IMPACT OF SOFTWARE CHARACTERISTICS, USER CHARACTERISTICS AND ORGANIZATIONAL & PROJECT CHARACTERISTICS ON USER PERCEIVED PERFORMANCE IN SOFTWARE DEVELOPMENT SECTOR

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Abstract

The main purpose of the study is to examine the relationship between organizational and project characteristics, project governance, software characteristics, user characteristics and user- perceived performance in the software development sector of Pakistan. Secondly it also examines how project management methodologies (PMM) influence the success of the IT projects in Pakistan. Purposive sampling method was used to choose the sample of the study. Sample of study consists of 151 IT professionals who are directly involved with the project management tools and techniques in the software development companies in Pakistan. Self-administered Google survey questionnaire was used for data collection and PLS – SEM software was used for data analysis. Results showed that there is a positive relationship between the organizational and project characteristics, Project governance and user perceived performance, software characteristics and project governance. However, there is no relationship between user characteristics and project governance. Additionally, project governance moderates the relationship between organizational and project characteristics, and user-perceived performance. Project governance also moderates the relationship between software characteristics and user-perceived performance. Finally, results revealed that project governance does not moderate the relationship between the user characteristics and user-perceived performance. The results from this research will contribute to improving project governance practices and achieving successful software development projects in Pakistan. The study claims that adopting agile methodologies in Pakistan will improve the effectiveness of software and the quality of software products.

Keywords: Software Characteristics, User Characteristics, Organizational Project Characteristics, User Perceived Performance.

INTRODUCTION

The study delves into the multifaceted concept of project success, which consists of two core dimensions: project success based on achieving main project objectives and utilizing its outputs, and project management success, evaluated through internal competency metrics like budget adherence, timeliness, and the quality of project outcomes (Chin and Spowage, 2010). Each of these factors contributes to the overall success of a project, which is measured continuously. The project management methodology (PMM) is a key aspect in increasing productivity and the possibility of meeting project objectives, scope, and milestones (Charvat, 2003).

According to Fortune et al. (2011), the effectiveness, quality, and likelihood of a project's success can all be negatively impacted if a company's PMM is not properly aligned with its long-term vision and objectives, or if it contains incomplete and weak methodology characteristics (Fortune et al., 2011). The

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use of project management methodologies (PMMs) has been met with resistance from several researchers (Pajares et al., 2017).

When evaluating the success of a project, it is important to look at both the short-term successes associated with competent project management and the long-term successes associated with the project's planned results. In today's competitive market, companies that can adapt quickly and efficiently will succeed. Patanakul et al. (2010) and Lappe and Spang (2014) argued that project management principles support the post-project implementation of these alterations. Organizations can implement changes in areas like production, marketing, and sales with the help of project management tools and processes (Kolltveit et al., 2007).

The rate at which projects are completed successfully is strongly influenced by the methods, tools, and processes used in project management. Using these approaches, procedures, and resources has been shown to significantly improve project outcomes in a variety of research contexts. As a result, businesses are beginning to understand that they need to implement efficient project management techniques in order to boost their projects' success rates. There has been an explosion of time-saving methods in the software industry in recent years. These methods can be categorized as either "heavyweight" or "lightweight." Lightweight approaches, often known as agile methods, place a higher value on interaction between humans and the delivery of working software than on detailed documentation (Lock, 2007).. In contrast to heavyweight approaches like the Waterfall Model, Agile processes place an emphasis on client collaboration, flexibility, and iterative development (Lappe and Spang, 2014; Patanakul et al., 2010).

Over the past ten years, software companies in Pakistan have followed international trends by steadily shifting towards adopting agile methodologies (Bryde, 2003). The need for higher quality software products and more efficient development as a whole is behind this change. Research questions focus on how IT software development firms in Pakistan might improve their project success rates by using agile project management practices. The impact of agile techniques on project success in the context of developing nations like Pakistan is poorly known despite their growing popularity due to their claimed adaptability and resourcefulness (Management et al., 2014).

There are a number of reasons why this study is important. This study fills a void in the current literature by investigating the effect of agile methods on the final outcome of software development projects in Pakistan (Rubel et al., 2020). Agile approaches have become popular, yet there is no evidence of their success in this setting. Project management literature benefits from this study as well, since it provides new insight into what makes IT and software development projects in Pakistan successful (Wafa et al., 2022). The goal is to teach software firms in Pakistan how to use PMM effectively so that their projects are more likely to be completed successfully.

This research adds to the current body of knowledge in the fields of project management and information technology by examining the impact of different project management approaches on software development projects in Pakistan.
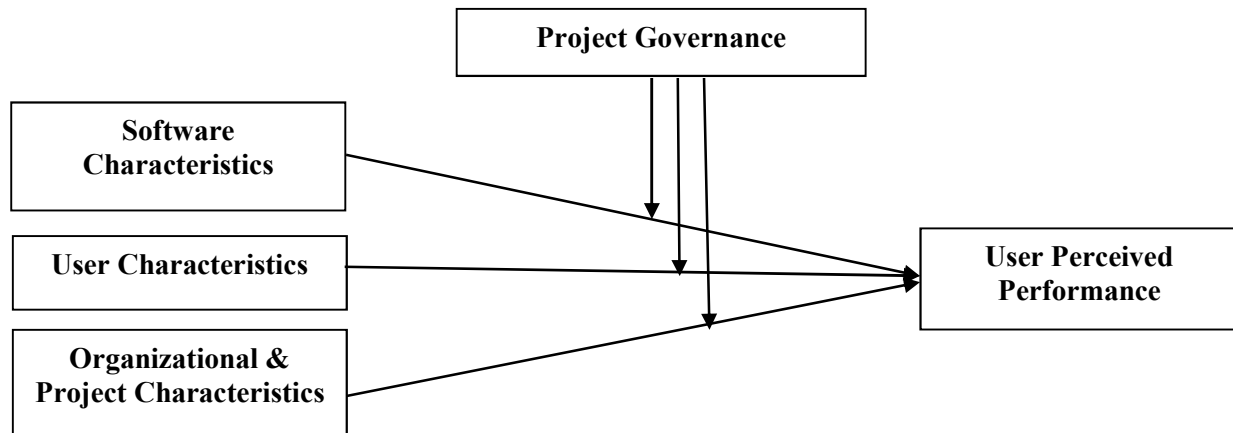
Figure 1: Proposed Conceptual Model

LITERATURE REVIEW

Software Characteristics, Project Governance and User Perceived Performance
Software project management trends are increasing rapidly, and software project management tools have been developed accordingly in response to the greater needs to improve software project management by establishing more interaction among software development team members and the project management tools (Kumar et al., 2022).

The project management software characteristics depend on the size, complexity, innovation, and its ability to benefit software developers (Hodgkins and Hohmann, 2010). Likewise, the project governance factors include the relevant approach that is used managing projects, matrix for the quality management and gauging the outcomes, and parameters used for managing risks (Crowder and Friess, 2015). Studies have found that there is a significant correlation between software characteristics and project governance, realizing they impact on the outcomes such as cost, timelines, scope, and quality (Cobb, 2011). Studies have also found that the project governance approach is very important while mitigating the influence of software characteristics on project results (Santos and de Carvalho, 2022a). There are more chances of success of project development techniques having strong project management, quality management, and risk management approach although diversified software characteristics (Dybå et al., 2014).

Software development in agile is different from the conventional methods such as waterfall because the changes are not encouraged in waterfall method and the process of changes is rigid in it (Joslin et al., 2015). User stories are a unique feature of agile software development where agile teams capture story points to determine the priority and complexity of the specific tasks (Ktata and Lévesque, 2009). While assigning story points to the tasks its mandatory for the agile teams to breakdown larger tasks into the smaller tasks in the form of user stories and plan their workflow in iterative method in which they develop a chunk of the task, test it, document their learning, and then redesign the working methods if required (Licorish et al., 2021). It helps agile teams to follow the acceptance criteria and ensure the designed test frameworks are accurate for further development (Haq et al., 2019).

User Characteristics, Project Governance and User Perceived Performance

The success of the team is as important in software development as it is in any process that requires human contact. A team is typically characterized as a small group of people with unique skills who are committed to a single objective, set of performance targets, and methods for which they are accountable (Carroll & Morris, 2015). The agile project management comprises of three main pillars for delivering efficient projects and these are effective decision making, smart goals setting and performing continuous evaluations and assessments (Owen et al., 2006). The focus of goals setting is to create value for the stakeholders and align the project objective with the organization's important milestones (Cervone, 2011). Decision making empowers teams and enables them to work in the decentralized system so the team should make data driven and experience-based decisions (Delic et al., 2022). For gauging the team ability and to find the areas of improvement continuous performance elevation is important and it ensures transparency between the team and stakeholders (Abrahamsson et al., 2010). Project managers should create a balance in project governance with control and flexibility to achieve the expected milestones (Ciric Lalic et al., 2022).

Agile project management is gaining fame in the software development industry due to its unique features that enable teams to streamline their processes (Haq et al., 2023). However, agile project governance does not moderate the relationship between user characteristics and user perceived performance (Chen et al., 2014). Agile teams follow the agile practices where they work on the shared code to help each other in their personal and professional growth at the same time it is beneficial for the agile development groups (Henry, 2004). Team activities such as pair programming, automated standardized testing and code reviews enable agile teams to focus on the software quality (Valverde and Moore, 2019a). These practices enable teams through regular training programs, team get liberty to organize their own work and collaborate with other team members; it is considered as the main feature of agile project management (Khan et al., 2021). However, this autonomy encourages agile teams to take responsibility for their assigned tasks and help them to achieve their perceived performance without applying regress project governance by the management (El-Sheikh and Pryke., 2010). Agile project managers make sure that agile teams are following the agile organizational work norms (Laine et al., 2002). To fulfill these responsibilities and frame their autonomy, agile teams develop and follow organizational work norms which are considered as an important feature and criteria to gauge agile project governance (Mähring, 2002). Studies show the continuous changes and operations in the dynamic context are the norm in agile software development (Scoleze Ferrer et al., 2020).

Organizational & Project Characteristics, Project Governance and User Perceived Performance

Software organization and project characteristics have a significant correlation (Piwowar-Sulej, 2021). Studies have been conducted on the direct connection of enhanced performance with the project governance mechanisms in software development projects (Koi-Akrofi et al., 2019). There are two types of governance mechanisms that are mainly practiced in software development projects, first one is contractual governance, its major focus is on following the formal rule and written contacts and there is relational project governance which includes informal ways of communication and project governance such as creating friendly relationship among the agile development team members (Nuottila et al., 2016). Both project governance methods have been tested and brought significant results in the software development industry and these were beneficial for the businesses and employees (Santos and de Carvalho, 2022). It's the right practice for project governance to follow the techniques that are aligned

with the organizational goals in the IT industry to monitor and control project time, scope, and resources (Copola Azenha et al., 2021). Project governance also provides and encourages developing a structure, process, and data-driven-decision-making models for managing projects in an agile framework (Ciric Lalic et al., 2022).

Advance software development gets inspiration for Agile software development approach as it is gaining popularity and known as the most effective technique so far (Patterson and Spreng, 1997). Unlike the traditional approaches, the agile approach emphasizes iterative and incremental software development where you follow the software development life cycle which includes three important steps: Develop, Test, Improve. Agile teams thrive to improve their software development by focusing on the application of agile tools and techniques (Ostrom, 1999). The requirements of agile organizations are onboarding self-sufficient teams who believe in collaborative work and share their work and learning for mutual benefits (Sankaran et al., 2008). Agile project governance moderates the connection between the Organization and Project Characteristics with the user perceived performance (Joslin, 2014). The vision of Agile was published in Agile Manifesto in 2001 (Yang et al., 2015). The Agile manifesto encourages teams to collaborate for performing complex tasks and delivering high quality projects (Oteng-Peprah et al., 2018). The manifesto suggests that individual interaction is more valuable than the working software. It gives an idea of the required work ethics and culture (Larsen et al., 2021). Agile project management is taking over in IT industry over the conventional and traditional project management approaches because it is very important for development teams to feel backed by their management (Valverde and Moore, 2019b). Both software and non-software entities come under this support system (Anvuur et al., 2012).

Project Governance and User Perceived Performance

During the agile development project, the team members take various roles to fulfill the different phases of the assigned task and they create a self-organized environment. This is important in agile development as the whole team needs to be on the same page to complete successful projects (Musawir et al., 2020). However, agile teams face issues during the large, scaled projects of software development. Therefore, the traditional role of a project manager is obsolete in agile project management because these self-organized teams work closely on the deliverables, and they adjust the development process (Tam et al., 2020). In some cases, projects are governed by the hybrid model of project management where both agile and traditional project governance practices are being observed to raise the alarming issues between the development teams (Luna et al., 2020). Governance iterations can be unified with the development iterations to practice the lean management and governance mechanism to resolve issues among the agile teams in timely manners (Ahuja and Carley, 1999). To understand the user perceived performance, it's important to understand the values and dynamics of agile development teams as they work together, therefore, they share common values (Joslin et al., 2014). Through empirical studies five factors help to understand and evaluate team performance (Clark and Gottfredson, 2009).

Summary of Hypothesis

H_1: Organizational and project characteristics have a significant impact on the effectiveness of project governance.

H_2: There is a positive relationship between project governance and user-perceived performance.

H_3: There is a positive relationship between software characteristics and project governance in software development projects.

H_4: User characteristics have a positive impact on the effectiveness of project governance.

H₅: Project governance moderates the relationship between user characteristics and user-perceived performance.

H₆: Project governance moderates the relationship between organizational and project characteristics and user-perceived performance.

H₇: Project governance moderates the relationship between software characteristics and user-perceived performance.

METHODS

In this study, a quantitative research method was used. Surveys and statistical analysis were used to collect and analyze data from software companies in Pakistan. This study looks at how agile project management is used in Pakistan's software and IT industries. Moreover, this research was carried out in a natural setting, without any changes to or disruptions of normal work processes. The data was collected over the course of one month, making it a cross-sectional study, which is also called a "one-shot" study. Surveys, which are good for quantitative research, were picked as the method for collecting data. Purposive sampling was used to choose the study sample, taking into account the specific population being studied: people who work in the software business and directly use agile project management software and tools. The group for the study was made up of both male and female who worked full-time in IT at software companies in Pakistan, with 38% being women and 62% being men. These people worked in different IT jobs, from junior to senior levels, including as software developers, software quality assurance specialists (SQAs), Agile project managers, and support staff. It's important to note that all individuals were actively using one or more tools for project management. Out of the 800 questionnaires that were sent out, 151 were filled out, with 38% of the answers coming from women and 62% from men. In order to gather data, a Google survey questionnaire was made and sent to software developers and IT professionals in Pakistan who work directly with project management tools. The survey was sent to IT workers at a number of software houses and IT companies via WhatsApp and email. In this study, the CFA tool was used to assess the measurement model's rationality, while the SEM was utilized to test the instrument's reliability, rationality, convergent validity, and discriminant validity.

Furthermore, CFA was used to estimate and verify the reliability of the conceptual mode; for the data collected (Tanakinjal et al., 2010). The HTMT and composite reliability measures, as well as the estimated factor loading range and discriminant validity, were all calculated using convergent validity. Bootstrapping in the SmartPLS software was applied to examine the relationships between the factors.

ANALYSIS AND RESULTS

The results of the analysis, including convergent validity, reliability, and discriminant validity, are presented in Table 1, demonstrating a high level of reliability and validity in the model.

Table 1

Measurement Model (Convergent Validity, Reliability, Discriminant Validity)

Construct & Item	Factor Loading	CR	CA (α)	AVE
Organizational & Project Characteristics				
Met safety standards	0.785	0.890	0.845	0.618
Motivated for future projects	0.815			

Enabling of other project work in future	0.744			
Met client's requirement	0.786			
Met planned quality standard	0.798			
Project Governance				
New understanding/ knowledge gained	0.760	0.893	0.850	0.625
Steering group satisfaction	0.784			
Complied with environmental regulations	0.780			
End-user satisfaction	0.821			
Project team satisfaction	0.806			
Software Characteristics				
I supplemented the organization's project PMM when necessary, with missing tool(s)	0.871	0.917	0.879	0.734
I supplemented the organization's project PMM when necessary, with missing technique(s)	0.871			
I supplemented the organization's project PMM when necessary, with capability profiles(s)	0.853			
I supplemented the organization's project PMM when necessary, with missing knowledge areas(s)	0.831			
User Characteristics				
I applied the relevant processes during the project life cycle	0.871	0.933	0.911	0.737
I achieved the project results expected by applying relevant tools	0.852			
I achieved the project results expected by applying relevant techniques	0.889			
I achieved the project results expected by applying relevant capability profiles	0.831			
I achieved the project results expected by applying relevant knowledge areas	0.849			
User Perceived Performance				
Make it easier to do my job	0.869	0.956	0.942	0.812
Improve the quality of my work	0.901			
Give me greater control over my work	0.934			
Improve the quality of my decisions	0.916			
Improve my problem-solving ability	0.882			

As shown in the table above, the results of Cronbach's alpha were higher than 0.7, which indicated that the measurement tools used in the study are reliable. Convergent validity was assessed by using average variance extracted (AVE). The AVE values for all the factors were significantly higher than 0.5, which is the minimum acceptable level. This indicates that the factors in the study are related to each other. Additionally, most of the individual items had strong factor loadings greater than 0.7, which indicates promising results.

Fornell Larcker Criterion and HTMT Ratios
Table 2 presents data regarding the relationships, between concepts and the assessment of validity using the Fornell Larcker criterion and HTMT ratios. The objective is to confirm that the measures used in the study are distinct and not strongly correlated, thus supporting the reliability of the research model.

Table 2
Correlations and Discriminant Validity by Fornell–Larcker Criterion and (HTMT) Ratios

	Organizational & Project Characteristics	Project Governance	Software Characteristics	User Characteristics	User Perceived Performance
Organizational & Project Characteristics	0.786	0.729	0.271	0.410	0.436
Project Governance	**0.848**	0.791	0.428	0.663	0.399
Software Characteristics	**0.315**	**0.489**	0.857	0.663	0.437
User Characteristics	**0.467**	**0.524**	**0.742**	0.858	0.554
User Perceived Performance	**0.491**	**0.444**	**0.486**	**0.598**	0.801

By comparing these values with those off the diagonal (representing correlations between constructs) we observe that all diagonal values are higher than their corresponding off values, which supports validity according to the Fornell Larcker criterion. Moreover since the HTMT ratios are below the accepted threshold of 0.85 it indicates that there is validity among the constructs. This combination of using both the Fornell Larcker criterion and HTMT ratios helps ensure that there is distinction among measurement model constructs, avoiding issues, like multi-collinearity and ultimately enhancing reliability in our model.

Cohens f² Measures
Table 3 seems to display the strength of relationships, between factors using Cohens f² (f square). Cohens f² measures how well a predictor explains the variation in the variable. The numbers in the table indicate how much each predictor affects the variable.

Table 3
Effect size - Chohen (f^2) f Square

Org Project Characteristics	Project Governance	Effect Size	Software Characteristics	User Characteristics	User Perceived Performance	Effect Size
Org Project Characteristics	0.847	Substantial				
Project Governance					0.190	Moderate
Software Characteristics	0.062	Moderate				

User Characteristics User Perceived Performance	0.004	Small

The effect sizes, measured by Cohens f² give us insights into the strength of relationships between factors in our model. Notably when predicting Project Governance, Organizational & Project Characteristics have an impact ($f^2 = 0.847$) suggesting that organizational and project related factors strongly influence the governance structure within a project. Similarly when predicting Software Characteristics Project Governance has an effect ($f^2 = 0.190$) indicating that governance practices have an impact on the features of the developed software. Likewise Software Characteristics moderately contribute to shaping User Characteristics ($f^2 = 0.062$) implying that software attributes play a role in defining user related traits. However User Characteristics have an influence, on User Perceived Performance ($f^2 = 0.004$) suggesting that user specific attributes only slightly affect how users perceive system performance. Simultaneously these effect sizes give us a understanding of how different factors influence the studied model to varying degrees.

R Squared and Adjusted R² Values

In Table 4 we can see the R² and adjusted R squared, for the specified constructs. These values provide information about how much of the variance in each construct's explained by the model.

Table 4
R Squared (R²) and Adjusted R²

	R Square	R Square Adjusted
Project Governance	0.590	0.581
User Perceived Performance	0.160	0.154

Regarding Project Governance the R² value is 0.590 which means that 59% of the variance in Project Governance can be attributed to the predictor variables used in our model. The adjusted R² takes into account both the number of predictors and model complexity is calculated to be 0.581. Similarly when it comes to User Perceived Performance our model explains, around 16% of the variance as indicated by an R² value of 0.160. The adjusted R² is found to be 0.154.

Path Analysis

In Table 5, we can see the outcomes of a path analysis that was conducted to test hypotheses. The focus was, on examining the effects between constructs in the model. The table provides information about estimated path coefficients (β) T values, P values and whether each hypothesis is supported or not.

Table 5
Path Analysis - Hypothesis Testing (Direct effect)

	Hypothesis	β	T Values	P Values	Decision
Org Project Characteristics -> Project Governance	H1	0.649	11.754	0	Supported
Project Governance -> User Perceived Performance	H2	0.4	5.11	0	Supported
Software Characteristics -> Project Governance	H3	0.213	2.799	0.005	Supported

User Characteristics -> Project Governance	H4	0.062	0.795	**0.427**	**Not Supported**

The results of the path analysis provide insights into the relationships among the constructs in our model. We have evidence supporting the hypothesis that Organizational & Project Characteristics significantly predict Project Governance. This is evident from a path coefficient (β = 0.649) and high statistical significance (T value = 11.754, P value = 0). Similarly we robustly support the hypothesis stating that Project Governance significantly predicts User Perceived Performance. This is backed by a moderate path coefficient (β = 0.4) and a significant T value (5.11 with P value = 0). Additionally we have support for the hypothesis linking Software Characteristics to Project Governance although with a smaller but still significant path coefficient (β = 0.213) and a significant T value (2.799 with P value = 0.005). However we do not find support for the hypothesis suggesting a relationship between User Characteristics and Project Governance due, to a small path coefficient (β = 0.062) and no statistical significance (T value = 0.795 P value = 0.427). In general these findings add to our understanding of how the examined constructs connected highlighting their strength and significance.

Moderation Analysis

The findings presented in Table 6 provide insights, into the impact of variables on the relationships between factors. This analysis specifically focuses on how moderator variables influence these relationships. The table includes information such as estimated path coefficients (β) T values, P values and decisions regarding the support or non-support of each hypothesis.

Table 6
Path Analysis - (Specific Indirect effect): Moderation

	Hypothesis	β	T Values	P Values	Decision
User Characteristics -> Project Governance -> User Perceived Performance	H5	0.026	0.749	0.454	**Not Supported**
Org Project Characteristics -> Project Governance -> User Perceived Performance	H6	0.26	4.612	0	Supported
Software Characteristics -> Project Governance -> User Perceived Performance	H7	0.085	2.438	0.015	Supported

Table 6 examines how specific variables moderate the relationships between factors offering insights into our model. Hypothesis 5 which suggested that User Characteristics as a moderator significantly affect the relationship between Project Governance and User Perceived Performance is not supported. The small path coefficient (β = 0.026). Lack of significance (T value = 0.749, P value = 0.454) indicate that User Characteristics do not have a significant moderating effect on this relationship. On the hand Hypotheses 6 and 7 are supported. Organizational & Project Characteristics and Software Characteristics act as moderators with β = 0.26). Small (β = 0.085) positive effects respectively significantly influencing the relationship between Project Governance and User Perceived Performance.

The statistical significance (T values of 4.612 and 2.438, P values of 0) provides evidence, for these moderating effects. These findings enhance our comprehension of the model by revealing how certain variables selectively influence the connections, between concepts.
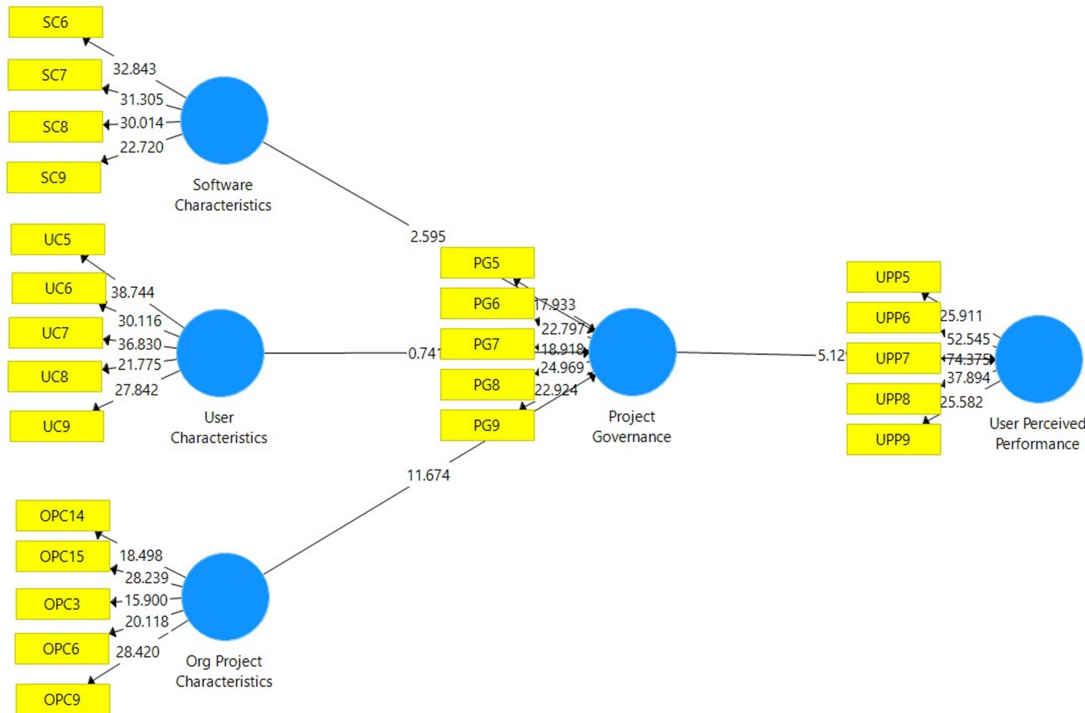

Figure 2: Result of Analysis

DISCUSSION

The study researched the relationships between software characteristics, user characteristics, organizational characteristics, project governance, and user-perceived performance in software development projects. Organizational and project characteristics have a significant impact on the success of project governance (Sánchez-Segura et al., 2023; Zwikael and Smyrk, 2015). The results indicate that factors such as organizational culture of IT companies, level of project complexity in software development, and project scope significantly impact the effectiveness and implementations of project governance. There is a positive relationship between project governance and user-perceived performance. The hypothesis is supported by the study findings and coherent with past research (Subramanyam et al., 2010). During the agile development project, the team members take various roles to fulfill the different aspects of the assigned task and project and they create a self-organized environment. This is important in agile development as the whole team needs to be on the same page to complete successful projects. There is a positive relationship between software characteristics and project governance in software development projects (Capra and Wasserman, 2008; Noll et al., 2016). The study found that software characteristics, such as complexity, functionality, and technical quality, positively influence project governance. Results support the original hypothesis and confirm that there is a positive relationship between software characteristics and project governance. User characteristics have no relation with the project governance (Bhattacharya et al., 2012). The original hypothesis is not supported by the study

results, and it is revealed that user characteristics have no relationship with the project governance. The study found that user characteristics, including software knowledge and understanding, skills and interaction with the tool, and involvement in the project, are not influenced by the effectiveness of project governance. Project governance does not impact and moderates the relationship between user characteristics and user-perceived performance (Kang et al., 2014). Study results do not support the original hypothesis and it has been found that project governance does not act as a moderator between the user characteristics and user-perceived performance. Project governance moderates the relationship between organizational and project characteristics and user-perceived performance (Kang et al., 2014). The study discovered that project governance plays a moderating role. Effective project governance practices help to leverage the positive impact of positive organizational and project characteristics on user-perceived performance. Project governance moderates the relationship between software characteristics and user-perceived performance (Liǔ et al., 2021; Man & Roijakkers, 2009). The study found that project governance performs a moderating role in the relationship between software characteristics and user-perceived performance. Therefore, results support the original hypothesis. Effective project governance practices and help in mitigating the potential negative impact of unfavorable software characteristics, leading to developed user-perceived performance.

CONCLUSION

Despite the limitations related to the research, study has produced some useful results and findings. It highlights the positive relationships between software characteristics, user characteristics, organizational characteristics, project governance, and user-perceived performance in software development projects. Moreover, Project governance acts as a moderator, influencing the value of software characteristics and organizational and project characteristics and eventually improving user-perceived performance. However, project governance does not moderate the relationship between user characteristics and user perceived performance. The results highlight the importance of strong project governance practices, considering use ability and ease of project management software, Level of user's education and experience with the software and organization's approach to implement the project governance. These insights have practical suggestions for project managers, by helping to improve project outcomes in the software development industry.

Recommendations

- Agile methodology in software development projects looks to be a highly effective strategy for efficient project governance and effective user perceived performance. Development initiatives should use agile frameworks from Pakistani software businesses. Staff training, workshops, and awareness campaigns should promote agile practices.
- Results also reveal that agile's key benefit is that there are no hard and fast rules, thus organizations can customize the framework. Pakistani software businesses must evaluate their industry demands and difficulties and embrace agile practices. In Pakistan's IT business, this personalization will assist projects succeed.
- Additionally, studies showed that academia should encourage students to explore agile methodologies and their use in Pakistan's IT business. Pakistan's needs, success factors, and problems must be identified. This will increase software development project management understanding.

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