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A Study of Project Management Processes for Sustainable and Successful Projects in Software Industry: Expectations vs Perceptions of Managers

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ARTICLE DETAILS	ABSTRACT
<p>History Revised format: February 2021 Available Online: March 2021</p> <p>Keywords Project Management, Software Industry, Gender, Processes, Project Success.</p> <p>JEL Classification: M48, M49</p>	<p>Project Management Processes (PMPs) are essential to avoid project failures due to the complexity and nature of projects in the software industry, particularly in emerging economies. The software industry is growing rapidly in Pakistan with an increasing number of local, regional and international clients. The project managers who are familiar with PMPs are therefore needed for the proper implementation of these processes, which will lead to sustainable and successful software projects. However, very limited studies have analyzed the expectations and perceptions of the project managers of these PMPs. In order to fill this gap, therefore, this study examined the role of PMPs in the sustainable development and success of software projects by documenting the expectations and perceptions of managers. A structured questionnaire is designed to collect data from 143 participants working in software houses. SPSS is used for the processing and analysis of data using selected statistical tools. The results show a clear difference in expectations and perceptions for PMPs, which means that project managers are of a less rational, sentimental and emotional nature. The findings of this study also show that the male segment is dominant in the software industry which may be due to of Pakistan's specific social and cultural environment. There is however no significant difference between expectations and perceptions of both male and female project managers for PMPs. The findings of this study will help researchers, practitioners, academics and other stakeholders in the software industry.</p>



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1. Introduction

The inception of project management standards is traced back to the construction of pyramids during the Egyptian era. Modern project management was introduced a half-century ago. However, due to major failures in the 1980s, sound project management tools, techniques and practices have been used for software projects followed later by almost every industry (Carayannis et al., 2005; Kerzner, 2017). The software industry has been confronted with an alarming rate of project failure compared to other industries. It has been reported that poor quality software costs around \$2.84 trillion in 2018 in the US (Krasner, 2018). A study reported that 41% of existing literature on project failure was related to software projects due to high failure rates (Gupta et al., 2019). The evident reason for failure was the lack of an ideal candidate for the implementation of project management processes. The majority of project managers in the software and information technology (IT) sector have technical skills rather than managerial skills in different projects (Ko & Kirsch, 2017; Dobie, 2020). It has been reported that IT projects have failed because project managers have not been equipped with management skills (Liu & Liu, 2010; Lauesen, 2020) .

Papke-Shields et al. (2010) argued that the implementation of standard project management processes is essential for all organizations. PMPs are developed and validated by the Project Management Institute (PMI), the Association for Project Management (APM), the Australian Institute for Project Management (AIPM) and the International Project Management Association (IPMA) which are finally compiled into the Project Management Body of Knowledge (PMBok) (Rose, 2013). Practitioners working in the software industry are required to be aware of the orientation and application of PMPs due to the complex and diverse nature of the tasks in order to complete different projects (Akgün, 2020). PMPs could be a solution to reduce project failure and improve quality. Most of the time, the failure of major software projects is associated with “poor management” (Marinho et al., 2014; Gupta et al., 2019).

PMI provides a wide range of standard processes and practices for project managers in almost every field, including the software industry. The project standard processes are equally applicable in developed and emerging economies such as Pakistan, which are pursuing a variety of projects. This study examines the application of PMPs to the Pakistani software industry by considering the local dynamics and awareness of project managers. IT projects are unique and show a significant difference in nature and characteristics, such as short or long term, uncertainty, etc. compared to projects in other domains. The software industry in Pakistan has shown unprecedented growth, with great potential and multidimensional challenges, that can lead to high rate of project failure (Maqbool et al., 2018). A study reported that only 2% of jobs are published for the role of project manager in Pakistan's software industry (Bilal et al., 2017). Failure to comply with and lack of awareness of PMPs was also reported as one of the reasons for the failure of the project (Cruzes, 2013). Trained and competent project managers are crucial to the success of the project. PMPs and their application can have a significant impact on the success rate of IT projects (Engelbrecht et al., 2017; Vujović et al., 2020). A hybrid project manager with a knowledge of both the business and IT domains can address the uncertain challenges faced by IT projects more effectively (Ko & Kirsch, 2017).

2. Literature Review

2.1 Project Management and Software Industry

The era of projects started million years ago since ancient mankind. However, 1957 is considered to be the dawn of modern project management through the inception of the Critical Path Method (CPM), which is a major contribution to the project management profession (Weaver, 2006). In the 1980s, the software industry in developed countries implemented PMPs in order to overcome high failure rates. Subsequently, developing and emerging countries have also started to apply PMPs for efficient use of resources, particularly in the software industry (Carayannis et al., 2005). Project management is treated as an academic field of planning and is used in combination with a wide range of other disciplines (Geraldi & Söderlund, 2018). Too much effort, resources and time was wasted on the rationale of project success and failure, ignoring some important research issues that could enhance the knowledge and

theories of project management (Söderlund, 2004). The literature on project management outlines the objectives and strategies for achieving success in the project (de Carvalho et al., 2015; Gupta et al., 2019).

Terlizzi et al. (2016) examined the impact of the application of project management processes to the success of the project by analyzing 3047 software projects. Jones (2004) investigated more than 250 large software projects by grouping them into two categories, i.e. successful and failed projects based on six PMPs. The remedy presented is that if a project has implemented proper software project management techniques, there are greater chances that a project will succeed. It was concluded that project management is the only reason for the success or failure of any project. Large software projects that lack quality control will most likely fail. A study introduced new trends and possibilities for thinking and research into practical project management. The most important, popular and best practices have been proposed and recommended. Some of the drawbacks identified in previous studies have been reassessed by the impact of standard project management processes. The effectiveness of these methodologies and standards has been assessed in the context of the evolution of project management (Cicmil & Hodgson, 2006). A study reported that most of the risks faced by software projects are critical, which can be avoided by using risk management processes (Bilal et al., 2020).

Kerzner (2017) reported that project management allows for better project planning, execution, monitoring and evaluation, creating greater benefits from improved decision-making, improved customer satisfaction in addition to less time and low project risks. It has become a competitive advantage by managing the various risks, complexity and diversity that automatically improve the quality of the project. The project manager is responsible for the success and failure of any project, keeps the teams motivated and ensures proper communication with all stakeholders. The issues of team members and the needs of stakeholders can be well understood through proper communication. The work efficiency of the team can be improved through the implementation of management innovation. Proper coordination of all components is crucial for the successful management of IT projects, which will lead to the successful implementation of the project (Liu & Liu, 2010; Oh & Choi, 2020). Similarly, the project management practices that appeared to be used are part of the entire life cycle, but the most prominent tools and techniques are part of the planning phase (Fernandes et al., 2013; Soltan & Ashrafi, 2020).

PMI has presented PMBoK as a guideline for project managers to ensure the success of a project through the implementation of specific processes. PMBoK lists 47 processes, which are grouped into 10 knowledge areas and 5 process groups. The latest edition introduced a new area of knowledge called Project Stakeholder Management along with its four processes (Rose, 2013). Software projects are unique in nature, in the sense that they can be implemented in a distributed environment. This brings with it a number of advantages and drawbacks. The plus is a quality product at a low price, and the downsides are cultural and time differences (Singh & Lano, 2014). Mir & Pinnington (2014) conducted an empirical study to analyse the relationship between project success and project management performance by collecting data from 154 software companies in the UAE. The findings showed a positive relationship between the performance of project management practices and the success of the project. However, it was noted that the organizations are very slow to adopt these project management practices and that only 41% of project managers follow PMPs.

Marinho et al. (2014) reported that the trend of project-based organizations continues to increase due to unlimited benefits. However, due to poor success rates and low performance, serious challenges have emerged that can be addressed through project management in terms of scope, time, cost and uncertainty management, etc. It is evident that small software houses with 1-10 employees play an important role in improving the economy of developing countries such as Pakistan. There is, however, very little literature on the implementation of PMPs in small software companies. Most of the project management practices followed in Pakistan and in other parts of the world are of a similar nature. The challenges faced by

small software companies included a number of responsible, inadequate project management tools, poor communication and lack of user coordination. All of the factors identified have played an important role in the success of any project. It is a good sign that small software companies are trying to adopt formal project management tools and sound software development tools (Shakir & Nørbjerg, 2015; Maqbool et al., 2018). The low success rate of software projects remains a major problem for the software industry (Hidding & Nicholas, 2017; Gupta et al., 2019).

2.2 Expectations and Perceptions of Project Managers in the Software Industry

The perceptions of project managers for PMPs associated with successful IT projects can vary a lot (Pankratz & Basten, 2018). Project managers and technical staff have a key role to play in IT companies. A study examined the difference in perception between 91 technologists and project managers from eight different organizations. The findings showed that the perception of technologists differs from that of project managers. Project managers have perceived continuous improvement and have also agreed with the perceptions of technologists who need to be involved in management work in order to establish their importance within the organization (Sankar et al., 1991). Perceptions of male and female team members working on the engineering project were investigated by collecting data from 68 teams with 43 female and 263 male members. The results showed that there was no difference in perception and expectations of male and female team members using a four-dimensional model (McAnear & Seat, 2001). In addition, a study reported that male project managers rate the performance of female project managers lower than male project managers, while female project managers rate performance equally (Szymanska & Rubin, 2018).

Hornik et al. (2003) examined the difference between expectations and perceptions of users, project managers and professionals from three different dimensions of satisfaction, performance and career. There was no difference in the expectations and perceptions of users and managers, while to improve project performance, organizations needed to work to eliminate the difference in perceptions and expectations of professionals. Mui & Mulenburg (2004) conducted a study to determine the perception and attitude of female towards project management in comparison to male project managers. Professionals from two countries have been approached to identify the issues faced by female and male project managers. Results indicated that there was no difference between the issues faced by male and female project managers. In addition, it was noted that the female project managers had a higher tendency to work with the team than the male project managers.

The demand for project managers is increasing as organizations take over project management from all domains around the world. This demonstrates a positive relationship between project management processes and performance (Ibraigheeth & Fadzli, 2019). The truthfulness of the perceived relationship of project managers to the relationship between work place performance and project management processes has been tested. There is no significant link between project management processes and performance. The expectations and perceptions of project management skills differ in the different professional roles of the software industry (Crawford, 2005). The software industry is addressing the ongoing problem of huge project failure and has resulted in a waste of resources, time and increased costs. A study was undertaken to determine the difference in perception of project managers and sponsors related to the success of projects during the initiation phase. The results showed that there was no significant difference between the perception of project managers and sponsors at the beginning of the project development lifecycle (Onu, 2012). Martens & Carvalho (2017) recognized the sustainability factor in project management from the project manager's perspective.

Wan et al. (2018) analyzed perceptions, expectations of 395 practitioners for the detection of malfunctions in IT projects. It has been reported that there is a significant difference in the perceptions of defect detection among practitioners. Qureshi et al. (2013) conducted a study to find out more about the management style of male and female managers in the software industry by collecting data from 120 male and female employees serving software project managers in Pakistan. Findings showed that the

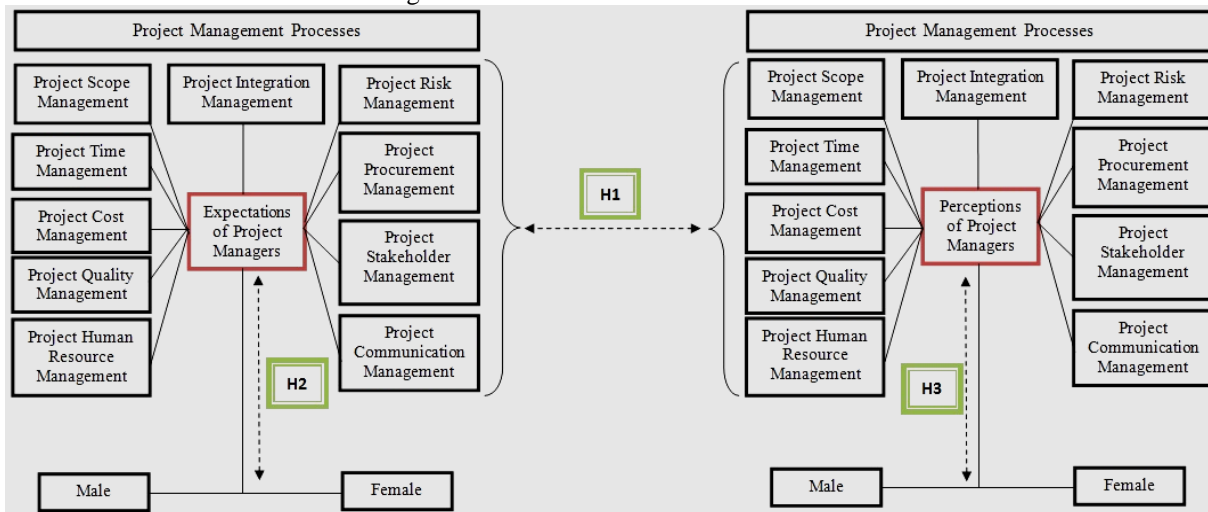
respondents recommended males to be a software project manager. The majority of female project managers in the software industry have left the project management profession due to domestic and other priorities (Pacha & Banda, 2013). The purpose of the Project Management Office (PMO) is to manage and monitor all projects in any organization. The value of the PMO was questioned even if it was determined to increase the project's chances of success. The reasons for these concerns were due to the multiple responsibilities of the PMO and to the different needs of the stakeholders. PMO managers and leaders have shown that they need more understanding and skills to manage stakeholders in terms of perceptions and expectations (Arumugam, 2013). Previously, studies have argued that the project performance can be predicted by measuring the project management skills of project managers (Blomquist et al., 2016; Alvarenga et al., 2019).

Pakistan’s software industry has seen unprecedented growth over the last few years. It provides a standardized and customized solution to different clients by addressing the expectations and perceptions of different stakeholders. The current study is to investigate the perceptions and expectations of project managers working in Pakistan's software industry for PMPs. This study compiles the feeling of project managers before the implementation of project management processes as well as after the implementation of project management processes in their respective software projects by comparing pre and post feeling/state of mind in terms of expectations and perceptions. This research is based on a survey approach to determine perceptions and expectations of project management processes for a sample of project managers from Pakistan Software Industry. The opinions and responses of the sample population are taken by using a questionnaire and represent the population response. Statistical analysis is performed on collected data collected from the survey to conclude results. Based upon existing literature and by considering dynamics and practices of the software industry in the local setting of Pakistan, following theoretical framework/model shown in Figure 1 is devised to test the given hypotheses.

The research hypotheses investigated in this research are as follow:

- H1:** There is no significant difference in expectations and perceptions of project managers regarding project management processes.
- H2:** There is no significant difference in the expectations of male and female project managers for project management processes.
- H3:** There is no significant difference in perceptions of male and female project managers for project management processes.

Figure 1 : Theoretical Framework and Research Model



Source: Generated

3. Research Method

The population of the study included male and female project managers' belonging to different age groups and varied educational backgrounds who are working in the software industry of Pakistan. A sample of 200 respondents was selected through non-probability sampling i.e. purposive sampling that was approached for data collection using a self-administrated structured questionnaire. Consequently, 143 questionnaires were processed for data analyses that were complete. However, incomplete questionnaires and outliers were excluded while processing data through SPSS. The individual project manager is taken as a unit of analysis in the real setting being a non-contrived study setting. Researchers had moderate interference with respondents during the data collection period. The research instrument for the research is a structured questionnaire in English, developed with the help of project management standard processes mentioned in PMBoK-5. It contains 47 items related to five different phases of project management and designed to measure the expectations and perceptions of project managers by considering the dynamics of the local setting. The response was measured through 5 points Likert scale representing the extent to agree or disagree ranging from 1 to 5 as 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4=Agree, 5= Strongly Agree. Moreover, demographics were also documented to assess the profile of project managers working in the software industry. SPSS is used for organization and analysis of data through selected statistical tools to test the hypotheses of the study.

4. Results

Demographics of respondents are considered to assess the personal properties of respondents i.e. gender, marital status, age, qualification, house income and working pattern etc. of project managers in the software industry of Pakistan that is given in Table I.

Table I. Demographics of Respondents

Demographics	Scale	Frequency	Percent
Gender	Male	110	76.9
	Female	33	23.1
Marital Status	Single	112	78.3
	Married	31	21.7
Age of Respondent	20-25 Years	11	7.7
	26-30 Years	88	61.5
	31-35 Years	39	27.3
	36-40 Years	3	2.1
	40 and Above	2	1.4
Monthly Income (Rs.)	21,000-40,000	31	21.7
	40,001-60,000	59	41.3
	60,001-80,000	18	12.6
	80,001-1,00,000	8	5.6
	1,00,001 and Above	27	18.9
Education level	BS	105	73.4
	MS	28	19.6
	Others	10	7
Number of hours worked (per week)	> 40 hrs	46	32.2
	40 hrs	47	32.9
	< 40 hrs	50	35

Source: Generated

Table I shows that the majority of project managers are male 76.9 % of respondents and 23.1 % respondents are female representing 78.3 % respondents unmarried and 21.7 % are married. Moreover, most of the respondents are young professionals having undergraduate qualification with an average monthly income of up to Rs. 60000 who are required to work more than 40 hours per week. Cronbach's alpha was used to test the reliability of each knowledge area that is given in Table II.

Table II. Reliability Statistics for Expectations & Perceptions of PM Processes

PMPs	N of Items	Cronbach's Alpha	
		Expectations	Perceptions
Project Management Processes			
Project Integration Management	6	.882	.886
Project Scope Management	6	.912	.929
Project Time Management	7	.936	.920
Project Cost Management	4	.924	.932
Project Quality Management	3	.891	.871
Project Human Resource Management	4	.876	.897
Project Communication Management	3	.861	.911
Project Risk Management	6	.931	.946
Project Procurement Management	4	.865	.954
Project Stakeholders Management	4	.920	.946

Source: Generated

Table II shows the coefficients for reliability and internal consistency of the selected variables. Cronbach's alpha is calculated as a result of the reliability test which shows how much reliable the data is for conducting statistical analysis and conclusions. Cronbach's alpha values are good as they are closer to 1.0. If Cronbach's alpha value greater than 0.8 the data is considered reliable for statistical analysis and conclusion of results. The Cronbach's alpha value for all knowledge areas are shown in Table II. The values indicate that the minimum value of Cronbach's alpha for all Project management knowledge areas is above 0.8, therefore the data is significantly reliable for data analysis and statistical inference. Descriptive statistics indicate means, standard deviation, skewness, kurtosis and standard error etc. for the selected variables given in Table III. The mean value for expectations and perceptions for all project management knowledge areas ranges from 3.0 to 4.0 whereas the standard deviation for all project management knowledge areas is below 1.3. Moreover, comparison of means is helpful to identify any significant difference in the expectations and perceptions of project managers for project management processes. The difference between the means is determined by subtracting the mean values for expectations from the mean values of perceptions (P-E).

Table III. Descriptive Statistics for Expectations & Perceptions of PMPs

PMPs	Mean	Std. Dev.	Skewness	Kurtosis	Mean	Std. Dev.	Skewness	Kurtosis
	Expectations Statistics				Perceptions Statistics			
Project Integration Management	3.69	0.9348	-1.319	1.639	3.4254	0.9407	-0.798	0.08
Project Scope Management	3.6305	1.0018	-1.072	0.744	3.641	0.9825	-0.849	0.417
Project Time Management	3.6454	1.0086	-1.089	0.539	3.6444	0.943	-0.94	0.602
Project Cost Management	3.5542	1.1617	-0.701	-0.502	3.1976	1.204	-0.462	-0.93
Project Quality Management	3.6783	1.1192	-0.571	-0.553	3.6317	1.0161	-0.712	0.196
Project Human Resource Management	3.5699	1.0466	-0.728	-0.234	3.2745	1.1768	-0.5	-0.763
Project Communication Management	3.5478	1.0112	-0.57	-0.292	3.3403	1.1982	-0.354	-0.867
Project Risk Management	3.5338	1.08	-0.718	-0.285	3.2925	1.0981	-0.423	-0.632
Project Procurement Management	3.2762	1.0139	-0.583	-0.082	3.0542	1.2005	-0.282	-0.942
Project Stakeholder Management	3.5927	1.0311	-0.696	-0.096	3.5157	1.1126	-0.616	-0.434

Source: Generated

The difference between perceptions and expectations of project managers (P-E) is presented in Table IV, which indicates that there is no significant difference between expectations and perceptions of project

managers for project management processes in the software industry. Out of 47 processes, the difference (P-E) for 38 project management processes is negative, which means the perceptions of project managers are slightly lower than expectations for project management processes. The perception of project managers is slightly higher than expectations for only 8 project management processes.

Table IV. Gap between Expectations & Perceptions for PMPs

Knowledge Areas & Processes	Expectation (E)		Perceptions (P)		P Vs E
	Mean (X)	SD	Mean (X)	SD	P-E
Project Integration Management	$\alpha = 0.882$		$\alpha = 0.888$		
You have to develop project charter for your organization	3.6	1.21	3.22	1.3	-0.38
You have to develop project management plan for your organization	3.88	1.18	3.44	1.21	-0.44
You have to direct and manage project work for your organization	3.81	1.15	3.46	1.12	-0.35
You have to monitor and control project work for your organization	3.83	1.16	3.5	1.09	-0.33
You have to perform integrated change control for your organization	3.55	1.19	3.44	1.07	-0.11
You have to close project or phase for your organization	3.47	1.19	3.48	1.24	0.01
Project Scope Management	$\alpha = 0.912$		$\alpha = 0.929$		
You have to plan Scope management for your organization	3.69	1.21	3.66	1.11	-0.03
You have to collect requirements for your organization	3.71	1.29	3.69	1.14	-0.02
You have to define scope for your organization	3.71	1.16	3.69	1.17	-0.02
You have to create WBS for your organization	3.58	1.18	3.62	1.1	0.04
You have to validate scope for your organization	3.52	1.13	3.63	1.18	0.11
You have to control scope for your organization	3.56	1.24	3.57	1.16	0.01
Project Time Management	$\alpha = 0.936$		$\alpha = 0.920$		
You have to plan schedule management for your organization	3.73	1.2	3.68	1.17	-0.05
You have to define activities for your organization	3.78	1.19	3.77	1.14	-0.01
You have to sequence activities for your organization	3.57	1.18	3.66	1.04	0.09
You have to estimate activity resources for your organization	3.59	1.25	3.64	1.19	0.05
You have to estimate activity duration for your organization	3.57	1.15	3.61	1.13	0.04
You have to develop schedule for your organization	3.68	1.13	3.62	1.2	-0.06
You have to control schedule for your organization	3.6	1.21	3.54	1.15	-0.06
Project Cost Management	$\alpha = 0.924$		$\alpha = 0.932$		
You have to plan cost management for your organization	3.58	1.34	3.26	1.39	-0.32
You have to estimate costs for your organization	3.65	1.21	3.16	1.25	-0.49
You have to determine budget for your organization	3.47	1.3	3.22	1.34	-0.25
You have to control costs for your organization	3.52	1.29	3.15	1.29	-0.37
Project Quality Management	$\alpha = 0.891$		$\alpha = 0.871$		
You have to plan quality management for your organization	3.7	1.25	3.62	1.16	-0.08
You have to perform quality assurance for your organization	3.55	1.24	3.73	1.1	0.18
You have to control quality for your organization	3.78	1.22	3.55	1.16	-0.23
Project Human Resource Management	$\alpha = 0.876$		$\alpha = 0.899$		
You have to plan human resource management for your organization	3.39	1.24	3.17	1.35	-0.22
You have to acquire project team for your organization	3.5	1.27	3.22	1.33	-0.28
You have to develop project team for your organization	3.6	1.19	3.23	1.35	-0.37
You have to manage project team for your organization	3.79	1.2	3.48	1.35	-0.31
Project Communication Management	$\alpha = 0.861$		$\alpha = 0.911$		
You have to plan communication management for your organization	3.57	1.12	3.34	1.33	-0.23
You have to manage communications for your organization	3.62	1.16	3.31	1.27	-0.31
You have to control communications for your organization	3.46	1.16	3.37	1.3	-0.09
Project Risk Management	$\alpha = 0.931$		$\alpha = 0.946$		
You have to plan risk management for your organization	3.56	1.29	3.34	1.23	-0.22
You have to identify risks for your organization	3.51	1.29	3.33	1.21	-0.18
You have to perform qualitative risk analysis for your	3.54	1.26	3.16	1.27	-0.38

organization					
You have to perform quantitative risk analysis for your organization	3.36	1.24	3.24	1.24	-0.12
You have to plan risk responses for your organization	3.54	1.19	3.31	1.28	-0.23
You have to control risks for your organization	3.69	1.24	3.37	1.2	-0.32
Project Procurement Management	$\alpha = 0.865$		$\alpha = 0.954$		
You have to plan procurement management for your organization	3.41	1.21	3.08	1.26	-0.33
You have to conduct procurements for your organization	3.08	1.24	3.01	1.28	-0.07
You have to control procurements for your organization	3.27	1.18	3.15	1.25	-0.12
You have to close procurements for your organization	3.35	1.17	2.98	1.33	-0.37
Project Stakeholder Management	$\alpha = 0.920$		$\alpha = 0.946$		
You have to identify stakeholders for your organization	3.7	1.22	3.48	1.23	-0.22
You have to plan stakeholder management for your organization	3.62	1.1	3.55	1.12	-0.07
You have to manage stakeholder engagement for your organization	3.54	1.14	3.56	1.23	0.02
You have to control stakeholder engagement for your organization	3.52	1.14	3.48	1.21	-0.04

Source: Generated

Similarly, the Independent t-test is used to identify any significant difference between expectations and perceptions of project managers for project management processes based on gender that is shown in Table V (a) and Table V (b). The perception about learning of project a manager from their experience is limited (Savelsbergh et al., 2016). It reveals that the level of significance for expectations (0.490) and perceptions (0.604) is greater than alpha (0.05) in relation to project management processes for male and female project managers. The project managers have similar views on managing people and projects irrespective of gender and industry (Ramos et al., 2016). The results indicate that there is no difference in perception and expectations of male and female who are working as project managers for the application of project management processes in the software industry.

Table V(a). Independent Samples Test (Expectations)

		Levene's Test				t-test for Equality of Means					
		Mean	Std. Dev.	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
Gender	N	Mean	Dev.							Lower	Upper
Male	110	3.5443	.87998	.509	.477	-.692	141	.490	-.11971	-.46170	.22229
Female	33	3.6640	.84241			-.709	54.660	.482	-.11971	-.45834	.21893

Table V(b). Independent Samples Test (Perceptions)

		Levene's Test				t-test for Equality of Means					
		Mean	Std. Dev.	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
Gender	N	Mean	Dev.							Lower	Upper
Male	110	3.3809	.90027	1.641	.202	-.519	141	.604	-.09037	-.43446	.25372
Female	33	3.4712	.79228			-.556	58.994	.580	-.09037	-.41543	.23469

Source: Generated

5. Conclusion

Project manager’s working in different software organizations follow certain processes to perform their work. PMBoK introduced by PMI provides 47 PMPs, which are practiced by the majority of organizations in different domains, including the software industry. The economy of developing countries depends heavily on growing industries such as IT. Software houses (industry) are growing rapidly in Pakistan and are dealing with local, regional and international clients. This research is focused to measure the difference between expectations and perceptions of project managers for project

management processes in the software industry based on gender. This study is based on a survey approach and a structured questionnaire is used to record feedback of 143 project managers working in the software industry. Data was collected through a structured questionnaire in English and most of the respondents were approached personally for data collection. Statistical analysis is performed through SPSS on collected data to conclude the results. The results show that the expectations of project managers for the use of project management processes are low. Moreover, it is evident from the results that there is no significant difference in perception and expectation for project management processes between male and female project managers who are working in the software industry. Moreover, there is an evident difference in the expectations and perceptions of project managers that necessitates corrective action that enables to measure project managers' performance based on PMPs.

Findings of this research indicates that male segment is dominant than female in the software industry due to specific social and cultural environment of Pakistan. However, there is no significant difference between expectations and perceptions of male and female project managers. This study could enhance understanding of researchers, practitioners, academicians and other stakeholders serving in the software sector. There are some limitations of the study as sample selected is mostly from specific cities of the Punjab, Pakistan because software houses are not equally distributed in all the cities of Pakistan. Moreover, it is found that the majority of project managers working at various software houses are not familiar with technical terms and PMPs presented by PMI. It is suggested that project managers' knowledge and awareness for application of Project management processes should be included in key performance indicators to assess their potential. Moreover, a survey may be conducted in the developed countries, developing countries and least developed countries to assess expectation and perception of project management for its application to take corrective measures by improving the project management processes.

References

- Akgün, A. E. (2020). Team wisdom in software development projects and its impact on project performance. *International Journal of Information Management*, 50, 228–243.
- Alvarenga, J. C., Branco, R. R., Guedes, A. L. A., Soares, C. A. P., & e Silva, W. da S. (2019). The project manager core competencies to project success. *International Journal of Managing Projects in Business*.
- Arumugam, S. (2013). Perceptions & Expectations of the Roles & Functions of the IT Project Management Office. *PACIS*, 277.
- Bilal, M., Gani, A., Liaqat, M., Bashir, N., & Malik, N. (2020). Risk assessment across life cycle phases for small and medium software projects. *Journal of Engineering Science and Technology*, 15(1), 572–588.
- Bilal, M., Malik, N., Khalid, M., & Lali, M. I. U. (2017). Exploring industrial demand trend's in Pakistan software industry using online job portal data. *University of Sindh Journal of Information and Communication Technology*, 1(1), 17–24.
- Blomquist, T., Farashah, A. D., & Thomas, J. (2016). Project management self-efficacy as a predictor of project performance: Constructing and validating a domain-specific scale. *International Journal of Project Management*, 34(8), 1417–1432.
- Carayannis, E. G., Kwak, Y.-H., & Anbari, F. T. (2005). *The story of managing projects: An interdisciplinary approach*. Greenwood publishing group.
- Cicmil, S., & Hodgson, D. (2006). New possibilities for project management theory: A critical engagement. *Project Management Journal*, 37(3), 111–122.
- Crawford, L. (2005). Senior management perceptions of project management competence. *International Journal of Project Management*, 23(1), 7–16.
- Cruzes, D. S. (2013). Expectations and achievements: a longitudinal study on an offshoring strategy. *2013 ACM/IEEE International Symposium on Empirical Software Engineering and Measurement*, 123–132.
- de Carvalho, M. M., Patah, L. A., & de Souza Bido, D. (2015). Project management and its effects on project success: Cross-country and cross-industry comparisons. *International Journal of Project Management*, 33(7), 1509–1522.
- Dobie, C. (2020). *Handbook of project management: A complete guide for beginners to professionals*. Routledge.
- Engelbrecht, J., Johnston, K. A., & Hooper, V. (2017). The influence of business managers' IT competence on IT project success. *International Journal of Project Management*, 35(6), 994–1005.
- Fernandes, G., Ward, S., & Araújo, M. (2013). Identifying useful project management practices: A mixed methodology approach. *International Journal of Information Systems and Project Management*, 1(4), 5–21.
- Geraldi, J., & Söderlund, J. (2018). Project studies: What it is, where it is going. *International Journal of Project Management*, 36(1), 55–70.
- Gupta, S. K., Gunasekaran, A., Antony, J., Gupta, S., Bag, S., & Roubaud, D. (2019). Systematic literature review of project failures: Current trends and scope for future research. *Computers & Industrial Engineering*, 127, 274–285.
- Hidding, G. J., & Nicholas, J. M. (2017). A new way of thinking about IT project management practices: Early empirical results. *Journal of Organizational Computing and Electronic Commerce*, 27(1), 81–95.
- Hornik, S., Chen, H.-G., Klein, G., & Jiang, J. J. (2003). Communication skills of IS providers: an expectation gap analysis from three stakeholder perspectives. *IEEE Transactions on Professional Communication*, 46(1), 17–34.
- Ibraigheeth, M., & Fadzli, S. A. (2019). Core factors for software projects success. *JOIV: International Journal on Informatics Visualization*, 3(1), 69–74.
- Jones, C. (2004). Software project management practices: Failure versus success. *CrossTalk: The Journal of Defense Software Engineering*, 17(10), 5–9.
- Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*.

John Wiley & Sons.

- Ko, D.-G., & Kirsch, L. J. (2017). The hybrid IT project manager: One foot each in the IT and business domains. *International Journal of Project Management*, 35(3), 307–319.
- Krasner, H. (2018). The cost of poor quality software in the us: A 2018 report. *Consortium for IT Software Quality, Tech. Rep*, 10.
- Lauesen, S. (2020). IT Project Failures, Causes and Cures. *IEEE Access*, 8, 72059–72067.
- Liu, S., & Liu, C. (2010). Management innovation of it project managers. *2010 3rd International Conference on Information Management, Innovation Management and Industrial Engineering*, 3, 62–65.
- Maqbool, B., Rehman, F. U., Abbas, M., & Rehman, S. (2018). Implementation of Scrum in Pakistan's IT Industry. *Proceedings of the 2018 2nd International Conference on Management Engineering, Software Engineering and Service Sciences*, 139–146.
- Marinho, M., Sampaio, S., & Moura, H. (2014). Uncertainties in software projects management. *2014 XL Latin American Computing Conference (CLEI)*, 1–10.
- Martens, M. L., & Carvalho, M. M. (2017). Key factors of sustainability in project management context: A survey exploring the project managers' perspective. *International Journal of Project Management*, 35(6), 1084–1102.
- McAneer, T. P., & Seat, E. (2001). Perceptions of team performance: a comparison of male and female engineering students. *31st Annual Frontiers in Education Conference. Impact on Engineering and Science Education. Conference Proceedings (Cat. No. 01CH37193)*, 3, S2A-10.
- Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: linking project management performance and project success. *International Journal of Project Management*, 32(2), 202–217.
- Mui, P., & Mullenburg, G. M. (2004). Is there really a difference between women and men as project managers? *2004 IEEE International Engineering Management Conference (IEEE Cat. No. 04CH37574)*, 2, 742–745.
- Oh, M., & Choi, S. (2020). The Competence of Project Team Members and Success Factors with Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 6(3), 51.
- Onu, S. (2012). Perceptual differences between project managers and sponsors in the initiation phase of a project. *2012 IEEE International Conference on Industrial Engineering and Engineering Management*, 2003–2007.
- Pacha, M., & Banda, S. (2013). Gender issues in project management: A subtlety. *International Journal of Research*, 2(1), 53–62.
- Pankratz, O., & Basten, D. (2018). Opening the black box: Managers' perceptions of IS project success mechanisms. *Information & Management*, 55(3), 381–395.
- Papke-Shields, K. E., Beise, C., & Quan, J. (2010). Do project managers practice what they preach, and does it matter to project success? *International Journal of Project Management*, 28(7), 650–662.
- Qureshi, A. A., Afzal, S., Daud, I., & Saleem, M. A. (2013). A comparative analysis of gender based management styles of software project managers. *International Journal of Computer Applications*, 71(14).
- Ramos, P., Mota, C., & Corrêa, L. (2016). Exploring the management style of Brazilians project managers. *International Journal of Project Management*, 34(6), 902–913.
- Rose, K. H. (2013). A guide to the project management body of knowledge (PMBOK® Guide)—Fifth Edition. *Project Management Journal*, 3(44), e1–e1.
- Sankar, C. S., Ledbetter, W. N., Snyder, C. A., Roberts, T. L., McCreary, J., & Boyles, W. R. (1991). Perceptions of reward systems by technologists and managers in information technology companies. *IEEE Transactions on Engineering Management*, 38(4), 349–358.
- Savelsbergh, C. M. J. H., Havermans, L. A., & Storm, P. (2016). Development paths of project managers: What and how do project managers learn from their experiences? *International Journal of Project Management*, 34(4), 559–569.
- Shakir, S. N., & Nørbjerg, J. (2015). The End of the Line: Project Management Challenges in Small Software Shops in Pakistan. In *Strategic Project Management* (pp. 107–131). CRC Press.

- Singh, R., & Lano, K. (2014). Literature Survey of previous research work in Models and Methodologies in Project Management. *Editorial Preface*, 5(9).
- Söderlund, J. (2004). Building theories of project management: past research, questions for the future. *International Journal of Project Management*, 22(3), 183–191.
- Soltan, S., & Ashrafi, M. (2020). Predicting project duration and cost, and selecting the best action plan using statistical methods for earned value management. *Journal of Project Management*, 5(3), 157–166.
- Szymanska, I. I., & Rubin, B. A. (2018). Gender and relationship differences in the perceptions of male and female leadership. *Gender in Management: An International Journal*.
- Terlizzi, M. A., de Souza Meirelles, F., & de Moraes, H. R. O. C. (2016). Barriers to the use of an IT Project Management Methodology in a large financial institution. *International Journal of Project Management*, 34(3), 467–479.
- Vujović, V., Denić, N., Stevanović, V., Stevanović, M., Stojanović, J., Cao, Y., Alhammadi, Y., Jermittiparsert, K., Van Le, H., & Wakil, K. (2020). Project planning and risk management as a success factor for IT projects in agricultural schools in Serbia. *Technology in Society*, 63, 101371.
- Wan, Z., Xia, X., Hassan, A. E., Lo, D., Yin, J., & Yang, X. (2018). Perceptions, expectations, and challenges in defect prediction. *IEEE Transactions on Software Engineering*.
- Weaver, P. (2006). A brief history of project management. *APM Project*, 19(11), 1–4.