
Article

Virtual Team Adaptation: Management Perspective on Individual Differences

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Abstract: In the contemporary business world, digital transformations have undergone vast and important developments over the last several decades, and they have aided in the development of the virtual team concept, in which geographically dispersed team members work to achieve a common goal. Virtual teams, according to the literature, suffer from process losses more frequently than their face-to-face counterparts. Although just a few studies have looked at the effects of individual differences in virtual teams, this study fills in the gaps by examining the impact of individual differences: Age Disparity (AD), Gender Disparity (GD), Language Competency (LC), and IT Competency (ITC) in management perspective on virtual team adaptation in the Sri Lankan private sector. A survey was used to collect data from a sample of 175 private sector companies in Sri Lanka during the COVID- 19 pandemic, and the data was analyzed using partial least squares path modeling (PLS) to test the study's hypotheses. The results indicated that the hypotheses were statistically significant only in the language competency and IT competency and their effects were in the expected direction. Future research could benefit from perceptions of employees in public sector organizations.

Keywords: virtual team adaptation; individual differences; management perspective

1. Introduction

1.1. The Virtual Team Adaptation

Digital transformations have undergone massive and vital developments during the last several decades in the business world [1]. It has aided in the development of the virtual team concept, in which geographically scattered team members collaborate to achieve a common goal. A virtual team is not confined by physical organizational boundaries but relies on technology to communicate and collaborate successfully[2]. Because of ongoing technological advancements, the virtual team concept is growing in popularity, and substantial studies are being conducted in this field[3]. As a result of the world's constant search for new business strategies, the virtual team concept has emerged to leverage the knowledge of a geographically dispersed workforce [4]. Because there will be no face-to-face meetings, the virtual team conducts most of their contacts digitally. Virtual teams have great potential to boost organizational efficiency since they tend to break down space and time boundaries [5].

Globalization has resulted in a massive increase in virtual teams, which necessitates rapid product development, innovation, geographically distributed expertise, and improved networking collaborations [6]. According to Hoch and Dulebohn [27], virtual teams can be project-based or functional, as well as short-term or long-term. It's critical for businesses to understand the fundamental features of their virtual team members so that constraints may be discovered, and training can be arranged to address them [7]. Virtual teams, according to Gheni et al. [8], have a several advantages, including achieving economies of scale, improving productivity through flexibility in working cycles, attracting the best talent regardless of geographic location, accelerating innovative product

launches, and enhancing local knowledge and presence. E-learning, telework, virtual communities, virtual linkages, electronic marketplaces, and outsourcing or off-shoring are all examples of virtuality in the workplace[1].

1.2 Drawbacks of VTA

However, Lockwood [9] found that global virtual team adaptation faces many issues due to structural power inequalities, failure to fit with corporate values, professional identity conflicts, and fear of outsourcing. Furthermore, he stated that there was a lack of corporate training and development, cultural challenges, inferior technology, poor meeting skills, and poor leadership abilities in virtual team adaptation. Furthermore, factors such as real-time communication methods such as video conferencing, video chat, and other streaming chats have technology concerns such as significant transmission errors, delays, and turbulence that may also influence the ineffectiveness of virtual team [5]. Moreover, virtual team members have fewer interactions than face-to-face team members since there is less involvement [10]. Furthermore, ineffective work-life balance due to a huge number of meetings consuming personal time, poor consistency of effort due to limited interactions and connections between team members, limited adaptation due to real-time meeting timing constraints, and inaccurate information decision-making are all identified as common problems for global virtual teams by Daim et al. [10].

1.3 Sri Lankan context

As a result of the COVID-19 pandemic, many companies permitted their staff to work from home in accordance with local health restrictions [11]. Hence, many organizations must be adaptable and flexible in order to convert their existing teams into virtual teams [12]. According to the International Finance Corporation's [13] estimates, Covid-19 could cost Sri Lanka 6.7 percent of its total GDP, with serious consequences for individual and family well-being. Because the pandemic is not yet over and appears to be here to stay for another couple of years, Sri Lanka needs to promote remote working, or virtual teams. Furthermore, most businesses are already investing more in virtual technologies, and even after the COVID-19 pandemic, there will be a greater demand for virtual team practices, as well as more opportunities in the categories of working from home and remote working than ever before especially in private sector [14],[15].

1.4 Problem statement

Sri Lanka's growth rate in 2020 was 3.6 percent, according to the World Bank, which was the lowest performance in recent years due to the COVID-19 pandemic. According to Trading Economics, Sri Lanka had a little more than 8 million employed people in the fourth quarter of 2020. In Sri Lanka, the private sector employs the most people, accounting for 42.7 percent of the total [16]. On a worldwide scale, there are an increasing number of chances for Sri Lankans to work as virtual team members. Consequently, fostering digital literacy and empowering the workforce will be a solution to Sri Lanka's poor economic growth rate.

Despite the fact that numerous local and global researchers have discovered the value of virtual teams, many factors influence their successful implementation. According to Marlow et al. [17], it is better to study how individual differences of virtual team members can impact team communication and thus team performance as a prospective avenue for future research. Global research has revealed that there are issues with virtual team communication and performance due to individual differences such as age disparity [18], IT competency [19], language competency[6], [20]and gender disparity among team members [21]. However, in the Sri Lankan context, studies based on virtual team adaptation are few and far between. Hence, the present study investigates how these individual factors impact on Sri Lankan virtual team adaptation and what their implications are in the context of the Sri Lankan private sector.

2. Literature Review

2.1 Individual Differences affecting virtual team adaptation (VTA)

A significant aspect of this research is to examine, from the management perspective, how individual differences affect virtual team adaptation. Every team is made up of two or more people who have diverse natures. In order to obtain the intended outputs from a team, it is critical to build a synergistic understanding between team members [22], which is the same for a virtual team. Even though many factors have an effect on the effective nurturing of virtual teams, this study mainly focuses on the different characteristics of team members, such as biological and psychological patterns that team members have followed within the team that have bonded their ties. A successful virtual team requires effective relationships, which are shaped by the features of the team members [23]. Many researchers have examined various aspects of virtual team adaption based on the available literature. Individual characteristics, such as personality differences, have received less attention. As a result, the current study has filled in the gaps by presenting the management perspective on individual variations on virtual team performance. Hence, in the following section, there is a review of the literature under four variables: age disparities, gender disparities, language competency, and technological competency.

2.2 Age Disparities (AD)

According to Killingsworth et al. [24], age is a major factor in the surface-level diversity of the workforce. At present, the workforce is comprised of four generations, such as baby boomers, millennials, generations Y, and generations Z. Accordingly, Venkatesh and Morris [25], millennials are more comfortable working with virtual tools than prior generations. Individuals from the millennial generation are more likely than earlier generations to communicate favorably using virtual communication platforms. Cardon and Marshall [18] found that Gen Y professionals are more effective than prior generations when using social networking sites. Hence, H1 has developed,

H1: There is a significant impact of age disparities on virtual team adaptation.

2.3 Gender Disparities (GD)

The contradictory arguments introduced by numerous researchers in terms of gender disparity and performance in both local physical teams as well as virtual teams. Consequently, gender diversity was highlighted as a factor influencing virtual team effectiveness by Michailidou et al. [26], and females outperform males in online mixed-gender classes and have more positive attitudes toward team cooperation activities. While male workers make up the bulk of the workforce, female workers are on the rise. As a result, Venkatesh and Morris [25] demonstrated that gender plays an essential role in technology adoption.

However, when male virtual team members tend to be domineering, when virtual teams use asynchronous communication patterns, traditional male communication patterns are undermined. Female team members may prefer asynchronous communication since it allows them to convey their thoughts without being interrupted by others [21]. Females were shown to employ more verbal dialogue in virtual meetings than males [27]. According to Furumo et al. [26], female virtual team members convey their opinions in all formats of communication, including social, task, and coordinating. Females, on the other hand, tend to use more social communication to create bonds as the team progresses. Male members communicated less frequently and relied more on task-related performance [21]. Hence, the following hypotheses has been developed,

H2: There is a significant impact of gender disparities on virtual team adaptation.

2.4 Language Competency (LC)

Jimenez et al. [28] stressed the significance of a common language for virtual team members to communicate and share knowledge. They also demonstrated that virtual team members with less fluency in language skills may be excluded from conversations and their input value may be underestimated. Language differences can also harm team dynamics by causing social categorization and biases [29]. According to Tenzer, Pudelko, and Harzing [30], language differences among virtual team members reduced their trustworthiness and intention to trust, and they identified language barriers as a hurdle. As stated by Sas C [31], language dispersion is one of the characteristics of virtual or remote teams. Thus, the following hypothesis was derived:

H3: There is a significant impact of language competency on virtual team adaptation.

IT competency (ITC)

According to Marlow et al. [17], there is a paucity of academic interest in studying how certain virtual teams successfully grasp team adaptation while others fail to do otherwise. They discovered that people's comfort levels with technology and electronic tools varies, and that those who are more familiar with electronic tools are more likely to master team communication more effectively and rapidly. Virtual teams should be made up of members who are skilled at using interactive technology, working across time, location, organization, and culture while remaining sensitive to project and time constraints [32]. Also, you should be able to network. Culturally diverse teams, according to Gillam and Oppenheim [33], may have subcultures and multiple categories of values expressed by national cultural values. Members of virtual teams often rely on digital media, according to Krumm et al. [34], hence computer and media literacy has become a necessary competence. Hence, it is hypothesized that,

H4: There is a significant impact of IT competency on virtual team adaptation.

3. Study Design and Methods

3.1 Preliminary study

A preliminary study was carried out to investigate the private sector business environment in Sri Lanka and to determine the relevant concerns in selected key variables of the study. Six interviews with the managers of the private-sector companies and five interviews with the employees were conducted. This study particularly focused on the impact of individual differences on VTA in order to archive survival and growth in the post COVID-19 normal environment. The evidence from these interviews and informal discussions enriched the selected concepts in the present study.

3.2 The Sample, Study Variables, Questionnaire Design and Data Collection

Since this study focuses on examining the impact of individual differences on VTA from a management perspective, the managers who are currently working in Sri Lankan private sector organizations have been considered the target population. Hence, it constructed the survey questionnaire, and a total of 300 questionnaires were disseminated via Google Form among the managers who are working in a private-sector organization with prior experience in virtual teams. As a result, 183 questionnaires were collected (61 percent complete); however, due to eight incomplete questionnaires, only 175 (out of 183 questionnaires) could be used for the survey. As a result, the analysis considered a total of 175 usable surveys. In social science research, a response rate of 58 percent was considered acceptable by Hair et al. (2013).

A three-part structured questionnaire was employed in the investigation (i.e., Part 1 for background information on managers; Part 2 for individual differences; and Part 3 for

virtual team adaptation). The data was gathered between August 2021 and December 2022. The study's five components were operationalized as multi-item constructs. As a result, (1) age disparity adapted from Weingarten [35]; Wang, Akar, and Chen [36], (2) Gender disparity, which has three items adopted from Furumo and Michael Pearson[21]. Then (3) language competency consists of four items which have been adopted by Klitmller, Schneider, and Jonsen [29]. The six items of (4) IT competency have been adopted from studies by Klitmller, Schneider, and Jonsen [29]. Finally, five items of virtual team adaptation were supported by Marlow et al. [19]; Kim et al.[37]. All the variables were addressed by using a five-point Likert Scale ranging from "1 strongly disagree" to "5 strongly agree".

4. Results

4.1 Demographic analysis of the Sample

According to the survey which has exhibits in the table 2, males made up 60% of the sample, with females accounting for 40% of the managers, and 80% of the sample consisted of those aged 18–35 years, and 20% was represented by those aged 36–50 years. The majority (68%) of the managers have more than five years of experience, and 26% of the managers have more than 10 years of working experience. Furthermore, 77 percent of managers are educated and hold a bachelor's or master's degree, and those managers belong to more than ten sectors of the private sector in Sri Lanka.

Table 1. Demographic Analysis

Demographic data	No. of surveys	Percentage
Gender (Female)	70	40
Gender (Male)	105	60
Age (<25 years)	19	11
Age (26 - 30 years)	67	38
Age (31 - 35 years)	54	31
Age (36 - 40 years)	28	16
Age (> 40 years)	5	3
Work experience: (<1 year)	9	5
Work experience (1 - 5 years)	42	24
Work experience (5 - 10 years)	77	44
Work experience (10 - 15 years)	37	21
Work experience (> 5 year)	10	6
GCE A/L or Equivalent	5	3
Diploma	9	5
Advanced Diploma	18	10
Degree or Equivalent	96	55
Postgraduate Qualification	47	27
Sectors: Agriculture and Forestry	3.5	2
Banking, Insurance, and Financial Services	70	40
Industries (Mining, Manufacturing)	17.5	10
IT, ITES, KPM, and BPM Services	38.5	22
Services (Wholesale, Retail, Transportation)	45	26
Sample size	175	100

4.2 Evaluation of the Conceptual Model

The conceptual model was evaluated against the measurement model by evaluating the outer loadings of the items in the construct. The outer model of the conceptual framework consisted of the independent and dependent variables and their reflective

indicators, which were examined by the Composite Reliability (CR) and Average Variance Extracted (AVE). The threshold values are CR > 0.60 and AVE > 0.50[38], [39]. The final measurement items and outcomes of the measurement model, including standardized factor loadings, composite reliabilities, and average variance extracted, are shown in Table 3. This demonstrates that the indicators and their underlying constructs are valid, and the research constructs' composite reliability scores also show that the measuring model is reliable.

Table 2: Standardised Factor Loadings (t-value) and Composite Reliability/ AVE

	Constructs and Indicators	Standardised Factor Loadings (t-value)	Composite Reliability/ AVE
<i>Age Disparity(AD)</i>			0.698/0.538
	<ul style="list-style-type: none"> ▪ Generation X (Born 1965 - 1980) individuals have advanced virtual team adaptation knowledge and skills than individuals of the Baby Boomers generation. ▪ Generation Z (Born 1995 - 2010) individuals have advanced virtual team adaptation knowledge and skills than Generation Y individuals. 	<ul style="list-style-type: none"> ▪ Generation X (Born 1965 - 1980) individuals have advanced virtual team adaptation knowledge and skills than individuals of the Baby Boomers generation. ▪ Generation Z (Born 1995 - 2010) individuals have advanced virtual team adaptation knowledge and skills than Generation Y individuals. 	0.803 (2.057)
<i>Gender Disparity (GD)</i>			0.914/0.842
	<ul style="list-style-type: none"> ▪ Male/Female mix teams excel at virtual team adaptation than all male teams. ▪ Male/Female mix teams excel at virtual team adaptation than all female teams. 	<ul style="list-style-type: none"> ▪ Male/Female mix teams excel at virtual team adaptation than all male teams. ▪ Male/Female mix teams excel at virtual team adaptation than all female teams. 	0.969 (6.937)
<i>Language Competency (LC)</i>			0.857/0.667
	<ul style="list-style-type: none"> ▪ Common Language Proficiency (English) is vital for successful virtual team adaptation. ▪ Speaking only parent language (Sinhala or Tamil) is a barrier for effective virtual team adaptation. ▪ Speaks all 03 languages (Sinhala, Tamil, English) is important for effective virtual team adaptation. 	<ul style="list-style-type: none"> ▪ Common Language Proficiency (English) is vital for successful virtual team adaptation. ▪ Speaking only parent language (Sinhala or Tamil) is a barrier for effective virtual team adaptation. ▪ Speaks all 03 languages (Sinhala, Tamil, English) is important for effective virtual team adaptation. 	0.719 (5.947)
<i>IT Competency (ICT)</i>			0.785/0.549
	<ul style="list-style-type: none"> ▪ Knowledge about the functionalities of a medium is important for effective virtual team adaptation. ▪ Knowing how and when to use a medium is important for effective virtual team adaptation. 	<ul style="list-style-type: none"> ▪ Knowledge about the functionalities of a medium is important for effective virtual team adaptation. ▪ Knowing how and when to use a medium is important for effective virtual team adaptation. 	0.870 (15.774)
			0.789 (5.957)

	▪ Knowledge of using synchronous media (e.g., Video conference) is important for effective virtual team adaptation.	0.789 (4.934)
<i>Virtual team</i>		0.860/0.607
<i>Adaptation (VTA)</i>		
	▪ Effective virtual team adaptation leads to mutual respect when giving and receiving feelings.	0.753
	▪ Effective virtual team adaptation leads to improved problem-solving capability when decision making and conflict resolution.	0.818
	▪ Effective virtual team adaptation causing timely information sharing which leads to resolving issues quickly.	0.720
	▪ Effective virtual team adaptation leads to consistency of communication routine	0.821

4.3 Discriminant Validity of the Latent Variables

The discriminant validity of the latent variables was assessed using the method proposed by Fornell and Larcker [40]. The discriminant validity of each latent variable is shown in Table 4, in which the AVE derived from each construct is also shown in the diagonals. The square of correlations (R²) between constructs is shown in the other items in Table 4. The AVE of the specified construct is not exceeded by any non-diagonal entry.

The next approach to assessing discriminant validity is the Heterotrait – Monotrait ratio (HTMT) where the threshold value of 0.90 suggests a lack of discriminant validity [39]. All the values in the Table 4 are less than 0.90 and can be concluded no discrimination issues.

Table 3: Discriminant Validity of the Latent Variables – Fornell- Larcker Criterion and HTMT

Latent Variables	Fornell- Larcker Criterion					Heterotrait – Monotrait ratio (HTMT)				
	AD	GD	ITC	LC	VTA	AD	GD	ITC	LC	VTA
AD	0.734									
GD	-0.099	0.918				0.239				
ITC	0.138	0.082	0.817			0.539	0.145			
LC	0.028	0.224	0.238	0.741		0.794	0.348	0.379		
VTA	0.149	0.218	0.351	0.391	0.779	0.466	0.253	0.431	0.557	

Source: The survey data

4.4 Evaluation of the Structural Model

Once the measurement model results were confirmed, the structural model was analysed with the PLS-SEM algorithm in order to produce the values of the reflective and formative paths. The bootstrap procedure was applied to get the significant results of the path co-efficient (P-values). The significant relationships between the constructs are determined by the value of P, which is less than or equal to zero (5%; two- tailed test) and the empirical t-value is above 1.96 [39]. The structural model assessment procedure comprises of Collinearity issues with Variance Inflation Factor (VIF) which is followed by

the estimation of the Path Co-Efficient in the structural model and assessment of the R² which is 34%. The critical level of Collinearity is measured with a VIF value is above 5. The evaluated VIF values are tabulated in Table 5, and all the VIF values of dependent and independent variables are below the threshold value of 2. It can be concluded that there are no multicollinearity issues with this structural model. Only two paths (ITC-> VTA, 0.003<0.05 and LC->VTA, 0.001-> 0.05) of the final structural model were significant ($p < .05$) which are shown in the table 6.

Table 4: The Collinearity assessment is done with Variance Inflation Factor (VIF)

Table 5: The Path values of the Relationship

5. Discussion on Findings

Variables	VTA
AD	1.00328
GD	1.0674
ITC	1.0820
LC	1.1096

The analysis attempts to scrutinize the dimensionality of the individual differences constructs and to examine how the dimensions of these constructs impact virtual team adaptation. The results of the study confirmed the positive and significant impact of the

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Value
AD -> VTA	0.120	0.123	0.106	1.132	0.258
GD -> VTA	0.143	0.152	0.118	1.206	0.228
ITC -> VTA	0.253	0.279	0.101	2.503	0.003
LC -> VTA	0.295	0.313	0.092	3.210	0.001

language competency of team members on the virtual team adaptation in the private sector of Sri Lanka. Much of the existing literature is in line with the present findings. Accordingly, Lockwood [9] carried out similar analysis, underlining the importance of English as a lingua franca for corporate change and strategy. Language gaps, he added, can be a symptom of virtual team problems. According to a study conducted by Schulze and Krumm [34], virtual team members who do not have the necessary spoken or written language abilities may experience anxiety and panic. Collins et al. [8] stated that having a strong command of the English language is essential while working with worldwide virtual teams. Working in a multicultural virtual team is also extremely beneficial.

Further, the present study confirmed that the IT competency of team members has a statistically positive and significant impact on virtual team adaptation in the private sector of Sri Lanka. The findings of the numerous researchers and professionals are on par with the abovementioned outcome of the present study. According to Schulze and Krumm [34], computer-mediated communication competence (CMC competency) is critical for a powerful digital team. It also emphasizes knowing when and how to use specific media devices for collaboration and successful digital communication platforms. According to Gibbs, Sivunen, and Boyraz [7], technology use is a defining element of virtuality. As per the finding of Potter, Cooke, and Balthazard [41], having a high level of technological skill is critical for virtual team communication since it reduces the likelihood of only dominant

team members speaking up. According to Marlow et al. [17], certain virtual teams have better communication and understanding of their success since their members have the latest and most advanced technological knowledge.

Table 6: Evaluation of the Hypotheses

6. Theoretical Implications

Because of the COVID-19 outbreak, virtuality has become a contentious problem for the entire world. In the future, virtuality will be a deciding factor in the success of a business. This study made a significant theoretical contribution by studying previously

Relationship	Hypotheses	Path values (P<0.05)	Results
AD -> VTA	H1: There is a significant impact of age disparities on virtual team adaptation.	0.120 (0.252)	Rejected
GD-> VTA	H2: There is a significant impact of gender disparities on virtual team adaptation.	0.163 (0.211)	Rejected
LC-> VTA	H3: There is a significant impact of language competency on virtual team adaptation.	0.285 (0.018)	Accepted
ITC-> VTA	H4: There is a significant impact of IT competency on virtual team adaptation.	0.320 (0.000)	Accepted

untapped areas in the literature. According to the findings of this study, language competency and technical competency have an impact on virtual team adaptation. These findings may pave the way for future research into Sri Lankan virtual teams and how to improve their effectiveness. In addition, this research also highlighted new ways of thinking about traditional individual characteristics, including age and gender. Hence, there may be other factors to explore since these criteria have such a minor impact on virtual teams.

7. Practical Implications

In this study, language and technological competencies were found to have a significant impact on virtual team communication adaptation in this study. Sri Lanka's private sector employs 43 percent of the country's overall workforce, making it the country's largest industry [16]. Based on present trends, remote working, working from home, and worldwide virtual teams will be the buzzwords for Sri Lanka's future workforce [14]. As a result, private-sector companies must invest more in virtual technologies and provide up-to-date training sessions for their virtual workers to ensure that they are appropriately skilled in language and technology. Organizations must also prepare for the future virtual working style by implementing new technological developments, successful change management techniques, and business process improvement strategies, as well as establishing a flexible virtual working culture [14], [30]

The impact of language competence, particularly in the English language, is revealed by this study, as most organizations employ it as their primary language and are proficient with virtual technology. Because 20% of the workforce is concerned about losing their jobs in several traditional job areas, the government can develop a strategy of investing in students in schools and universities to develop these skills for the future workforce as well as the current workforce. This will prepare the workforce to operate as part of global virtual teams, both now and in the future, with the proper language competencies.

8. Limitations and Future Research

The first limitation identified in this study is the sample size. Due to the COVID-19 pandemic and inferential study, there was a time constraint on collecting the sample size recommended by the Anderson table. And also, this study has been completed within 3 months, and it would be better if this research could be converted into a longitudinal study, which allows adequate time for literature review and collecting data. And also, as per the data analysis, the adjusted R² is 323, which is a somewhat lower value. Therefore, it is better if there could be a literature review to identify more variables that would increase the adjusted R², which would better illustrate the proportion of independent variables explained by the dependent variable.

Regarding virtual teams in the Sri Lankan context, this research suggests several directions for future research. One future avenue would be to look into how virtual teams can improve communication to improve team performance, particularly with regard to the Sri Lankan virtual teams. Some virtual teams are high performers, which would be due to the communication techniques they use, which may lead to higher performance. This could be done in relation to certain sectors such as IT, ITES, banking, and even finance and HR support services.

Another future research avenue that sheds light due to this study is determining the challenges faced by Sri Lankan remote workers working for global virtual teams and the proposed solutions for these challenges. As explained in the practical implications section, this area would be highly important for Sri Lankan policymakers and the workforce.

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