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The Effectiveness of Collaboration Tools on Virtual Project Management

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Abstract

The purpose of this research is to identify the relationship and effectiveness between collaboration tools and virtual project management. As a consequence, in a today's economy and emerging markets the need for the virtual teams and virtual project management is overseen by many organizations for financial, management and strategic reasons. The research covers different type of virtual teams, meetings and collaboration platforms. The study conducted with small size organizations operating in virtual environment. In this paper the statistical analysis is performed to study dependency of the collaboration tools on the disruptions in project management processes, usage for social networking and level of data management.

Keywords: Collaboration Tools, Project Management, Virtual Project Management, Virtual Teams,

INTRODUCTION

Virtual teams have been characterized as group of the individuals who are located in different geographic locations, utilizing electronic correspondence to cooperate and achieve common objectives [1]. The need for the virtual teams and virtual project management is explained with different variables. A staff that may need to adjust work with family responsibilities; financial benefits to work offsite; associated travel cost and business meetings; skilled and practical innovation can help make collaborated effort far less demanding. The technological advantage makes virtual teams groups to work on collaborative projects [2].

The difference between virtual teams and physical teams are highlighted in the research study by Berry [3]. In study it is explained that virtual team interactions can be divided into four categories:

1) Same time and same place interaction. Considers the meetings similar to face-to-face meetings, but with the use of telecommunication and technology services (ex: e-mail across the department).
2) Same time, but different place interaction. Consider the use of instant messaging applications.
3) Different time and same place interaction. Consider the use of dedicated collaborative platforms in the same working environment.
4) Different time and different place interaction. Considers the use and exchange of e-mail communications.

The division indicates that almost any team is virtual at some limits.

According to Curlee [4], virtual projects are the projects that 50% of the teams members reside in the different geographic location. Team members are dependent on the technology and communication platforms to collaborate, which is never seen in face-to-face meetings.

The success of the organization and project management depends on the ability of the organization to supply its employees with the necessary tools for the collective collaboration. The successful project management factors have different perceptions by different stakeholders [5]. In the study by Kanawattanachai [6], the findings revealed that knowledge management, coordination and communication directly impacts on the virtual team performance. As we are examining the breakdown of collaborations, we have to understand that collaboration contains communication in project teams. A framework developed by PMI (Project Management Institute) contains specific section related to the communications. According to the Project Management Body of Knowledge (PMBOK), the communication guidelines consist from communication planning, information distribution, performance reporting and administrative close [7]. Communications planning included the defining the information and communication requirements of the stakeholders. Information distribution includes the availability of the information to the stakeholders. Performance reporting considers status reporting, forecasting and progress performance evaluation. Administrative closure considers criteria for the project completion.

RESEARCH HYPOTHESES

The scope of the research hypotheses considers the project managers and members in small organizations (up to 50 employees) [8] from India, Bangladesh, Serbia, Germany and

the US. The members are not limited to departments and considered to be partially distributed teams. The organizations are not limited to project management experts, but may consider the presence of project manager in team. The industry is not limited to IT, but may consider the any type that uses collaboration tools. From the readings and findings, following hypotheses have been formulated.

1. **$H1_0$: ρ=0, there is no relationship between usage of collaboration tools and disruption in project management processes**

   $H1_A$: ρ≠0, there is relationship between usage of collaboration tools and disruption in project management processes

There is consideration that stakeholders might misuse collaboration tools for their personal life and work. They might mix the formal and informal communication methods with the availability of such platforms. Such activities may disrupt project management processes in any of the five phases of project management [7]. The phases considered as initiation, planning, execution, monitoring and closing. To test the relationship, I will interview subjects with close-ended questions. The questionnaire will consider the ordinal type of variables related to the usage of collaboration tools and disruption in project management processes. To investigate the relationship between two variables, statistical analysis was performed.

2. **$H2_0$: ρ=0, there is no relationship between usage of collaboration tools and difficulty on data management**

   $H2_A$: ρ≠0, there is relationship between usage of collaboration tools and difficulty on data management

Collaboration tools tend to provide an infrastructure to easily share information. The issues arise from security concerns on classified files to data management. To test the relationship, I will interview subjects with close-ended questions. The questionnaire will consider the ordinal type of variables related to the usage of collaboration tools and difficulty level of data management. To investigate the relationship between two variables, statistical analysis is performed.

3. **$H3_0$: ρ=0, there is no relationship between usage of collaboration tools and decrease in productivity of human resources**

   $H3_A$: ρ≠0, there is no relationship between usage collaboration tools and decrease in productivity of human resources

Collaboration tools provide an ability of holistic view of the project overview. This opens an opportunities to switch between tasks and update the progress. Therefore, it reduces virtual team members' productivity as it may interrupt working sessions. It should be highlighted that stakeholders might misuse collaboration tools for their personal life and work. They might mix the formal and informal communication methods with the availability of such platforms. To test this, the project members are interviewed with close-ended questions. The questionnaire considers the ordinal type of variables related to the usage of collaboration tools and decrease in productivity of human resources. To investigate the relationship between two variables, statistical analysis is performed.

4. **H4: The odds that collaborative tools create disruptions in project management processes are high**
5. **H5: The odds that collaborative tools are used for social networking are high**
6. **H6: the odds that collaborative tools create difficulty on data management are high**

   The test hypotheses 4,5 and 6, the ordinal logistics regression is performed.

BACKGROUND AND SIGNIFICANCE

A. Literature Review

Collaborative frameworks and services consist from voice and videoconferencing to collaboration platforms. This set of tools empowers and increase business productivity and operations. It allows workers to effectively exchange data around themselves, customers and business stakeholders. The team members gain access to the variety services thru different devices: cell phones, tablets, PCs, and laptops. In addition, the members are utilizing their own particular devices to gain access to these services. According to Forrester Research [9], collaboration services market was about $42 billion in 2012 and estimated around $80 billion by 2018. About the large portion of the organizations overviewed to accept that the mobile devices are best suited for entertainment services, while almost two-thirds accept that the PC is best suited for benefit, joint effort and email. The study affirmed that cell phones and tablets are progressively seen as the viable solutions in the coordinated effort stages. Moreover, 20% to 30% of firms evaluated these mechanisms as best suited for collaboration. The Forrester Research identifies five types of collaboration services [9]:

1) Self-managed services consider that the end client claims and deals with the whole system including development and maintenance and doesn't rely on the external suppliers.
2) Managed services consider that the end client uses external service provider to manage the collaboration services. The client leases and owns and hardware and software on its premises.

3) Hosted services consider that the client uses external providers to manage the collaboration services. The client leases and owns the hardware and software on provider's premises. The hosted services have an advantage over the cloud since the end client may be improve its security and performance features [10].

4) Cloud services consider that the end client uses external providers to deliver the solutions. The external provider owns complete infrastructure and leases it to the end client. The end clients are progressively looking to replace their existing platforms with cloud-based Software-as-a-Service (SaaS) solutions. SaaS empowers business change and makes organizations more responsive by permitting workers to effectively manage data around themselves.

5) Outsourced services consider that the end client uses external providers to manage entire infrastructure.

The findings reveal that there is a market opportunity and business demand for the virtual project management. There are different types of virtual teams. In relevance to it, there are different types of collaborative models for virtual teams. In addition, there is an impact on performance on virtual project teams from knowledge management to communication perspective. Therefore, there are concerns on effectiveness of collaboration tools on virtual project management. The purpose of this research is to identify the relationship and effectiveness between collaboration tools and virtual project management.

B. Statement of the problem

The progress in Information Technology is pervasive and tremendous. Consistently technology is developed quicker with transforming paces, faster and sophisticated solutions, greater information sets, and software that is more exceptional. The methods for virtual team collaboration, knowledge sharing and working together tends to be more enriched and empowered [11]. The trend for virtual team collaboration is increasing due to the shift of nature of the businesses, outsourcing and associated business costs in specific geographic locations [12].

With the increasing number of virtual teams, the demand of the virtual project management is increasing respectively. The associated risk [13] of virtual teams falls into the need of assessment of the communication management [14], knowledge management [15] and collaboration tools [14]. Collaborative tools and frameworks make simple to share the information and the knowledge. This advantage might be risky in sharing classified data. In addition, there is frequently no clear owner of originated information produced through collaborative tools and no guarantee of data disposal. These issues create potential cost associated problems of duplicating and federating the data [16]. The acquisition of the technology or solution may bring business competitive advantage or create a burden with an avoidable costs [17]. To assess the perceived use of collaboration tools, project managers have to escalate the importance of effectiveness of the collaboration tools on virtual project management.

In order to evaluate this, it is required to performance a statistical analysis to study the relationship between the usage of collaboration tools and its effectiveness.

RESEARCH DESIGN

A. Research Questions

Research Question 1: Is there a relationship between usage of collaboration tools and disruption in project management processes?

To answer this question, I interviewed subjects with the close-ended questions. The questionnaire considering the ordinal type of variables related to the usage of collaboration tools and disruption in project management processes. To investigate the relationship between two variables, statistical analysis is performed by using Spearman's correlation coefficient.

Research Question 2: Is there a relationship between usage collaboration tools and data management?

To answer this question, I interviewed subjects with the close-ended questions. The questionnaire considers the ordinal type of variables related to the usage of collaboration tools and difficulty level of data management. To investigate the relationship between two variables, statistical analysis is performed by using Spearman's correlation coefficient.

Research Question 3: Is there a relationship between usage of collaboration tools and decrease in productivity of human resources?

To answer this question, participants were interviewed with the close-ended questions. The questionnaire considers the ordinal type of variables related to the usage of collaboration tools and difficulty level of data management. To investigate the relationship between two variables, statistical analysis performing by using Spearman's correlation coefficient.

Research Questions 4: What are the odds that collaboration tools disrupt project management processes, create difficulty on data management and used for social networking?

To answer this question, the statistical analysis is performed by using ordinal logistic regression. The dependent variable considering to be frequency of usage of collaborative tools and independents are: frequency of using tools for social networking, frequency of incidents occurring in project management processes, and level of difficulty to manage the data.

B. Research Method

The primary method considering semi-structured interviews with close-ended questions. The purpose of close-ended questions is for data coding and processing. The ordinal type of variables are categorized and coded as following:

T**able 1.** Processed Variable types and value definition for close-ended questions interview

Variable	Value
Frequency of usage of collaboration tools per project	1 – "Rare"
	2 – "Often"
	3 – "Very Often"
	4 – "Always"
Frequency of incidents reported in project management processes	0 – "Never"
	1 – "Rare"
	2 – "Often"
	3 – "Always"
Frequency of usage of collaboration tools for social networks	0 – "Don't use"
	1 – "Rare"
	2 – "Often"
	3 – "Always"
Level of difficulty on data management	0 – "Not Difficult"
	1 – "Slightly Difficult"
	2 – "Difficult"
	3 – "Very Difficult"

C. Data Sampling and Collection

The data is collected on the two levels: project manager level and member level. To shape the data the number of interviewees will be from 30 to 50 individuals from small size organizations from different regions. The targeted interviewees in this research are considered to be from India, Bangladesh, Serbia, Germany and the US. The collection stage including surveys and interviews.

RESEARCH METHODOLOGY

A. Data Sample

The primary method considers semi-structured interviews with close-ended questions. The purpose of close-ended questions is for data coding and processing. The ordinal type of variables are categorized and coded as following in Table 2:

Table 2: Processed variable types and value definition for close-ended questions interview

Variable	Value
Frequency of usage of collaboration tools per project	1 – "Rare"
	2 – "Often"
	3 – "Very Often"
	4 – "Always"
Frequency of incidents reported in project management processes	0 – "Never"
	1 – "Rare"
	2 – "Often"
	3 – "Always"
Frequency of usage of collaboration tools for social networks	0 – "Don't use"
	1 – "Rare"
	2 – "Often"
	3 – "Always"
Level of difficulty on data management	0 – "Not Difficult"
	1 – "Slightly Difficult"
	2 – "Difficult"
	3 – "Very Difficult"

B. Data Collection

The data is collected on the two levels: project manager level and member level. To shape the data and significance of analysis, number of interviewees sample size is 49 individuals from small size organizations from different regions. The targeted interviewees considering from India, Bangladesh, Serbia, Germany and the US. The collection stage considering surveys and interviews.

C. Hypotheses

1. *$H1_0$: $\rho=0$, there is no relationship between usage of collaboration tools and disruption in project management processes*
   $H1_A$: $\rho\neq0$, there is relationship between usage of collaboration tools and disruption in project management processes
2. *$H2_0$: $\rho=0$, there is no relationship between usage of collaboration tools and data management*
   $H2_A$: $\rho\neq0$, there is relationship between usage of collaboration tools and data management
3. *$H3_0$: $\rho=0$, there is no relationship between usage of collaboration tools and decrease in productivity of human resources*
   $H3_A$: $\rho\neq0$, there is no relationship between usage

collaboration tools and decrease in productivity of human resources

4. *H4: The odds that collaborative tools create disruptions in project management processes are high*
5. *H5: The odds that collaborative tools are used for social networking are high*
6. *H6: the odds that collaborative tools create difficulty on data management are high*

RESULTS

A. Research Results

The data was collected on the two levels: the project manager level and the member level. To shape the data and significance of analysis, number of interviewees sample size is 49 individuals from small size organizations from different regions. The targeted interviewees considering from India, Bangladesh, Serbia, Germany and the US. The collection stage considering surveys and interviews. Figure 1 represents stacked bar chart. The graph includes 6 project managers 43 team members.

Table 3: represents sample size acquired from the interviews and surveys with the Likert scale accordingly.

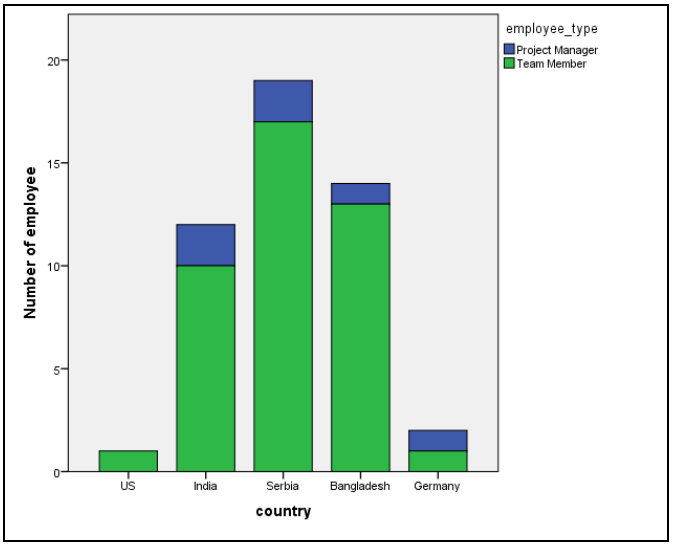

Table 3: Summary of the data sample, values and responded percentage.

Case Processing Summary

		N	Marginal Percentage
freq_use_of_collab_tools	Rare	7	14.3%
	Often	18	36.7%
	Always	24	49.0%
freq_incidents_in_pm_process	Never	1	2.0%
	Rare	14	28.6%
	Often	27	55.1%
	Always	7	14.3%
freq_misuse_social_networks	Don't Use	2	4.1%
	Rare	8	16.3%
	Often	28	57.1%
	Always	11	22.4%
level_of_difficulty_on_data_management	Not Difficult	12	24.5%
	Slightly Difficult	28	57.1%
	Difficult	8	16.3%
	Very Difficult	1	2.0%
Valid		49	100.0%
Missing		0	
Total		49	

B. Hypotheses Testing

Based on gathered data we try to prove or disprove the following hypotheses:

1. **$H1_0$: ρ=0, there is no relationship between usage of collaboration tools and disruption in project management processes**
   $H1_A$: ρ≠0, there is relationship between usage of collaboration tools and disruption in project management processes

As we are comparing the relationship between two ordinal variables, Spearman's correlation coefficient is performed. In the analysis, a 95% confidence interval is considered.

Table 4. Spearman's correlation coefficient results between frequency of use of collaboration tools and frequency of incidents occurring in project management processes.

Correlations

			freq_use_of_collab_tools	freq_incidents_in_pm_process
Spearman's rho	freq_use_of_collab_tools	Correlation Coefficient	1.000	.657**
		Sig. (2-tailed)	.	.000
		N	49	49
	freq_incidents_in_pm_process	Correlation Coefficient	.657**	1.000
		Sig. (2-tailed)	.000	.
		N	49	49

**. Correlation is significant at the 0.01 level (2-tailed).

From the results (Table 4), there was a statistically significance between frequency of use of collaboration tools and frequency of incidents occurring in project management processes, so we can reject the null hypothesis and accept the alternative hypothesis. The finding may be concluded as:

Conclusion 1. *There was a strong positive correlation between frequency of use of collaboration tools and frequency of incidents occurring in project management processes, $\rho_s(95) = .657$.*

2. **$H2_0$: ρ=0, there is no relationship between usage of collaboration tools and data management**
   $H2_A$: ρ≠0, there is relationship between usage of collaboration tools and data management

As we are comparing the relationship between two ordinal variables, Spearman's correlation coefficient is performed. In our analysis, a 95% confidence interval is considered.

Table 5. Spearman's correlation coefficient results between frequency of use of collaboration tools and level of difficulty of data management.

Correlations

			freq_use_of_collab_tools	level_of_difficulty_on_data_management
Spearman's rho	freq_use_of_collab_tools	Correlation Coefficient	1.000	-.160
		Sig. (2-tailed)	.	.272
		N	49	49
	level_of_difficulty_on_data_management	Correlation Coefficient	-.160	1.000
		Sig. (2-tailed)	.272	.
		N	49	49

From the results (Table 5), there was a statistically significance between frequency of use of collaboration tools and frequency of incidents occurring in project management processes, so we can reject the null hypothesis and accept the alternative hypothesis. However, the relationship tended to be negative relationship. The finding may be concluded as:

Conclusion 2. *There was a negative correlation between frequency of use of collaboration tools and level of difficulty of data management, $\rho_s(95) = -.160$.*

3. **$H3_0$: ρ=0, there is no relationship between usage of collaboration tools and decrease in productivity of human resources**
   $H3_A$: ρ≠0, there is no relationship between usage collaboration tools and decrease in productivity of human resources

As we are comparing the relationship between two ordinal variables, Spearman's correlation coefficient is performed. In the analysis, a 95% confidence interval is considered.

Table 6. Spearman's correlation coefficient results between frequency of use of collaboration tools and frequency of using tools for social networking.

Correlations

			freq_use_of_collab_tools	freq_misuse_social_networks
Spearman's rho	freq_use_of_collab_tools	Correlation Coefficient	1.000	.277
		Sig. (2-tailed)	.	.054
		N	49	49
	freq_misuse_social_networks	Correlation Coefficient	.277	1.000
		Sig. (2-tailed)	.054	.
		N	49	49

From the results (Table 6), there was a statistically significance between frequency of use of collaboration tools and frequency of using tools for social networking, so we can reject the null hypothesis and accept the alternative hypothesis. Thus, collaboration tools decrease productivity of human resources. The finding may be concluded as:

Conclusion 3. *There was a positive correlation between frequency of use of collaboration tools and frequency of using tools for social networking, $\rho_s(95) = .277$.*

In order to perform regression analysis it there are assumptions required to be satisfied. Table 7 represents test results of the assumptions of proportional odds.

Table 7: Test of parallel lines to ensure the assumption of proportional odds was met

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	30.169			
General	27.398[b]	2.771[c]	8	.948

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

b. The log-likelihood value cannot be further increased after maximum number of step-halving.

c. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.

From Table 7, we may conclude that the assumption of proportional odds was met, as assessed by a full likelihood ratio test comparing the residual of the fitted location model to a model with varying location parameters, $\chi2(8) = 2.771$, $p = .948$.

The next step is to perform the goodness-of-fit test to determine how observations are fit (Table 8).

Table 8. Goodness-of-fit test

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	63.733	22	.000
Deviance	18.844	22	.655

Link function: Logit.

From Table 8, the deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $\chi2(22) = 18.844$, $p = .655$.The Pearson goodness-of-fit test indicated that the model was not a good fit to the observed data, $\chi2(22) = 63.733$, $p < .001$. The final model (Table 9) statistically significantly predicted the dependent variable over and above the intercept-only model, $\chi2(8) = 42.990$, $p < .001$.

Table 9. Model fitting information

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	73.159			
Final	30.169	42.990	8	.000

Link function: Logit.

The PLUM ordinal regression to model the dependence of the factors (Table 10).

Table 10. Plum ordinal regression output with parameter estimates

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[freq_use_of_collab_tools = 1]	-19.663	1.362	208.504	1	.000	-22.332	-16.994
	[freq_use_of_collab_tools = 2]	-15.926	1.281	154.460	1	.000	-18.438	-13.415
Location	[freq_incidents_in_pm_process=0]	-23.929	13443.079	.000	1	.999	-26371.880	26324.022
	[freq_incidents_in_pm_process=1]	-22.834	1.076	450.513	1	.000	-24.942	-20.725
	[freq_incidents_in_pm_process=2]	-18.884	.000	.	1	.	-18.884	-18.884
	[freq_incidents_in_pm_process=3]	0[a]	.	.	0	.	.	.
	[freq_misuse_social_networks=0]	3.086	13443.079	.000	1	1.000	-26344.864	26351.037
	[freq_misuse_social_networks=1]	-.492	1.227	.161	1	.688	-2.897	1.913
	[freq_misuse_social_networks=2]	2.423	1.060	5.225	1	.022	.345	4.500
	[freq_misuse_social_networks=3]	0[a]	.	.	0	.	.	.
	[level_of_difficulty_on_data_management=0]	3.048	1.450	4.423	1	.035	.207	5.890
	[level_of_difficulty_on_data_management=1]	2.259	1.014	4.966	1	.026	.272	4.245
	[level_of_difficulty_on_data_management=2]	0[a]	.	.	0	.	.	.
	[level_of_difficulty_on_data_management=3]	0[a]	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

4. H4: The odds that collaborative tools create disruptions in project management processes are high

From Table 10 the results show that odds of disruptions in project management processes occurring "Rare" are high. The finding may be concluded as:

Conclusion 4. *The odds of occurring incidents in project management processes considering to be "Rare" are high (95% CI, -24.942,-20.725), Wald $x^2(1) = 450.513$, $p < .001$*

5. H5: The odds that collaborative tools are used for social networking are high

From table 10 the results show that odds of using collaborative tools for social networking "Very Often" are high. The finding may be concluded as:

Conclusion 5. *The odds of using collaborative tools for social networking and informal activities "Very Often" considering to be high (95% CI, 0.345, 4.500), Wald $x^2(1)=5.225$, $p=0.22$*

6. H6: the odds that collaborative tools create difficulty on data management are high

From table 10 the results show that odds of using collaborative tools and "Slightly Difficult" data management are high. The finding may be concluded as:

Conclusion 6. *The odds of difficulty level on data management on collaborative tools "Slightly Difficult" considering to be slightly high (95% CI, 0.272, 4.245), Wald $x^2(1)=4.966$), $p=0.26$*

C. Research Questions Discussion

This section summarizes the findings and answers to the research questions and hypotheses concerning of effectiveness of collaboration tools on virtual project management.

Research Question 1: Is there a relationship between usage of collaboration tools and disruption in project management processes?

To answer this question, the Spearman's coefficient correlation was performed. From the analysis it may be concluded that there is a strong positive correlation between frequency of use of collaboration tools and frequency of incidents occurring in project management processes, $\rho_s(95)$ = .657. Out of the research scope, the results may be concerned with poorly aligned and integrated platforms as it disrupt the project management processes. To mitigate this, it may be taken into consideration the alignment of human resources and business needs among with the trainings and policy use of that tools.

Research Question 2: Is there a relationship between usage collaboration tools and data management?

To answer this question, the Spearman's coefficient correlation was performed. From the analysis it may be concluded that there is a negative correlation between frequency of use of collaboration tools and level of difficulty of data management, $\rho_s(95)$ = -.160. The usage of collaboration tools do not have significant relationship, but instead weak negative relationship, which brings a question for the future research that collaboration tools decrease level of difficulty in data management.

Research Question 3: Is there a relationship between usage of collaboration tools and decrease in productivity of human resources?

To answer this question, the Spearman's coefficient correlation was performed. From the analysis it may be concluded that there is a positive correlation between frequency of use of collaboration tools and frequency of using tools for social networking, ρs(95) = .277. The finding shows us that employee tend to use tools for social networking, however, the use of those tools and relationship to project performance or other performance indicators have to be investigated.

Research Question 4: What are the odds that collaboration tools disrupt project management processes, create difficulty on data management and used for social networking?

To answer this question a cumulative odds ordinal logistic regression with proportional odds was run to determine the disruption in project management processes, misuse of collaborative tools and difficulty of data management while frequently usage of collaborative tools. The assumption of proportional odds was met, as assessed by a full likelihood ratio test comparing the residual of the fitted location model to a model with varying location parameters, $\chi2(8) = 2.771$, p = .948. The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $\chi2(22) = 18.844$, p = .655. The Pearson goodness-of-fit test indicated that the model was not a good fit to the observed data, $\chi2(22) = 63.733$, p <.001, but most of the cell were filled with zero frequencies in 54.2% of cells. The odds of occurring incidents in project management processes considering to be "Rare" are high (95% CI, -24.942,-20.725), *Wald* $x^2(1) = 450.513$, $p < .001$. The odds of using collaborative tools for social networking and informal activities "Very Often" considering to be high (95% CI, 0.345, 4.500), *Wald* $x^2(1)=5.225$, $p=0.22$. The odds of difficulty level on data management on collaborative tools "Slightly Difficult" considering to be high (95% CI, 0.272, 4.245), *Wald* $x^2(1)=4.966$), $p=0.26$.

From the results it may be concluded that collaboration tools rarely create disruptions in project management processes; collaboration tools often used for social networking and informal communications and collaboration tools may or may not create slight difficulties on data management. As different statistical methods produces different results, this relevance have to be investigated.

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