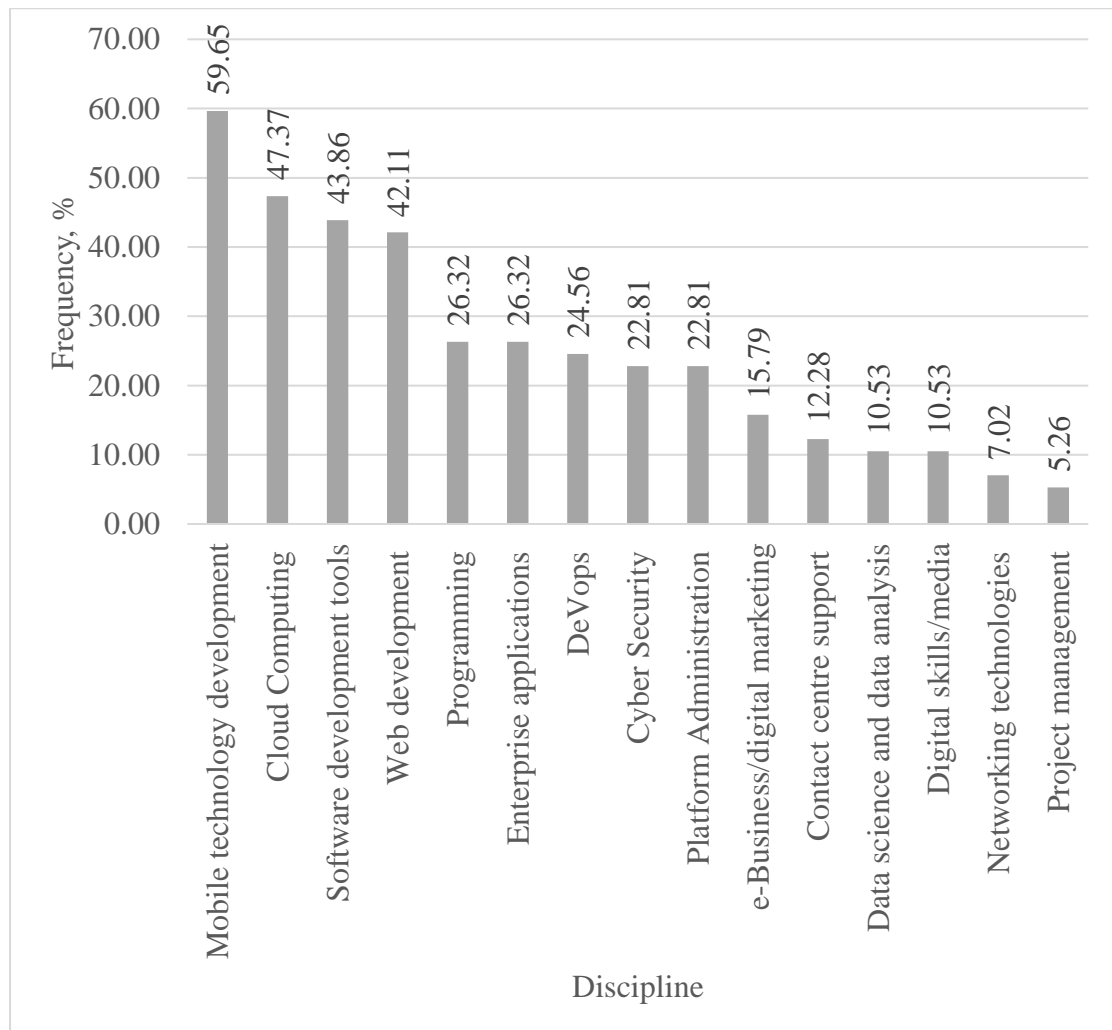


*Discipline by In-house*

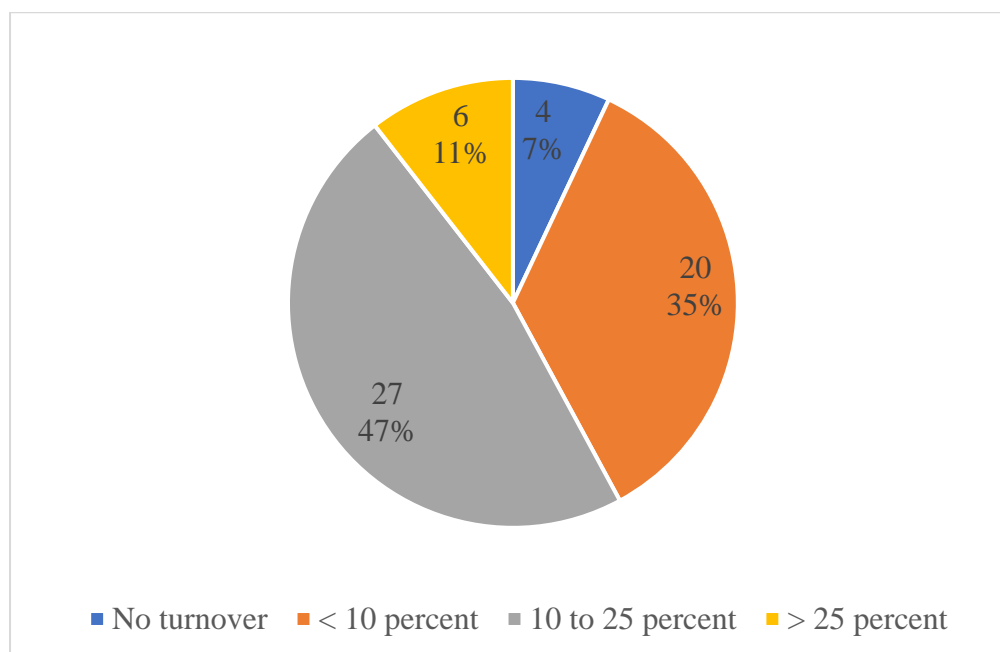
The study reveals that only 9 out of 57 companies handle all their tasks internally. The top five disciplines managed in-house by companies include networking technologies (93%), programming (71.9%), project management (71.9%), contact support (68.4%), and cybersecurity (64.9%). In contrast, the bottom five disciplines that see less in-house handling include cloud computing (24.6%), DevOps (36.8%), mobile technology development (36.8%), enterprise application (43.9%), and digital skills/media (47.4%). The details are presented in Figure 11.

**Figure 11***Discipline by In-house**Discipline by Outsourcing*

The top five disciplines outsourced by companies are mobile technology development (59.6%), cloud computing (47.4%), software development (42.1%), web development (43.9%), and programming (26.3%). On the other hand, project management (5.3%), networking technologies (7.0%), digital skills/media (10.5%), data science and data analysis (10.5%), and contact centre support (12.3%) rank among the top five least outsourced disciplines (Figure 12).

**Figure 12***Discipline by Outsourcing***Turnover Rate and Status of Vacancies**

Only seven percent of the companies reported no turnover of employees in the reference period last year, while 47 percent of the companies faced a turnover of IT employees between 10 and 25 percent (Figure 13).

**Figure 13***Turnover Rate in Fintech Companies*

During the survey, 19 out of 57 companies reported having vacancies. The majority of these vacancies were in programming, software development, and mobile technology development. Additionally, 31 out of 57 companies reported that they found it challenging to fill their vacancies in the reference period, which encompasses the last three recruitment cycles.

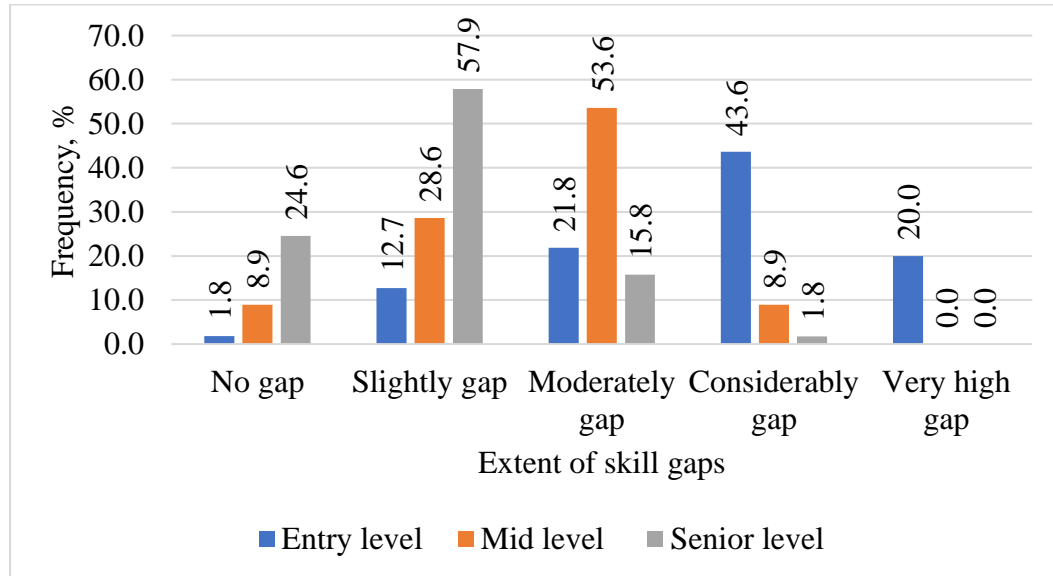
**Hard Skills Requirements and Extent of Skill Gaps**

Figure 14 illustrates the hard skill gaps as reported by the fintech companies in Nepal among their IT employees. The survey reveals significant skill gaps at the entry-level, with 20 percent of companies reporting a very high gap and 43.6 percent reporting a considerably gap (Figure 14). Only 1.8 percent of companies reported that entry-level employees are competent enough to work at full proficiency, in contrast to mid-level (8.9%) and senior-level (24.6%) employees. The majority of companies reported slightly gaps in their senior-level employees, while more than half of the company reported that their mid-level employees have moderately gaps. The cases of

very high gaps are not found in mid-level and senior-level employees. The hard skill requirements are discussed for each discipline.

**Figure 14**

*Extent of Skill Gaps in IT Employees in Fintech Companies in Nepal*



The extent of hard skill gaps experienced by fintech companies across disciplines and levels was assessed. The respondent provided information regarding the hard skills necessary for employability and the extent of these gaps based on different job levels. The Kolmogorov-Smirnov and Shapiro-Wilk tests are conducted to check the normality of data for each discipline. The data is found to have a non-normal distribution. The Kruskal-Wallis test, also known as the H test, is a non-parametric test conducted to compare the extent of skill gaps among the independent groups of employees for each discipline and shown in Table 3. The test statistics are adjusted for ties. Apart from this, a post-hoc test among the categories is conducted to find the specific group differences (Appendix B). There is statistically significant difference between skill gaps among entry-level employee with mid and senior-level employee (Table 3). For each distinct discipline, the skill gaps are statistically significant. It shows there are significant differences in skill gaps among the

employee groups, and it is discussed under each discipline. Further, entry-level employees exhibited higher skill gaps compared to mid-level and senior-level employees in all discipline in fintech companies in Nepal.

**Table 3**

*Kruskal-Wallis Test (H-Test) for Assessing the Significant Difference of Skill Gap Between Employee Group*

Discipline	<i>N</i>	<i>H</i>	<i>DF</i>	<i>Asymptotic Sig.</i> (2-sided test)
Programming	117	42.818 <sup>a</sup>	2	<0.001*
Mobile technology development	59	26.694 <sup>a</sup>	2	<0.001*
Web development	91	28.539 <sup>a</sup>	2	<0.001*
Software development tools	83	37.929 <sup>a</sup>	2	<0.001*
Cloud computing	40	15.022 <sup>a</sup>	2	<0.001*
Platform administration	88	27.380 <sup>a</sup>	2	<0.001*
Cyber security	104	35.064 <sup>a</sup>	2	<0.001*
DevOps	59	14.258 <sup>a</sup>	2	<0.001*
Networking technologies	153	52.564 <sup>a</sup>	2	<0.001*
Data science and data analysis	92	25.449 <sup>a</sup>	2	<0.001*
Enterprise applications	72	19.591 <sup>a</sup>	2	<0.001*
e-Business/digital marketing	82	13.383 <sup>a</sup>	2	0.001*
Digital skills/media	75	13.223 <sup>a</sup>	2	0.001*
Contact centre support	112	18.822 <sup>a</sup>	2	<0.001*
Project management	117	41.331 <sup>a</sup>	2	<0.001*
In an overall (general)	168	70.327 <sup>a</sup>	2	<0.001*

*Note:* <sup>a</sup> The test statistic is adjusted for ties.

df=degree of freedom

\*The significance level is 0.050

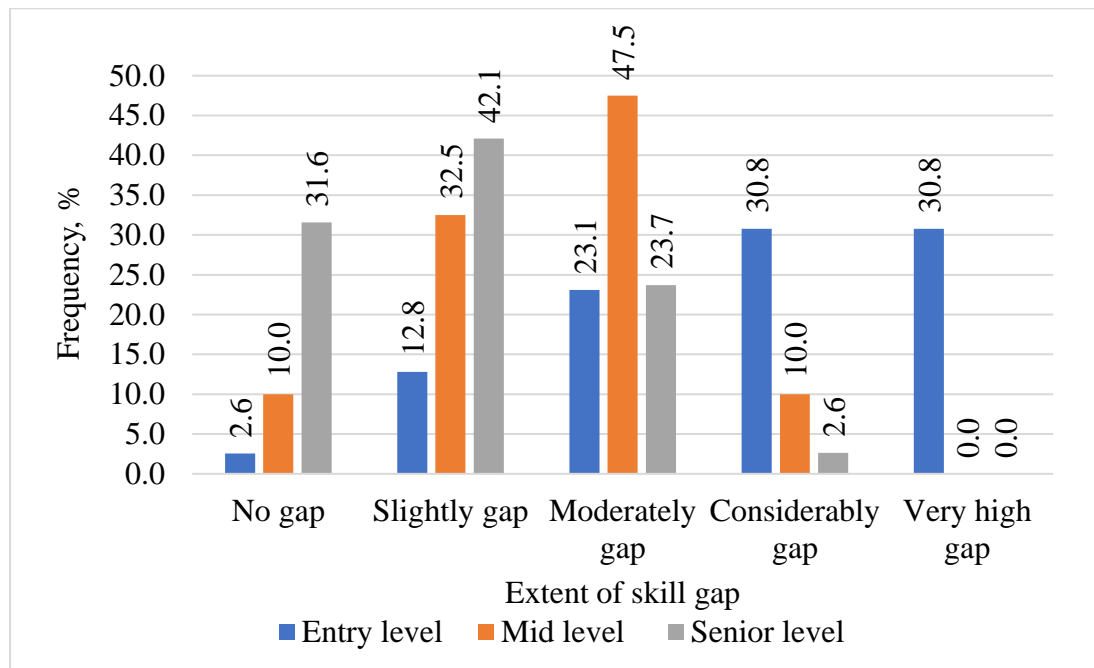
The comprehensive table for post hoc test, a pair wise comparison between groups, is shown in the (Appendix B). The post hoc test shows there are statistically significant differences in skill gaps between entry-level employees and mid-level



employees, as well as between entry-level employees and senior-level employees. Thus, results indicate entry-level worker could not perform the job at the required level. There are non-significant differences in skill gaps in cloud computing, DevOps, data analysis and digital skills/media. In cases of cloud computing, DevOps, and data analysis the extent of skill gaps of senior employee is in higher side so makes no differences with the mid-level employees. While the extent of skill gaps in digital skills/media is less for both mid and senior-level which created the non-significant differences.

### ***Programming***

Programming is conducted internally at 41 companies. The primary hard skill requirements in the programming discipline encompass React, Angular, and Node.js for the front end, while for the back end, they include Java, .NET, PHP, and Python. Additionally, proficiency in SQL, MySQL, MS SQL, Oracle, Postgres, and MongoDB is required for database-related tasks. The clustered bar chart displayed in Figure 15 illustrates the extent of the skill gap in the programming discipline, as reported by 41 companies. Notably, none of these companies reported encountering very high skill gaps among their senior and mid-level employees. Conversely, when it comes to entry-level employees, the study found a considerable gap in 30.08% of companies and a very high gap in the same percentage. Among mid-level employees, a significant 47.5% of companies reported experiencing a moderately skill gap. Senior-level employees, on the other hand, predominantly have a slightly gap, with 42.1% of companies reporting this, while 31.6% reported no gap among their senior-level staff. In contrast, only a mere 2.6% of the company's entry-level employees are found to be working at a fully proficient level.

**Figure 15***Extent of Skill Gaps in Programming*

The Kruskal-Wallis test statistic, adjusted for ties, yielded a significant result ( $H = 42.818$ ,  $df = 2$ ,  $p < .001$ ), indicating that skill gap distribution varies significantly among employee categories in the programming discipline. Following the post-hoc pairwise comparison test conducted on employee categories within the programming domain, the study identified statistically significant disparities in the distribution of skill gaps. Senior-level employees differed significantly from both mid-level ( $p = 0.013$ , Adj. Sig. = 0.038) and entry-level employees ( $p < .001$ , Adj. Sig. = 0.000). Additionally, mid-level and entry-level employees exhibited notable disparities in skill gaps ( $p < .001$ , Adj. Sig. = 0.000).

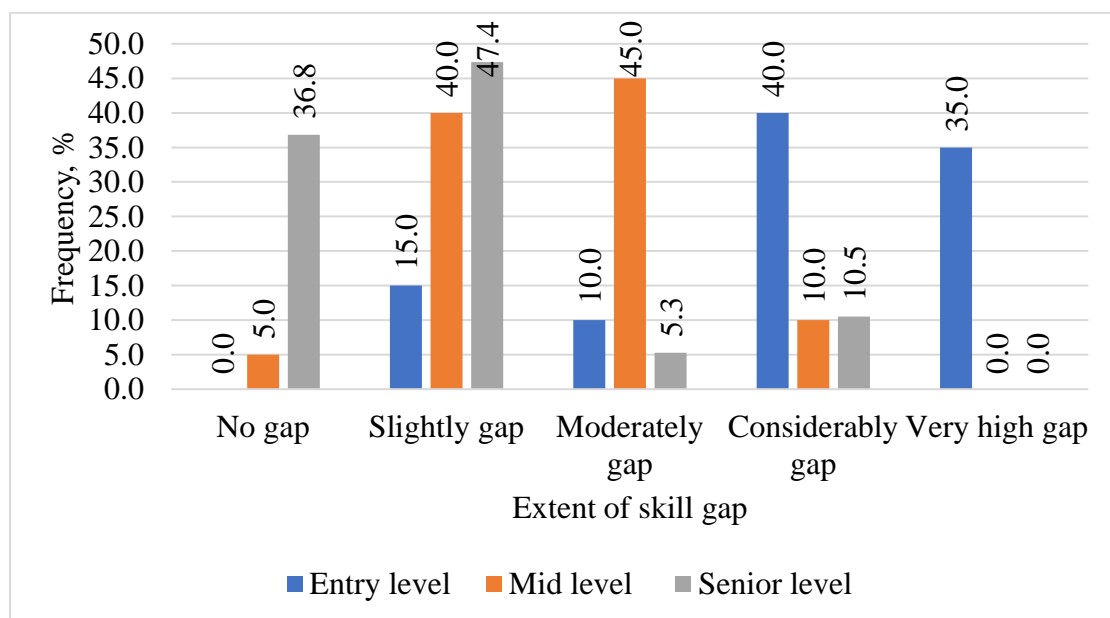
***Mobile Technology Development***

Among the 57 companies included in the survey, 21 of them manage mobile technology in-house. The essential hard skills required in the field of mobile technology encompass Flutter, React, React Native, iOS Swift, Java, Kotlin, and JavaScript. The graph as illustrated in Figure 16 shows the entry-level positions; none

of the employees are capable of fully meeting job requirements, while 36.8 percent of companies state that their senior-level employees can fulfil the job requirements proficiently. On the other hand, 10.5 percent of companies report significant skill gaps between their senior-level and mid-level employees. An overwhelming 85 percent of companies report that their mid-level employees exhibit slightly to moderately skill gaps. Conversely, none of the companies report very high skill gaps among their senior and mid-level employees. In stark contrast, more than 75 percent of companies report that entry-level employees exhibit considerably to very high skill gaps. In summary, the extent of skill gaps is particularly pronounced in entry-level positions.

**Figure 16**

*Extent of Skill Gaps in Mobile Technology Development*

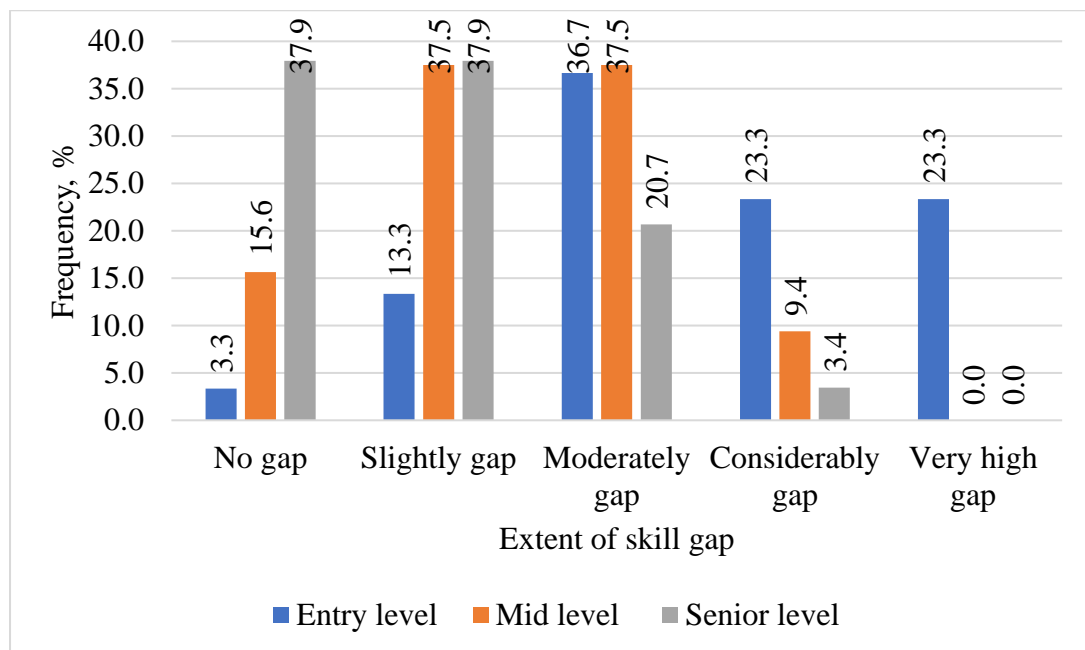


The Kruskal-Wallis test statistic (adjusted for ties) was  $H = 26.694$ , which had 2 degrees of freedom. The result was statistically significant, with  $p < .001$ , indicating that there were significant differences among the groups. Pairwise comparison shows senior-level employees exhibited statistically significant disparities when compared to both mid-level ( $p = 0.046$ , Adj. Sig. = 0.000) and entry-level employees ( $p < .001$ ,

Adj. Sig. = 0.000). Further, mid-level employees also displayed significant differences in comparison to entry-level employees ( $p = 0.002$ , Adj. Sig =  $<0.001$ ).

### ***Web Development***

The number of companies that have web development conducting in-house is 33. In the web development discipline, the primary hard skill prerequisites for front-end work include React and JavaScript. On the other hand, for back-end development, the preferred competencies are Java, .NET, PHP, Laravel, Python, and C#. SQL is the most sought-after skill for database management. In Figure 17, it is depicted that only 3.3 percent of companies mention that their entry-level employees perform at full proficiency when compared to senior-level employees by 37.9 percent and mid-level employees by 15.6 percent. Both senior-level and mid-level employees are reported to have a slightly gap by 37 percent of companies. In contrast, entry-level employees exhibit a considerably to very high gap, as indicated by 46.6 percent of companies. Among senior-level and mid-level employees, there is a significantly lower number of companies that report considerably gaps. Additionally, it's worth noting that none of the mid-level and senior-level employees are reported to have a very high gap.

**Figure 17***Extent of Skill Gaps in Web Development*

The Kruskal-Wallis test suggests that there are statistically significant differences among the employee groups ( $H = 28.539$ ,  $df = 2$ ,  $p < 0.001$ ). Further, the pairwise comparison also suggests there is a significant difference between entry-level and mid-level ( $p < 0.001$ , Adj. Sig = 0.002). As well as the senior-level and entry-level ( $p < 0.001$ , Adj. Sig = 0.000). However, the comparison between senior and mid-level exhibits notable but non-significant differences ( $p = 0.057$ , Adj. Sig = 0.17).

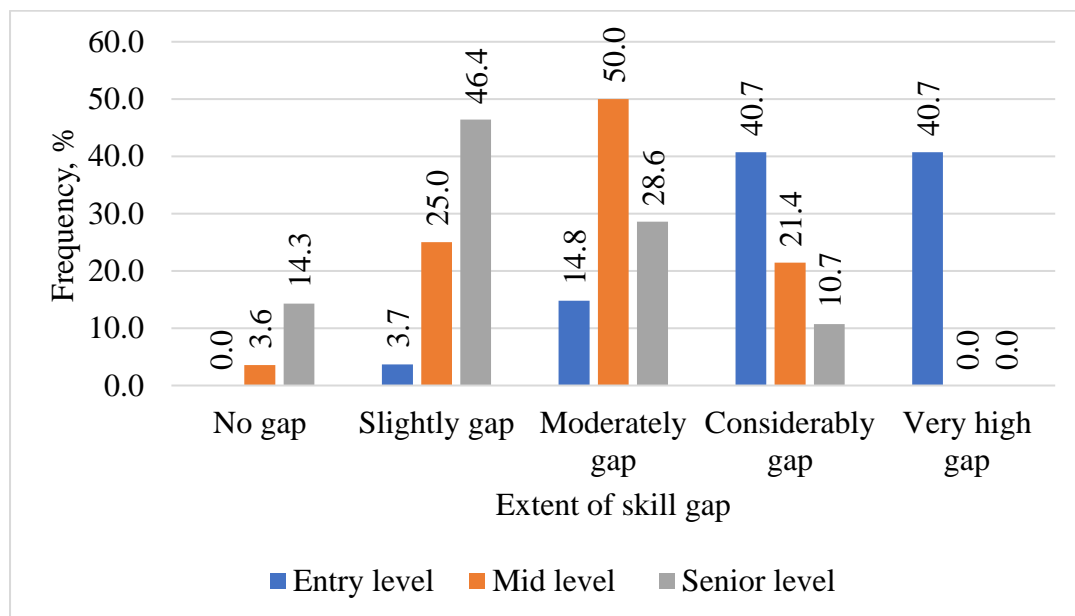
***Software Development***

Agile Scrum, Visual Studio, JIRA, Java, GitLab, and Python are the sought-after hard skills by companies. Software development as a core in-house function is reported by 29 companies. The clustered column graph presented in Figure 18 reveals that more than 80 percent of companies report a considerably to very high skill gap among entry-level employees. While 46 percent of companies report a slightly gap among senior-level employees, 10 percent state that senior-level employees have a considerably gap, which is half the rate observed among mid-level employees.

Exactly half of the companies operating in this field indicate that their mid-level employees possess a moderately gap. Only 14.3 percent of companies report that their senior staff is operating at the required level. When comparing the groups, entry-level employees exhibit very high skill gaps.

**Figure 18**

*Extent of Skill Gaps in Software Development*



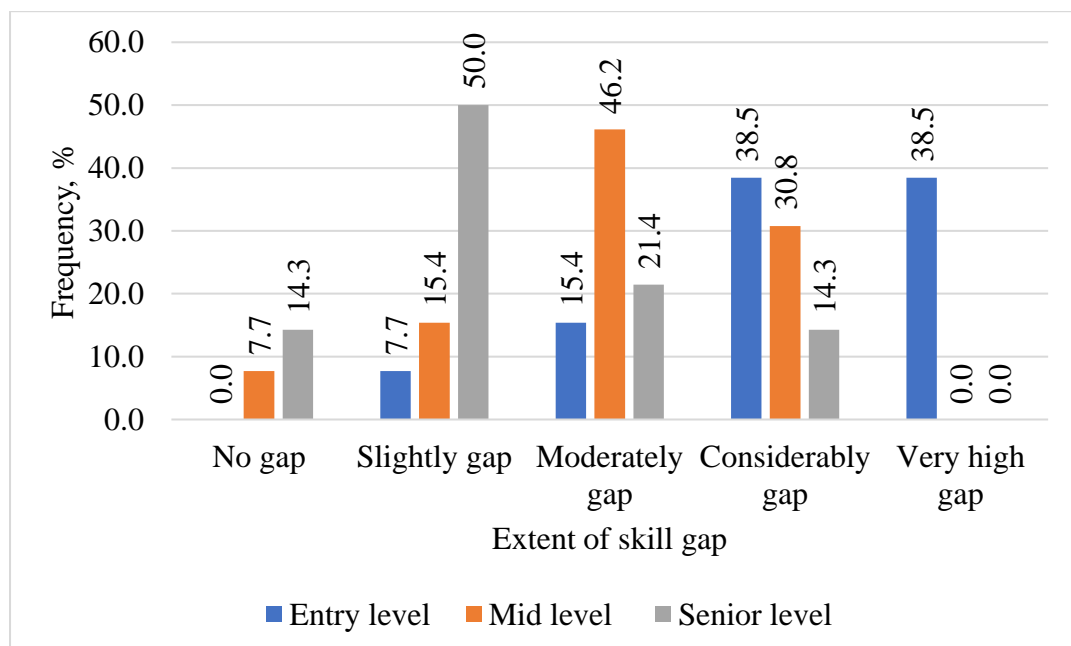
In an independent-samples Kruskal-Wallis test for software development discipline, the test statistic (adjusted for ties) was calculated among the groups ( $H = 37.929$ ,  $df = 2$ ,  $p < .001$ ), indicating that there are significant differences among the groups in terms of skill gaps. In addition to this, a pairwise comparison was conducted and found that senior and mid-level have notable but non-significant statistical results ( $p = 0.067$ ,  $Adj. Sig = 0.202$ ). But there is a significant difference between entry-level employees with the mid-level ( $p < 0.001$ ,  $Adj. Sig. 0.000$ ) and senior-level ( $p < 0.001$ ,  $Adj. Sig. 0.000$ ).

### *Cloud Computing*

Only 14 of the 57 companies have cloud computing as an in-house discipline. Skills in cloud systems, cloud platforms, cloud networking, and proficiency in Docker are essential requirements in the cloud computing discipline. Among the 14 companies that reported on the extent of skill gaps in this field, the study discloses that at the entry-level, 38.5 percent of companies report a very high gap, and the same percentage indicates a considerable gap. Interestingly, none of the companies reported a very high gap for senior and mid-level employees (Figure 19). However, there is a considerably high gap at the senior-level for 14.3 percent of companies, which is nearly half the rate observed in the mid-level category. Precisely 50 percent of companies state that their senior-level employees have a slightly gap. This underscores that a significant majority of companies are struggling with skill gaps among their entry-level employees.

**Figure 19**

*Extent of Skill Gaps in Cloud Computing*

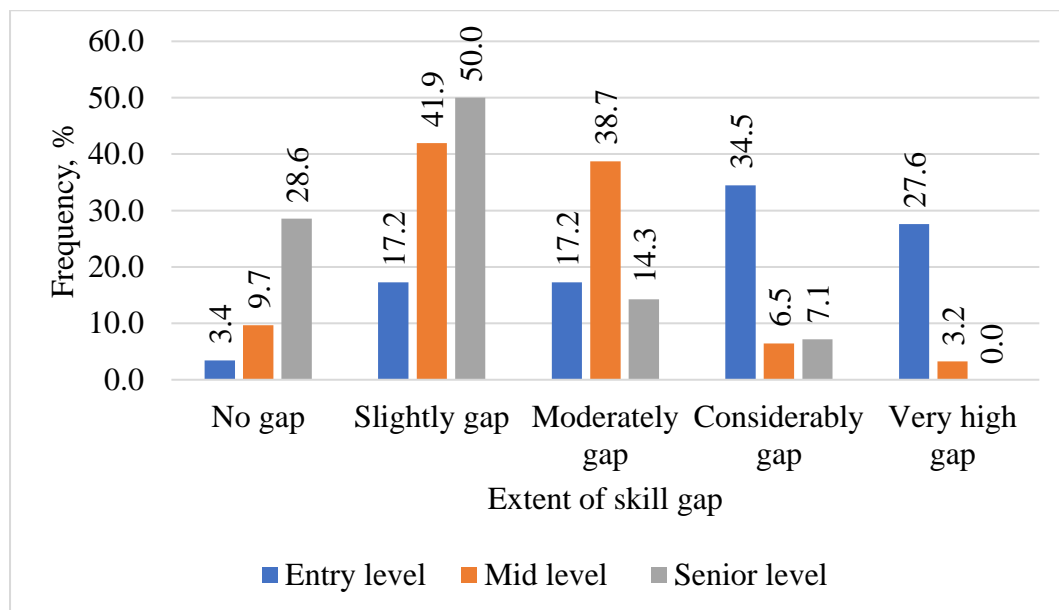


In cloud computing discipline, the H test shows the significant differences in skill gaps among the group of employees ( $H = 15.022$ ,  $df = 2$ ,  $p < 0.001$ ). In addition to this, a pairwise comparison was conducted and found a notable but non-significant difference between senior and mid-level employees ( $p = 0.133$ , Adj. Sig = 0.398). There is a significant difference between senior and mid-level ( $p < 0.001$ , Ad. Sig. 0.000). Similarly, comparisons exhibit a significant difference between mid-level and entry-level employees ( $p = 0.021$ , Adj. Sig = 0.063).

### ***Platform Administration***

Companies are actively seeking major hard skills in areas such as Linux, networking, Windows, VMware, Office 365, system administration, web development, and Azure. Out of the 57 companies, 31 manage platform administration internally. Figure 20 illustrates that more than 60 percent of these companies report a considerable to very high gap in the skill levels of their entry-level employees. However, a mere three percent state that their entry-level staff work with full proficiency. In contrast, only seven percent of the companies indicate a considerably gap in their senior-level employees, which is just one percentage point higher than for mid-level employees. Furthermore, over 80 percent of the companies report that their mid-level employees exhibit skill gaps ranging from slight to moderately gap.



**Figure 20***Extent of Skill Gaps in Platform Administration*

There are significant skill gaps among the group of employees in platform administration ( $H = 27.380$ ,  $df = 2$ ,  $p < 0.001$ ). On comparing the pairwise category, it was found that there was a statistical difference between entry and senior ( $p < 0.001$ , Ad. Sig=0.000), entry and mid ( $p < 0.001$ , Ad. Sig=0.000). While there is a notable but non-significant difference between the senior and mid-level employees ( $p < 0.059$ , Ad. Sig=0.178)

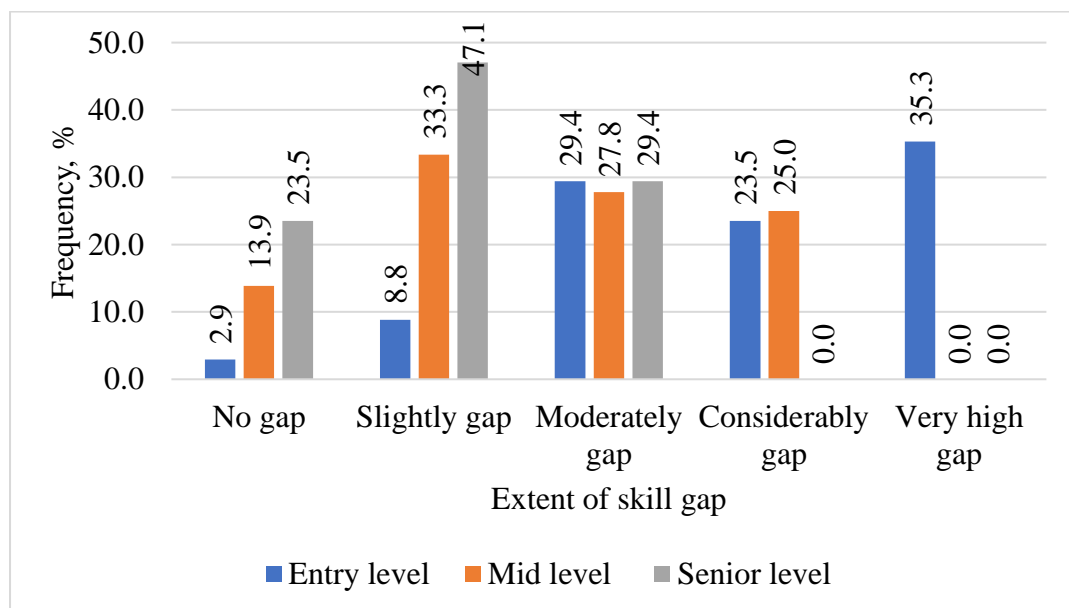
***Cyber Security***

Within this discipline, major hard skills in demand encompass security, SIEM (Security Information and Event Management), firewall management, VAPT (Vulnerability Assessment and Penetration Testing), ethical hacking, WAF (Web Application Firewall), as well as expertise with Fortinet, Checkpoint, and Palo Alto technologies. The bar chart illustrates the extent of skill gaps in cyber security (Figure 21). Approximately 35.3 percent of companies report a very high gap among entry-level employees. In contrast, both very high and considerable gaps are not reported among senior-level employees. Specifically, 25 percent of companies report a

considerably gap in mid-level employees, which is one and a half percentage points greater than the entry-level for the same category. For both entry-level and mid-level employees, about 29.4 percent of companies report a moderately gap. A significant proportion of companies indicate slightly to no gap among senior-level employees. However, only two percent of companies report that their entry-level employees can perform work at the required level, which is 11 percentage points lower than for mid-level employees.

**Figure 21**

*Extent of Skill Gaps in Cyber Security*



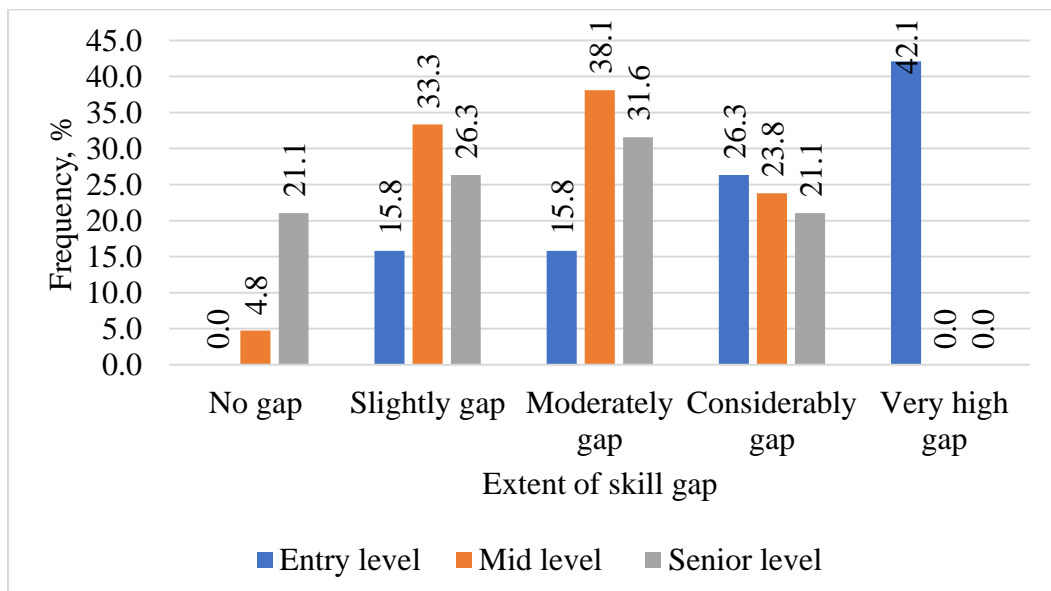
In cyber security, there is a notable difference between senior-level and mid-level employees in the initial analysis, but this difference does not hold up as statistically significant after applying the Bonferroni correction ( $p = 0.030$ , Adj. sig = 0.091). In the other two cases, there is a significant difference. The comparison between senior and entry-level is ( $p < 0.001$ , Adj. sig = 0.000), while the comparison between mid and entry-level is ( $p < 0.001$ , Adj. sig = 0.001).

## DevOps

Jenkins, Pipeline, Docker, Kubernetes, Git, containers, Azure, and Linux are some of the major tools for which hard skills are required. 21 of the 57 companies conduct this discipline in-house. The bar chart (Figure 22) shows the comparative skill gaps among the employees. 42.1 percent of companies report that entry-level employees have a very high skill gap. Among entry-level employees, a substantial 66.4 percent exhibit a considerable to very high gap in their skills. Notably, there were no reports of a very high gap between mid- and senior-level employees. However, 21.1 percent of companies report a considerably gap among senior-level employees, and 23.8 percent of companies report a considerably gap among mid-level employees. Approximately 47 percent of companies report either a slightly gap or no gap at all among their senior-level employees. In contrast, a significant majority of companies indicate a slight to moderately gap among their mid-level employees. Interestingly, only four percent of companies rate their mid-level employees as being able to perform their job at the required level with full proficiency.

**Figure 22**

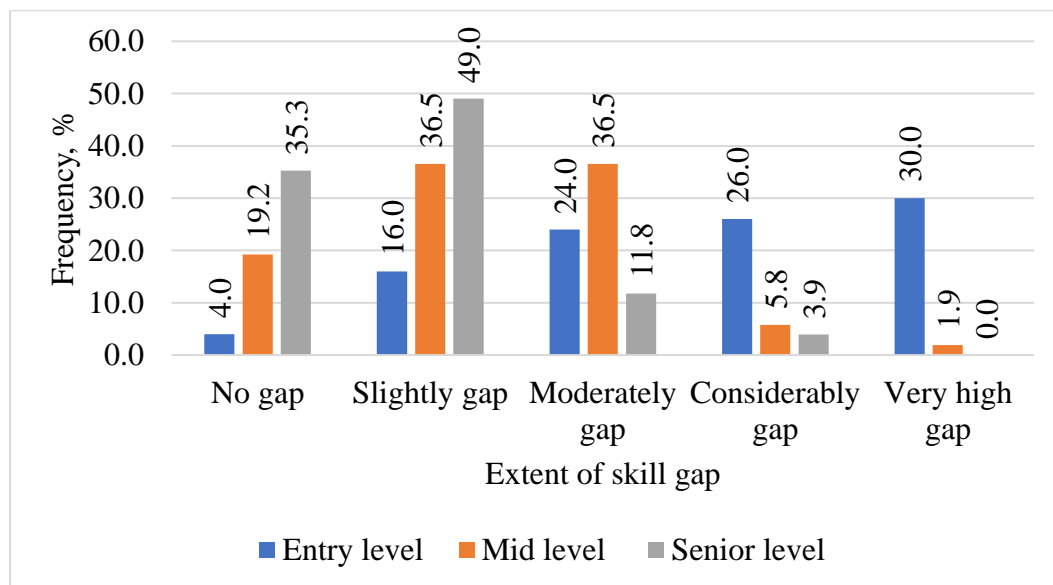
*Extent of Skill Gaps in DevOps*



In the DevOps discipline, there is a statistically significant difference among the groups ( $H = 14.258$ ,  $df = 2$ ,  $P < 0.001$ ). However, the same does not hold for pair wise comparison; there is a non-significant difference between senior and mid-level employees ( $p < 0.503$ ,  $Adj\ sig = 1.00$ ). Whereas there exists a significant difference between entry with senior-level ( $p < 0.001$ ,  $Adj. sig = 0.001$ ) and mid-level ( $p < 0.003$ ,  $Adj. sig = 0.009$ ).

### ***Networking Technologies***

The requisite hard skills include routing, switching, virtual private networks (VPNs), firewall management, expertise with Fortinet and CISCO technologies, as well as holding a CCNA certification. There are 53 companies that manage networking technologies in-house. Among them, 56 percent of the companies report a skill gap ranging from very high to considerably among their entry-level employees. However, only one percent of the companies report a very high gap in mid-level employees (Figure 23). A significant majority of senior-level employees, approximately 84 percent, are reported to have either a slightly gap or no gap. In contrast, for mid-level employees, 72 percent of them are reported to have a slight to moderately gap, as reported by the companies. Only four percent of the companies report that their entry-level employees work at a fully proficient level. This discipline exhibits the widest gaps among employees. A mere 3.9 percent of companies report a considerable gap in senior-level employees.

**Figure 23***Extent of Skill Gaps in Networking Technologies*

In the networking technologies discipline, the skill gap across the group is significant ( $H = 52.567$ ,  $df = 2$ ,  $p < 0.001$ ). There are significant differences between senior-level with mid-level ( $p < 0.015$ ,  $Adj\ Sig = 0.044$ ) and entry-level ( $p < 0.001$ ,  $Adj\ Sig = 0.000$ ). Mid-level has significant differences with entry-level ( $p < 0.001$ ,  $Adj\ Sig = 0.000$ ).

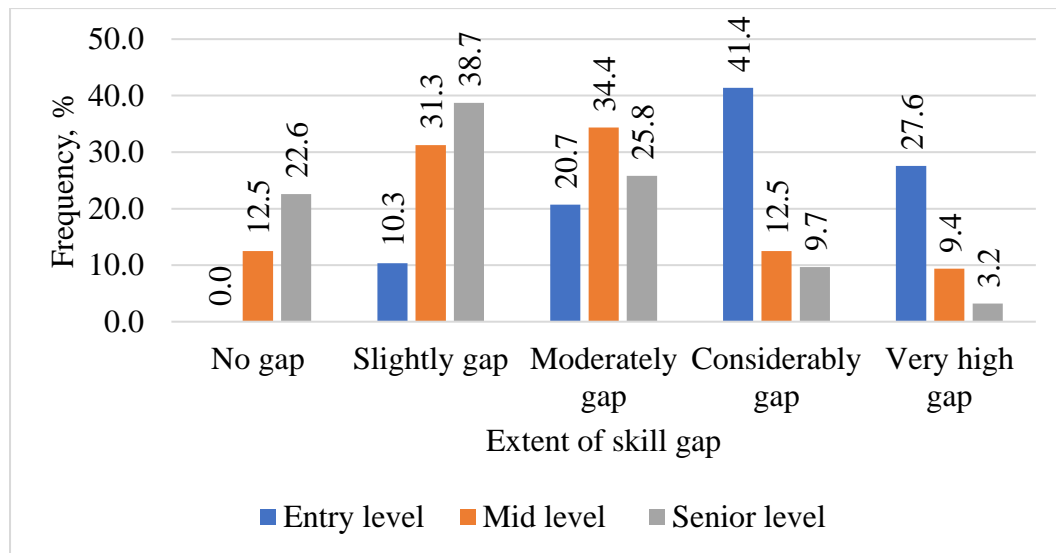
***Data Science and Data Analysis***

In data science and data analysis, there is a substantial demand for skills such as Power BI, SQL, data analytics, and proficiency in Microsoft Excel. 33 companies have responded in-house. The clustered bar and column in Figure 24 show the comparative extent of skill gaps among the employees. A significant 27.6 percent of companies are encountering a very high-gap issue among their entry-level employees. In contrast, only nine percent of companies at the mid-level and three percent at the senior-level are facing a very high gap challenge. The most pronounced skill gap exists in the considerably gap category, with 41.4 percent of companies perceiving a considerably gap among entry-level employees. However, a substantial 61.7 percent

of companies believe that their senior-level employees have either no gap or only a slight one. Additionally, over 65 percent of companies report that mid-level employees exhibit skill gaps ranging from slightly to moderately.

**Figure 24**

*Extent of Skill Gaps in Data Science and Data Analysis*



In the data analysis discipline, the skill gap across the groups was found to have significant differences ( $H = 25.449$ ,  $df = 2$ , and  $p < 0.001$ ). Pairwise comparison shows there is no significant difference between senior and mid-level ( $p < 0.163$ , Adj Sig=0.490). However, the test exhibits a significant difference between entry with senior ( $p < 0.001$ , Adj Sig=0.000) and mid ( $p < 0.001$ , Adj Sig=0.001).

### ***Enterprise Application***

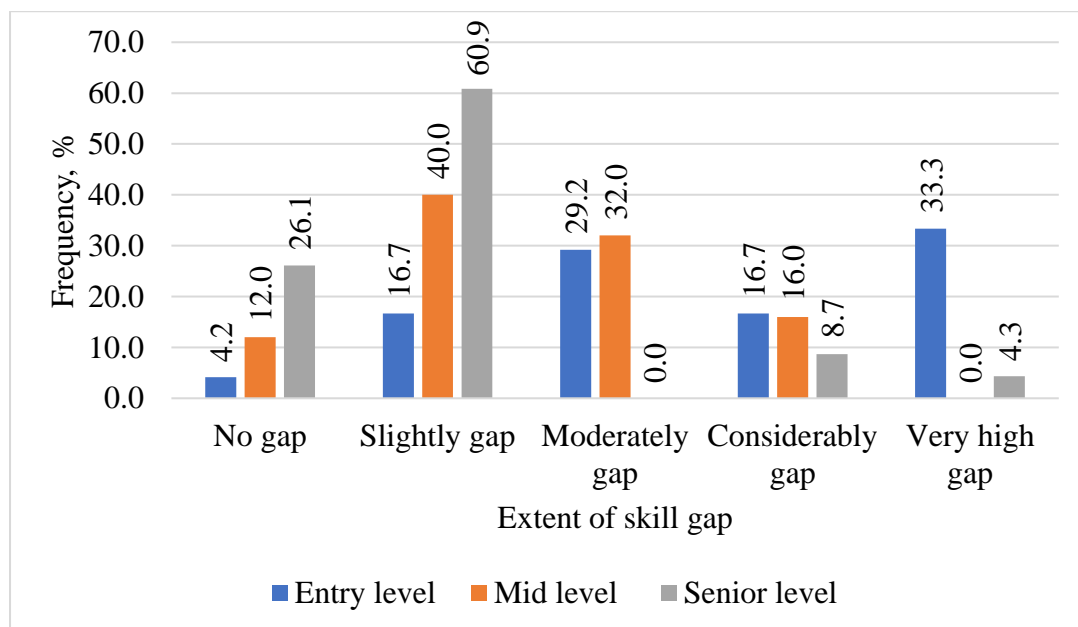
Enterprise application disciplines often require proficiency in various skills, including the operation of ERP systems, in-house application management, expertise in Finacle, CBS (Core Banking System), and Pumori.

Figure 25 presents an overview of the extent of skill gaps within the enterprise application domain. The most significant skill gap is observed in the no gap and slightly gap categories. Only 4.2 percent of companies state that entry-level

employees can perform their work with full proficiency, while 26.1 percent of companies believe there is no gap among senior-level employees. The percentage of companies reporting a moderate gap in the entry and mid-level categories is similar. This trend also holds for the considerably gap categories. However, a notable difference is observed in the very high gap category, where approximately one-third of companies report a persistently high gap among entry-level employees. When comparing these figures, it becomes evident that entry-level employees have significantly larger skill gaps.

**Figure 25**

*Extent of Skill Gaps in Enterprise Application*



In the enterprise application discipline, there is also a significant difference in skill among the group of employees ( $H = 19.591$ ,  $df = 2$ ,  $p < 0.001$ ). The pairwise comparisons show there are notable but non-significant differences between mid-level and senior-level ( $p < 0.081$ , Adj. Sig = 0.243). However, significant differences exist

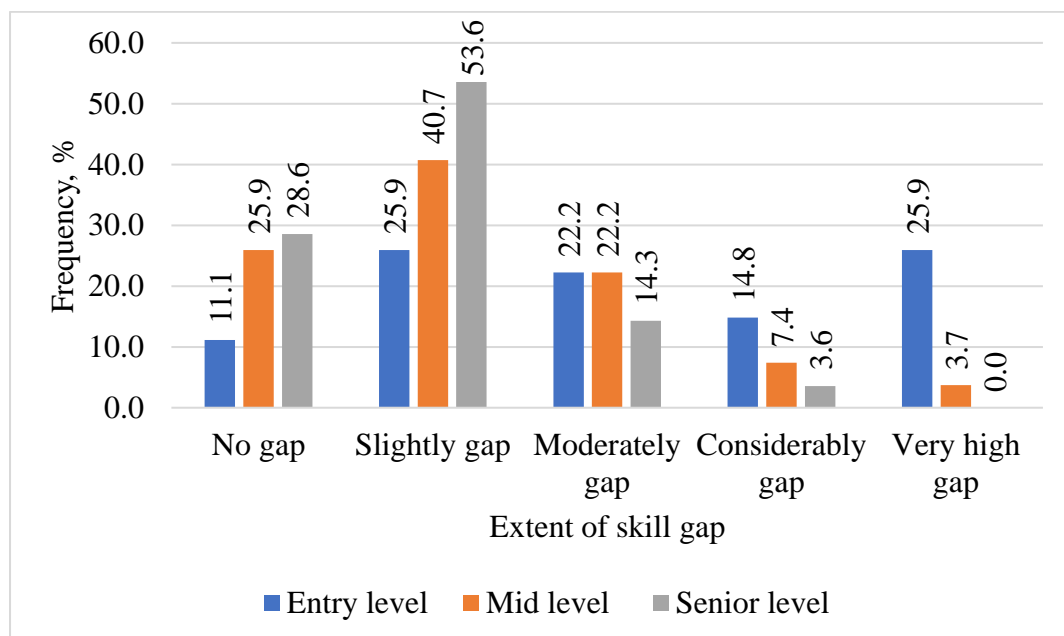
among entry and senior ( $p < 0.001$ , Adj Sig=0.000) and mid and entry ( $p < 0.007$ , Adj Sig=0.020).

### *e-Business/ Digital Marketing*

The most sought-after skills in the fields of e-business and digital marketing include search engine optimisation (SEO), social media analytics, and proficiency in Adobe Illustrator. 30 companies perform e-business and digital marketing with in-house resources and employees. Figure 26 illustrates the magnitude of skill gaps in the fields of e-business and digital marketing. One-quarter of companies (25.9%) have reported very high skill gaps among entry-level employees, a percentage significantly higher by 22 points than the companies reporting skill gaps in the same category for mid-level employees. Furthermore, over 82 percent of companies indicate that their senior-level employees have either no gap or only a slightly gap. When compared to other disciplines, a substantial number of companies reveal that there are either no skill gaps or only slight ones among their entry-level employees.

**Figure 26**

#### *Extent of Skill Gaps in E-Business/Digital Marketing*

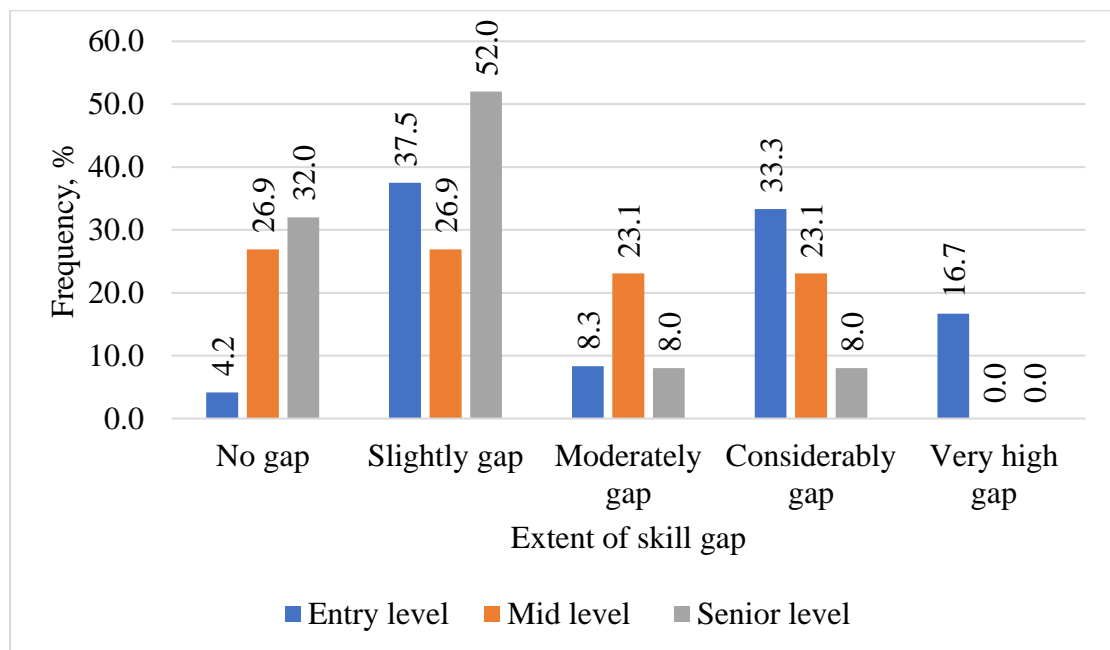




In the e-business and digital marketing disciplines, there is also a significant difference in skill among the group of employees ( $H = 13.383$ ,  $df = 2$ ,  $p = 0.001$ ). The pairwise comparisons show there are non-significant differences between mid-level and senior-level ( $p < 0.361$ ,  $Adj. Sig = 1.000$ ). However, significant differences exist among entry and senior ( $p < 0.001$ ,  $Adj Sig = 0.001$ ) as well as mid and entry ( $p < 0.009$ ,  $Adj Sig = 0.028$ ).

### ***Digital Skills/Media***

In this discipline, major hard skills in high demand include proficiency in Figma, Adobe software, and Illustrator. A total of 27 companies handles digital media in-house. Figure 27 provides insights into the extent of skill gaps in digital media skills. Notably, half of the companies report that their entry-level employees exhibit a considerable to very high gap in skills. In contrast, none of the companies reported a very high gap among senior and mid-level employees. While most senior employees are reported to have either no gap or only a slight one, eight percent of companies indicate a considerably gap, which also applies to the moderately gap category. Approximately 46 percent of companies report that there is a moderate to considerable gap among mid-level employee. Overall, it's evident that companies are facing skill gaps in their entry-level employees to a significant extent.

**Figure 27***Extent of Skill Gaps in Digital Skills/Media*

In digital skills and media, there exist significant skill gaps across the groups ( $H = 13.223$ ,  $df = 2$ ,  $p = 0.001$ ). Pairwise comparisons show there are non-significant differences between mid-level and senior-level ( $p < 0.125$ , Adj. Sig = 0.375). However, significant differences exist among entry and senior ( $p < 0.001$ , Adj Sig=0.001). But mid and entry show notable but non-significant differences after correction ( $p < 0.032$ , Adj Sig=0.097).

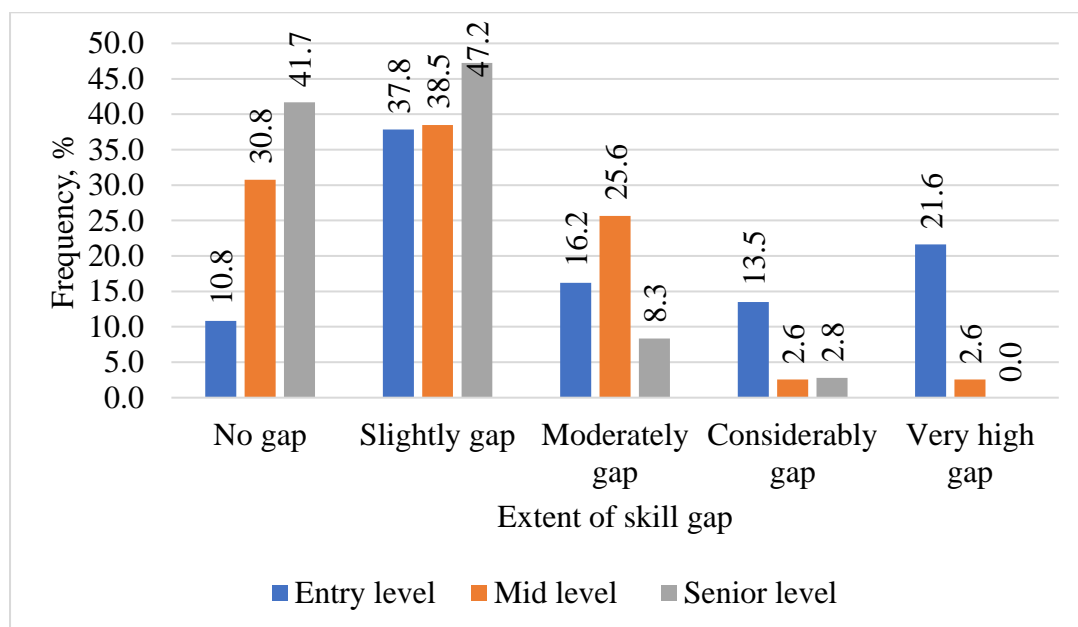
**Contact Centre Support**

The major hard skills required in this discipline include ticketing management, help desk services, customer support, problem solving, and email handling. 39 companies have designated contact centre support as their main discipline. Figure 28 illustrates the extent of skill gaps in contact centre support. It reveals that 21.6 percent of companies are experiencing very high skill gaps among entry-level employees, while 10 percent believe that entry-level staff can perform their work with full proficiency. In addition, 41.7 percent of companies reported that their senior-level

employees did not have skill gaps, which is 11 percentage points higher than the mid-level employees in the same category. The widest gap between entry-level employees and employees at other levels is observed in the considerably gap and very high gap categories. The majority of companies reported either no gap or only a slightly gap among mid-level and senior-level employees.

**Figure 28**

*Extent of Skill Gaps in Contact Centre Support*



In the contact centre support discipline, there exist significant skill gaps across the groups ( $H = 18.822$ ,  $df = 2$ ,  $p < 0.001$ ). Pairwise comparisons show there are non-significant differences between mid-level and senior-level ( $p < 0.120$ , Adj. Sig = 0.360). However, significant differences exist among entry and senior ( $p < 0.001$ , Adj Sig = 0.000). As well, mid and entry show notable but non-significant differences after correction ( $p < 0.005$ , Adj Sig=0.016).

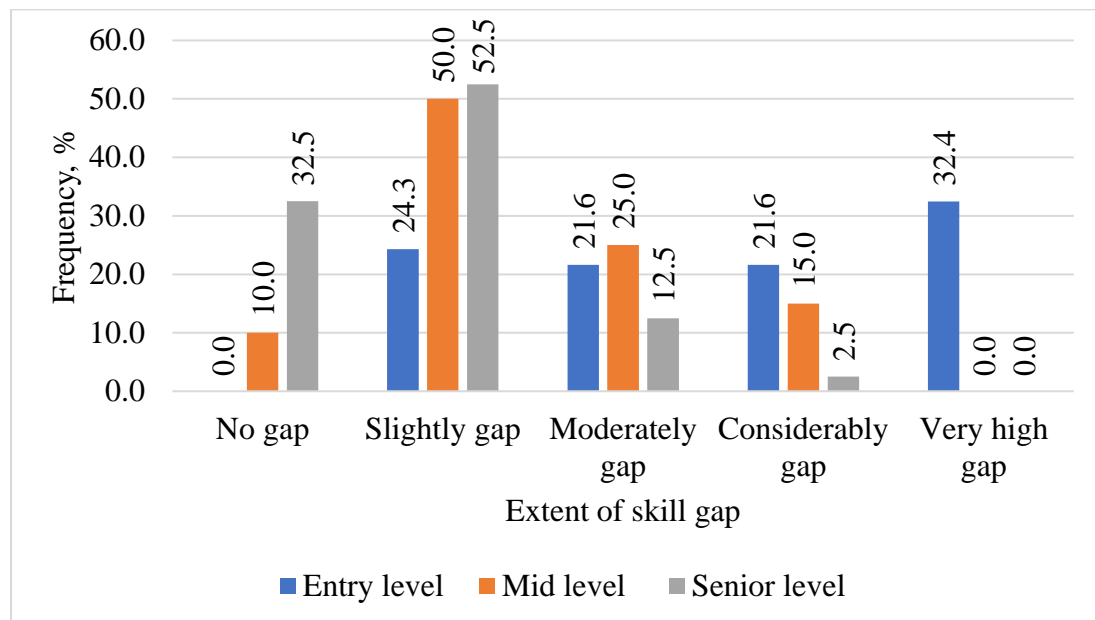
### ***Project Management***

In the project management discipline, the major hard skill requirements are Jira, Agile, Kanban, Tracker, Slack, and MS applications. A total of 41 companies

have reported that project management is their primary discipline and is managed in-house. The chart (Figure 29) outlines the extent of skill gaps in project management discipline reported by the companies. About one-third of companies (32.4%) report that entry-level employees have very high skill gaps. Another two-thirds have a slightly to considerably gap. At mid-level, half of the employees have slightly gap. Similarly, half of the senior-level has slightly gap whereas two and a half percent of companies' senior-level have considerably gap. Contrary to this, one-third of the company (32.5%) states the senior-level can conduct project management in full proficiencies. Overall, the extent of skill gaps experienced by companies at the entry-level is significant.

**Figure 29**

*Extent of Skill Gaps in Project Management*



In the project management discipline, there exist significant skill gaps across the groups ( $H = 41.331$ ,  $df = 2$ ,  $p < 0.001$ ). Pairwise comparisons show there are significant differences between mid-level and senior-level ( $p < 0.008$ , Adj. Sig =

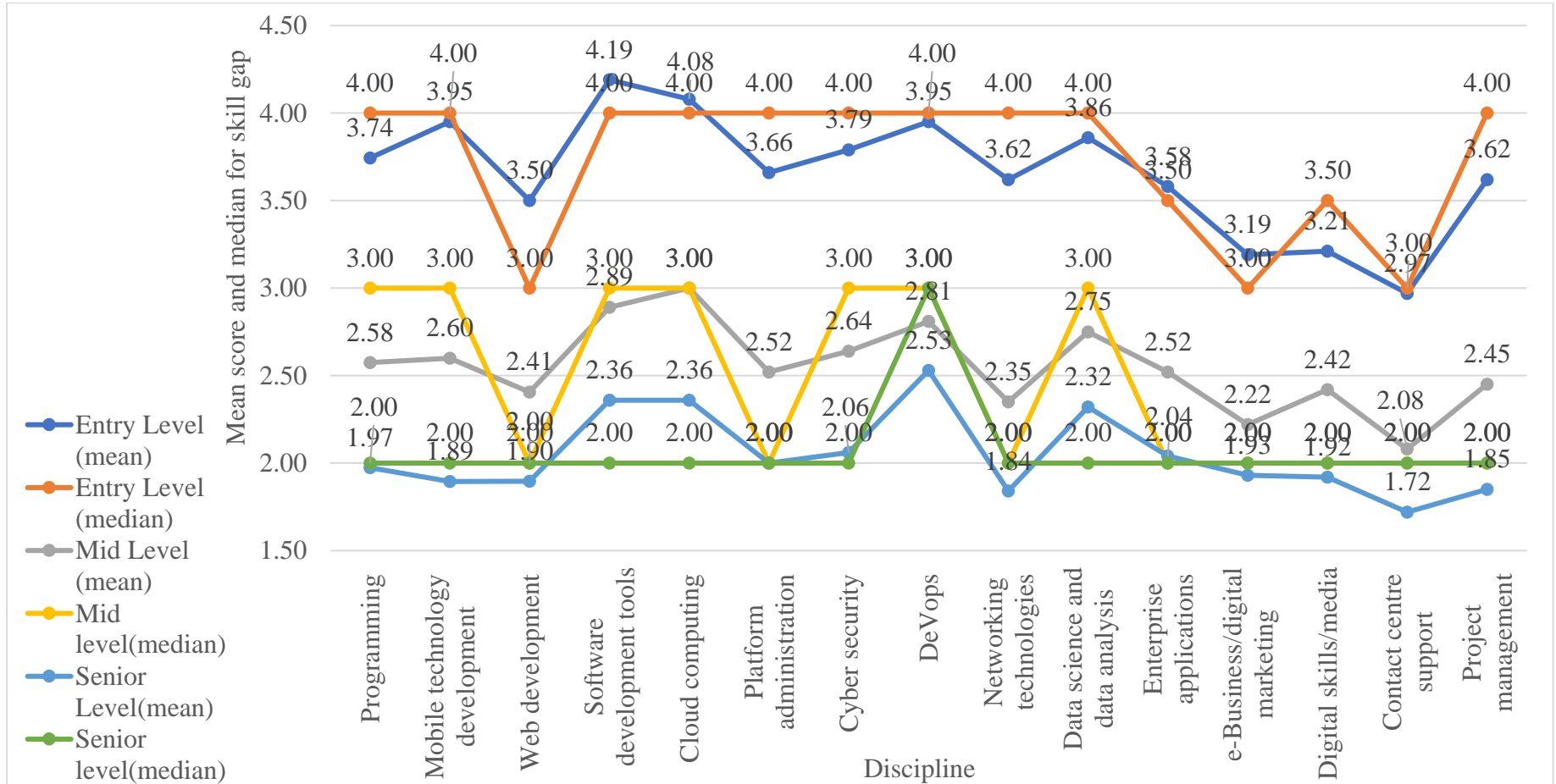
0.025). As well, significant differences exist among entry-level and senior-level ( $p < 0.001$ , Adj Sig=0.000) for mid and entry ( $p < 0.001$ , Adj Sig=0.000).

### **Hard Skill Gaps by Employee Group**

In comparison to other disciplines, contact centre support is found to have relatively low skill gaps. Skills gap is prominent across the disciplines. For mid-level employees, skill gaps are wider in mobile technology development, software development, cloud computing, DevOps, and data analysis. At the senior-level, there are skill gaps in DevOps. The average mean score for skill gaps for entry-level employees is 3.66, for mid-level employees it is 2.55, and for senior employees it is 2.05. The skill gaps among employees vary with each distinct discipline. There is minimal disparity between the mean and median score for each level of employee in a distinct discipline (Figure 30).

**Figure 30**

*Comparison of Mean and Median Score of Skill Gaps by Employees Level and Discipline*

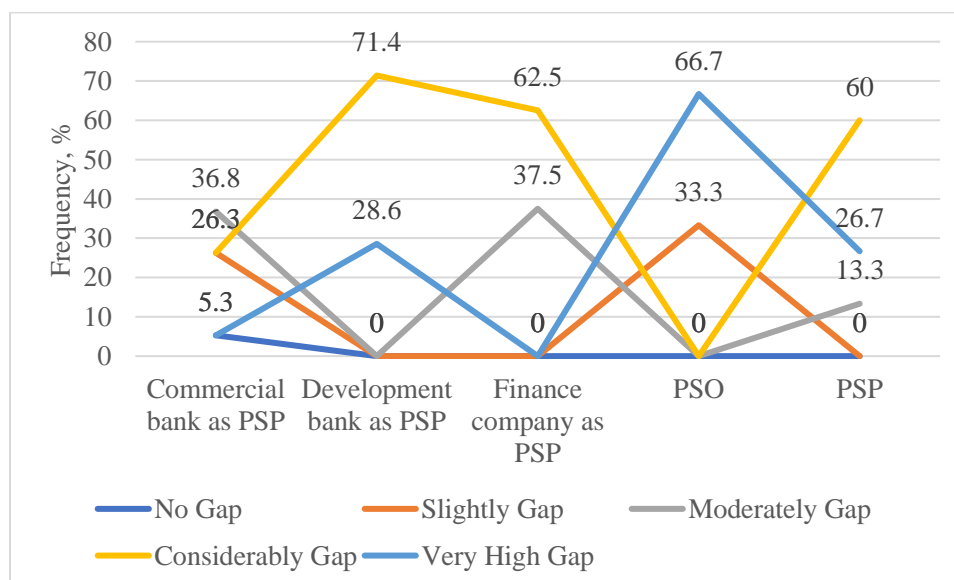


### Hard Skill Gaps within Employees Group by Types of Company

The respondents were asked to rate the extent of the skill gaps for each group of employees based on their experiences. The extent of skill gaps among entry-level employees by type of company is presented in Figure 31. The result depicts entry-level employee working in development banks and finances having considerably gap, whereas gaps lie in between slightly and considerably in the case of commercial banks. About two-thirds of entry-level employees in PSOs have a very high gap. And the other one third have slightly gap. The extent of skill gaps among entry-level employees of commercial banks is less in comparison to employees working for other companies.

**Figure 31**

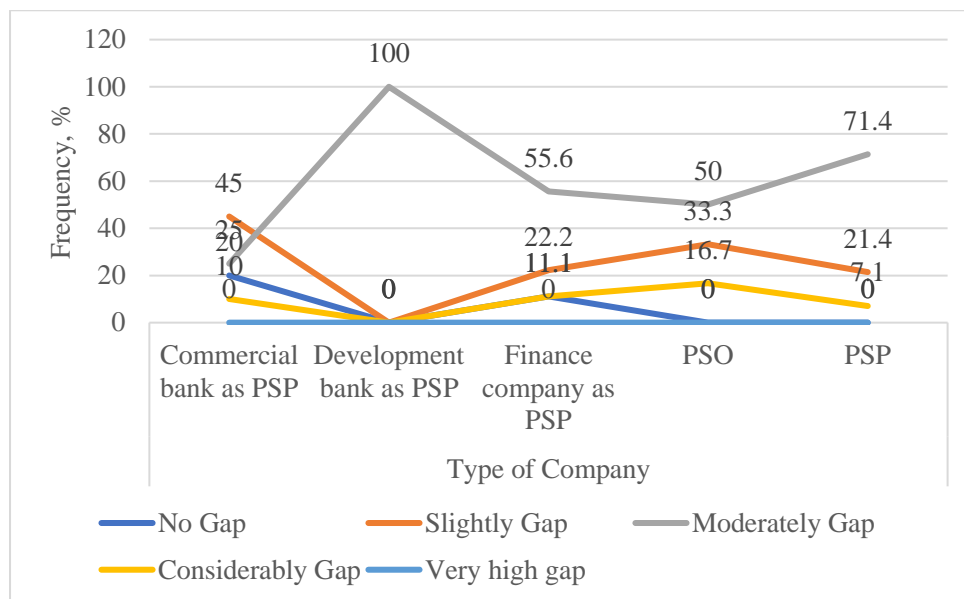
*Extent of Skill Gaps in Entry-level Employee by Type of Company*



For mid-level employees, there is no report of very high gap. All the mid-level employees of all development banks have moderately gap. Similarly, 10 percent of the commercial banks reported a considerably gap in their mid-level employees. The extent of the gap lies between the moderately and slightly gap (Figure 32).

**Figure 32**

*Extent of Skill Gaps in Mid-Level Employee by Type of Company*

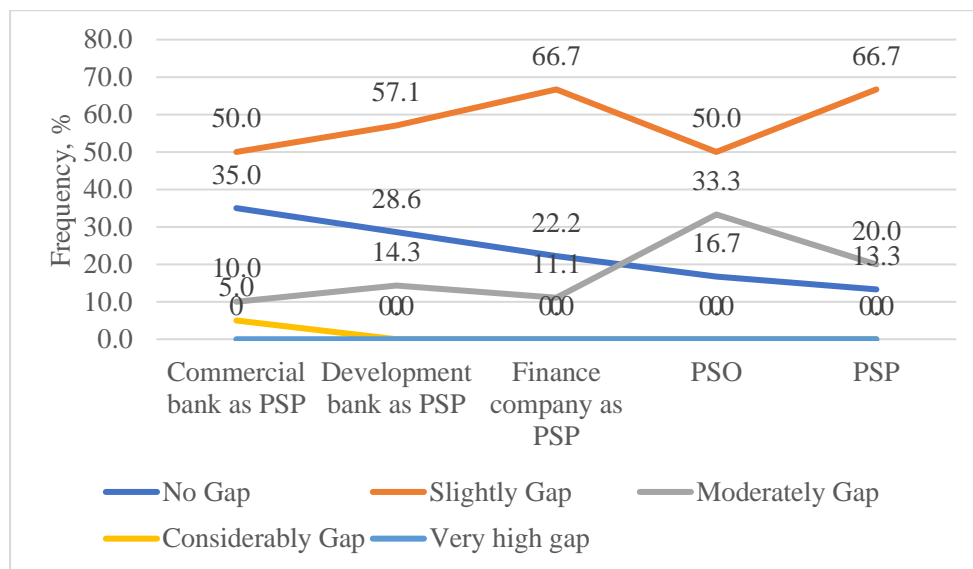


In senior-level employees, the extent of skill gaps lies between the no gap and moderately gap (Figure 33). Half of the mid-levels are reported to have slightly gap in the commercial, development, and PSO categories. Only five percent of the commercial banks have reported a considerable gap in senior-level employees. For other categories, cases of very high and considerably gap are not reported.



**Figure 33**

*Extent of Skill Gaps in Senior-level Employee by Type of Company*



The Kruskal-Wallis test was conducted to compare the distribution of skill gaps within employee groups by type of company (Table 4). The test shows non-significant differences for mid-level and senior-level employees. However, the test shows a statistically significant difference within entry-level employees. A post-hoc test reveals there is a difference in skill gaps between entry-level employees working in commercial banks and those working for other fintech companies.

**Table 4**

*Kruskal-Wallis Test for Comparison of Skill Gaps Within Employee Groups by Types of Company*

Employee	<i>N</i>	<i>H</i>	<i>df</i>	<i>Asymptotic Sig. (2-sided test)</i>
Entry-level	55	15.612 <sup>a</sup>	4	0.004
Mid-level	56	8.462 <sup>a,b</sup>	4	0.076
Senior level	57	2.228 <sup>a,b</sup>	4	0.694

<sup>a</sup> The test statistic is adjusted for ties.

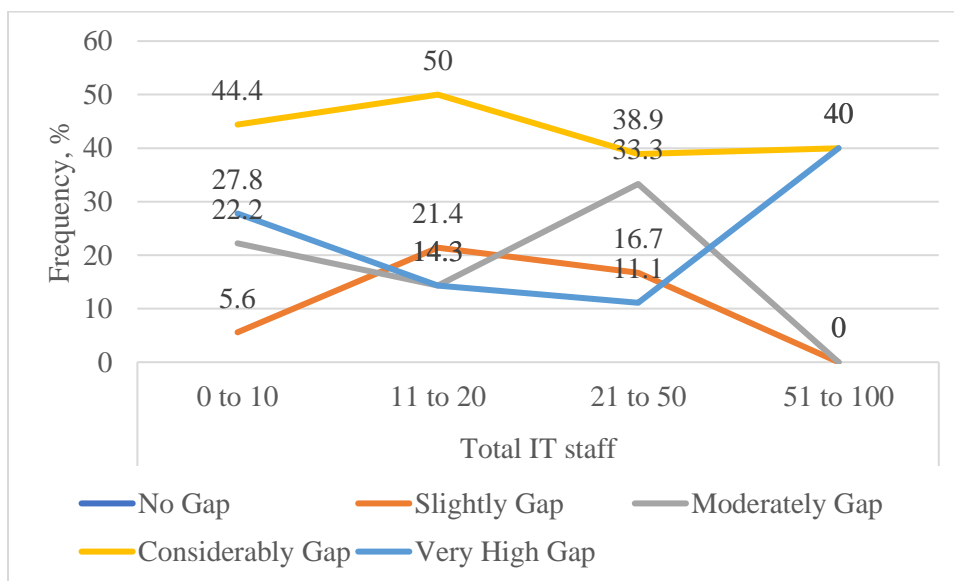
<sup>b</sup> Multiple comparisons is not performed because the overall test does not show significant differences across employee.

### Hard Skill Gaps in Employees' Group by Size of Company

The hard skill gaps in employees' groups by type of company are presented in this section. The extent of skill gaps among entry-level employees by size of company is presented in Figure 34. The company with an employee size greater than 51 to 100 has a considerably to very high gap in entry-level employees.

**Figure 34**

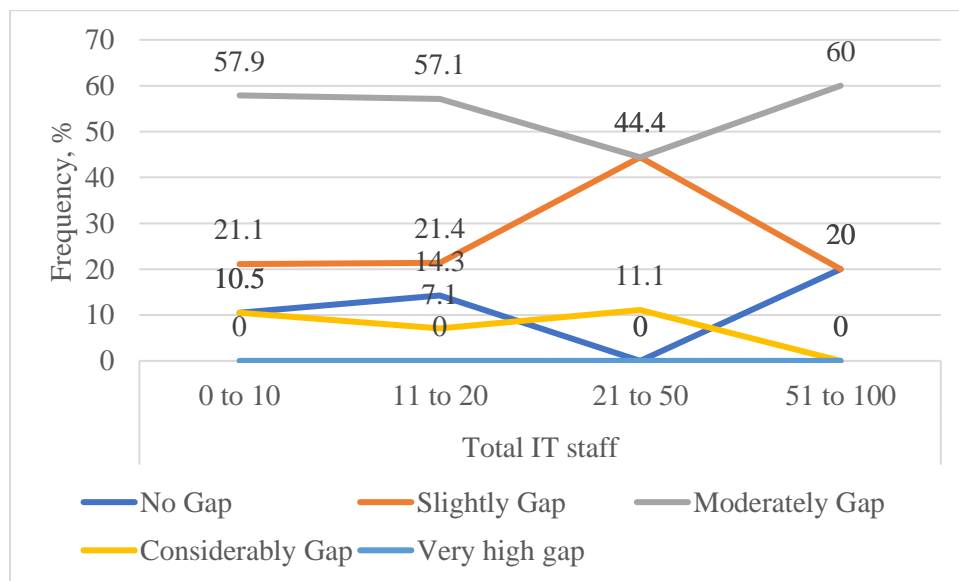
*Extent of Skill Gaps in Entry-level Employee by Size of Company*



The extent of skill gaps at mid-level by size of company is presented in Figure 35. There are no cases of a very high gap among mid-level employees. Companies have skill gaps ranging from moderately and considerably gap.

**Figure 35**

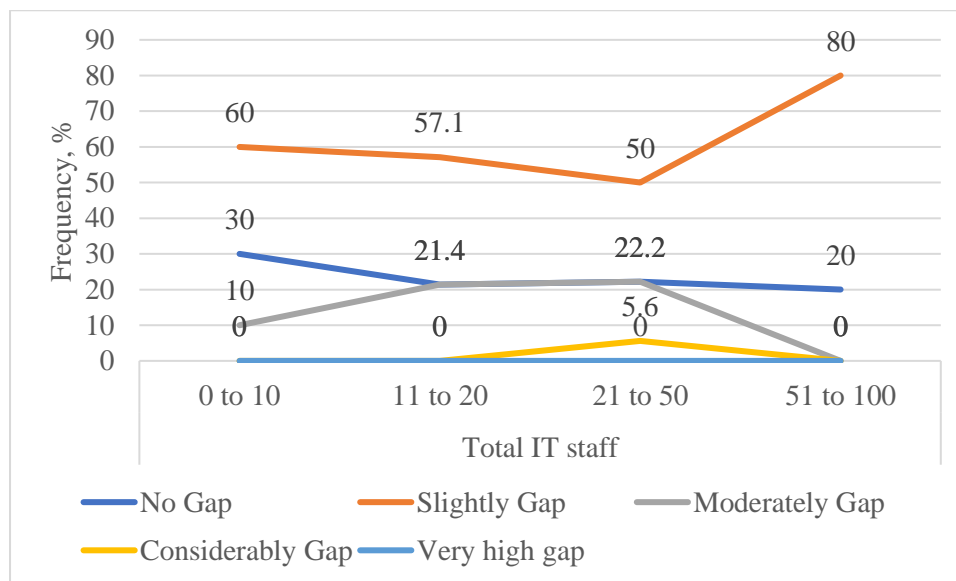
*Extent of Skill Gaps in Mid-Level Employee by Size of Company*



The extent of skill gaps among senior-level employees by size of company is demonstrated in Figure 36. There is no case of a very high gap. Only about five percent of the senior-level working in the company, with a size range of 21 to 50, are reported to have considerably gap. The company with sizes 51 to 100 shows that the gaps lie in between slightly and no gap. Similarity is exhibited by the company, with employee ranging between 0 and 10.

**Figure 36**

*Extent of Skill Gaps in Senior-level Employee by Size of Company*



The Kruskal-Wallis test was conducted to compare the distribution of skill gaps within employee groups by the size of the company (Table 5). The overall test does not reveal significant differences within the employee group.

**Table 5**

*Kruskal-Wallis Test for Comparison of Skill Gaps Within Employee Groups by Size of Company*

Employee	<i>N</i>	<i>H</i>	<i>df</i>	<i>Asymptotic Sig. (2-sided test)</i>
Entry-level	55	3.207 <sup>a,b</sup>	3	0.361
Mid-level	56	0.458 <sup>a,b</sup>	3	0.928
Senior level	57	1.801 <sup>a,b</sup>	3	0.615

<sup>a</sup> The test statistic are adjusted for ties.

<sup>b</sup> Multiple comparisons is not performed because the overall test does not show significant differences across the sample.

## **Causes and Effects of Hard Skill Gaps**

The contributing factors for skill gaps across levels of employees were identified. Respondents were asked to rank the causes of skill gaps in entry-level, mid-level and senior-level employees based on their experiences.

### ***Causes of Skill Gaps in Entry-level Employees***

Table 6 demonstrates the prime contributing factors causing skill gaps among entry-level employees, which include the education system, limited exposure to real-life problems, ineffective internships, and training and certification. Less than a third (29.8%) of the respondents reported that the education system is creating the skill gaps in entry-level employees as most frequently ranked in first choice. Other 22.8 percent report less exposure to real-life problems as frequently ranked in the second choice, while 12.3 percent believe ineffective exposure and training and certification, which are frequently ranked in the third choice. The word cloud generated for causes, effects, and coping strategies from MAXQDA is presented in Appendix G.

**Table 6**

### ***Causes of Skill Gaps in Entry-level Employees***

Causes	Ranked
Education system	1
Less exposure to real life problems	2
Ineffective exposure during internship	3
Training and certification	3

A similar observation was also identified through qualitative inquiry. Some of the most representative opinions opined by other participants of KII are exemplified in narrative form.

“The education system here must be changed. For example, in the current education system, we have BSc. CSIT, BCA, BCIT and technical engineering college. How is it there? Go to the college, give a 3-hour exam, pass it, get a certificate with a grade of 3-3.5. But in real life, it is not known where that thing is implemented. That part had to be taught. Practical way of education is needed. After that, student should change their mindset that good grade makes them employable.” (p1)

Some other participants put forward the same notion

I had learnt more than 50 subjects in my Bachelor. Only 10 were useful for me while I am working. Courses is not aligned to the market specific. (p15)

Skill sets taught by colleges are different than the skill sets sought by market (p12).

Our organization guides the entry-level interns for 3 to 6 months. Then only they figure out how to perform the jobs. At least three months is required to trained them. (p12)

Set of required skill is there but there may be lack of exposure while coming here and working. If there was an internship, it would have been a real-based problem. Some interns get good exposure and some don't. If you allow only basic printing and only allow photocopying, how will there be growth?” (p2)

“I completed by bachelor outside the Kathmandu valley. There were no established companies to do internship, but I was willing to do intern. Finally, I get one in the startup companies, due to limited resources, companies could not provide me enough exposure.” (pI3)

There is no effective training. I had worked there for whole 2 years but I did not get any trainings. (pI4)

### *Causes of Skill Gaps in Mid-Level Employees*

Table 7 demonstrates causes of skill gaps in mid-level employees changes includes skill requirements as most frequently chosen in the first choice, a high turnover rate as the second choice, expecting higher wages, and remote working due to differential wages as the third and fourth choices.

**Table 7**

#### *Causes of Skill gaps in Mid-level Employees*

Causes	Most frequently ranked
Changes in skill requirement	1
High Turnover rate	2
Expecting higher wages	2
Remote working due to differential wages	3

The causes of skill gaps in mid-level employees obtained through qualitative inquiry are presented below in narrative form.

Now if something new comes, it takes time. If you have to read it, you have to do it again, that's why there is a skill gap. (p11)

“If someone has learned the skillsets. Let’s say he learnt the technical skills. After working for two to four years in the company, he will try to apply that skill for foreign companies and will not work in any organization in Nepal. Because pay is less. Probably existing skilled are not maintained. There is a huge turnover” (p3)

“...the reason is that people are earning money in dollars from outsourcing works.” (p1)

The participant 11 opined that there is high turnover rate in the mid-level employees which lead frequent switch and creating the gaps within them and in company as well.

### *Causes of Skill Gaps in Senior-level Employees*

Table 8 indicates the major causes of skill gaps in senior-level employees, which include expecting higher wages, differential wages, and changes in skill requirements.

**Table 8**

### *Causes of Skill Gaps in Senior-level Employees*

Causes	Most frequently ranked
Expecting higher wages	1
Remote working due to differential wages	2
Changes in skill requirement	3

The following narrative statements presents the causes of skill gaps in senior-level employees as determined by qualitative research.

It is difficult to retain many highly skilled people. So only moderate people come to work in market. Thus, creating gap in whole industry. (p5)

“While working, our skills are lagging. So, we also need to reskill our skills timely as we work ... training and certification practices are very low. It will promote skill gaps. How are the standards of worldwide certification? We should think in the perspective of which certification makes us more sellable.”

(p3)

People are working remotely for foreign companies. Locally home-grown company could not afford huge salary. (p9)



You get freshers, you get mid-level. But to hire employee at senior level, who have skill at consultant level, is hard due to scarce, you may have to do it from outsourcing from foreign. (p7)

### *Effects of the Skill Gaps in Employee*

According to the findings shown in Table 9, at an individual level, the frequently chosen effects of skill gaps on the basis of ranking by frequency are: productivity, self-development, promotion, earnings, and work-life balance. Among others are the job, career, mental and psychological pressure, and wellbeing. Respondents reported that these effects are intertwined with each other, and one factor contributes to another in different ways.

**Table 9**

### *Effects of Skill Gaps in Employee*

Effect	<i>First Choice</i>	<i>Second Choice</i>	<i>Third Choice</i>	<i>Fourth Choice</i>	<i>Fifth Choice</i>
Earnings	12	7	7	10	8
Job career	10	9	8	9	9
Mental and psychological press	3	3	9	5	9
Productivity	22	12	7	5	3
Promotion	5	9	10	8	3
Self-development	2	12	9	10	6
Wellbeing	1		2	2	9
Work life balance	2	5	5	8	10
	57	57	57	57	57

The narrative statements of a qualitative investigation into the effect of skill gaps in employees at the individual level are shown below.

Skill gaps will impact in earning. (p2)

The contribution of individual with less skills will halt the personal and financial growth, which will affect the work life balance. (p9)

Mental pressure would be both psychological and sociological. Comparing with groups and friends and circles comes in mind. If I had learned something previously, I should not stick with such a low pay. (p12)

Salary depends upon the test interview which determines your job position and promotion. If there is not desired skill it's like full stop in job career. (15)

It has a very effect on the work-life balance. The work which generally takes a work take to complete takes six hours. To meet the target, you had to work an extra hour in the home so as to show your efficiency. (p2)

“Definitely once you acquire some skills, he will grow his mind. He does not want to stay in the company. You cannot increase salary significantly even after investing in them. There is both challenges and gap. There are shortages. It is harder to retain highly skilled people. Where do I rely is in moderate skilled people in Nepal. There is a gap in the whole industry.” (p5)

“Efficiency skill versus normal skill impact in productivity. Efficient are more crucial for company. Right skill set and right attitude is most. At the end of the day, it's all about the team member of the company. If the members don't have right skill company will not sustain for long time in this competitive environment.” (p7)

### ***Effects of the Skill Gaps in Company***

The major effects of skill gaps in a company are decreased output and productivity, delays in the launch of new products, an increase in operation costs, outsourcing, and a decrease in profitability (Table 10).

**Table 10***Effect of the Skill Gaps in Company*

Effect	<i>First Choice</i>	<i>Second Choice</i>	<i>Third Choice</i>	<i>Fourth Choice</i>	<i>Fifth Choice</i>
Decrease in output and product	32	12	5	3	3
Decrease in profitability	2	4	5	13	16
Delay in launch of new product	9	20	11	7	5
Increase in operation cost	4	13	18	13	6
Increase in training expenditure	4		8	8	19
Outsourcing	6	8	10	13	8

The narrative statements for the effect of the skill gap in the company, as exemplified by the statements, are presented below.

Skill gaps will definitely delay the launch of new products. (p8)

I think teaching means spending 10 thousand per month. It will cost more than 60 thousand. Which will cause the expenditure. (p9)

Unfortunately, due to the skill gaps we are giving works to third parties. We are outsourcing the works. (p1)

“If I hire a person and get x output and I lose 30% of x rather than 70 percent of x, not x. Because of that, it had an impact on productivity. And I didn't get what I wanted. And what happened next, if I need full productivity, I need to hire fourth person, my HR cost increased.” (p5)

Company's expenses will increased. And expenses mean not only salary but also rent, room, space. My cost will escalate. As soon as the staff increase

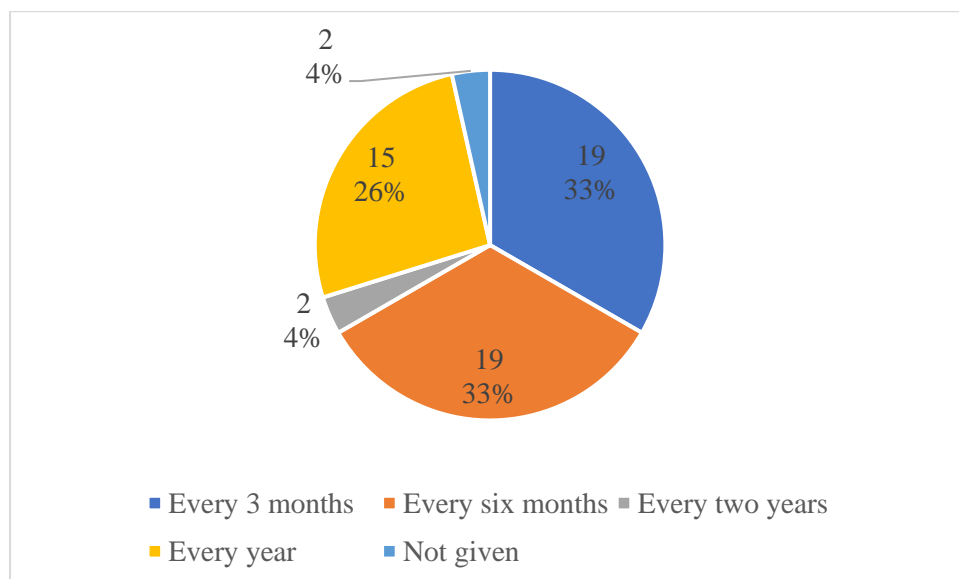
from 10 to 15, spaces should be increased by 1.5 times. All the expense will get increased. Then it will hit the bottom line of Profitability. (p5)

### **Coping Strategies Used by Companies for Minimising Skill Gaps**

34 companies reported that all newly hired employees are given training. 9 companies reported that 25–50% of their newly hired employees are given training. The major purpose of conducting the trainings was found to be skill development, minimising the skill gaps, aligning employees with the organisation's policies, and making them aware of the culture. The survey reveals that 19 companies conduct training every six months. Similarly, another 19 companies conducted training every 3 months. The 15 organisations reported they conduct the training yearly. Whereas, two of the companies have not provided any training in the last two years (Figure 37). 33 companies reported that, of the total training provided annually, half of it is allocated to entry-level employees.

**Figure 37**

*Frequency of Training by Time Duration*



### Coping Strategies Anticipated from the Stakeholders

Table 11 highlights the frequently ranked coping strategies as anticipated by the respondents, which include the university, fintech sector, government agencies, and professionals. Respondents were asked to rank coping strategies by assigning them first, second, and subsequent choices. Just over a third (36.84%) have chosen that the education system should align with the market requirements as the most frequently chosen first choice. A similar view was collected during the qualitative inquiry. Almost a quarter (24.56%) have ranked industry-university collaboration as the most frequently chosen second choice. Nearly a quarter (24.56%) have ranked exposure to real-life problems as the most frequently chosen third choice. An effective internship is ranked as the fourth choice by respondents for coping with the skill gaps.

**Table 11**

*Coping Strategies Anticipated from the Stakeholders to Minimise the Skill Gaps*

Coping Strategies	<i>First choice</i>	<i>Second choice</i>	<i>Third choice</i>	<i>Fourth choice</i>	<i>Fifth choice</i>
Education curriculum aligned with market requirements	21	6	8	5	3
Effective internship	4	7	13	11	12
Industry university collaboration	11	14	6	6	12
Exposure of real-life problem	9	14	8	9	7
Mentorship for career development	7	9	11	13	8
Social dialogue among stakeholders	1	3	2	5	2
Training and certifications	4	4	9	8	13
	<i>57</i>	<i>57</i>	<i>57</i>	<i>57</i>	<i>57</i>

The qualitative inquiry also exemplifies a similar result. The most representative narrative data on anticipated coping strategies is presented below.

Our universities have not been able to change its courses according to the way technology is changing. It is necessary to think about redesigning the courses after understanding the skill gaps in the market. (p3)

“Tying up the education system with the industry is must. There must be an authority that takes some problems of the industry, breaks it down project wise and distribute to the educational institution for solution. Solution will come at a lower cost than outside. It will benefit both the parties.” (p1)

There should be exposure to practical life problem. Those students aspiring graduation in IT should have similar practice as in Chartered Accountant, where they get real life problem during their study. (p11)

Academic and profession have huge gap. There should be internship. (p12)

Digital industry means ever-growing. Today we have one, tomorrow we have to learn new things. Regular trainings and certification is must. (p1)

Apart from this, social dialogue among stakeholders and mentorship for career development were identified as other crucial means of coping strategies.

## **Chapter V: Discussion and Conclusion**

This study aims to investigate the status of the skill gaps, explore the factors causing the skill gaps, and examine the consequential effects of skill gaps on IT employees in fintech companies in Nepal. The purpose of this chapter is to discuss the findings. The chapter includes the extent of skill gaps in fintech companies, causes of skill gaps in employees, their effects on employees and companies, coping strategies, recommendations for future research, and a conclusion.

### **Extent of Skill Gaps**

The findings of the study show entry-level employees exhibit very high skill gaps in comparison to mid-level and senior-level employees. Only a small minority of companies report that their entry-level employees are able to perform the jobs at the required level. Thus, a greater extent of skill gaps is found in entry-level employees. These findings parallel the study conducted in Vietnam among the students of the STEM discipline by Nghia (2018), which shows the recent graduates were severely lacking in the skills to perform their job effectively, and the study by Bergin et al. (2019) based on the ILO School-to-Work Transition Survey.

The results show that the extent of skill gaps in mid-level employees ranges from no gap to moderately gaps while the skill gaps in senior-level employees range from no gap to slightly gap. Essentially, these results are likely to be related to the regular training, upskilling programmes, and experiences gathered over the course of their career.

### **Causes of Skill Gaps**

The survey identified the causes of skill gaps in entry-level employees as stemming from the education system, limited exposure to real-life problems, ineffective internships, and the need for training and certification. The entry-level

employees who have just graduated from universities should have exposure to real-life problems and a proper internship during the time of their studies to solve the issue while doing the job. Nagarajan & Edwards (2010) highlight a similar notion. The result finds that the prime cause of skill gaps is the education system not aligning with market requirements. The study conducted by Ahmeti (2022) in Kosovo in the IT sector supports the findings of this study. Further, a previous study conducted by Bott (2018) in Canada on the fintech sector focusing on the accounting and business curriculum also supports the findings. A possible explanation for these claims may be due to a lack of frequent social dialogue between the stakeholders and a lack of sufficient university-industry collaboration, which may have reduced the gaps.

The study finds changes in skill requirements, high turnover rates, remote working cultures, and expecting higher wages are causes for skill gaps in mid-level and senior-level employees. The evolving new technology certainly makes the employee's skills obsolescent, creating skill gaps. The high turnover rates, remote working culture, and expectation of higher wages are intertwined with each other. Expecting higher wages and frequently switching would cause a lag in the attainment of skills, which would create skill gaps. Further, the remote working culture due to the differential wage culture has left the local market vacant with skilled professionals. The companies in Nepal had to rely on moderate employees, which indirectly created the skill gaps. These results support the findings of Ahmeti (2022) in a study conducted in Kosovo.

### **Effects in an Employee and Companies**

The result shows that there is some degree of gap in each employee group. The consequential effects of skill gaps on employees include productivity, self-development, promotion, earnings, and work-life balance. The results collectively



agree with the study of McGuinness & Ortiz (2016). Because of skill gaps, average labour productivity will decrease, hampered earning, self-development, and promotion. The reduced productivity would disturb the work-life balance. At the company level, the effects include decreased output and productivity, delays in the launch of new products, an increase in operation costs, outsourcing, and a decrease in profitability. The results from the findings of Tether et al. (2005) show delays in the launch of new products and hinderances when implementing new work practices, which is similar to the findings of this study. These effects are consistent with the findings of Barthel et al. (2016). The result agrees with the finding of McGuinness & Ortiz (2016), who identified training expenses as a crucial driver of both training expenses and labour costs, which eventually will decrease profitability arising from additional training expenses. The study found decreased output, which hinders the growth of the company, which echoes the findings of SEEP Nepal (2018).

### **Coping Strategies**

The findings show the importance of industry-academia collaboration to align curricula with industry needs. Similar results were highlighted in the study conducted in different countries (Ahmeti, 2022; Halilbasic, 2021; Jiang et al., 2021; Karkkainen et al., 2018; Radermacher et al., 2014). The study found exposure to real-life problems and an effective internship to be effective coping measures. A similar measure is pointed out by Xu (2020). Thus, higher education institutions should act immediately to better prepare the graduates before they materialise (Santoso & Putra, 2017). The study finds companies have employed coping strategies to address skill gaps, including providing training to employees, with a focus on skill development and orientation to company policies and culture, which is similar to the findings of SEEP Nepal (2018) and Wu et al. (2022). This upskilling approach conducted by

companies is similar to the findings of Jiang et al. (2021). These strategies reflect the commitment of companies to invest in employee development.

### **Other Findings**

The other findings are discussed below:

#### ***Geographic Location and Size of Company by Employees***

The result indicates the concentration of fintech companies in the Kathmandu Valley. In terms of company size by employee, it is noted that fintech companies in Nepal vary significantly. This reflects the diversity in company size, which reflects the evolving nature of fintech in Nepal and the services it provides. The government could formulate new policies to diversify the geographic location.

#### ***IT Workforce Composition by Sex***

The data indicates female senior IT employees are significantly less than the national average of 1 in 7 found by the Nepal Labour Force Survey (Central Bureau of Statistics, 2017). Female employees' participation in entry and mid-level is significantly lower in comparison to their male counterparts. The findings in relation to the gender composition of the workforce are consistent with the work of Aryal (2020). Even in the most diverse fintech ecosystem in San Francisco, the female demographic accounts for 28 percent (Walters, 2022). This study highlights the gender imbalance in IT employees across levels and the need for greater gender diversity and inclusion efforts to increasing female participation in this sector.

#### ***Wages/Salary***

In some of the companies, recent graduates employed at the entry-level are receiving wages below the government-mandated minimum wage requirement. Furthermore, the findings show that the median salary for entry-level positions is half that for mid-level employees and only a quarter of what senior-level employees

receive. There is a considerable wage gap between the employees working at different levels. A fair wage should be prevalent to retain entry-level employees within the nation.

### ***Minimum Qualification and Turnover***

The minimum qualification required for employability is a bachelor's degree for entry-level employees. Additional experience is sought for mid- and senior-level employees. These qualifications reflect the educational and experiential standards expected in the fintech sector. The results indicate a large majority (93%) are facing employee turnover yearly, of which almost half of companies reported having a turnover rate between 10 and 25 percent. This indicates a large chunk of the IT workforce is switching jobs, which hinders their self-development and impacts companies.

### ***Key Services and Disciplines***

The fintech companies in Nepal had focused on the payment domain. The result is similar to previously conducted studies on the adoption and trend of fintech in Nepal. However, the research conducted in other nations shows the services provided by fintech include artificial intelligence, block chain and cryptocurrency, reg-tech, etc. Though payment is the biggest domain, it only accounts for 25 percent, as shown by Walters (2022) in a study conducted in the nine global fintech hubs. This shows Nepali fintech is in its nascent stage and should expand into other domains.

The study reveals 15 distinct disciplines, which is similar to the findings of Doherty & Stephens (2023) and the FIT ICT Skill Audit conducted in Ireland. Some organisations handle all tasks internally; others prefer outsourcing certain functions. This distinction indicates that not all companies have the resources to conduct all disciplines, so choices are made by companies in optimising their resources.

The study's findings provide valuable insights for policymakers, educational institutions, and industry stakeholders to foster the growth of the fintech sector while addressing skill gaps and promoting diversity and inclusion within the industry.

### **Recommendations for Future Research**

Following are the recommendations for future research:

1. A study employing a matched employee-employer design should be undertaken.
2. Further investigation into gender imbalances and the distribution of skill gaps by gender.
3. A comprehensive nationwide survey on skill gaps should be conducted.
4. Specifically, surveys should be conducted targeting recent graduates.
5. Research on turnover rates across each employee group should be pursued.
6. Future studies should explore the impact of soft skills and their consequential effects.
7. A study regarding the skills projection and human resources projection of IT employees should be conducted.
8. Skill gaps distributions among female and male employees by level/position should be conducted.
9. The specific study should be conducted focusing on the education curriculum and market requirements.
10. The study should be conducted on impact of outsourcing in relation to the gig economy in context of fintech sector Nepal.

## **Conclusion**

The fintech industry in Nepal is in a nascent stage, and the adoption of fintech technologies is increasing tremendously, which has created huge potential for its growth and development. Fintech companies employ a wide array of IT employees, from entry-level to senior-level, across distinct disciplines. Since skilled professionals are the backbone for the development and operation of fintech, it is equally important to examine the issue regarding the extent, causes, and effect of skill gaps. This will help the stakeholders make the untimely necessary decisions to cope with the problems.

This study points out the extent to which skill gaps persist across each level of employee. Among the mid-level and senior-level IT employees, skill gaps vary between no gap, slightly gap, and moderately gap, and they could mitigate their gaps. The most striking finding is that only a minority of entry-level IT employees working in fintech companies in Nepal could perform the job at the required level, which shows they exhibit very high skill gaps, which have a negative impact on the productivity, self-development, and earnings of individuals, creating disturbances in work-life balance. The major causes of the skill gaps among entry-level IT employees are the educational system not aligning with market requirements, their lack of exposure to real-life problems, and ineffective internships. The company had to invest in training and development programmes to upskill their entry-level employees, which had impacted the company's profitability due to the increase in training and operation expenditures. The finding underscores the need for social dialogue among stakeholders and greater collaboration between academia and industry to produce skilled graduates by aligning the education system with market requirements: proper exposure to real-life problems and effective internships during their studies.

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## Appendices

### Appendix A



त्रिभुवन विश्वविद्यालय  
TRIBHUVAN UNIVERSITY  
मानविकी तथा सामाजिक शास्त्र सङ्काय  
FACULTY OF HUMANITIES AND SOCIAL SCIENCES  
श्रम अध्ययन स्नातकोत्तर कार्यक्रम  
MASTER'S PROGRAMME IN LABOUR STUDIES (MLS)  
कीर्तिपुर, काठमाडौं, नेपाल / KIRTIPUR, KATHMANDU

प. नं./Ref. No. २५  
२०६८/०८०

Date: 21 June 2023

#### To Whom it May Concern

This is to certify that, Mr. Sajan Bartaula, student of 2020 batch, Masters Programme in Labour Studies, Tribhuvan University, Kirtipur, Kathmandu is writing Master's Level thesis entitled '*Skill Gaps in Financial Technology Companies in Nepal*'. To accomplish the study, he is approaching you/your institution to collect necessary information. In this regard you are cordially requested to support/assist him by providing the necessary information. The collected information will be kept confidential as per the statistical acts/rules of the country and analysed maintaining anonymity of the personal/institutional identity.

Thanking you for your best support.

  
Dr. Kamala Devi Lamichhane,  
Coordinator

## Appendix B

<b>Discipline</b>	<i>Comparison between the employee groups</i>	<i>Test Statistic</i>	<i>Std. Error</i>	<i>Std. Test Statistic</i>	<i>Sig.</i>	<i>Adj. Sig.<sup>a</sup></i>
Programming	Senior level-Mid level	18.563	7.436	2.496	0.013	0.038
	Senior level-Entry-level	48.462	7.483	6.476	<0.001	0.000
	Mid-level-Entry-level	29.899	7.387	4.047	<0.001	0.000
Mobile technology development	Senior level-Mid level	10.668	5.336	1.999	0.046	0.137
	Senior level-Entry-level	27.293	5.336	5.115	<0.001	0.000
	Mid-level-Entry-level	16.625	5.267	3.157	0.002	0.005
Web development	Senior level-Mid level	12.459	6.541	1.905	0.057	0.170
	Senior level-Entry-level	34.93	6.644	5.258	<0.001	0.000
	Mid-level-Entry-level	22.471	6.483	3.466	<0.001	0.002
Software development tools/methodologie s	Senior level-Mid level	11.411	6.235	1.83	0.067	0.202
	Senior level-Entry-level	37.846	6.292	6.015	<0.001	0.000
	Mid-level-Entry-level	26.435	6.292	4.201	<0.001	0.000
Cloud computing	Senior level-Mid level	6.569	4.368	1.504	0.133	0.398



<b>Discipline</b>	<b>Comparison between the employee groups</b>	<b>Test Statistic</b>	<b>Std. Error</b>	<b>Std. Test Statistic</b>	<b>Sig.</b>	<b>Adj. Sig.<sup>a</sup></b>
	Senior level-Entry-level	16.838	4.368	3.855	<0.001	0.000
	Mid-level-Entry-level	10.269	4.448	2.309	0.021	0.063
Platform administration	Senior level-Mid level	12.115	6.426	1.885	0.059	0.178
	Senior level-Entry-level	33.65	6.53	5.153	<0.001	0.000
	Mid-level-Entry-level	21.535	6.368	3.382	<0.001	0.002
Cyber security	Senior level-Mid level	15.171	6.999	2.168	0.03	0.091
	Senior level-Entry-level	41.515	7.098	5.849	<0.001	0.000
	Mid-level-Entry-level	26.344	6.999	3.764	<0.001	0.001
DevOps	Senior level-Mid level	3.54	5.282	0.67	0.503	1.000
	Senior level-Entry-level	19.132	5.413	3.535	<0.001	0.001
	Mid-level-Entry-level	15.591	5.282	2.952	0.003	0.009
Networking technologies	Senior level-Mid level	20.652	8.45	2.444	0.015	0.044
	Senior level-Entry-level	60.872	8.533	7.133	<0.001	0.000
	Mid-level-Entry-level	40.22	8.493	4.736	<0.001	0.000
Data science/ data analysis	Senior level-Mid level	9.127	6.549	1.394	0.163	0.490

<b>Discipline</b>	<b>Comparison between the employee groups</b>	<b>Test Statistic</b>	<b>Std. Error</b>	<b>Std. Test Statistic</b>	<b>Sig.</b>	<b>Adj. Sig.<sup>a</sup></b>
	Senior level-Entry-level	32.91	6.714	4.902	<0.001	0.000
	Mid-level-Entry-level	23.784	6.663	3.57	<0.001	0.001
Enterprise application	Senior level-Mid level	10.149	5.816	1.745	0.081	0.243
	Senior level-Entry-level	25.755	5.873	4.385	<0.001	0.000
	Mid-level-Entry-level	15.606	5.752	2.713	0.007	0.02
e-business/digital marketing	Senior level-Mid level	5.611	6.146	0.913	0.361	1.000
	Senior level-Entry-level	21.722	6.146	3.534	<0.001	0.001
	Mid-level-Entry-level	16.111	6.201	2.598	0.009	0.028
Digital skills/media	Senior level-Mid level	8.982	5.857	1.534	0.125	0.375
	Senior level-Entry-level	21.644	5.975	3.622	<0.001	0.001
	Mid-level-Entry-level	12.662	5.919	2.139	0.032	0.097
Contact centre support	Senior level-Mid level	11.095	7.136	1.555	0.120	0.360
	Senior level-Entry-level	30.894	7.228	4.274	<0.001	0.000
	Mid-level-Entry-level	19.799	7.086	2.794	0.005	0.016

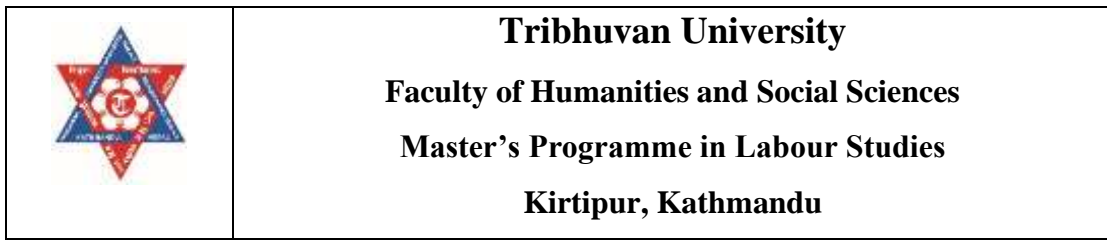
<b>Discipline</b>	<b>Comparison between the</b>	<b>Test</b>	<b>Std.</b>	<b>Std. Test</b>	<b>Sig.</b>	<b>Adj.</b>
	<b>employee groups</b>	<b>Statistic</b>	<b>Error</b>	<b>Statistic</b>		<b>Sig.<sup>a</sup></b>
Project management	Senior level-Mid level	19.038	7.228	2.634	0.008	0.025
	Senior level-Entry-level	47.208	7.373	6.403	<0.001	0.000
	Mid-level-Entry-level	28.17	7.373	3.821	<0.001	0.000
Overall comparison	Senior level-Mid level	32.898	8.813	3.733	<0.001	0.001
	Senior level-Entry-level	74.137	8.854	8.374	0.000	0.000
	Mid-level-Entry-level	41.239	8.892	4.638	<0.001	0.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

<sup>a</sup> Significance values have been adjusted by the Bonferroni correction for multiple tests.

## Appendix C



**SKILL GAPS IN FINANCIAL TECHNOLOGY COMPANIES IN NEPAL**  
*(A Study for the Master's Degree Thesis in Labour Studies)*  
**June 2023**  
**KEY INFORMANT INTERVIEW GUIDELINES**

Dear Participants,

Namaste, I am Sajjan Bartaula, student of Master's Programme in Labour Studies, Tribhuvan University. I am conducting a study entitled "*Skill Gaps in Financial Technology (Fintech) Companies in Nepal*" as a partial fulfilment of the requirement for the Masters in Labour Studies (MLS) at Tribhuvan University.

**Purpose of the study:** The sole purpose of the study is to examine the salient features, effects and causes of skill gaps in fintech companies in Nepal.

**Procedure to follow:** We will be discussing the skill gaps in your company. The discussion is expected to take 30 minutes to complete. I highly appreciated your participation in the discussion.

**Statement of confidentiality:** I assure that any information given by you will be kept confidential and will solely be used for academic purposes as part of the thesis.

**Voluntary participation:** Your decision to take part in this research is voluntary. I humbly request you that you share to the best of your knowledge and experience. If you feel any inconvenience during the discussion, please let me know about it; you may also withdraw from this discussion. But I hope that you will be able to participate throughout the discussion.

In case of any queries, criticism and suggestion, please let me know.

For further Information:  
Labour Studies Programme  
Tribhuvan University, Kirtipur  
Kathmandu  
Phone: [977-01-4335458](tel:977-01-4335458)

Sincerely,  
Sajan Bartaula  
MLS Research Scholar  
Tribhuvan University  
[sajan.777537@lsp.tu.edu.np](mailto:sajan.777537@lsp.tu.edu.np)

Do you agree to participate?

Yes  No

**Profile of Fintech Company**

Date of interview						
Name of the Fintech company						
Date of operation						
Address						
Branch office						
Year of establishment						
Email-id						
Name of CTO/CPO/IT Head						
Sex of the CTO/CPO/IT Head						
Telephone Number						
Total number of Staff						
Number of IT staff	Entry-level		Mid-Level		Senior Level	
	Male	Female	Male	Female	Male	Female

SN	Discussion Questions	CTO/IT Head/IT Manager
<b>A</b>	<b>GENERAL INFORMATION</b>	
1	What do you understand about “Fintech ”?	
2	What do you understand about “hard skills”, “soft skills” and “skill gaps”?	
3	In Nepal, what are the major services provided by fintech companies?	
<b>B</b>	<b>SALIENT FEATURES OF SKILL GAPS</b>	
1	What are the key and notable aspects that define the skill gaps in fintech companies in Nepal?	
2	What is the extent of skill gaps in fintech companies in Nepal? ( <b>PROBE:</b> Very High, low, no mismatch)	
3	What is the extent of skill gaps in your fintech company?	
	On an average how long does it take average entry-level staffs to fulfil the gaps? ( <b>PROBE:</b> Lacking of qualified skilled human resources)	
<b>C</b>	<b>KEY SERVICES AND DISCIPLINES</b>	
1	In Nepal, what are the disciplines in which fintech company offers employment?	

	( <b>PROBE:</b> Programming, Software Development, Mobile technology development, enterprise applications, cloud computing, Data science, DevOps, Cyber Security, Digital Skills, Networking technologies, project management, contact centre support, etc. and outsourcing if any, occupational structure needed to perform above services and disciplines)	
2	What are the disciplines in which your company offers employment?	
3	What services your company is trying to extend in upcoming days? ( <b>PROBE:</b> Skill requirements for future, train existing or hire new employees)	
<b>D</b>	<b>SKILL REQUIREMENTS</b>	
1	What are the <i>technical skills (hard skills)</i> that you as a company require from your fintech staff? ( <b>PROBE:</b> On basis of each discipline: front end, back end and level of competency (entry-level, mid-level and expert level))	
2	What are the most in-demand <i>non-technical skills (soft skills)</i> that you as a company require from your fintech staff? ( <b>PROBE:</b> On basis of each discipline and level of competency (entry-level, mid-level and expert level))	
3	Does your company prepare the <i>competency matrix</i> for identification of skills and skills gaps of staffs?	

	( <b>PROBE:</b> Skill tracking, appraisal, skill matrix, can you share the competency matrix with me, or can you share main findings of the competency matrix with me, how often you hire the employee)	
<b>E</b>	<b>SKILL GAPS</b>	
1	In the last two or three recruitments of technical human resources, have you experienced any <i>technical skills (hard skills)</i> mismatch/gaps among hired employees who could not perform job at required level?  ( <b>PROBE:</b> On basis of each discipline and level of competency (entry-level, mid-level and expert level))	
2	In the last two or three recruitments of technical human resources, have you experienced any <i>non-technical skills (soft skills)</i> mismatch/gaps among hired employees who could not perform job at required level?  ( <b>PROBE:</b> On basis of each discipline and level of competency (entry-level, mid-level and expert level))	
3	Can you share your experience related to skills when you had started career?  ( <b>PROBE:</b> Problem faced by you, why, how and furthermore)	
<b>F</b>	<b>CAUSES OF SKILL GAPS</b>	
1	What are the major factors do you think contribute to these skill gaps/mismatch?	




	( <b>PROBE:</b> Education syllabus, under-skilling, trainings and certification, internship, on the job trainings)	
2	Have you experienced any shortage of skilled human resources required for your company? ( <b>PROBE:</b> Hiring of less skilled employees, retention issues and turnover rates)	
3	To what extent has your study programme been a good basis? ( <b>PROBE:</b> Starting work, further learning, performing current job, future career, personal development, development of entrepreneurial skills)	
<b>G</b>	<b>EFFECTS OF SKILL GAPS</b>	
1	What are the effects of skill gaps in your company? <b>PROBE: (Personal level-</b> Hierarchy/Level of staffs, earnings, productivity, well being; <b>Company level</b> -training expenditure, firm level productivity, average labour cost, profitability; <b>National level</b> -Meeting SDG's Goal, Digital Framework Nepal, financial inclusion, Competitiveness)	
<b>H</b>	<b>COPING STRATEGIES</b>	
1	What overall strategies and methods were put into place at your fintech company to address employee's skill gaps? ( <b>PROBE:</b> Trainings, interaction, exposure to other institution, etc.)	

2	How government and fintech sector working together to cope the skill gaps in the fintech sector?	
3	What kind of further support or initiatives would you expect from the government and academic institution to address the skill gaps in the fintech sector?	

You are requested to share anything that you think I should include in this study but not captured in our discussions. Please feel free to share.

Thank you for your time and engagement. Your responses are highly valuable for this research.

## Appendix D

	<p><b>Tribhuvan University</b> <b>Faculty of Humanities and Social Sciences</b> <b>Master's Programme in Labour Studies</b> <b>Kirtipur, Kathmandu</b></p>
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**SKILL GAPS IN FINANCIAL TECHNOLOGY COMPANIES IN NEPAL**  
*(A Study for the Master's Degree Thesis in Labour Studies)*  
**July-August 2023**  
**Survey Questionnaire**

Dear Respondents,

Namaste, I am Sajan Bartaula, student of Master's Programme in Labour Studies, Tribhuvan University. I am conducting a study entitled "*Skill Gaps in Financial Technology (Fintech) Companies in Nepal*" as a partial fulfilment of the requirement for the Masters in Labour Studies (MLS) at Tribhuvan University.

**Purpose of the study:** The sole purpose of the study is to examine the salient features, effects, causes and coping strategies of skill gaps in fintech companies in Nepal.

**Procedure to follow:** You are required to answer the question in the following sections which will take 20-30 minutes.

**Statement of confidentiality:** I assure that any information given by you will be kept confidential and will solely be used for academic purposes as part of the thesis.

**Voluntary participation:** Your decision to take part in this research is voluntary. I humbly request you that you share to the best of your knowledge and experience. If you feel any inconvenience during the discussion, please let me know about it; you may also withdraw from this discussion. But I hope that you will be able to respond the questionnaire.

In case of any queries, criticism and suggestion, please let me know.

For further Information:  
Labour Studies Programme  
Tribhuvan University, Kirtipur  
Kathmandu  
Phone: 977-01-4335458

Sincerely,  
Sajan Bartaula  
MLS Research Scholar  
Tribhuvan University  
[sajan.777537@lsp.tu.edu.np](mailto:sajan.777537@lsp.tu.edu.np)

Do you agree to participate in this research?

Yes  No

### Section A: Profile of Fintech Company

Name of the Fintech company	
Type of Fintech	PSO <input type="checkbox"/> PSP <input type="checkbox"/> Commercial bank as PSP <input type="checkbox"/> Development Bank as PSP <input type="checkbox"/> Finance as PSP <input type="checkbox"/>
Address	
Year of establishment	
Name of Respondent	
Sex of the respondent	Male <input type="checkbox"/> Female <input type="checkbox"/>
Designation of respondent	
Years of experience	
Telephone Number (optional)	
Total Number of IT employees	<input type="checkbox"/> 1 to 5 <input type="checkbox"/> 6 to 10 <input type="checkbox"/> 11 to 15 <input type="checkbox"/> 16 to 20 <input type="checkbox"/> 21 to 25 <input type="checkbox"/> 26 to 50

	<input type="checkbox"/> 51 to 100		<input type="checkbox"/> above 100			
Number of IT employees	Entry-level		Mid-Level		Senior Level	
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
<i>(Number)</i>						
Minimum Income Range (monthly)						
Required minimum qualification for employment						

**Section B: Key Services and Disciplines**

What are the services offered by your fintech company in Nepal? *(Multiple choice)*

Payment/Billing <input type="checkbox"/>	Reg tech <input type="checkbox"/>	Mortgage <input type="checkbox"/>
Capital Markets <input type="checkbox"/>	Wealth Management <input type="checkbox"/>	Cards services to ban <input type="checkbox"/>
Money transfer <input type="checkbox"/>	Personal finance <input type="checkbox"/>	Others(specify)
Lending <input type="checkbox"/>	Insurance <input type="checkbox"/>	Others(specify)

What are the services your company is trying to extend in upcoming days?

.....

What are the major disciplines on which your company works and offers employment (in-house)? (Multiple choice)

1	Programming <input type="checkbox"/>	10	Data analysis/data science <input type="checkbox"/>
2	Mobile technology development <input type="checkbox"/>	11	Enterprise applications <input type="checkbox"/>
3	Web development <input type="checkbox"/>	12	e-Business/ digital marketing <input type="checkbox"/>
4	Software development tools <input type="checkbox"/>	13	Digital skills/media <input type="checkbox"/>
5	Cloud computing <input type="checkbox"/>	14	Contact centre support <input type="checkbox"/>
6	Platform administration <input type="checkbox"/>	15	Project management <input type="checkbox"/>
7	Cyber security <input type="checkbox"/>	16	If others(specify) .....
8	DevOps <input type="checkbox"/>	17	If others(specify) .....
9	Networking technologies <input type="checkbox"/>	18	If others(specify).....

Does your company outsource any of above discipline to vendor?

Yes

No

What are the major disciplines your company outsources?

1	Programming <input type="checkbox"/>	10	Data analysis/data science <input type="checkbox"/>
2	Mobile technology development <input type="checkbox"/>	11	Enterprise applications <input type="checkbox"/>
3	Web development <input type="checkbox"/>	12	e-Business/ digital marketing <input type="checkbox"/>
4	Software development tools <input type="checkbox"/>	13	Digital skills/media <input type="checkbox"/>
5	Cloud computing <input type="checkbox"/>	14	Contact centre support <input type="checkbox"/>
6	Platform administration <input type="checkbox"/>	15	Project management <input type="checkbox"/>
7	Cyber security <input type="checkbox"/>	16	If others(specify) .....
8	DevOps <input type="checkbox"/>	17	If others(specify) .....
9	Networking technologies <input type="checkbox"/>	18	If others(specify).....

**Section C: Hard Skill Requirements and Skill gaps in your company**

What are the major hard skills required in the *programming*? (*Front-End, Backend, database*)

.....

How do you rate the extent of hard skill gaps among the IT employees in *programming*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *mobile technology development*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *mobile technology development*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *web development*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *web development*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *software development tools/methodologies*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *software development tools/methodologies*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



What are the major hard skills required in the *cloud computing*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *cloud computing*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *platform administration*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *platform administration*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *cyber security*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *cyber security*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *DevOps*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *DevOps*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *networking technologies*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *networking technologies*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *data science/data analysis*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *data science/data analysis*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *enterprise application*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *enterprise application*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *e-business/digital marketing*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *e-business/digital marketing*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *digital skills/ media*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *digital skills/ media*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *contact centre support*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *contact centre support*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *project management*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *project management*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *Others specify*?

.....

How do you rate the extent of hard skill gaps among the IT employees in *Others specify*?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are the major hard skills required in the *Others specify?*

.....

How do you rate the extent of hard skill gaps among the IT employees in *Others specify?*

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In an overall, how do you rate the extent of hard skill gaps among the IT employees in your company?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Which of the soft skills required by the IT employees of your company?

*Rank top 3 for each level of employees*

Soft Skills	Entry-level	Mid-level	Senior-level
Adaptability			
Communication skills			
Creativity			
Critical Thinking			
Emotional Intelligence			
Leadership			
Persistence (Grit) and work ethic			
Problem Solving			
Project management and time management			
Team working			
None of above			



In an overall, how do you rate the *soft skill gaps* among the IT employees in your company?

	No gap (1)	Slightly gap (2)	Moderately gap (3)	Considerably gap (4)	Very high gap (5)
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In general, in which pool of IT employees, both *hard and soft skill gaps* are more noticeable?

Entry-level       Mid-level       Senior-level

**Section D: Vacancies and Hard to fill (Skill Shortages)**

What is IT employees turnover rate within your company?

Less than 10%       10-25 %       greater than 25%

No turnover

Do your company have any vacancies. IT at current?

Yes       No

Can you specify the IT position in which there is a vacancy?

.....

In last 2 to 3 recruitments, had your organization faced/facing hard to fill the vacancies, of IT employees?

Yes

No

Could you specify in which position your company had faced shortages?

.....

**Section E: Causes of skill gaps**

According to you, what are major causes of skill gaps in the IT employees in your company? (*Rank top 3 for each level of employees*)

*1.....First Important*

*2..... Second important*

*3..... Third Important*

Causes	Entry-level	Mid-level	Senior-level
Brain drains			
Changes in Skill Requirements			
Experts in local market working for foreign companies (Skill Shortages)			
Education system			
Ineffective exposure during internship			
Lack of learning attitude and willingness			
High Turnover rate			
Training and Certifications			
Less exposure to real life problems			
Professional available expect higher pay			

Professional available in market lack relevant knowledge on finance and technology			
--	--	--	--

**Section F: Effects of Skill gaps**

For a IT employees in your company, what are the effects of skill gaps? *(Rank top 5)*

<b>Effects in Individual</b>	<b>Please Rank</b>
Earnings/wages	
Job career	
Mental and psychological pressure	
Productivity	
Promotion	
Self-development	
Well-being	
Work-life balance	

For your fintech company, what are the effects due to skill gaps in IT employees?

*(Rank top 5)*

<b>Effects in a company</b>	<b>Please Rank</b>
Decrease in the output and productivity	
Delay in launch of new product	
Increase in Operation cost	
Increase in training expenditure	
Outsourcing	

Decrease in profitability	
---------------------------	--

**Section G: Coping Strategies**

How your company is trying to solve the problems of skill gaps of IT employees?

.....

What percentage of newly hired IT employees do you need to train?

0-25%       26-50%       51-75%       76-100%       all 100%

What is the major purpose of conducting these trainings?

.....

What portion of the overall training conducted yearly is given to IT employees below?

	0 to 25%	26 to 51%	51 to 75%	76 to 100%
Entry-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How often should you train existing IT employees due to changing requirements for their skills?

Every 3 months       Every 6 months       Every 1 year

Every two years       Not at all

What coping strategies do you expect from the universities to minimize the skill gaps of IT graduates? (*Rank top 5*)

Coping strategies	Please Rank
Mentorship for career path development	
Exposure to real life problems for students	
Education system aligned to market requirements	
Social dialogue among stakeholders	
Training and Certifications	
Industry-University Collaboration	
Effective Internship	

Further suggestion to solve the problem of skill gaps in IT graduates and what role do you expect from government?

.....

Comments or suggestions:
--------------------------

Thank you very much for your time and cooperation!

## Appendix E

### List of the surveyed fintech companies

SN	Licensed Institutions	Location	Date of license issued
	<b>Payment System operators (PSOs)</b>		
1	Nepal Clearing House Ltd.	Kamaladi, Kathmandu	2074-04-15
2	Smart Choice Technology Ltd.	Baluwatar, kathmandu	2074-09-17
3	Nepal Electronic Payment System (NEPS)	Narayanchaur, Kathmandu	2076-01-29
4	Nepal Payment Solutions Pvt. Ltd.	Hattisar, Kathmandu	2076-07-19
5	Fonepay Payment Services Ltd.	Bakhundole, Lalitpur	2076-10-26
6	Gateway payment Service Pvt. Ltd	Baluwatar, Kathmandu	2077-11-03
	<b>Payment System provider (PSPs)</b>		
1	Prabhu Technology Pvt. Ltd.	Kamaladi, Kathmandu	2074-03-04
2	IME Digital Solution Ltd.	Panipokhari, Kathmandu	2074-03-05
3	eSewa Pvt. Ltd.	Pulchowk, Lalitpur	2074-03-05
4	Cellcom Pvt. Ltd.	Sinamangal, Kathmandu	2075-09-08
5	Khalti Pvt. Ltd.	Pulchowk, Lalitpur	2076-01-02
6	Pay Nep Pvt. Ltd.	Naxal, Kathmandu	2076-04-15
7	QPay Pvt. Ltd	Bhadrakali, Kathmandu	2076-05-19
8	Smart Card Pvt. Ltd	Radhe Radhe, Bhaktapur	2076-06-29
9	Focusone Payment Solutions Pvt. Ltd.	Kamaladi, Kathmandu	2076-11-29
10	PayWell Nepal Pvt. Ltd.	Anamnagar, Kathmandu	2077-06-11
11	Goldmine Business Group Pvt. Ltd.	Baneshwor, Kathmandu	2077-08-29

<b>SN</b>	<b>Licensed Institutions</b>	<b>Location</b>	<b>Date of license issued</b>
12	Lenden Sewa Pvt. Ltd.	Siphal, Kathmandu	2077-10-20
13	Nepal E-Biz Management Pvt. Ltd.	Sanepa, Lalitpur	2077-11-18
14	Nepal Digital Payments Company Ltd.	Tripureshwor, Kathmandu	2077-12-03
15	Sulav Pay Pvt. Ltd.	Kuleshwor, Kathmandu	2077-12-05
	<b>Commercial Banks as PSPs</b>		
1	Nepal Bank Ltd.	Dharmapath, Kathmandu	2073-12-17
2	Agricultural Development Bank Ltd.	Ramshahpath, Kathmandu	2073-12-17
3	Global IME Bank Ltd.	Kamaladi, Kathmandu	2073-12-17
4	NIC Asia Bank Ltd.	Thapathali, Kathmandu	2073-12-17
5	Prime Commercial Bank Ltd.	Kamalpokhari, Kathmandu	2073-12-17
6	NMB Bank Ltd.	Babarmahal, Kathmandu	2073-12-20
7	Laxmi Sunrise Bank Ltd.	Hattisar, Kathmandu	2073-12-20
8	Nabil Bank Ltd.	Tindhara, Kathmandu	2073-12-24
9	Prabhu Bank Ltd.	Babarmahal, Kathmandu	2073-12-24
10	Kumari Bank Ltd.	Tangal, Kathmandu	2073-12-24
11	Nepal Investment Mega Bank Ltd.	Durbarmarg, Kathmandu	2073-12-24
12	Siddhartha Bank Ltd.	Hattisar, Kathmandu	2073-12-24
13	Himalayan Bank Ltd.	Kamaladi, Kathmandu	2073-12-24
14	Machhapuchhre Bank Ltd.	Lazimpat, Kathmandu	2073-12-24
15	Sanima Bank Ltd.	Naxal, Kathmandu	2073-12-29
16	Citizens Bank International Ltd.	Narayanhitipath, Kathmandu	2073-12-29
17	Rastriya Banijya Bank Ltd.	Singh Durbar Plaza, Kathmandu	2073-12-29

<b>SN</b>	<b>Licensed Institutions</b>	<b>Location</b>	<b>Date of license issued</b>
18	Standard Chartered Bank Nepal Ltd.	Naya Baneshwor, Kathmandu	2073-12-30
19	Everest Bank Ltd.	Lazimpat, Kathmandu	2073-12-30
20	Nepal SBI Bank Ltd.	Keshermahal, Kathmandu	2073-12-30
	<b>Development Banks as PSPs</b>		
1	Shangrila Development Bank Ltd.	Baluwatar, Kathmandu	2075-01-21
2	Garima Bikash Bank Ltd.	Lazimpat, Kathmandu	2075-02-22
3	Kamana Sewa Bikash Bank Ltd.	Gyaneshwor, Kathmandu	2076-03-30
4	Muktinath Bikash Bank Ltd.	Kamaladi, Kathmandu	2076-05-16
5	Lumbini Bikas Bank Ltd.	Dillibazar, Kathmandu	2076-09-23
6	Jyoti Bikas Bank Ltd.	Kamaladi, Kathmandu	2077-10-25
7	Mahalaxmi Bikas Bank Ltd.	Durbarmarga, Kathmandu	2078-11-23
	<b>Finance Companies PSPs</b>		
	<b>Finance company</b>		
1	ICFC Finance Ltd.	Tangal, Kathmandu	2075-01-16
2	Gurkhas Finance Ltd.	Dillibazar, Kathmandu	2075-02-24
3	Goodwill Finance Ltd.	Hattisar, Kathmandu	2075-08-17
4	Manjushree Finance Ltd.	Naya Baneshwor, Kathmandu	2076-08-25
5	Progressive Finance Ltd.	Tinkune, Kathmandu	2076-09-23
6	Reliance Finance Company Ltd.	Pradashanimarga, Kathmandu	2077-10-25
7	Best Finance Company Ltd.	Chabhil, Kathmandu	2078-01-19
8	Central Finance Ltd.	Kupandol, Lalitpur	2078-05-27
9	Nepal Finance Ltd.	Kamaladi, Kathmandu	2078-05-27



## Appendix F

### List of Participants in the Key Informant Interview

SN	Participant	Type of interview	Anonymous name	Employee Level
1	Participant 1	KII	Participant 1- KII	Senior
2	Participant 2	KII	Participant 2- KII	Senior
3	Participant 3	KII	Participant 3- KII	Senior
4	Participant 4	KII	Participant 4- KII	Senior
5	Participant 5	KII	Participant 5 – KII	Senior
6	Participant 6	KII	Participant 6 – KII	Senior
7	Participant 7	KII	Participant 7 – KII	Senior
8	Participant 8	KII	Participant 8- KII	Senior
9	Participant 9	KII	Participant 9- KII	Senior
10	Participant 10	KII	Participant 10- KII	Senior
11	Participant 11	KII	Participant 11- KII	Senior
12	Participant 12	KII	Participant 12- KII	Senior
13	Participant 13	KII	Participant I1- KII	Entry
14	Participant 14	KII	Participant I2- KII	Entry
15	Participant 15	KII	Participant I3- KII	Entry
16	Participant 16	KII	Participant I4- KII	Entry
17	Participant 17	KII	Participant I5- KII	Entry
18	Participant 18	KII	Participant I6- KII	Entry

## Appendix G

### Word Cloud for Causes of Skill Gaps



### Word Cloud for Effects of Skill Gaps in Individual Level



Word Cloud for Effect of Skill Gaps in Company Level



Word Cloud for Coping Strategies





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