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Understanding Virtuality: A Mixed Method Study Using Virtuality Index in Teams of Global Outsourcing Sector

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Abstract

In the light of ICT revolution, horizontal organizational structures and team-based work units have become more prevalent in global businesses and resulting rise of outsourcing industry. This study tested the extent of the virtuality of teams in Global Outsourcing Sector, and identified their virtual features using Virtuality Index and applying sequential Mixed-Method Research approach. Triangulation of findings generated composite set of virtuality features. Findings revealed that teams in the outsourcing sector are characterized as virtual teams having a significant extent of virtuality featuring workplace mobility, variety of practices, team distribution, interdependence, and ICT utilization, working across different time zones, dissolvable nature, resources pooling and knowledge sharing. This study lays a foundation for the researchers to begin their investigations with teams in outsourcing companies for further penetration of virtuality. Future researchers may simply carry out their investigations in

the global outsourcing sector with a clear assurance that they are in fact, virtual teams.

Introduction

The electronic revolution has changed businesses in various ways so that the old structure of organizations is not adaptable any more (Gibson & Gibbs, 2006). The high rate of globalization and rapid changes in the present world necessitate a business structure which can use these conditions in the best way. The new market needs a constant reaction and a continuous adaptation. It is one of the competitive indices. Those organizations are successful in the modern market, which can utilize modern experts, technology, and knowledge. Approaches such as minimizing, centralization, and re-engineering are of great value for the modern organization (Lurey & Raisinghani, 2000). In response to these changes, organizational systems, structures, and processes have to become more flexible and adaptive. Horizontal organizational structures and team-based work units have become more prevalent, and with advances in internet technology, there is an increasing emphasis on geographically distributed "virtual" teams as organizing units of work (Gilson et al, 2015).

In a global marketplace, more and more companies need international presence, therefore the need for creating virtual teams is widely acknowledged (Blaise, Bergiel, & Balsmeier, 2008). By dynamically allocating people to projects, based on expertise rather than location, organizations can assign the most qualified people to appropriate projects (Ropolyi, 2016).

Literature has granted ample space to defining virtuality. The term "virtual" primarily describes "a spectrum of

alternative concepts of future" (Stanney et al., 1998). Moreover, "virtual" can mean everything in a general sense, "potential new spaces, artificial data processing, and digital information medium" (Sandbothe, 2001). "Virtuality" defines space to create new identities similar to the real ones. Walsham (1994) believes that "virtuality" is a space where the alternative is reflected in the real world (Walsham, 1994). Explanation of the term "virtual" can be done from many perspectives of knowledge areas such as computer science or philosophy. Michael Heim defines the term "virtual" as "the possibility in the future but not now" (Heim, 1993). In the same way, Sotto defines virtuality as a sequence of "features that do not exist in reality, but are still there, having the ability to be found in reality" (Sotto, 1997). In all philosophical explanations, virtuality represents an event or entity that generates real effects, but is not actually real. And this philosophical approach is in line with today's approach concluding that the virtual organization is intangible, without borders and physical boundaries, but the structure consists of actual and traditional effects that are real. In an evolutionary sense, virtual organizations are considered to be extensions of the boundaries, structures and all the components that make up traditional organizations achieved through technological progress (Panteli & Chiasson, 2008).

With the global telecommunications infrastructure, liberalized policies and globalization, most of the European and US multinational companies outsource their non-key activities to countries like India, Sri Lanka Indonesia, and Bangladesh. Back-office functions, such as payroll and benefits administration, customer service, call center, and technical support, are just a few of the processes that the organizations of all sizes have been able to outsource to others who specialize in those areas (Bird & Ernst, 2009).

Most of the countries in the Asian region, including Sri Lanka, have emerged as the most preferred destination for Global Outsourcing Projects (Gunasekare, 2015). Within this industry, people work with multiple teams distributed over different geographical locations. They work across major time zone differences, across internal business units, and across cultures. Some participants in these teams may never meet face-to-face, yet they are working in effective teams. Although the functioning of outsourcing companies seems to be virtual by nature, researchers have not pursued more rigorous investigations to examine the virtuality of outsourcing sector teams. Thus, this study addresses this gap and examines the virtual nature of the teams of global outsourcing companies. This study will then be a baseline study for researchers who wish to embark on their studies of virtual teams in outsourcing sector. In addition to that, the findings are helpful for valid policy decisions in the outsourcing sector, since the study provides verification for virtuality in outsourcing sector teams.

The rest of the paper discusses the methodology adopted. Since the study follows the sequential mixed method approach, quantitative data analysis is presented followed by a qualitative data analysis. Thereafter, the main findings are presented and discussed. The paper concludes with a discussion on the implications of the findings and research areas for further inquiry and understanding.

Method

The working teams in the business process outsourcing companies were selected from fifteen outsourcing companies in Sri Lanka. 314 team members responded to the survey and fifteen team members participated in the in-depth interviews. The team members who participated in the survey were

excluded from the interviews at the qualitative stage, in order to strengthen the triangulation quality. The specific mixed-method design followed in this study is exploratory sequential mixed method design. Investigators using this paradigm are able to probe further into a dataset to understand its meaning and to use one method to verify findings stemming from the other method (Onwuegbuzie & Teddlie, 2003). Therefore, the study was carried out in two different stages; first the quantitative stage and then qualitative stage. Finally, the data were integrated to understand the virtuality nature better. Among the different virtuality models, virtuality index developed by Chudoba et al (2005) is used, since it has been validated and used in several situations (Maznevski & Chudoba, 2000; Cascio, 2000; Ale Ebrahim, Ahmed, & Taha, 2009). Using the concept of discontinuities, Chudoba et al (2005) proposed a virtuality index to assess how "virtual" a given setting is. The virtuality index is a tool to segment aspects of virtuality and their effects on any of the organizational variable (Chudoba et al., 2005). Chudoba et al., (2005) identified three dimensions of virtuality – team distribution, workplace mobility, and a variety of practices – that are overarching discontinuities with important implications for understanding how virtual an organization is. Further agreeing to the existing literature, virtuality index is the only instrument which is available, tested for validity and reliability, and used in many studies (Mei Lu et al.2006).

The three dimensions of virtuality index (VIR) (Mei Lu et al., 2006) are: i. Team distribution (TD) - the degree to which people work in teams that have people distributed over different geographies and time zones, relying upon collaboration technologies. ii. Workplace mobility (WM) - the degree to which employees work in environments other than regular offices, including different office sites, home, travel

routes, and places outside the workplace. iii. Variety of practices (VP) - the degree to which employees experience technology and work process diversity on their teams. This instrument also has 6 scales ranging from Never, Yearly, Quarterly, Monthly, Weekly and Daily.

Concurrent and convergent validity of these measures was established through factor analysis (Campbell & Fiske, 1959), and was found to be at an adequate level. Reliability of the factors was established through the coefficient alpha. For team distribution, workplace mobility and variety of practices the alphs values are 0.678, 0.765 and 0.948 respectively.

The sample size was 350 and the questionnaires returned were only 314. The response rate was 89.7 % which is considerably good. This rate is achieved due to the repetitive interaction with the virtual team members and many reminders for the survey responses.

Results

Quantitative phase

At the data screening process (Saunders, Lewis, & Thornhill, 2008) missing data were identified and treated in a way by using the median replacement method. The Kolmogorov-Smirnova test and the Shapiro-Wilk test were carried out to examine the normality of the two data sets. According to Hair et al. (2013) if the test is not non-significant ($p>0.05$) it tells that the distribution of the sample is normal. Since these tests were not significant it further confirms that the sample distribution is probably normal.

Table 3.1: Tests of Normality- Virtuality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Virtuality (VIR)	.154	314	.106	.958	314	.090
Team distribution (TD)	.329	314	.090	.769	314	.153
Work place mobility (WM)	.169	314	.067	.931	314	.265
Variety of Practices (VP)	.399	314	.082	.685	314	.087

a. Lilliefors Significance Correction

Source: Survey Data

Further, it was examined whether there is a multicollinearity problem in the analyses. Therefore, the variance inflation factors (VIFs) were calculated. As explained by Hair et.al (2013), maximum VIF values larger than 10 typically indicate severe multicollinearity. Even though some of these values are somewhat higher than desirable, this indicates that multicollinearity was not a major issue according to Hair et.al (2013). They pointed out,

> "*As a rule of thumb, if the VIF of a variable exceeds 10, that variable is said to be highly collinear and will pose a problem to regression analysis (Hair et al., 2013)*".

Thus, according to Table 3.2, the values of VIF do not signal the multicollinearity problem.

Table 3.2 Collinearity statistics - Virtuality

Model		Collinearity Statistics	
		Tolerance	VIF
1	TD	.977	1.024
	WM	.972	1.028
	VP	.992	1.008

a. Dependent Variable: VIR
Source: Survey Data

According to the study objectives following statistical techniques were used to analyse data and achieve the study objectives. Descriptive statistics of Team Distribution, Workplace mobility and Variety of places were calculated. Descriptive data analysis is important to make sense of the data and to summarize in some way, so that the reader has an idea of the typical values in the data, and to understand how they vary (Best & Kahn, 1998). Further in many studies, this is the first step, prior to more complex inferential analysis (Leo, 2012).

The two main types of descriptive statistics encountered in the study were measures of central tendency, (averages) and measures of dispersion. Table no 3.3 presents the descriptive statistics of virtuality.

Table 3.3: Descriptive Statistics – Virtuality

	N	Min	Max	Mean	Std. Dev.	Variance	Skewness			Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Test Stat	Statistic	Std. Error
TD	314	19.0	24.0	22.99	1.26	1.59	-.593	.138	-6.73	-.215	.274
WM	314	22.0	28.0	25.03	1.62	2.64	-.520	.138	-1.81	-.722	.274
VP	314	9.00	15.0	12.57	1.33	1.77	-.613	.138	4.507	.440	.274
VIR	314	53.0	66.0	60.60	2.67	7.14	-.510	.138	-3.65	.416	.274

Valid N (listwise)314
Source: Survey data

Descriptive data for the degree of virtuality and its three constructs are given in table 3.3. The overall virtuality index is skewed moderately to explain the high degree of virtuality since its skewness is between -.5 and −1 (SK = -.510) as indicated in Table 3.3. In observing the three dimensions of virtuality, they are almost in between -.5 and +.5 meaning that all the dimensions are moderately skewed toward medium degrees of virtuality. Data indicate that the virtual team members collaborated with people in different time zones and people who they never met face to face via Internet-based conferencing applications on a daily and weekly basis. However, team members collaborated with people who spoke different native languages, less frequently (on a monthly, quarterly, or even longer basis).

Workplace mobility was also moderately skewed toward high degrees of virtuality with skewness between -.5 to + 0.5 less than -1, (SK = -.520). Virtual team members worked at different sites and with mobile devices on a daily and weekly basis, but they had fewer frequent professional interactions with people from outside the company or working time while

traveling or at home during normal business days (on a monthly, quarterly, or even longer basis).

Variety of practices was moderately skewed with skewness value less than -1 (SK = -.613). Other than working with teams that had different ways to track their work on a daily or weekly basis, team member replacement was less frequent. Team members also worked less frequently with people who used different collaboration technologies (on a monthly, quarterly, or even longer basis).

To see the skewness of the population (Rose, Spinks, & Canhoto, 2015) the test statistic was calculated. Bryman & Cramer (1997) suggest that the critical value of test statistic (Z_{g1}) is approximately 2. (This is a two-tailed test of skewness $\neq 0$ at roughly the 0.05 significance level.) Accordingly, if $Z_{g1} < -2$, the population is very likely skewed negatively. And the test statistic of this study shows -3.69 to infer the population skewness as negatively skewed. It confirms the moderately high virtuality of the population.

Initially, the factorability of the 12 item virtuality scale was examined. At first, 08 of the 12 items were loaded above 0.5 with at least one other item, suggesting reasonable factorability. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.604, above the recommended value of 0.6, and Bartlett's test of sphericity was significant. But it was unable to get a simple structure. During several steps, a total of four items were eliminated because they did not contribute to a simple factor structure and failed to meet minimum criteria of having a primary factor loading of 0.5 or above and no cross-loadings. The three-factor solution was arrived deleting items 2, 5, 6 and 7.

The three-factor solution satisfied all the criteria suggesting KMO measure of sampling adequacy was 0.698 and Bartlett's Test of Sphericity also significant (Table 3.4). The

communalities were all above 0.3, further confirming that each item shared some common variance with other items. The scree plot proposed three factors as well (Figure 3.1).

Table 3.4: KMO and Bartlett's Test- Virtuality

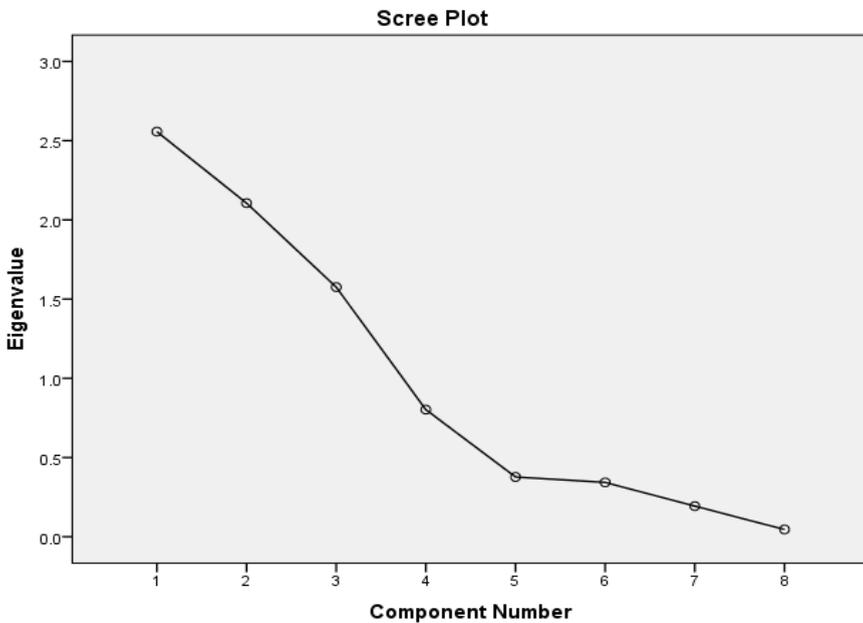| Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.698
Bartlett's Test of Sphericity	Approx. Chi-Square	1500.164
	df	24
	Sig.	.000

Source: Survey Data

Figure 3.1 Scree Plot- Virtuality
Source: Survey Data

Analysis of the total sample yielded only three clear interpretable factors of virtuality (Table 3.5). The first factor contained three items (item loading ranging from .918 to .857), the second factor contained two items (item loading ranging from .984 to .981) and the third factor had three items (items ranging from .865 to .537).

Table 3.5: Rotated Component Matrix[a]

	Component		
Items	1	2	3
10.VP1 Work on projects that have changing team members	.918		
12.Vp3 Work with people that use different collaboration technologies	.894		
11.VP2 Work with teams that have different ways to track their work	.857		
9.WPM5 Work while traveling, for example, at airports or hotels		.984	
8.WPM4 Work at home during normal business days		.981	
4.TD4 Collaborate with people who speak different native languages or dialects than your own			.865
3.TD3 Collaborate with people you have never met face-to-face			.836
1.TD1 Collaborate with people in different time zones			.537
Reliability Statistics Cronbach's Alpha	.877	.974	.628

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 5 iterations.
Source: Survey Data

The eigen values were 2.55 (factor 1), 2.10 (factor 2) and 1.57 explaining 77.97 percent of the total variance. Each of the three factors represented a subscale measuring the dimensions of virtuality. The reliability coefficients for these subscales are

presented in table 4.13. Internal consistency for each of the factors was examined using Cronbach's alpha. The alphas were .877 for variety of practices (3 items) .977 for workplace mobility (2 items) and .628 for team distribution (3 items).

After examination of the factor structure, the factors were rationally named. In table 3.6 the captured factors were given with the identified names.

Table 3.6: Naming the Factors - Virtuality

Variety of Practices
Work on projects that have changing team members
Work with people that use different collaboration technologies
Work with teams that have different ways to track their work
Work Place Mobility
Work while traveling, for example, at airports or hotels
Work at home during normal business days
Team Distribution
Collaborate with people who speak different native languages or dialects than your own
Collaborate with people you have never met face-to-face
Collaborate with people in different time zones

Source: Survey Data

The factor labels proposed by Chudoba et al., 2005 were well suited to the extracted factors and were retained. But four items were deleted from the original scale based on the responses given by the team members of Sri Lankan BPO industry.

Qualitative Phase

The qualitative data collected through in-depth interviews and focused group interviews based on virtuality index (Chudoba et al., 2005) was analysed to understand the extent of virtuality

in teams in global outsourcing companies. The themes generated via the interview data were presented in table 4.20.

Table 3.7: Common Themes of Virtuality

Themes	Words captured in the interviews
Interdependence.	Cooperation, teamwork, each other, sequential tasks,
ICT utilization	Having Video conference, collaborative software, Internet systems, emails, voice mail. Online, databases.
Geographical dispersion	Remote reporting relationships, being at multiple locations, functionally distributed, job mobility and flexibility, work some part of the week at home,
Working across different time zones.	Members are across multiple time zones, time difference is the major concern, work around the clock
Dissolvable Nature.	Partners may dissolve, move on to new partnerships and teams, movement to another project.
Resources Pooling and Knowledge sharing.	Complement each other by pooling, sharing, and reallocating the resources, dependence on one another, participation in sharing, highly cooperative, facilitates to share knowledge and experience.

Source: Interview Data

The team members described their way of working in these teams, nature of their work environment, etc., in response to the

questions they were posed. All together six themes were captured. They are Interdependence, ICT utilization, Geographical dispersion, working across different time zones, Dissolvable Nature and Resources pooling and knowledge sharing. These virtuality characteristics were observed as common virtuality characteristics in the outsourcing companies.

The concept of interdependence in teams involves cooperation and collaboration between participants in these virtual teams. While sharing skills and information, each member dedicates his/her own contribution to the common goal of customer fulfilments. This results in greater equality in the member relationship. Further, it is a sequential task arrangement in which each member of the group has his/her own task contributions that certainly affect the performance of the other group. Each member has unified skills and corporation which determine each other's work accomplishments as well as the group performance.

With ICT evolvement, the office uses information technology like desktop videoconferencing, collaborative software, and intranet systems to enhance the flow of information among team members. As a result, members can reach one another between different geographically dispersed locations. E-mail is the most frequently used tool by all teams. Per a day, as an average 8-15 emails transactions were taken place. Frequently the return mail is also quick. Responses are limited only to the inquiry. Personal telephone call is another most frequently used tool. Possibly due to cost factor, personal calls also limited only to the matter inquired. Voice mail is used when the personal calls are not connected or the individual is not available. Fax and group telephone conference, standard/express mail delivery, shared databases/groupware are probably used instances when it is unable to utilize other

communication vehicles; maybe a most efficient and cost-effective way to share business information due to the difference in time zones. Videoconference although used on average once a month. It is more prominently used by transnational teams, maybe a most efficient and cost-effective way to share business information with other team members through ''simulated face-to-face interactions''. Other than these tools, represented either on-line data/voice chat technologies or other miscellaneous technology to exchange business information is used by transnational teams, when other communication vehicles are not sufficient; may be perceived as an efficient and cost-effective way to share business information.

Since ICT is a primary communication means, work location is no longer of significance. Innovative technologies have enabled collaboration independently of place or time, and provided connectivity between each other. Being at multiple locations, the team members are functionally distributed, so that the teams are spread across different places. Remote reporting relationships are growing, where some of the employees work in locations different from their managers. Many jobs within these companies do not require employees to come to the workplace, while increasing job mobility and flexibility. Increasingly, people work some part of the week at home, and so it is extremely common for work meetings to occur over the telephone.

Since the team members are at different locations, teams face more complexity when members are across multiple time zones, in large part because of increased difficulties in scheduling and coordinating work activities. The team members are sometimes functioning at far beyond the company, maybe out of the country. In connecting with them the time difference is the major concern. The work tradition of

the outsourcing industry is to work around the clock since it needs to meet the challenge of working across different time zones. In the longitudinal case study of three global virtual teams Maznevski & Chudoba (2000) illustrated the importance of establishing a predictable rhythm of communication exchanges, which becomes increasingly challenging when team membership encompasses different time zones (Kanawattanachai & Yoo, 2002; Yoo & Alavi, 2004).

The team represents the alignment among the partners who aim at a common goal. Naturally, once the objective has been achieved or the opportunity has been exploited, partners may dissolve and move on to new partnerships and teams. In this movement, the team's task is the main priority. The membership sometimes may be different, but the members are known to each other since every one represents the same company.

Participants within a team, complement each other by pooling, sharing, and reallocating the resources since they have realized their strong dependence on one another and the continued participation in the network also necessitates this sharing. The organizational culture reflects highly cooperative, which facilitates the team members to share knowledge and experience among each other to achieve the team goals.

Discussion and Conclusion

The study analysed and triangulated the quantitative survey data collected using virtuality index (Chudoba et al., 2005) and qualitative data collected via in-depth interviews and focused group interviews. The study found that the extent of virtuality in teams of global outsourcing industry is significantly high. It was shown in the analysis of descriptive statistics of virtuality data. The overall virtuality index is skewed left and showed

negative skewness, explaining the high degrees of virtuality. Finally, the qualitative data also showed supportive evidence to conclude that the extent of the virtuality of teams in outsourcing companies is high. The outsourcing work environment, having workplace mobility, variety of practices and team distribution shows more virtual features. Most of the respondents were of the view that their working environment consists of virtual characteristics like interdependence, ICT utilization, and geographical dispersion, working across different time zones, dissolvable nature, resources pooling, and knowledge sharing. This showed that the qualitative findings identified a few more special characteristics. Hence teams in global outsourcing sector can be characterized as virtual teams having a significant extent of virtuality.

This finding is aligned with the findings of May and Carter (2001) in their case study of virtual teams working in the European automotive industry. They have shown that enhanced communication and collaboration between geographically distributed engineers at an automotive manufacturer and supplier sites are characterized in these teams and these teams contribute to better quality, reduced costs and a reduction in the time-to-market (Ale Ebrahim, Ahmed, & Taha, 2009). Further, a study of Indian BPO companies explained that the firms that handle a host of back-office work which includes responding to credit card inquiries, preparation of invoices, payrolls, cheques, reconciliation of daily accounts, writing medical transcriptions, processing applications, billings, and collections extend their services with a highly virtual environment (Swadesin & Kalindi, 2012). 99 out of the Fortune 100 companies use VMware virtualization technology to power their data centres which are in the outsourcing industry (Bird & Ernst, 2009). Based on the case study, Chou explored how knowledge sharing communication

style, interpersonal trust, team interaction, geographical dispersion, workplace mobility, and technology have serious influences on virtual teamwork in this sector. (Chou, 2012).

There are number of implications of this study. This study proposes, the extent of virtuality in teams in the outsourcing sector. The contextual characteristics of teams in outsourcing companies and the way how the team members work within their teams have been widely discussed. This may be a supportive step for the major player of outsourcing teams, in making a variety of team decisions. Verification of virtuality of teams of the global outsourcing sector further confirms the virtuality assumption of these teams. This lays a foundation for the researchers to begin their investigations with teams in outsourcing companies as virtual teams. There are some limitations in this study in terms of collecting data via interviews. Most of the interviews were taken outside places since these outsourcing companies did not permit strangers even to enter into the workplaces. Information is highly restricted and private communications were not allowed in these companies. The findings of this study do not claim to be exhaustive. It is hoped that the findings are a fruitful and helpful basis for further penetration of virtual teams. However future researchers may simply carry out their investigations in the global outsourcing sector with a clear assurance that they are, in fact, virtual teams.

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