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TEAM WORK QUALITY

Why it Matters in Enhancing the Creativity of Software Organizations

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Emerald Publishing Limited
Howard House, Wagon Lane, Bingley BD16 1WA, UK

First edition 2021

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-80117-263-9 (Print)
ISBN: 978-1-80117-262-2 (Online)
ISBN: 978-1-80117-264-6 (Epub)

ISOQAR certified Management System, awarded to Emerald for adherence to Environmental standard ISO 14001:2004.

Certificate Number 1985
ISO 14001

INVESTOR IN PEOPLE

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LIST OF ABBREVIATIONS

ANCOVA	Analysis of Co-Variance
ANOVA	Analysis of Variance
APA	American Psychological Association
CCQ	Creative Climate Questionnaire
CMMI	Capability Maturity Model Integration
CMMI DEV V1.3	CMMI for Development Version 1.3
DIPP	Department of Industrial Policy and Promotion
FDI	Foreign Direct Investment
FY	Financial Year
GVT	Global Virtual Team
IT	Information Technology
NASSCOM	National Association of Software and Services Companies
OCB	Organizational Citizenship Behaviour
PCA	Principal Component Analysis
R and D	Research and Development
RQs	Research Questions
SPSS	Statistical Package for Social Sciences
TWQ	Team Work Quality

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PREFACE

Information technology (IT) sector has witnessed a dramatic growth in the past three decades and has turned into one of the major contributors of the nation's economy. Software organizations have emerged in India in large numbers in the recent years since India stands as one of the major destinations for foreign investors across the globe who intends to invest in the IT industry.

This book entitled *Team Work Quality – Why it Matters in Enhancing the Creativity of Software Organizations* is an attempt to identify how two important management strategies, namely 'Team Work Quality' and 'Creativity' are related with each other and how the characteristics of a software team impact their relationship with specific reference to Indian software organizations.

The authors of the book have carried out a real-time investigation through application of appropriate research methodologies and collected data from team leaders, subjected them to statistical analysis in order to infer how team work quality contributes towards enhancement of creativity with respect to software organizations in India, thereby ensuring the authenticity of the views presented by them in the forthcoming chapters.

Team Work Quality, a very recent terminology that has come up in the last decade and is being widely applied in software organizations across the world these days, has been measured in this book using Weimar (2013)'s model of Team Work Quality. Likewise, in this book, organizational creativity has been measured based on Woodman et al. (1993)'s Interactionist model of Organizational Creativity. A quantitative analysis has been conducted in order to identify the relationship between the above two variables. In addition to that, the moderating relationship of five team characteristics, namely team size, team age, team ethnicity, team role and tenure of the team leader, on the relationship between 'Team Work Quality' and 'Creativity', has also been identified in this book.

This book presents the results of analysis of quantitative data collected from 474 team leaders working at software organizations located in Chennai and Bengaluru, India, and those have been identified to have qualified the CMMI DEV V1.3 Maturity Level 5 assessment, conducted by the Software

Engineering Institute, in the year 2015. The results reveal that team work quality and organizational creativity are interrelated with each other and their relationship is moderated by four out of the five characteristics identified by the authors.

In addition to that, this book also offers strategies to the software organizations for improving their levels of organizational creativity, through enhancement of team work quality, thereby helping its readers in creating a better work environment.

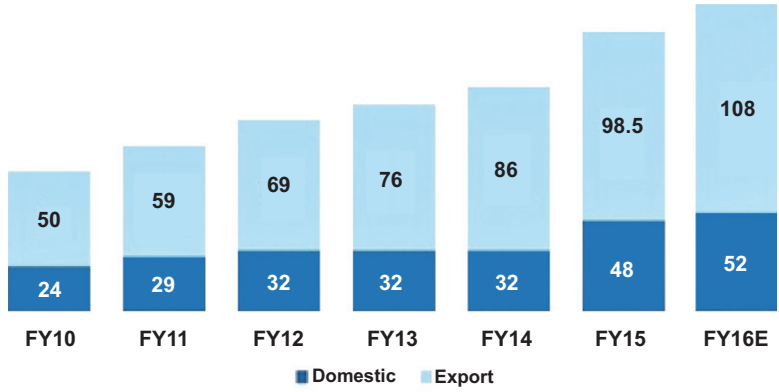
1

INTRODUCTION

1.1 AN OVERVIEW OF INDIAN INFORMATION TECHNOLOGY SECTOR

It has been observed that in today's globalized environment, India is considered to be a home for many of the best software companies in the world. The Indian software companies are known across the globe for their efficiency and effectiveness in their business-related solutions and information technology (IT) (Bhatnagar, 2006). The Indian software industries have grown at a rate of 30% every year for past two decades. The export value of Indian software services across the globe in the year 2008 was approximately $60 billion. India exports two-third of its software services to the United States including half of all Fortune 500 companies. Software companies operating in India have been the reason for the enormous change in the Indian economy. From various research studies, it has been observed that software companies in India are experiencing an outstanding and remarkable compounded growth of about 60% every year (Asheref, 2008). The software services in India are being exported to more than 95 countries around the world approximately (Subbiah, Navaneethakrishnan, & Jeyakumar, 2009).

The development and growth life cycle of Indian software companies begins from performing programming at low cost to providing extensive and valuable assistance and services in the software development to clients operating in overseas. India is considered to be the birth place for the software development and most recommended destination for services enabling IT. The adoption of new liberal policies in India has provided opportunities for the growth and development of the software industries. The following figure illustrates the growth in market size of the Indian IT industry since the



Source: NASSCOM (2017).

Fig. 1.1. Growth of Market Size of Indian Information Technology (IT) Industry (US $ bn).

year 2010 till 2016 as reported by the National Association of Software and Service Companies (Fig. 1.1) (NASSCOM, 2017).

As the above figure indicates, the IT sector in India has witnessed a tremendous growth in the last few years and is further anticipated to grow at a rate of 14% in the forthcoming financial year (FY) 2016–2017. NASSCOM (2017) has predicted that the sector will reach a revenue of around 350 (US$ bn) by the year 2025, which is three times higher when compared with its current revenue per annum. The Department of Industrial Policy and Promotion (DIPP) has identified that foreign direct investment (FDI) inflows equivalent to US $ 22 bn has happened in India in the last 16 financial years (since April 2000 till date) in Indian hardware and software alone on account of India's strengths and core competencies in the IT sector (Indianbusiness, 2016). It is very clear that Indian IT sector is witnessing a tremendous growth as the years pass on and is likely to reach even greater heights attracting numerous foreign investors to invest in the nation, thereby contributing the nation's economy to a relatively higher extent when compared with that of the other business sectors.

India is said to have the largest technical workforce in the world accounting to 3 million engineers and stands second largest in possessing qualified technical engineers trained perfectly with good communication skills in order to meet the requirements of clients within the nation as well as abroad (Gopal, Bakhri, & Bhakri, 2015). India's talented and deserving technical manpower force plays a prominent role in the success of the software industries. According to Phadnis and John (2013), about one-third of the global IT

workforce comprised the Indian population, and the major players in the global IT sector have Indian employees who outnumber their employees from their respective home countries. Major software companies all over the world have Indian's as a part of their work population (IANS, 2015).

This shows that the IT sector has not only witnessed a remarkable growth in the last two decades but also has produced talented workforce to the entire IT industry across the globe.

1.2 IMPORTANCE OF TEAM WORK IN SOFTWARE ORGANIZATIONS

The success story of a software organization completely relies on both human and societal factors. In current corporate world, team work has an important role particularly in software organization. Team work always identifies itself as an effective tool in accomplishing organizations objectives. This is as a result of its features which affect organization's result and performance. In simple terms, the software organizations will not function, but the employees as when it comes to individuals there has to be a team and team work always, and employees cannot execute or function in their own way in a software industry; they should form a team and act separately along with teams. When forming a new team, it is important to note that the team work will bring positive results. No task could be achieved without the support of the team members, and the accomplishment of every employee is intricately assured to the triumph of the whole team (Sharma, Kansal, & Paliwal, 2012). The performance and accomplishment of team work relies not only on the capability of the team itself in executing its effort but also on the managerial background.

The managerial environments in which the team is included are essential too (Qureshi, Alshamat, & Sabir, 2014). If members of the team think that their thoughts are being supported and acknowledged, then the positive vibe will take place among them. Many organizations have acknowledged the importance of team work and agreed that the effective performance of a team would improve effectiveness and productivity of the organization as a whole. According to Hoegl, Parboteeah and Gemuenden (2003), the rapid increase in the complexity of the programs of the software development industry are forcing the organizations to make its members work as a team in order to provide ingenious solutions.

Today, development of software is based on effective team work. Viji (2010) argue that teams create greater impact in the Indian software development

processes. The strength behind the achievement of the Indian software organization is the strategy of working as effective teams. The effectiveness and coordination of the team, delivery procedures and focus towards the customers have resulted in bringing repeated clienteles to the Indian software organizations, says Sudhakar (2010).

According to Kratzer, Leenders, and Engelen (2004),80% businesses which have employee strength of 100 or more completely rely upon team effectiveness either for creation of innovative product or for exploration. One of the critical difficulties in the industrial organizations is the growth of effective, steadfast and gratified workforce. Software organizations are quite different when compared with other organizations in the industry for the end outcome of a majority of them is an intangible software service rather than a tangible product. Therefore, creativity and team work in a software organization is indispensable.

Team work is essentially important in the framework of software development (Jain, 2010). Team work is considered as a major factor in enhancing the competitive advantage of a software organization. Most software organizations have faith in team work in order to enhance their productivity and throughput (Beers, 2005). An effective team in a software organization is likely to produce better results in terms of flexibility, production and resourcefulness, and also deliver advanced and wide-ranging results to organizational hitches than what an individual employee can provide (Neha, Rangnekar, & Barua, 2012). Where team work and collaboration is considered as a dominant factor, there will be a strong connotation with job contentment, says Lal, Pathak, and Kumar (2015).

The main objective of an IT organization is to accomplish operational effectiveness, control the expenses on cyclic tasks, lessen the response time of the client and attain reliability and accurateness in client dealings, so that the contentment of the consumer could be enhanced. In order to accomplish this, the software organizations form teams and execute their business operations. More than 70–80% of software organizations have teams, and predominantly software development is being done by team members of the organizations.

According to Sudhakar, Farooq, and Patnaik (2012), team efficiency reduces the costs and enhances productivity of software organizations. Effective team work according to Wang and Jiang (2011) determines the overall quality of the software organization and plays a major role in determining its success in the industry. Further, the authors add that effective team processes within software organizations stand as drivers of creativity, thereby inducting software process innovation.

1.3 IMPORTANCE OF CREATIVITY IN THE SOFTWARE DEVELOPMENT INDUSTRY

Human resources have been the key performers of any information systems management, and the successful software development needs better problem-solving skills, creativity and creative self-efficacy (Zubair & Kamal, 2015). With the advancement of IT and the tremendous innovations happening in the IT Industry, the software organizations are expected to exhibit creativity in both technical skills and firm's managerial skills. In today's high volatile and complex environment of software development field, creativity acts as a successful responding factor of the organization (Chiravuri & Ambrose, 2007).

Development of software is indeed a cognitive, knowledge-intensive and complex activity which needs to be triggered by the creative idea of the most skilled and knowledgeable software engineer (Hegde, 2013). Fostering the creativity needs the understanding of the psycho-social factor related to personal knowledge possession of the working software individual in an IT organization.

In the field of software development, the active relationship between the typical creative activities and creativity role is considered to be composition in programming. The terms like programming, software architectural practices, software designs, visualization and system analysis are the competencies in the software industry which all needs creativity for better enhancement of the software (Alebiosu, 2013). Creativity according to Farida (2007) stands as a corporate identity for any organization whose major resources arrive from the production of innovative and right thoughts and visions, procedures and services to handle customers' difficulties or prospects. Both employees and environment are more important to enhance a creative organization and businesses. This shows that creativity is not only considered as a role of the employees' temperament and the features of the context in which they work but also as a role of communication between personalities or characteristics of the entities with which they work. Creativity induces innovation in a software organization. Innovation and creativity are intimately associated constructs, which share considerable overlap in traits (Amabile, Schatzel, Moneta, & Kramer, 2004).

Creativity is said to be the generation of new and helpful concepts and ideas, largely at the entity level. Innovation is regarded as the process or method, by which those concepts and ideas are confined, sieved, funded, improved, altered, elucidated and ultimately executed or commercialized. It is this creativity, which fuels the process of innovation pipeline. In order to remain significant and to struggle in tracking down its duty and operation,

organizational management should concentrate in both ends of the practice, often making creative concepts and ideas and using the process of innovation, thereby realizing the possible values of such concepts and ideas.

The lack of innovative ideas in software organizations affects the emergence of creative presentable and unique products in the software industry. Through appropriate implementation of creativity, innovation can, thus, be brought into practice at organizations (Surendra & Aneesh, 2015). The innovative skills of software engineers can enable creativity to be implemented in each and every stage of the software development process, thereby resulting in the success of the projects in software industry (Rose & Furneaux, 2016). The ability to make new ideas that are greater than the primitive ones through creativity makes it a trendier tool for the software engineers.

1.4 NEED FOR ORGANIZATIONAL CREATIVITY IN SOFTWARE ORGANIZATIONS

Organizational creativity is considered as an element, which develops the capability of the companies and organizations in order to keep hold of their competitive benefit and to continue ahead of their challenges. From an organization viewpoint, the word creativity generally defines the methods rather than essential characters of individuals.

Organizational creativity concentrates on the elements which control creative results in organizations or businesses (Khorshidi, Abdoli, & Khorshidi, 2013). It is emphasized that organizational creativity at workplace is essential in resolving either semi-structured or un-structured complications. Creativity in an organization is also essential for accomplishing organizational growth as it can motivate all managerial features, for example, invention, training and promotion.

Organizational creativity enhances the overall ability of an organization to demonstrate novelty in its actions of knowledge (Nisula, 2013). It paves way for the production of novel and useful outcomes by people working together in the software organizations. It is perceived as a multi-level phenomenon associated with the creativity of individual, group and organizational level that acts as an enabler of change in an organization.

Organizational creativity according to Usta and Unsar (2015) helps software organizations in generating new, useful and variable ideas for delivering quality services, products, processes and procedures by individuals and groups. It enables the formation of valuable new products, processes and ideas by individuals collaborating in a complex social system.

The performance standards, freedom of expression, resources and leaders in a software organization influence organizational creativity to a great extent. Olszak and Kisielnicki (2016) have identified that it acts as a vehicle of development of a software organization through rendition of competitive advantage, business success and organizational effectiveness by implanting new ideas, processes and techniques in all the managerial functions of the organization.

1.5 WHY DOES TEAM WORK QUALITY MATTER?

'Team Work Quality (TWQ)' has emerged as an interesting area of research especially with specific reference to the software industry, in the recent times, ever since Hoegl and Gemuenden (2001) introduced this terminology a decade ago. The terminology 'TWQ' which was originally conceptualized by Hoegl and Gemuenden (2001) was extended by Weimar, Nugroho, Visser, and Plaat (2013).

This book is associated with the investigation of how 'TWQ' with specific reference to the IT-based organizations in India is related to Organizational Creativity prevailing at workplace. Creativity is yet another interesting area of research in the context of software organizations. Even though studies have been separately done by researchers to examine how organizational creativity and TWQ contribute towards the success of an organization, no authors have till date attempted to identify the relationship between these two concepts.

The current book bridges that gap by trying to establish and empirically test the relationship between TWQ and creativity with specific reference to IT companies in India. It examines how creative environment prevailing at an organization impact each and every construct of TWQ and suggests strategies for enhancing the overall quality of team work through enhancement of creativity at workplace.

Further, it also explores how the relationship between TWQ and creativity is affected by characteristics of the team. Five different characteristics, namely team size, age of the team, role of the team, ethnic diversity within a team and finally tenure of the team leader have been considered here.

Software organizations that have exhibited highest level of quality in software development in India have been taken into consideration here, and a quantitative analysis has been conducted on the data collected from its employees to investigate the relationship between TWQ and creativity.

In addition to that, the last chapter of this book offers strategies for improving the quality of team work within the target software organizations, thereby enhancing their overall creativity.

1.6 WHAT DO THE AUTHORS INTEND TO CONTRIBUTE HERE?

TWQ as a factor has attained more attention in the field of organizational creativity particularly with respect to software organizations. Creativity was found to be significant factor for organizational success irrespective of any field or industry. This book will provide an overview about the relationship between TWQ and creativity in Indian software organizations. This book will help in understanding the importance of TWQ within Indian software organizations. This book also identifies various factors that determine the TWQ within a software team. It will act as an eye-opener for the software organizations, academicians, investigators and so on. Apart from these, this book also will provide various insights and strategies for software organizations in India that would assist them in improving overall TWQ through the inducement of creativity at the workplace. The authors intend to find answers for the following questions in this book.

(1) What are the factors that determine the quality of team work within a software team?

(2) What are the factors that constitute the organizational creativity of an IT-based organization?

(3) What is the relationship between TWQ and creativity or the creative work climate prevailing in an IT-based organization?

(4) How do the characteristics of a team moderate the relationship between TWQ and creativity within software organizations in India?

(5) What are the strategies for Indian software organizations that would help them in enhancing the overall TWQ through the inducement of creativity at the workplace?

1.7 BASIC DEFINITION OF TERMINOLOGIES

1.7.1 Team Work Quality

TWQ is a terminology that is used to quantify the quality of teams within an organization. TWQ is determined by seven determinants of a team, namely team communication, co-ordination of expertise, cohesion, value diversity, mutual support, trust and performance (Weimar, 2013).