WORK FROM HOME (WFH) AND RELATED TECHNICAL CHALLENGES FOR SOFTWARE COMPANIES IN KATHMANDU: LESSONS FROM COVID-19 AND ITS FUTURE IMPLICATIONS

Pala Kansakar[1], Er Ajay Kumar Sharma[2]

[1]PG Scholar, Lord Buddha Education Foundation, Kathmandu, Nepal

[2] **Professor, Lord Buddha Education Foundation, Kathmandu, Nepal**

ABSTRACT

The COVID-19 pandemic has significantly accelerated the adoption of remote work globally, including in Nepal. The demand for new trend on work from home started after the surge of pandemic. This research outlines the related technical challenges faced by software companies in context to Kathmandu, particularly within the IT sector. The paper emphasizes on different challenges faced by Software companies in context to Kathmandu and the research further initiates to provide possible solutions and guidelines that could be implemented in Software Companies to overcome the possible future issues while adopting work from home. In context to Kathmandu, work from home was a new concept hence the focus of the research revolves around different factors such as infrastructure, network issues and IT and training awareness that impacts adoption of technology while working from home. The survey was conducted among 388 respondents who are IT professionals from IT companies located within Kathmandu valley. The findings indicates that though Work From Home (WFH) culture was a new concept during COVID-19 pandemic for software companies in Nepal, it has been widely gaining popularity. The regression analysis was performed which shows that infrastructure, network issues and IT and training awareness has a positive relation with the ease of adoption of technology. However on the basis of statistical analysis, there is not much concern on availability of the logistics to the employees but there are still some concern on network reliability due to low bandwidth internet services provided by Internet Service Providers. Further the result shows that IT and trainings awareness, programs are being conducted by software companies on regular basis which has helped them better understand the policy and tools and has been able to experience ease in transition to work from home.

Keywords: *Work from home (WFH), COVID-19, Software Companies*

1. INTRODUCTION

The concept of "work from home" initially wasn't widely popular, with most people working from office premises unless there was an emergency. However, advancements in technology since the 1980s have made remote work feasible. Initially, only a few professions allowed work from home due to concerns about decreased productivity (Faulds & Raju, 2021). The COVID-19 pandemic forced companies to transition to a work-from-home culture, adopting various technologies for business continuity. The companies were compelled to shifting to work from home permanently due to the rise in sudden pandemic(Savić, 2020). Due to this sudden demand to adopt work from home employees were forced to adopt work from home for better productivity. Employees had to face lot of technical challenges while adopting new technology and tools. Many business suffered during pandemic among which IT was the one who had been affected more. People were quickly trained and forced to more to work from home culture (Al-Habaibeh et al., 2021) . In the global context there are more research on cyber security threats while adopting to work from home. However other common issues includes frequent network issues, internet connectivity were some of the factors that contribute to adopt remote work

2. RESEARCH OBJECTIVES

The objective of the research is to investigate the technical issues faced by software companies located in Kathmandu while shifting from work from office to working remotely and also discuss on the lesson learned that could be implemented during or after the pandemic to resolve these issues in context of Nepal.

- To investigate Infrastructure hurdles faced by software companies of Kathmandu while shifting to working remotely instead of working from office premise.
- To examine different Network challenges faced by software companies of Kathmandu while moving to work from home practice.
- To develop feasible solutions and guidelines that could be implemented in Software Companies to overcome the possible future issues in context to Kathmandu.

3. RESEARCH QUESTIONS

The research questions are the list of questions which will be analyzed in the research and possible solutions will be provided accordingly:

RQ1. Is there any significant relationship between the infrastructure hurdles faced by software Companies in Kathmandu while adopting work from home during pandemic situation?

RQ2. Is there any significant relationship between Network issues faced by software companies in Kathmandu valley while adopting culture of working from home during COVID-19 pandemic?

RQ3. Is there any significant relationship between conducting IT training and awareness generating programs in software companies will motivate software companies to adopt work from home culture?

RQ4. What can be the conceptual model to overcome technical challenges for software companies during work from home?

4. SIGNIFICANCE OF THE STUDY

The dissertation will provide the various challenges that software companies had to face and the major factors affecting the adoption work from home culture. Following are the list of areas where this research can be benefited:

- It might offer suggestions to new businesses on how to implement work-from-home policies and prepare for overcoming technical challenges following a pandemic or who are already using a work from home model (Ford et al., 2021).
- It enables other researchers to continue their investigation on technical challenger and their relationship to the pandemic in the present context.
- It may offer insight to Internet Service Providers on adoption or implementation of guidelines and IT policies.

5. SCOPE OF THE STUDY

The scope of research is to explore on related technical challenges faced by Top software companies of Kathmandu during the pandemic and implement the lesson learned from it that could be implemented after the pandemic. The research can be further extended by implementing the lesson learned and use the study as a guidelines for new software companies in future.

6. LIMITATION OF THE STUDY

Any research should include practical limitations to reduce the topic's ambiguity and help the researcher be truthful. Additionally, limitations will provide researchers the chance of resolving issues with their future studies. The Sample size and data collected during the survey was restricted to only within Kathmandu valley and further the research does not includes all the technical challenges as this is limited to research only on issues related to infrastructure, network and IT training challenges faced by software companies

7. LITERATURE REVIEW

The literature review section compiles research from various papers and journals that address the technical challenges encountered by software companies in Kathmandu during the pandemic. It encompasses a range of studies discussing the issues faced by these companies when implementing work-from-home practices. This section also incorporates research papers that directly relate to the thesis topic. It includes several research articles that have been carefully examined and evaluated. Additionally, the literature review identifies five foundational papers that have inspired the research ideas for the thesis.

7.1 OUT BREAK OF COVID-19 AND WORK FROM HOME CONCEPT: AN OVERVIEW

(Patanjali & Bhatta, 2022) found that the first case of COVID-19 was detected in Wuhan, China, in November 2019, and it was later declared a pandemic by the World Health Organization (WHO). This pandemic had a significant impact on both employees and organizations worldwide, leading many companies to adopt a work-from-home (WFH) culture. This research paper reviewed various studies and literature about how organizations were affected before and during the pandemic. It is one of the early papers to focus on the WFH culture during this period. The researchers conducted a survey among IT professionals from different countries to understand the impact of WFH. The study's findings revealed that several factors influenced employee performance while working from home, with a supportive work environment being a crucial factor affecting the WFH experience.

7.2 WORK FROM HOME HISOTRY AND CURRENT TREND IN GLOBAL CONTEXT

Jack Nilles, a scientist, was an early advocate of working from home in 1976, suggesting the use of phones and computers for remote work instead of going to the office. This concept became known as "work from home." With the ongoing COVID-19 pandemic, many

employees began working from home. A survey conducted in India by in 2020, focusing on IT professionals in software companies, found that most people preferred working from home. Interestingly, only 27% faced challenges, primarily related to network issues. Even before the pandemic, 70% of respondents had taken leaves to work from home, indicating a pre-existing interest in remote work. Furthermore, 83% expressed a strong desire to continue working from home. This survey underscores the importance of stable networks and effective communication for successful remote work.

8. THEORITICAL MODEL

This study employed two research methodologies: quantitative and qualitative research. It involved referencing 30 research publications during the dissertation process, including a thorough examination of frameworks like Technology Acceptance Model (TAM). The study identified study variables and proposed a conceptual model based on this research. To analyze the collected responses, the study used survey questionnaires and statistical tools, indicating a quantitative approach. The relationship between the research variables was assessed using a linear regression model. Data for this study were collected from IT professionals and engineers in different software companies located in the Kathmandu valley, Nepal. The data collection involved distributing surveys both online and offline to these respondents. The study surveyed 388 individuals who have experience working remotely from home or have worked in both office and home environments.

The acceptance of technology is crucial for those interested in learning new technologies, and it depends on several factors. An individual's attitude and interest are key factors in their willingness to adopt technology. To understand how users perceive and approach technology adoption, various diffusion and adoption theories are used. Two popular models for analyzing technology adoption are TAM and Unified Theory of Acceptance and Use of Technology (UTUAT). This study also focused on the TAM model to explain how individuals accept or reject technology.

8.1 TECHNOLOGY ACCEPTANCE MODEL

The Technology Acceptance Model, introduced by Davis in 1986, looks at two main factors: PU (Perceived Usefulness) and PEU (Perceived Ease of Use). PU focuses on how users see an Information System helping with their tasks and performance, while PEU is about how easy users find it to use the system. These factors influence whether users find a new technology suitable for them. TAM has been adapted and tested by different researchers to

predict how people will adopt technology, taking into account external factors that can influence their behavior. This model helps us understand why people embrace or reject new technologies.

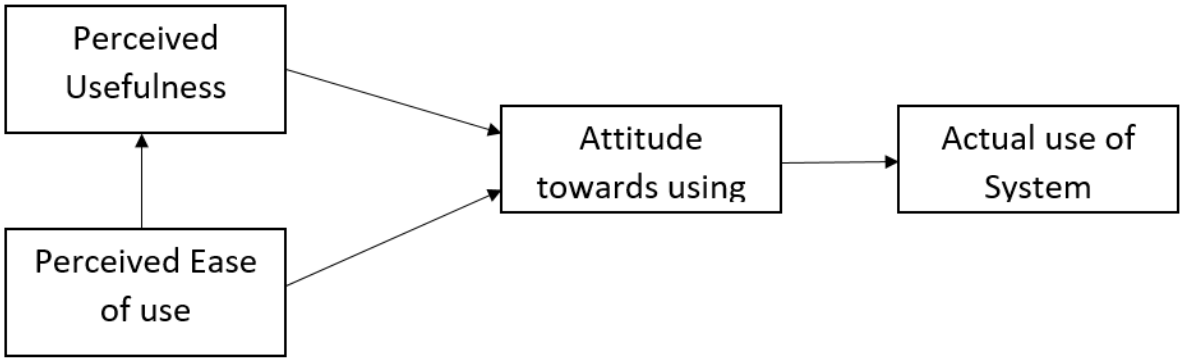

Figure 1 : Technology Acceptance Model

8.2 RESEARCH FRAMEWORK

The framework for the research contains both dependent and independent variables which affect technology adoption of work from home. The figure 2 depicts the research framework:

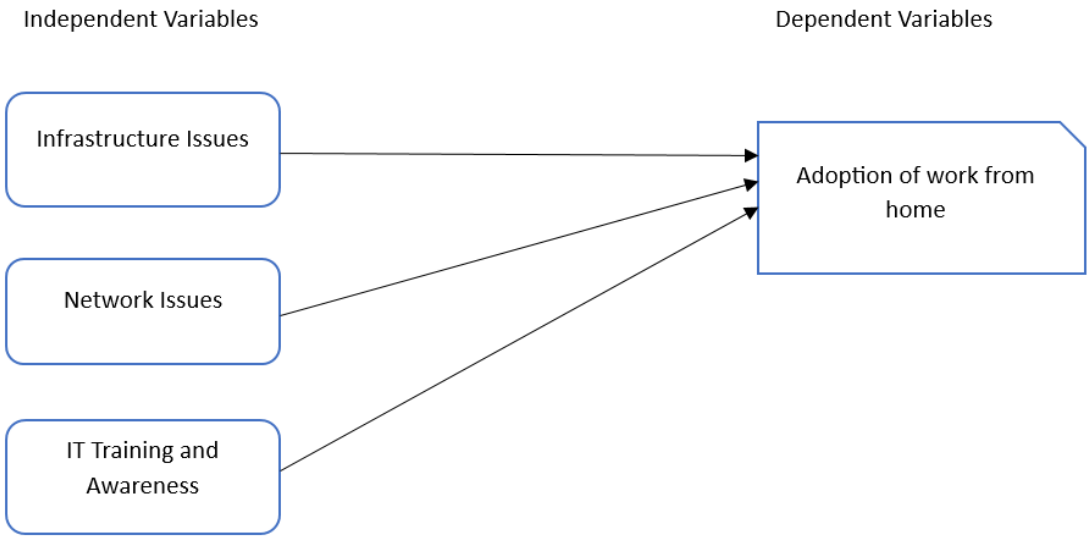

Figure 2: Research Framework

Independent Variables

The independent variables are the once which is not affected by other variables. For the research purpose, three variables has been identified as independent variables which are "infrastructure issues", "Network Issues" and "IT Training and awareness".

Dependent Variables

The dependent variable which is identified for the dissertation is "Adoption of work from home "

9. RESEARCH GAP

Very few research were found that discussed advantages and disadvantages of working from home in Nepal. Therefore there is an unmet need to conduct a research on pros and cons of introducing work from home culture in Nepal and the challenges that we could face while implementing work from home. This paper overcomes this gap and discusses on pros and cons of work from home, challenges that we could face and possible solution.

10 . DATA ANALYIS AND INTERPRETATION

The data analysis has been done for the related infrastructure, network and IT and Training I issues in context to software companies in Kathmandu. It also includes the necessary diagrams and charts for descriptive statistics. Likewise, reliability, descriptive, regression, ANOVA test has also been done which has helped to relation between the independents variables with dependent variable. The Data analysis done using SPSS. All the questions which are presented in the survey are mapped with their research objectives respectively. The questions which are included for the specific research objectives and provided with round off values for respective objectives of the research.

CRONBACH'S ALPHA RELIABILITY TEST (RELIABILITY TESTING)

The validity of the survey questions that were given to survey participants is also assessed through reliability testing. To determine the consistency of the chosen variables and the outcome received from the survey respondents, Cronbach's alpha testing was carried out. The alpha coefficient of reliability has a range of interpretations from 0 to 1. Given that values higher or lower than these are typically not recognized for uni-dimensional datasets, a reliable dataset should fall between 0.6 and 0.8. Tables 1-4 depict reliability statistics for each independent variable as well as an overall alpha coefficient for the responses gathered.

Table 1: Infrastructure issues adopting work from home

Case Processing Summary

		N	%
Cases	Valid	388	100.0
	Excluded[a]	0	.0
	Total	388	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.619	15

Table 2: IT and training while adopting work from home

Case Processing Summary

		N	%
Cases	Valid	388	100.0
	Excluded[a]	0	.0
	Total	388	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.854	11

Table 3: Network issues adopting work from home

Case Processing Summary

		N	%
Cases	Valid	388	100.0
	Excluded[a]	0	.0
	Total	388	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.754	8

Table 4: All variables reliability statistics

Case Processing Summary

		N	%
Cases	Valid	388	100.0
	Excluded[a]	0	.0
	Total	388	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.809	41

LINEAR REGRESSION ANALYSIS

The dependent variable value is constant term is ("AdoptTech") and all independent variables are ("InfraMean," "Network Mean," and "ITtrainingMean"). The coefficient for "InfraMean" is 0.176. Increase in the "InfraMean" independent variable, while holding all other variables constant. The coefficient is statistically significant (p = 0.034, < 0.05), which indicates that "InfraMean" has a significant positive impact on AdoptTech. The 95% confidence interval for the "InfraMean". The coefficient for "NetworkMean" is 0.160. Similar to "InfraMean," the coefficient for "NetworkMean" is statistically significant (p = 0.010, < 0.05). Therefore, "NetworkMean" also has a significant positive impact on "AdoptTech."

Table 5: Model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df 1	df 2	Sig. F Change
1	.214[a]	.046	.038	.751	.046	6.161	3	384	.000

a. Predictors: (Constant), ITtrainingMean, NetworkMean, InfraMean

Table 6: Analysis of variance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.437	3	3.479	6.161	.000[b]
	Residual	216.829	384	.565		
	Total	227.265	387			

a. Dependent Variable: AdoptTech

b. Predictors: (Constant), ITtrainingMean, NetworkMean, InfraMean

Table 7: Regression coefficients

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	3.365	.390		8.623	.000	2.598	4.133
InfraMean	.176	.083	.112	2.122	.034	.013	.339
NetworkMean	.160	.062	.137	2.587	.010	.038	.282
ITtrainingMean	.111	.056	.097	1.985	.048	.001	.222

a. Dependent Variable: AdoptTech

The coefficient for "ITtrainingMean" is 0.111. The coefficient is statistically significant ($p = 0.048$, < 0.05), suggesting that "ITtrainingMean" has a significant positive impact on "AdoptTech."

10. DISCUSSION AND FINDINGS

On the basis of statistical analysis, the results showcase Out of 388 respondents, the targeted audience were from the Software companies among with 91.8% of respondents had experience working from home during the pandemic and the remaining 8.2 % did not have experience working from remote during the pandemic from which wan deduce that 32 respondents either were new employees or from trainee group which started working only after pandemic. Hence we can anticipant that the result would be reliable for the dissertation as majority of respondents and working professional has experience in working home remotely during pandemic. According to the statistical analysis we can work. The availability of the logistics to adopt remote work seems to be good however there are still some concerns on network reliability due to low bandwidth internet services. The statistical analysis also shows that most of employees has positive relation with different IT and trainings awareness programs being conducted by software companies on regular basis which has helped them

better understand the policy and tools and has been able to experience ease in transition to work from home.

RQ1. Is there any significant relationship between the infrastructure hurdles faced by Tech Companies in Kathmandu while adopting work from home during pandemic situation?

The statistical analysis reveals a significant positive relationship ($p = 0.034, < 0.05$) between infrastructure challenges in software companies and the ease of transitioning to remote work during the pandemic. Factors such as hardware availability, technology setup, and software tool installation indicate that these companies are adequately supporting their employees with the necessary resources for remote work.

RQ2. Is there any significant relationship between Network issues faced by IT companies in Kathmandu valley while adopting culture of working from home during COVID-19 pandemic?

The statistical analysis shows a non-significant relationship ($p = 0.160, > 0.05$) between network issues in software companies and the ease of adopting remote work during the pandemic. However, frequent network problems were observed, emphasizing the need for stable connectivity, possibly through financial support or collaboration with ISPs to ensure productivity while working from home.

RQ3. Is there any significant relationship between conducting IT training and awareness generating programs in software companies will motivate startup companies to adopt work from home culture?

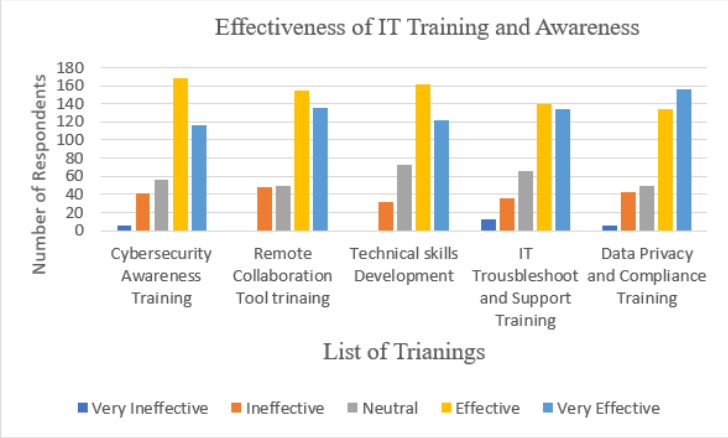

Figure 3 : Effectiveness of IT and Training Awareness

The statistical analysis ($p = 0.048, < 0.05$) highlights a significant positive relationship between IT training and awareness programs in software companies and the ease of remote work adoption during the pandemic. Surveying 388 respondents revealed their positive feedback on the effectiveness of such training, emphasizing the importance of conducting regular programs to empower employees for remote work and improve collaboration, security, and online practices.

Conceptual Framework

It demonstrates a conceptual model in order to ease work from home. The figure 4 shows various technical issues related to work from home and describes on the solution in order to ease work from home for IT professionals

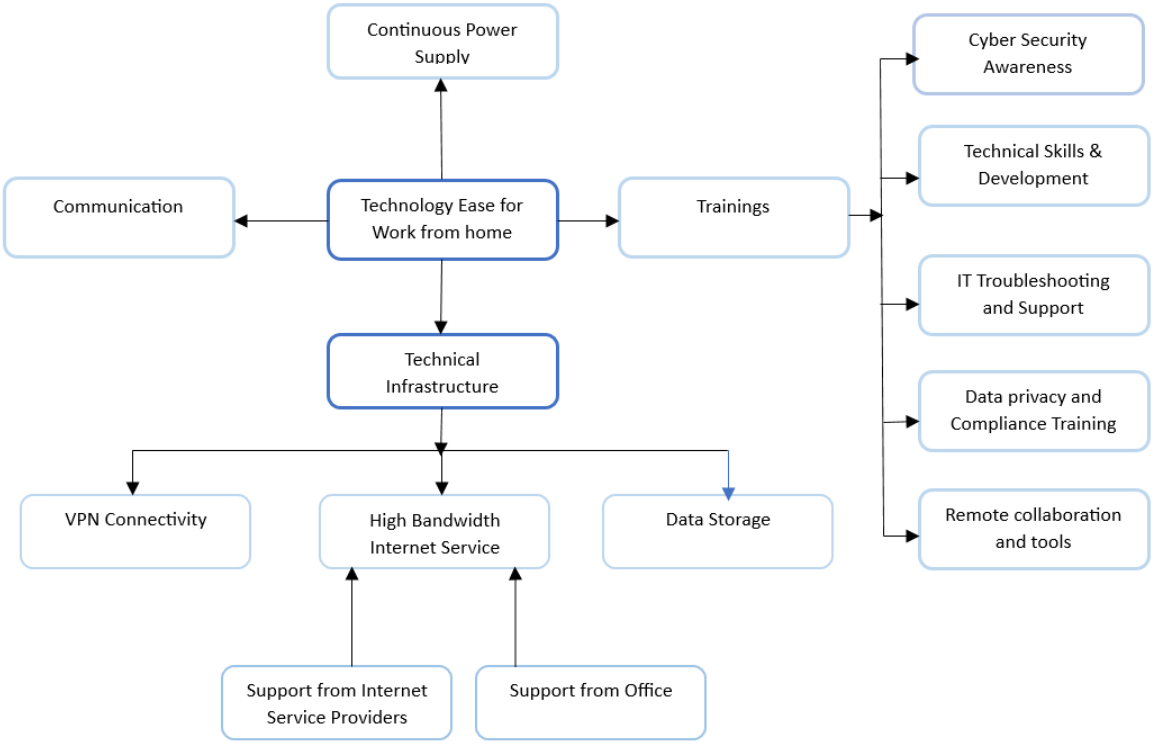

Figure 4 : Conceptual Framework

Internet Service Providers (ISPs) are crucial for reliable remote work connectivity, but in Nepal, users often face issues due to low bandwidth. ISPs should offer flexible plans and collaborate with software providers to optimize services for better remote work experiences. Having a robust technical infrastructure is crucial for enabling seamless remote work. A well-established infrastructure ensures that remote employees can access company resources, collaborate effectively, and maintain productivity. To enhance remote work, software companies can partner with ISPs to offer high-bandwidth internet during working hours. Additionally, providing financial support for employees to upgrade their home internet plans can improve the work-from-home experience. VPNs establish secure, encrypted connections to safeguard data and communications, crucial for privacy, especially on public Wi-Fi. They protect against hacking and unauthorized access. In Nepal, bandwidth remains a concern for software companies during remote work. Offering high bandwidth internet packages as part

of remote work policies and reimbursing employees for upgrading their home internet plans can address these connectivity issues. Using cloud services and CDNs like Dropbox, Google Drive, and AWS for software storage eases access, collaboration, and reduces local network strain, enabling faster access to resources. Training and awareness programs for remote employees are crucial for effective use of collaboration tools and software, enhancing productivity and adaptability in changing work environments.

12. CONCLUSION AND RECOMMENDATION

The overall dissertation work and has also included possible recommendations for software companies in order to ease the work from home challenges in the current scenario of today's work from home model. In order to adopt remote work in a better way, all the software companies can collectively work to provide improve technical barriers for adaptability of technology while working remotely

Based on the result of the survey response, most of the software companies in the Kathmandu has opted for remote work from home and has been continuing working from home model. Though work from home culture was a new concept during COVID-19 pandemic for software companies in Nepal, it has been widely gaining popularity in current scenario as IT professionals are swiftly adopting to different software and tools in order to adopt remote work. The availability of the logistics to adopt remote work seems to be good however there are still some concerns on network reliability due to low bandwidth internet services provided by Internet Service Providers. Hence providing support for high bandwidth Internet packages by Software companies can be included as a part of internet expenses for remote work policy for their employees. This could extend with providing reimbursements to employees for upgrading their home internet plans to higher bandwidth options. Further providing support on IT training and awareness programs to IT professionals are essential to remotely working employees for effectiveness of using collaboration tools and software. Proper training ensures that employees are maximizing the potential of available technology, enabling them to accomplish tasks more efficiently which will help them to improve on more productive and provide ease on transition to work from home. The statistical analysis also shows that most of employees has positive relation with different IT and training awareness programs being conducted by software companies on regular basis which has helped them better understand the policy and tools and has been able to experience ease in transition to work from home.

According to the statistics, there is some concern on cloud data storage which can be addressed using content delivery networks (CDNs) to distribute and ease the storage of software, reducing the strain on local connections such as using Dropbox, Google Drive, Microsoft OneDrive, or dedicated cloud platforms (AWS, Azure) providing easy access. Regular cyber security awareness training teaches employees to identify and avoid common cyber threats, including phishing and malicious attachments, enhancing overall security and incident reporting awareness. Topics covered include data protection, secure remote access, password security, and secure device usage. Technical skills and development training for remote workers enhances adaptability to new tools and software, keeping them updated with the latest technology and industry trends to minimize knowledge gaps. IT troubleshooting and support for remote workers ensures minimal downtime, faster issue resolution, and uninterrupted workflow by addressing technical problems encountered while working from home. Data privacy and compliance training for remote workers raises awareness about handling sensitive data securely and complying with regulations. It emphasizes responsible data handling and the use of approved tools, contributing to a smoother remote work experience while aligning with legal requirements. Training in remote collaboration and tools helps employees use these tools effectively for efficient communication, teamwork, and productivity in remote work settings, emphasizing security, version control, and technology utilization. It also promotes virtual team cohesion and a smooth transition to remote work. Frequent power disruptions can lead to data loss, interrupted communication, missed deadlines, and overall frustration**.** In order to ensure continuous power supply to ease remote work. Effective communication is crucial for remote work, fostering collaboration, feedback, and team connections, ultimately creating a productive and engaged remote work environment, while overcoming challenges.

RECOMMENDATIONS

In current scenario, though work from home has been swiftly being adopted by software companies within Kathmandu valley there are still some challenges that they need to overcome. The above research work highlights on different key challenges that software companies need to address it and also discusses on improvements and suggestions for smoother transition to work from home. The statistical also shows some concerns on network reliability. Below mentioned points are the suggestions for the dissertation:

- ISPs should offer flexible plans and options can cater to individual requirements. For this ISPs can work on providing a range of plans with varying speeds and

features, allowing users or software companies to choose the one that suits their work-from-home needs.

- To reduce traffic usage of internet during peak hours, ISPs can collaborate with software providers to optimize their services for smoother performance over their networks by providing high bandwidth internet packages to Software companies in order to improve remote work from home experience.
- Software companies collaborating with Internet Service Providers can be beneficial to the users. The companies can make arrangements and Partnership with ISPs to provide high bandwidth internet during working hours to improve work from home experience to the users working remotely.
- Provide financial assistance or reimbursements to employees for upgrading their home internet plans to higher bandwidth options would aid in remote work from home assistance program to the users.
- VPN creates a secure and encrypted connection between your device and the network you're connecting to. This is crucial for protecting sensitive data and communication, especially when using public Wi-Fi networks. VPNs ensure online activities are private and not easily accessible to hackers or unauthorized parties.
- Providing high bandwidth Internet packages by companies can be include as a part of internet expenses for remote work policy. This could extend with providing reimbursements to employees for upgrading their home internet plans to higher bandwidth options.
- Utilizing cloud services and content delivery networks (CDNs) to distribute and store software, reducing the strain on local connections such as using Dropbox, Google Drive, Microsoft OneDrive, or dedicated cloud platforms (AWS, Azure) to enable easy access and collaboration on files from anywhere. Cloud solutions provide scalability, automatic backups, and the ability to share large files without overloading email systems.
- IT trainings and awareness programs are essential to remotely working employees for effectiveness of using collaboration tools and software. Proper training ensures that employees are maximizing the potential of available technology, enabling them to accomplish tasks more efficiently.

- Skill Development trainings can also aid in building new skills and techniques easily, allowing them to work more proficiently and adapt to changing work environments and technology. The trainings are explained below in detail.
- Cyber Security Awareness Training for Data protection, secure remote access, password security, secure device usage, phishing defense, incident reporting etc.
- Technical Skills and Development training to quickly adapt to new technology. This training also ensures that remote workers are up-to-date with the latest tools, technologies, and industry trends, reducing knowledge gaps.
- IT troubleshooting and Support provides minimum downtime, faster resolution of issues and consistent workflow.
- Data Privacy and Compliance Training educates remote workers about the potential risks associated with handling sensitive data outside the office environment, making them more vigilant.
- Remote Collaboration and Tools Training employees can use remote collaboration tools proficiently, fostering efficient communication, teamwork,
- Continuous power supply: Frequent power disruptions can lead to data loss, interrupted communication, missed deadlines, and overall frustration**.** In order to ensure continuous power supply to ease remote work.
- Frequent communication and promoting n open feedback culture can encourage constructive feedback and discussions to improve remote work processes.

13. REFERENCES

Agrawal, S., De Smet, A., Lacroix, S., & Reich, A. (2020). To emerge stronger from the COVID-19 crisis, companies should start reskilling their workforces now. *McKinsey Insights (Issue May)*.

Al-Habaibeh, A., Watkins, M., Waried, K., & Javareshk, M. B. (2021). Challenges and opportunities of remotely working from home during Covid-19 pandemic. *Global Transitions*, *3*, 99–108.

Alzahrani, A. (2020). Coronavirus social engineering attacks: Issues and recommendations. *International Journal of Advanced Computer Science and Applications*, *11*(5).

Amankwah-Amoah, J., Khan, Z., Wood, G., & Knight, G. (2021). COVID-19 and digitalization: The great acceleration. *Journal of Business Research*, *136*, 602–611.

Ben-Zvi, T., & Luftman, J. (2022). Post-Pandemic IT: Digital Transformation and

Sustainability. *Sustainability*, *14*(22), 15275.

Borkovich, D. J., & Skovira, R. J. (2020). Working from home: Cybersecurity in the age of COVID-19. *Issues in Information Systems*, *21*(4).

Budnitz, H., & Tranos, E. (2022). Working from home and digital divides: resilience during the pandemic. *Annals of the American Association of Geographers*, *112*(4), 893–913.

Dey, B. L., Al-Karaghouli, W., & Muhammad, S. S. (2020). Adoption, adaptation, use and impact of information systems during pandemic time and beyond: Research and managerial implications. *Information Systems Management*, *37*(4), 298–302.

Faulds, D. J., & Raju, P. S. (2021). The work-from-home trend: An interview with Brian Kropp. *Business Horizons*, *64*(1), 29.

Ford, D., Storey, M.-A., Zimmermann, T., Bird, C., Jaffe, S., Maddila, C., Butler, J. L., Houck, B., & Nagappan, N. (2021). A tale of two cities: Software developers working from home during the covid-19 pandemic. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, *31*(2), 1–37.

Georgiadou, A., Mouzakitis, S., & Askounis, D. (2022). Working from home during COVID-19 crisis: a cyber security culture assessment survey. *Security Journal*, *35*(2), 486–505.

Gqoboka, H., Anakpo, G., & Mishi, S. (2022). Challenges Facing ICT Use during COVID-19 Pandemic: The Case of Small, Medium and Micro Enterprises in South Africa. *American Journal of Industrial and Business Management*, *12*(9), 1395–1401.

Hai, T. N., Van, Q. N., & Thi Tuyet, M. N. (2021). Digital transformation: Opportunities and challenges for leaders in the emerging countries in response to COVID-19 pandemic. *Emerging Science Journal*, *5*(1), 21–36.

Kamal, M., Aljohani, A., & Alanazi, E. (2020). IoT meets COVID-19: status, challenges, and opportunities. *ArXiv Preprint ArXiv:2007.12268*.

Khandelwal, M. (2020). Work from home: Meeting the change in workplace. *Research Reinforcement A Peer Reviewed International Refereed Journal*, *8*(1), 82–89.

Lai, J., & Widmar, N. O. (2021). Revisiting the digital divide in the COVID-19 era. *Applied Economic Perspectives and Policy*, *43*(1), 458–464.

McArthur, D. P., & Hong, J. (2023). Are slow internet connections limiting home working opportunities? *Travel Behaviour and Society*, *33*, 100629.

Morrison-Smith, S., & Ruiz, J. (2020). Challenges and barriers in virtual teams: a literature review. *SN Applied Sciences*, *2*, 1–33.

Ong, M. H. A., & Puteh, F. (2017). Quantitative data analysis: Choosing between SPSS, PLS, and AMOS in social science research. *International Interdisciplinary Journal of*

Scientific Research, *3*(1), 14–25.

Papagiannidis, S., Harris, J., & Morton, D. (2020). WHO led the digital transformation of your company? A reflection of IT related challenges during the pandemic. *International Journal of Information Management*, *55*, 102166.

Patanjali, S., & Bhatta, N. M. K. (2022). Work from home during the pandemic: The impact of organizational factors on the productivity of employees in the IT industry. *Vision*, 09722629221074137.

Pranggono, B., & Arabo, A. (2021). *Ford, Denae Storey, Margaret-Anne Zimmermann, Thomas Bird, Christian Jaffe, Sonia Maddila, Chandra Butler, Jenna L Houck, Brian Nagappan, Nachiappan*. Internet Technology Letters; Wiley Online Library.

Razif, M., Miraja, B. A., Persada, S. F., Nadlifatin, R., Belgiawan, P. F., Redi, A. A. N. P., & Shu-Chiang, L. (2020). Investigating the role of environmental concern and the unified theory of acceptance and use of technology on working from home technologies adoption during COVID-19. *Entrepreneurship and Sustainability Issues*, *8*(1), 795.

Savić, D. (2020). COVID-19 and work from home: Digital transformation of the workforce. *Grey Journal (TGJ)*, *16*(2), 101–104.

Suresh, M., & Gopakumar, K. (2021). Multi-grade fuzzy assessment framework for software professionals in work-from-home mode during and post-COVID-19 era. *Future Business Journal*, *7*(1), 10.

The impact of pandemic COVID-19 in workplace. (2020). *European Journal of Business and Management*, *12*(15), 1–10.

Tønnessen, Ø., Dhir, A., & Flåten, B.-T. (2021). Digital knowledge sharing and creative performance: Work from home during the COVID-19 pandemic. *Technological Forecasting and Social Change*, *170*, 120866.

van Zoonen, W., Sivunen, A., Blomqvist, K., Olsson, T., Ropponen, A., Henttonen, K., & Vartiainen, M. (2021). Factors influencing adjustment to remote work: Employees' initial responses to the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *18*(13), 6966.

Wang, L., & Alexander, C. A. (2021). Cyber security during the COVID-19 pandemic. *AIMS Electronics and Electrical Engineering*, *5*(2), 146–157.

Weil, T., & Murugesan, S. (2020). IT risk and resilience—Cybersecurity response to COVID-19. *IT Professional*, *22*(3), 4–10.

Yarberry, S., & Sims, C. (2021). The impact of COVID-19-prompted virtual/remote work environments on employees' career development: Social learning theory, belongingness,

and self-empowerment. *Advances in Developing Human Resources*, *23*(3), 237–252.

Savić, D. (2020). COVID-19 and work from home: Digital transformation of the workforce. *Grey Journal (TGJ)*, *16*(2), 101–104.