The influence of organizational culture and project management maturity
in virtual project teams

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Abstract— **The growth of organisations and businesses have resulted in the organisations having offices in different geographical areas. The partnerships of different organisations have caused them to create a team that is not situated in one area. A virtual project team is one where the project team is located in different geographical areas and rely on technology for communication. Different factors can affect the performance of the virtual team. The aim of this article was to find the level of influence that the organisational culture and the project management maturity of an organisation has on virtual project team. The quantitative research methodology was used in the research. An online survey was used as the data collection tool. The google forms application and the Microsoft excel software were used for the data analysis of the feedback from the participants taking part in the research. The results of the research indicate that organisational culture has an influence in the virtual project performance and that the elimination of project management maturity affects the success of the virtual project negatively.**

This article promotes and emphasises the importance of organizational culture, project management maturity, communication, trust, good leadership and efficient ICT tools on the success of virtual project teams. Project managers can benefit from this knowledge by giving special attention to these factors.

Keywords—: virtual project team, organizational culture, project perfromance, project management maturity, performance factors,

I. INTRODUCTION

The use of virtual project teams in organisations has been growing exponentially over the past few years and this growth is expected to continue in future [17]). The growth of virtual teams is in response to the aspects that include: globalization, distribution of expertise, innovation and collaborations ([38]; [23]; [34]). This article explores the level of influence that the organisational culture and the project management maturity of an organisation has on virtual project team. Many of the studies focused on the project management maturity and organisational culture in traditional (face-to-face) teams [5]. Besides the factors mentioned above, there are other factors that may affect the performance of virtual teams. These factors include leadership, communication and trust in virtual project teams [5]; [16]).

Research findings determined that organisational culture has a definite influence on the success of virtual project teams. The research identified the following to be important factors in organisational culture that lead to the success of virtual project teams: team communication, the effective use of ICT tools, leadership and team orientation. The findings further established that there is a link between project management maturity and project performance. Studies widely highlighted communication as one of the most important factors in virtual project team's success ([23]; [34]; [16]). This article determines which aspect of organisational culture and project management maturity would be influenced positively or negatively.

The first section of this article explores the literature on the definitions to create more understanding of the concept of virtual teams, organisational culture, project management maturity, team performance and the factors for enhancing performance in virtual project teams. The second section provides a brief overview of the research methodology that was followed, flowing into the third section that provides the factors that influence organisational culture, project management maturity and the virtual team performance. The final section concludes by presenting and discussing the key findings of this research and future research possibilities.

II. RESEARCH QUESTIONS

The research questions for this study are as follows:

 a) Does the organizational culture have a positive influence in virtual project performance?
 b) Does project management maturity have a positive influence in virtual project performance?

III. LITERATURE REVIEW

A. Concept of virtual team

Several definitions have been used by authors to define virtual teams. A virtual team is defined as a group of individuals brought together to complete a common goal, who are in different time zones, have different cultures and may speak different languages ([65]; [66]; [62]; [16]). These individuals are 'geographically, organisationally and/or time dispersed and are brought together by information and telecommunication technologies ([47]; [65]; [62]). Studies identified the multiple organisational cultural values to include religion, language and communication ([45]; [32]; [3]; [13]; [66], [46]).

The benefits that a virtual project team brings to an organisation are as follows: saving organisational expenses on travel and accommodation, saving time that may have been used for traveling, recruitment of the best employees in the industry and the promotion of originality and creativity among the team members ([7]; [54]).

The challenges that a virtual team faces are as follows: communication dynamics [7]; [23]; [34]; [16]), differences in culture, ([58]; [51]) and the lack of efficient ICT tools [7], [34]; [16]).

B. Virtual project Performance

Virtual project performance relates to a customer accepting an output, which can be a service or a product after the project was completed [61] Studies indicated that team performance involves collaboration and interaction among team members ([31]; [6]; [61] [51]). Project team effectiveness is considered as an accomplishment of clearly defined goals and objectives (PMI 2013; [61]; [51]). The effectiveness is achieved when the standards of quality are met or exceeded by the team on the clients defined timelines, the processes chosen by the team allow them to work well together to enhance the team's performance and finally when individual growth for the team members is made possible and team satisfaction is evident ([61], [62]; [51].

C. Organisational Culture

Organisational culture according to [53], is a property of an independently defined entity. The members of this entity would have successfully solved internal and external challenges, and shared the experiences in doing so. The solutions to these problems are either successful or unsuccessful. The successful solutions are used more often by the members each time they come across similar problems [9]. According to [63] organisational culture is the collection of values, beliefs and behavioural norms that offer guidance to its members. Organisational culture is usually put in place by the founders of an organisation. When faced with problems, the team comes together and decide how to handle each problem. They use the same methods of solving similar problems. As the organisation grows and new members are employed into the organisation, the new members learn to use the methods that have been in use by the organisation. These methods have been tried and tested and they become part of the ways that the organisation does its business. The methods are used so often that when similar problems arise, there is no need to meet and discuss solutions anymore, the members would already know which methods to use. It has been established that the organisations that focus more on key managerial components that include customers, employees and leadership have a higher performance level than those that do not ([59]; [63]). Team leader effectiveness and team satisfaction have been found present and influenced by the organisational culture that focus on communication as well as cooperation among the teams ([14]; [61]; [16]).

D. Project Management Maturity

Project performance is influenced by many organisational factors, especially the style, culture and the level of project management maturity of the organisation [2]. The Organisational Project Management Maturity Model (OPM3) was proposed by the Project Management Institute in 2008 [2]. The model focused on the integration, improvement and assessment of project management practices and is currently used as a standard to measure project management maturity [2]. Studies by [26] established that there was no relationship between project management maturity and project performance. Their success measurements were based only on cost and schedule [2]. It was established that project management maturity has no influence on project management, however, it does influence the business performance [63]. A change in the organisational culture regarding sharing, collaboration and empowerment is necessary to solve issues that relate to project time, budget and expectations [63]; [53]). A study done in Zimbabwe in the telecommunications industry showed that higher project management maturity levels have a positive effect on project performance, this study however, was carried out on traditional project teams and not virtual project teams [41].

E. Additional Factors in Virtual Team Performance

1) Leadership:
There are five categories of effective leadership in virtual project teams: good communication, building trust, establishing a vision, leading by example and coordinating and collaborating ([57], [36]; [34]; [16]). Project team leadership ensures high team performance because of execution of the project

processes which ultimately lead to the success of the project team [1], [18]; [48]; [62]). A good project team leader creates unity and cohesion in integrating the project activities [36]. Leadership brings forth different challenges to virtual teams as compared to those challenges found in traditional face-to-face teams [29]. The leader of a virtual team will need to keep in mind the cultural differences and optimize on them and adopt a leadership style that will [42]; [34]; [51]). According to [35] team effectiveness in virtual teams is only partially affected by the leadership style, while [56] indicated that the leadership profiles in a traditional team need not be any different from those of the virtual teams [29]. A good leader is capable of detecting problems prior to their occurrence and taking corrective measures in time [7]. Creating a collaborative environment is one of the challenges that leaders face in a virtual environment [30]. Ensuring productivity, finding alignment and commitment in the team is a challenge for project team leaders in a virtual team ([30]; [29]).

2) *Trust:*

Trust is defined as the 'extent a person is confident in and willing to act on the basis of the words, actions and decisions of another' [39]. [10] considers trust as a factor which may support or hinder the effectiveness of knowledge sharing in both traditional and virtual project teams. Trust has been established to be a critical factor in virtual project team performance ([48]; [64]; [62]) and the foundation of all relationships is trust [12]. Trust influences the team satisfaction and overall virtual team performance ([64]; [62]; [16]). [25] established that the increase in trust between the team members contribute in building team commitment and unity among the virtual team [64]. When trust is present in the team it allows for the production of new ideas despite the cultural diversity and increases the amount of contribution that the virtual project team makes to the organisation [64]. Virtual project teams need to have trust among them for improved communication ([11]; [54]; [16]). However, product development is delayed when there is a lack of trust in the virtual team ([33]; [13]) and the capability of an organisation to meet its goals is reduced when there is a limited amount of trust in the virtual team [33].

3) *Communication and ICT tools*

In virtual project teams, technologies are the platform for communication [2] and the collection of these technologies relate to the sharing, coordination, collaboration and management of information for communication ([24]; [23]; [52]3; [34]; [15]). Communication is an important factor in accomplishing project goals whether the team is virtual or not [37]. A study of the effect of communication on virtual project team performance showed that the virtual teams that communicate more

often perform better than those that communicate less [43]. A team member's communication preference as well as their communication behavior are partially determined by the culture that they have conformed to [37]. Communication plays a vital role in the creation of trust in virtual teams ([24]; [23]; [52]; [62]; [16]). The success of the virtual project team is impacted by the team's ability to communicate effectively and the appropriate level of technology tools used ([7]; [23]; [13]; [16]). On the other hand, miscommunication can arise from the absence of non-verbal behavior [20].

The literature was used to explore and understand the concept of organisational culture and project management maturity in virtual project teams. The literature suggests that there are several factors that impact on the improvement of performance in virtual project teams. These factors were used by the researcher to develop a questionnaire to investigate the impact each of them has on the performance of virtual project teams.

The additional factors mention above (trust, leadership and ICT tools) are not included in the survey of the study. The main focus of the study was to identify if organizational culture and project management maturity have a positive influence on virtual project performance.

IV. METHODOLOGY

A quantitative research methodology was used in this article. The survey research design was adopted for this research and the researcher created an online-survey tool using the google forms. This research design was employed because it examines a wide range of respondents as data is collected based on respondents' values, culture, options, beliefs, behaviour and attitudes ([60]; [55], [40]). The objective of this survey was to determine if the organisational culture and the project management maturity had a positive or a negative influence in the performance of their virtual project team.

The questionnaire was divided into five (5) sections as follows: first section required respondents to provide their biographical information, current job position and level. In the second section respondents were to indicate the factors they felt mostly influenced the success of a virtual project in their organisation. Thirdly, respondents were to rate their organisation on project management maturity and the fourth section required respondents to rate their organisation on organisational culture. In the final section respondents provided information on the virtual project team they are currently involved in. The majority of the questions were in fixed choice format and respondents were asked to select the most appropriate answer. There was space to provide further comments should they wish to do so.

A four (4) point Likert scale was used as response option as follows: (1) Not at all to (4) To a great extent. Some of the options used were (1) Not at all to (3) Highly. Purposive sampling method was adopted as the researcher had a

predefined group being sampled from the target population. There were 122 respondents to the survey and about 20 organisations participated in the survey of which 7 were international organisation. The organisations included respondents from banking, manufacturing, mobile services, insurance, IT developers, internet solution firms etc. based in South Africa and some from overseas. The inclusion criteria required the participants to be a project manager or IT professional involved in IT virtual project teams based in South Africa. A test was conducted on the 122 respondents to test the reliability and validity of data.

V. DATA ANALYSIS

The data was captured from the questionnaire in an excel sheet for data analysis. The data was collected from participants in various fields including: project management, software developers, systems analysts and other IT professions. For the purpose of this article Microsoft excel was used for descriptive analysis to determine whether or not organisational culture and project management maturity enhance performance in virtual project teams.

VI. ETHICAL CONSIDERATIONS

The participants were informed of the purpose of the survey and ethical standards were applied to protect the privacy and confidentiality of research participants. The information provided by the participants was not made available to any individual who was not directly involved in the research study. The participant would remain anonymous throughout the study.

VII. RESULTS

In this section the data collected from project managers and IT professionals is reported, interpreted and discussed and the factors which impact more on improving performance in virtual project teams are highlighted.

A. Virtual project team participation

To get to know the participants better, there were three questions to understand their background with virtual projects teams they were currently involved in. The results are presented in Table 1.

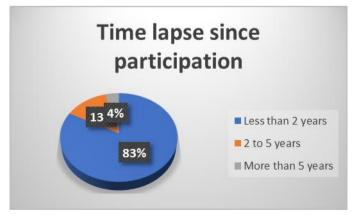FIGURE 1 MOST RECENT VIRTUAL PROJECT PARTICIPATION

figure 1 shows that a majority (83%) of the respondents could provide recent knowledge on the virtual projects teams. Since this is a fast developing field recent knowledge is needed to establish trends in the market.

FIGURE 2 YEARS OF EXPERIENCE

Findings in figure 2 indicate that over half (55%) of the respondents have less than 2 years of experience in virtual projects and only 10% have more than 5 years of experience. This might be because virtual project teams is a relevantly new phenomenon in South African organizations.

B. Virtual Project Perfromance Factors

The respondents were asked about the factors that mostly influence the success of their virtual project team. The respondents had eight options, but were to choose only three (3) options that were most influential to their team. Table 3 provides the feedback from respondents. The top five (5) project success factors were identified as: good communication (61%), customer satisfaction (50%), meeting project schedule (38%) good leadership (37%) and effective use of (ICT) tools (33%).

TABLE I.   FACTORS THAT INFLUENCE THE SUCCESS OF A VIRTUAL PROJECT TEAM

	Count	%
Good communication management	75	61%
Customer satisfaction	61	50%
Meeting schedule requirements	46	38%
Good leadership	45	37%
Efficient information technology communication (ICT) tools	40	33%
Competent project team	39	32%
Meeting budget requirements	38	31%
Trust amongst project teams	22	18%

C. Project management maturity

The information was gathered about the project management maturity of the organisation they currently work or worked for at the time when the virtual project was taking place. The respondents asked whether their organisations understood the project management principles, organisation was compliant with the project management standards, utilised a project management methodology effectively and followed the project management processes of the methodology effectively. The findings in Table 4 suggest that over half (52%) of the organisations have a good understanding of project management principles and about 45% were compliant with the project management standards. Respondents pointed out that the negligence of project standards and methodologies lead to the failure of meeting customers' needs and meeting project budget.

D. Organisational Culture

The information was gathered about the organisational culture of the organisation they are currently working for or the organisation the virtual project teams they worked for. The findings in Table 5 suggest that the majority (64%) of the organisations are outcome oriented and overall the organisational culture is team orientated, there is good communication achieved in the virtual project team and the organisation is leading in market share compared with its competitors. The findings showed that correct execution of team and outcome orientation lead to the success in meeting project scope and schedule in virtual projects teams.

VIII. DISCUSSION

A. Virtual Project Perfromance Factors

A study on global software development by [67] revealed that the top five success factors of a project are as follows:

organisational structure, project manager's skills, communication, requirement specification and cultural awareness. The findings of this research concur that communication is one of the most important factors in a virtual project team's success. The project manager's skills referred to, include leadership and the project manager's ability to achieve project scope, time and budget requirements. The findings support the literature that effective communication, good leadership and effective use of ICT tools results in higher levels of team communication and have positive influence that enhance team performance ([23]; [62]; [34]; [16]).

B. Project Management Maturity

The findings of the study indicate that there is a correlation between virtual project performance and project management maturity. The organizations that are compliant with the project management standards, utilised a project management methodology effectively and followed the project management processes of the methodology effectively have a higher virtual project performance. Project performance in virtual projects teams is not defined by the level of project management maturity on its own, however, the complete elimination of project management maturity will have a negative impact of the project performance. Studies by [63] established that there was a relation between project management maturity and project performance while [41] have found that project management maturity has a positive influence on the success of a project. The different findings of the researchers may lie in the different measures and methodologies used for their respective research.

C. Organizational Culture

Good communication, in any project, has been highlighted as one of the most important factors in project performance ([23]; [62]; [34]; [16]). There has been little to no debate on this matter. The findings indicated that the correct execution of team and outcome orientation lead to the success in meeting project scope and schedule in virtual projects.

TABLE II. PROJECT MANAGEMENT MATURITY

	To a great extent		To a moderate extent		To a little extent		Not at all		Total	
My organization has a good understanding in project management principles	64	52%	43	35%	14	11%	1	1%	122	100%
My organization is compliant with project management standards	55	45%	49	40%	17	14%	1	1%	122	100%
My organization utilizes project management methodologies effectively	44	36%	54	44%	23	19%	1	1%	122	100%
My organization utilizes project management processes effectively	51	42%	48	39%	22	18%	1	1%	122	100%

TABLE III. ORGANIZATIONAL CULTURE OF THE ORGANIZATION

	To a great extent		To a moderate extent		To a little extent		Not at all		Total	
My organisation takes risks	46	38%	47	39%	24	20%	5	4%	122	100%
My organisation is a team oriented	60	49%	42	34%	15	12%	5	4%	122	100%
My organisation is outcome oriented	78	64%	34	28%	10	8%	0	0%	122	100%
My organisation is leading in market share when compared with its competitors	53	43%	44	36%	16	13%	9	7%	122	100%
My organisation is often first to launch new products in the market when compared with its competitors	51	42%	46	38%	16	13%	9	7%	122	100%

TABLE IV. SUMMARY OF ORGANISATIONAL CULTURE, PROJECT MANAGEMENT MATURITY AND PROJECT SUCCESS

Organisational Culture	Project Management Maturity	Primary Project Success Indicators
Team Orientation (72%)	Compliance with project management standards (45%)	Meeting project scope (50%)
Outcome Orientation (64%)	Effective use of project management methodology (48%)	Meeting project schedule (50%)
Communication (52%)		Meeting project budget (43%)
		Customer Satisfaction (43%)

The results of the survey in Table 4 indicate that when the culture of team orientation, outcome orientation and good communication is achieved in the virtual project, the project scope and schedule are met. The negligence of project standards and methodologies lead to the failure of meeting customers' needs and meeting project budget

IX. CONCLUSION AND CONTRIBUTIONS

This article explored the level of influence that the organisational culture and the project management maturity of an organisation has on the performance of virtual project team.

The key findings confirm that the project management maturity played an important role in the success of virtual project team. The organisational culture and factors such as, good leadership, trust, communication and team commitment played a bigger role in the success of the virtual project teams compared to the project management maturity, however, the complete elimination of project management maturity affects the success of the virtual project team. Findings indicated that organisational culture positively affects virtual project performance. The average

scoring of project management maturity results in the average scoring of virtual project performance.

The practitioners of project management and project managers will benefit significantly from this paper to improve their knowledge or awareness of organisational culture, project management maturity and virtual team performance factors for virtual project teams, could assist them to enhance the success of a project implemented by a virtual project team.

This research could be extended to include other significant virtual project teams by collecting data from respondents across the globe and comparing the results.

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