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PROCESS CONTROL MODEL FOR AGILE PROJECT MANAGEMENT

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ABSTRACT: Software project companies are increasingly delivering complicated, customized software products and services. As a result of the difficulties of working in dynamic and unexpected software delivery settings, Agile techniques were created. As obligatory guidelines, there are four basic ideals and twelve guiding principles in the Agile Manifesto. However, its execution is highly dependent on project teams and their organizational environment in each scenario. The Agile technique is highly linked to team values as well as the overall corporate culture in a specific team setting when used in daily cooperation. Team values, in turn, are dependent on team members and their motivation, which is fueled by autonomy, mastery, and purpose. Project team values change because of Agile transformation, which is the focus of this research. As empirical research, a desk review, and findings of various case study analyses in firms experiencing Agile transformation are given. Researchers found that project teams' values are affected by the Agile transformation process. According to the results, an Agile transformation had an influence on a project team's attitude to work organization, which could be examined from a range of views ranging from a sense of humor to a feeling of bravery and concentration. Project values, as well as the agility and culture of the project organization, may be impacted by large organizational changes.

General Terms: Agile, Transformation, process, framework, organization, environments, paradigm

Keywords: Agile transformation, organizational change, project team, Process control model and Agile values.

1. INTRODUCTION

Complex projects and programmes, as well as the management of project and programme portfolios, have been impacted by a vigorous market competition. improving overall project efficiency, increasing efficiency in project portfolio management while cutting down on time-

to-market and innovating/developing new products for consumers and increasing transparency and predictability of customer deliveries are some of the most pressing issues in modern project management. The Agile transformation method is being used by a growing number of multinational corporations to adopt Agile project management. In the future, Due to its capacity to respond quickly, easily, intuitively, and individually to the needs of its consumers, the Agile company will be able to keep up with the competition in the market. Few actual data are available since each company's Agile implementation or transformation is unique to that company. Through complicated, inventive, and one-of-a-kind initiatives and programs, Consumers and other stakeholders benefit from the sophistication of huge corporations' business services and products. Complex projects and programmes, as well as the management of project and programme portfolios, have been impacted by a vigorous market competition. In today's project and programme management environment, the most pressing concerns are increasing project visibility, increasing customer delivery predictability, improving overall project efficiency, reducing time to market, enhancing innovation and development, enhancing customer and business team collaboration, improving project and programme portfolio management effectiveness, and delegating project and programme responsibilities. A growing number of multinational corporations are through the Agile transformation process to integrate agile project management.

In the future, Customers' expectations for responsiveness, simplicity, speed, and ease of use will be met with an Agile firm's capacity to respond quickly and individually to their needs. Few actual data are available since each company's Agile implementation or transformation is unique to that company. Through complicated, inventive, and one-of-a-kind initiatives and programs, large firms provide more sophisticated business services and products to their consumers and stakeholders.

The Agile organization is on its way to become one of the modern company's forms for dealing with marketplace rivalry by exploring new prospects and responding to consumers' expectations in a simple, quick, user-friendly, and customized manner. The lack of empirical data on large-scale organizational change is since each Agile implementation or transformation approach is tailored to the needs of a particular organization. To make Agile transitions easier and more efficient while also saving resources, senior executives and managers may find this article's findings and conclusions valuable. According to contingency theory, the fundamental objective of this paper's empirical study is to address the research question concerning concerns and obstacles, supporting circumstances and non-supporting factors, and long-term objectives of Agile transformation as an organizational change in big companies. The empirical study findings address a vacuum in the literature review for large-scale organizations using Agile techniques to achieve complex IT and ICT projects. The findings of the study revealed that changing project management techniques may result in broad, integrated, and complex organizational changes in technology, methodology, procedures, strategy, and organizational culture, enhancing the organization's competitive edge. As research approaches, A comprehensive assessment of the available literature, as well as multiple case studies examining the practices of companies using new agile project management approaches and focusing on process and control models. Research study analysis is hindered by the lack of a wide variety of case studies. In most cases, they rely on information that can be accessed on the internet, with just a few significant facts and explanations of the Agile transformation

process. For future comparisons and discoveries, Inquiry into the same or comparable cases by several specialists may be interesting. The following is the paper's structure: The first section describes the study findings, followed by conclusions, ideas, and recommendations.

Process Control Model

The main focus of the process control model is to align the objective of the project, activities performed by the team to effectively utilize the available resources to accomplish it in a dedicated time frame. Further, the outcome must meet the need and desire of the consumer. Through holistic process control modeling procedures can improve work ambiguity experienced by individuals and their task performance can be enhanced. The expectation from the model is that, under the appropriate situation, enacting procedure control will yield desired performance outcome. In the absence of appropriate process control mechanisms the developer may find deficiency in understanding of, did not have appropriate feedback, may lead to sacrifice the behavior that intended to obtain desired performance outcome.

Fig. 1 : Process Control Model

Process control model is operated to maximize the production by maintaining a desired level of product quality and safety for making the procedure cost effective. The above mentioned Figure 1, discusses all the relevant parameters that play crucial significance for effectively planning and controlling the process model. Figure 1 consists of determining requirements, planning, data drive and decision, focus on time, cost and scope of the project, built in quality, and feedback. This process control mechanism effectively deals with how to manage desired requirements of the stakeholder by proper planning which focuses on dedicated time cost and the scope of the project. Followed by the steps like deciding how to carry the project, emphasis on quality and obtaining feedback to re-process if a loop occurred in the proceedings.

2. LITERATURE REVIEW

PaterekPawe(2017) Through complicated, inventive, and one-of-a-kind initiatives and programs, large-sized businesses supply sophisticated commercial services and products to their clients. The fierce market rivalry posed several obstacles in the administration of complex projects and programs. A few of the most challenging tasks in project and programme management are to improve communication and collaboration between the business and the project teams, to increase transparency in project planning, to increase predictability in customer deliveries and to improve overall efficiency. Agile project management strategies based on contingency theory are being utilized in this study to better understand the issues and difficulties that arise when an organization undergoes an Agile transition. Based on an

examination of the literature, several case studies of firms utilizing the Agile project management technique are given as empirical research. When it comes to Agile transformation, large-scale enterprises face a variety of obstacles, conditions, and challenges. The results show that a change in the project management method has a significant impact on the overall project structure. To obtain a competitive edge, the corporation had to make significant upgrades in its technological capabilities, methodological processes, and organizational culture.

Cegarra-Navarro, Juan-Gabriel (2016) Organizational agility makes it easier to find and retrieve important information, allowing organizations to use that information to produce high-quality services and products or respond to new rivals. This study model examines the connections between knowledge management frameworks, organizational agility, and company success. On a dataset of 112 significant Spanish enterprises, these connections are investigated empirically using partial least squares structural equation modeling. Organizational agility has a key role in both the direct and indirect link between organizational success and the use of knowledge in the workplace, according to the results of this modeling study.

Dikert, K., (2016) When it comes to improving productivity, organizations are increasingly turning to agile methods, which were originally designed for small, self-contained teams. When implementing agile at a large scale, development teams need to coordinate their activities and may need to interface with other organizational units, which presents additional challenges. Agile and lean software development methods are thoroughly examined in this study, which focuses on the problems and elements that have shown to be successful in large-scale implementations. Large-scale industrial agile changes required a comprehensive review of the literature, which we carried out. We found 1875 papers using our keyword search. We collected 52 papers that described 42 industry instances demonstrating how to implement large-scale agile development. Almost all the publications included were personal accounts, suggesting a dearth of solid academic study on the subject. We found 35 reported problems, and 29 success factors, each of which was subdivided into nine different categories. Managerial support was key, as was selection and adaptation of a new agile paradigm as well as proper training in addition to a positive mental attitude.

Czakon, W. ed. (2015)Knowledge management components of an Agile transformation are described in this research as a change in the organization's organizational structure that results from the adoption of new Agile project management techniques. The research focuses on IT and ICT projects that depend primarily on changeable knowledge resources. In terms of pre-conditions and facilitators, the article replies to research questions concerning prospective knowledge management elements, concerns, and obstacles within the Agile transformation process. Several case studies of companies who have used the new Agile project management technique were utilized to compile the data for this empirical research. To achieve increased dependability of research findings, Byanalysing documents, interviewing people, and observing people, the empirical research data were gathered utilizing a triangulation technique. There are several aspects of knowledge management that need to be examined in large-scale project firms when they undergo an Agile transition. According to the findings of the study, a change in project management approach had a substantial influence on the overall project organization. As a result, the company was able to increase its competitive advantage by implementing comprehensive organizational reforms in processes, technology, methodology,

strategy, structure, and organizational culture. Having a well-functioning knowledge management system is essential to the success of an Agile transition. Knowledge management requirements and obstacles must be addressed by project businesses and their senior executives to successfully undertake a transition process. The formation of a community of practice, participation of Agile coaches and champions, enough support from the executive team, and a growing understanding of organizational culture were all considered to be essential prerequisites and needs for the implementation of Agile. A fundamental challenge for firms adopting an Agile approach is to implement an ongoing learning process as part of their learning organizational culture.

Gandomani, T.J (2013) Moving to agile requires a well-defined strategy and structure, and the socio-technical process should be thoroughly investigated. Many firms are attempting to utilize agile methodologies in their software product lines because of the benefits and earned values of agile approaches in the software industry. The transition to agile methodologies is not simple, and it takes time due to its nature. Companies confront several problems throughout the agile transformation process since it necessitates organizational change. While some studies have looked at how to employ agile methodologies, others have looked at how to overcome difficulties in the agile adoption process. Previous research is useful, but each of them has focused on the transition process from a different angle. The characteristics of the agile transformation process are discussed in this paper from a broader viewpoint. It is our goal to illustrate that focusing just on the adoption of agile is not the only way to achieve success in the agile transformation process, we must establish an agile change management strategy. This strategy should take into account all elements of a changing approach and is the foundation for success in the agile transformation process via meaningful transformation experiences.

Gandomani, T.J (2013) For traditional businesses to remain competitive in today's fast-paced economy, they need to become nimbler. In order to achieve this move, organizations must adopt new agile ideas and adapt their way of thinking. It is difficult and time-consuming for firms to transition to an agile model, despite its clear benefits. As a result of the agile mindset's focus on people rather than processes, most of the challenges are human-related and need a dramatic shift in thinking across the board. Using a Systematic Research Review (SLR) approach, this paper analyses and categories the available research on the human elements of agile transition. Its primary purpose is to assist companies transitioning to agile to avoid the risks involved with the process by learning about the issues and implementing the recommendations provided.

Malik, R. S. et al., (2019) Project management strategy is intended to achieve the objective of the project by assuring high success rate. Agile project management provides an optimistic solution to solve the challenges having various ranges of complexity depending on diverse requirements. To evaluate the impact of using agile project management to accomplish projects, the study conducts a distinct literature review. The finding shows that by appropriately utilizing the SCRUM process control mechanism a sustainable agile development methodology is accomplished. Further after comprehensively exploring the literature it was assured that by using agile project management techniques company can assure thriving development and success of projects based on enhanced productivity.

Hayat, F et al., (2019) Project management plays a significant role in the software industry. There are three pillars of any project such as time, cost, and scope that directly rely on the need

of the project. Agile methodology plays an impactful role on software management in a distinct knowledge arena. The research conducted a survey on distinct software industries and found that Scrum is one of the most effective agile development strategies and has significant impact on project management.

Thesing, T et al., (2021) Procedural models for project management can be discriminated based on their plan procedure approach which can be classified as waterfall and agile methodology. The intention of the paper is to comprehensively compare both the strategy used for project management and identify the most suitable approach for concrete projects. The study collected the simple from 15 experts across different industries located in Germany. The criteria for selecting appropriate procedural models based on the parameters like scope, time, cost, project, team characteristics and organization. The finding shows that based on the need of the organization, requirement of the project, and formulate appropriate planning reflexible projects that are best suitable for fulfilling all the requirements and the need.

Mas, A et al., (2020) Agile management procedure is well recognised in software development companies prominently because of its characteristics that makes it effective in comparison to traditional approach. The intention of the research is to identify and handle a set of agile metrics which is prepared based on the companies who are prepared the ISO process reference model. The outcome of the study shows that the agile metrics have an effective impact that assists to prepare based on the need of the work according to the procedure model established by the company.

Venkatesh, V et al., (2018) The research is interested in identifying the role of project manager and process control of information systems (IS). The study chose integrated control theory and IS project management existing resources to enhance the understanding based on the parameters like project risk on individual, performance and psychological stress, project elected knowledge, and others. The study collects data from 1230 respondents who are working in 130 projects related to IS. The results provide significant support to three strata of models that emphasize initially, the impact of technical project risk on individual development. Secondly, IS project manager project related knowledge based on internal and external process control mechanisms. And lastly the relationship between technical project risk and developer outcome based on knowledge and process control model.

3. RESEARCH METHODOLOGY

Research in this article aims to show how project team values affect Agile transformations in the real world. To provide their customers and users with fresh, intelligent, and creative business services and products, large software project organizations are adopting or using the Agile project management approach. The bulk of the Agile transformation instances studied (> 30%) occurred in software and telecommunications companies, either in big IT/ICT departments or at the enterprise level.

As a research approach, a multi-case study analysis was utilized to illustrate and explain the results. Using multiple case studies and intentional selection, we hoped to find answers to research questions and close an epistemological gap in relation to large-scale organizational

project management changes in terms of the methods used by businesses and changes in how project teams operate and the values they represent. But only teams working on very complex IT and ICT initiatives and projects are eligible to take part in the research being conducted on this subject matter. Improve the quality of this empirical research by using the triangulation method, which allows for many perspectives. Numerous companies, consultants, and authors contributed to the triangulation concept, which yielded a wide range of case study sources and data collection methods. The majority of the case studies were found via a search of an existing Internet resource. 12 consultant groups (source triangulation) provided documents generated by several authors and consultants (informant triangulation). An experienced Agile coach conducted two case studies based on structured and unstructured interviews, and the third case study is based on the author's personal observations.

The online source of the majority of many case studies is a key restriction of this research study. Case studies obtained from online publications mostly describe successful transformation procedures and give just a small number of specifics relevant to this study. Using the author's knowledge in practice to interpret each case study enables for as much information to be gleaned from these descriptions as feasible, but it may also lead to erroneous or subjective author interpretations. Future research investigations might be conducted by different researchers on the same or comparable numerous case studies to provide some fascinating comparisons and findings.

4. DATA ANALYSIS

The empirical research findings reported in this work are part of a larger research study on Agile transformation, which has been partly published in earlier studies, Nevertheless, without the specific alterations and judgments regarding team values reached by the project team.

The project team's organizational changes and the impact on their values as a result of the implementation or adoption of an Agile transformation approach are critical components of delivering results. The following is a case study analysis of how each change in the organization affected the daily work and routines of the project team:

- Communication –85 percent of the time, it had a significant effect and led to more direct, face-to-face communication inside the project team and with external interfaces like other cooperating project teams, consumers and users as well as other business units within the project organization.
- Teams Cooperation & Collaboration–In terms of shared work tasks involving two or more team members, the transformation had a considerable effect (71%) since it resulted in considerably tighter team cooperation than previously. Allowing for increased experimentation and innovation via better tacit knowledge and experience exchange in daily tasks. When two or more people in a team are working together to complete a single task, it plays a substantial role (71 percent) in the transformation process. It is possible that the feedback loop may be reduced and greater creativity and experimentation could be enabled if there was a considerable increase in the amount of information shared in the form of implicit knowledge and experience during the course of a typical day.
- Friendly Work Environment –By forming long-term teams that encouraged collaboration and increased communication, more than half of the cases (53 percent) were altered.
- Self-Organization –Even if it's challenging to deploy, To guarantee that the product is

updated on a regular basis, the project team must be encouraged to be self-organized and independent.

- Employees Initiatives & Intrinsic motivation –As many as 45 percent of the instances were influenced by a favorable work atmosphere, encouraging the members of the team to accept new ideas and commit to their work, as well as to be creative and proud of their work and the job they were doing;
- Multidisciplinary Teams –implemented in a number of project teams; nonetheless, most project organizations faced a difficult difficulty since it had a considerable influence on their organizational structure; Increased team autonomy, self-organization, and creative problem solving were all made possible with the inclusion of a wider range of skill sets in project teams.
- Customer Cooperation –Team communication and customer interaction must be improved, either directly or indirectly, to reduce feedback cycles and delivery times.
- Business Cooperation & Collaboration –As a result, it was renamed "cooperation and collaboration" to better reflect how the project team worked together with other departments, such as HRM/HRD, budgeting and accounting, strategic choices, legal and regulatory elements, logistics and marketing, inside the project organization; and others; and it was changed back to cooperation.

For a major corporation with the qualities stated above to create and manufacture high-quality goods and services in an agile manner, a tight and mutually connection between the teams, their products and services, and corporate governance is required. Figure 2 depicts this crucial triangle interaction.

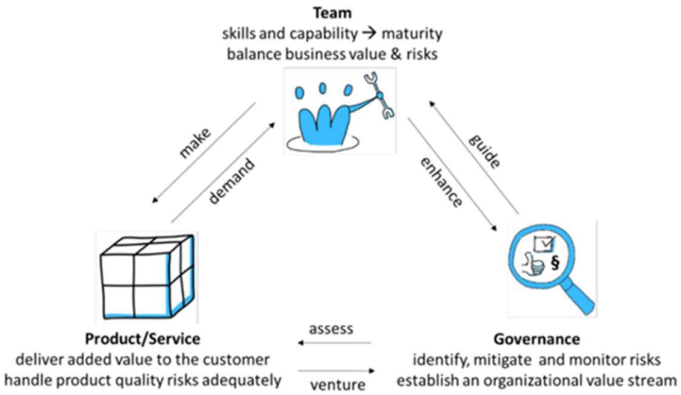

Fig. 2: The Agile QM Triangle (Process controlled)

Customers and users benefit from the enterprise's products and services, which are designed to meet their needs. They need a team of experts to create and implement them. These groups need a wide range of expertise and competencies to provide solutions of the highest caliber. As the solution is being developed and implemented, they must weigh the business values and risks associated with that solution. The organization's governance ensures that this constant balance is maintained. The teams, on the other hand, are an integral component of the organization and work to improve their own set-up as well. Aside from providing guidance, governance is also responsible for making sure that the teams' solutions follow market norms and laws. This leads to certain initiatives inside the organization that need to be handled.

Table 1: Have you experienced any of the following challenges while working with agile methods that you are currently using?

	Yes	*No*	*Don't know*
Agile teams struggle to identify how to communicate their progress to management	51.53%	41.10%	7.36%
Agile teams struggle to identify what needs to be reported to management	53.61%	36.75%	9.64%
Management expects certainty of time, budget, and specifications from the beginning of the project	75.31%	18.52%	6.17%
Re-prioritisation and de-scoping is perceived by management as lack of control	50.62%	38.27%	11.11%
Management expects consistency in reporting right from the start even when the teams are still in the process of transitioning to Agile	53.99%	33.13%	12.88%
Other (please specify)			

Data in Table 1 shows that over 50% of those polled have dealt with at least one of the "agile projects in an agile environment" sub-challenges discovered via this case study. This shows how common these issues are across many contexts.

Figure 3 shows the weighted findings, In the several case studies reviewed, each organizational change is given as a percentage share.

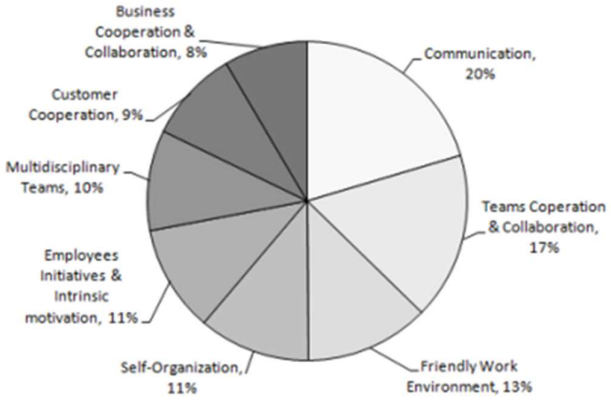

Fig. 3. Organizational (weighted) changes in the Agile transformation process- Control factors

In Fig. 4, the same results are given from a different perspective. The proportion of each organizational change in the total number of case studies studied is shown.

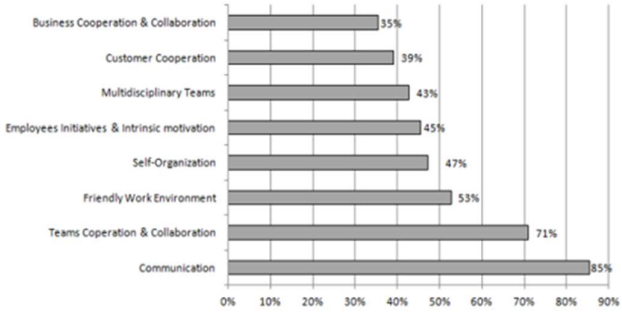

Fig. 4. Organizational (non-weighted) changes in the Agile transformation process)

As a result of several case study assessments, the author has formed his own opinion on the influence of organizational changes on the project team's values during the Agile transformation process. Most of the identified Agile project team values (11 out of a total of 15) were influenced by changes in corporate communication. All of the identified organizational changes had an influence on feedback and communication values. From the standpoint of project team values, organizational changes in the Agile transition

	Courage	Focus	Commitment	Respect	Openness	Visibility	Humour	Proactivity	Honesty	Empathy	Creativity	Fun	Communication	Simplicity	Feedback
Communication	X		X	X	X	X	X		X	X	X		X		X
Teams Cooperation & Collaboration	X	X		X	X					X	X		X		X
Friendly Work Environment				X	X		X		X	X		X	X		X
Self-Organization	X	X	X			X		X			X		X	X	X
Employees Initiatives & Intrinsic motivation	X		X					X			X	X		X	
Multidisciplinary Teams			X	X	X	X					X		X	X	X
Customer Cooperation		X	X	X	X				X				X		X
Business Cooperation & Collaboration		X	X	X	X	X							X		X

Fig. 5. depicts an Agile readiness process (Panasiewicz, Paterek, 2017) for assessing the project team and organization prior to transformation implementation.

This tool evaluates the project teams and project organization's preparedness to embrace Agile in four areas: People management and development; knowledge management; and organizational culture are all aspects of control parameters that lead to governance. It is possible that if the readiness protocol questions aren't answered correctly, the project may fail or be abandoned entirely. Otherwise, the previous governance model and attitude will be retained, resulting in a "pseudo-Agile" implementation or an abandoned project altogether.

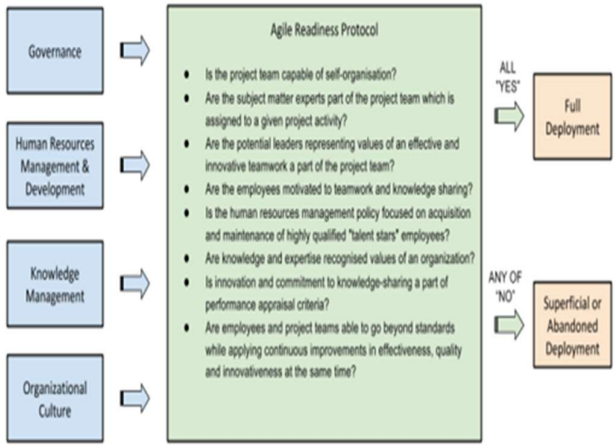

Fig. 6. Readiness protocol of the Agile transformation deployment

In the future, Quantitative indicators for evaluating the impact of Agile transformation teams and organizational changes on project team values may be converted or added to questions using the above-mentioned tool by researchers.

Fig. 6. Design & Strategic Learning requirements modules

Another area of our survey was used to assess design and strategic learning needs for team regularity production. Figure 6 depicted this second category of our survey. According to the results of this survey, our initial goal was to learn if teams consistently provide value for their stakeholders, and most respondents said "yes" or "categorically yes," indicating that this is the case for most firms. Some of our team members were divided and said no because of the lack of sufficient engagement of stakeholders in the process of work validation. After that, we inquired about the external environment and how people felt about the future, and the majority said yes. However, most participants said that they lacked a collaborative atmosphere for their mixed teams. This shows that the adoption of agile requires a strong collaborative atmosphere. A business analyst for JIT was required, as were questions about the organizations' willingness to "dedicate for full-time business expert," "dedicate for the full-time delivery team," "provide time boxes for each iteration," "assign the right person at right role," and implement mandatory discipline as part of our investigation. According to our findings, roughly 50 percent of the persons we asked about full-time business expert devotion were unwilling to do so.

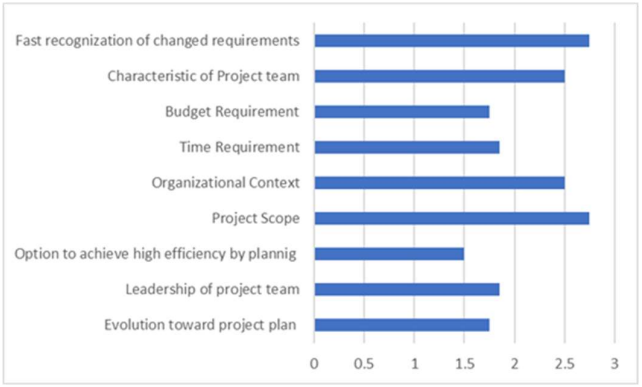

Fig. 7. Components of Process control model and Agile metrics.

From the perception of project managers the components that are the characteristic of agile project management with respect to project control model are discussed in the Figure 7. Robust planning that emphasizes on certainty to accomplish high efficiency leads to ensure the success

rate of the project. Another advantage of agile project management is the capability to quickly recognise change requirements due to regular feedback from the customer that can only be possible by effective process control model. As the model enables, to identify the loopholes and work on it to resolve them quickly. Characteristics of a project scope is based on uncertainty and dynamics of the consumer requirements are strongly impacted on the decision to choose the data and selecting the procedural model. Other components like time requirement and budget requirement act as a bedrock for formulating process control modeling as also discussed in the process control model framework. Despite that, leadership roles cannot be negligible because they are responsible to motivate, dedicate and enhance the productivity of the workforce by improving interaction coordination and cooperation among the team members. Henceforth, these parameters act as a connectivity between the process control model and agile metrics activities.

5. CONCLUSION

Two concerns regarding the Agile transformation were addressed empirically in this study, namely the framework of the transition as a model of comprehensive organizational change and the framework of the transition as a model of comprehensive organizational change. The examination of various case studies addressed the knowledge gap that had been identified. Sherehiy et al., 2007; Sherehiy et al., 2007) published theoretical works on the structure and process of transformation. It also expanded and supplemented data from empirical studies. The most important discovery concerning. Transitioning to a new project management technique is a complicated and extensive process. Processes, tactics, technologies, communication, and other aspects of governance are all undergoing changes. Customer collaboration, organizational structure, organizational strategy, organizational culture, and technology are all terms that come to mind while discussing customer cooperation. Law and financial accounting the key stages of change are determined by the person. The stages of evolutionary deployment and organizational culture modifications should be handled in the same order as they were developed in the current research project. The study findings revealed certain process and control factors that should be taken for governance as a common factor. However, additional concepts should be addressed while analyzing short- and long-term aims and organizational strategy, as per Joslin and Müller (2015) and Paterek (2017) in the context of the transformation process' corporate environment. The study's results may be valuable to practitioners or consultants who are interested in implementing novel project management practices in software development organizations to increase productivity and organizational agility. The Web source of many case study descriptions is the research study's principal weakness. Consultants and its writers concentrated on adoption success stories and lessons gained rather on the adoption process itself information about the specifics and difficulties experienced. The procedure itself is the second constraint. Complexity that requires an in-depth analysis of organizational practice and specialized approaches to gather this information The findings of the study have sparked a slew of new and intriguing topics for future investigation. Many factors influence a company's ability to make a successful transformation, including the adoption circumstances, situations when a transformation fails or is only half-complete, and the effect they have on software companies. Preparation for the deployment of a process. Panasiewicz and Paterek (2017) introduced the Agile readiness methodology.Future empirical research topics in the

Agile transformation process

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