

Economic Utilization Of Fresh Graduates In Software Projects

D.Nirmalraj

*Research Scholar, Department of Management Studies, SRM University, Katangulathur, Kancheepuram,
nirmalmbahr@gmail.com*

Dr. N. Santhosh Kumar

*Assistant Professor(S.G), Department of management Studies SRM University, Katangulathur, kancheepuram,
santkum73@gmail.com*

Abstract

The project manager plays a pivotal role in a complete project lifecycle. The role of a project manager has been transformed over the years. Transformation and maturity of project manager's role has been substantiated by various literatures and research studies in the past. The ever changing expectations, complex, volatile scenarios, inability to meet the demand, sudden ramp-up and ramp-down of projects, and advancement of technologies in IT domain have enabled the project manager to witness the lot more challenges in managing projects and people. This paper presents the challenges that are being encountered by project managers in deployment of fresh graduates and economic utilization of them in projects. To investigate this, project manager's having a team size of more than 10 were sampled as respondents for the survey. The Challenges while deploying, utilizing and managing project team members in application development, support and maintenance projects have been identified. Since the study is associated with more than one variable outcome multivariate techniques has been used. Using factor analysis techniques, 5 factors have been extracted which are named as Technical knowledge and learnability (factor1), reasoning ability (factor2), individual excellence (factor3), ability to communicate (factor4), and ability to ideate (factor5). The study extends its scope to identify the competencies required for project managers to effectively handle the challenge of deploying fresh graduates in the projects and to sustain economic utilization of project team members which will help in revenue generation and profit margin

Keywords Economic utilization of graduates in IT projects, project manager competencies, project manager challenges, Deployment in Application development projects, Deployment in Application support and maintenance projects, challenges in IT projects deployment

Introduction

An article published in the economic times indicates that less than 20 per cent of the estimated six lakh engineering students, who graduate every year, are "employable" for software jobs [1]. In Indian labor market the challenge for IT recruiters and hiring agencies is, to identify employable fresh graduates from colleges and universities for IT projects. The search for skilled freshers never stops with the selection and recruitment process in campus. The fresh graduates hired for

any software project should be deployable and billed by customer. They undergo demand based training on technology, business domain and soft skill needed. The trainings are between 3-6 months on an average. All most all large companies have invested in training their large fresher population in India [2] Post training resources whose skillset matches with the project requirements are pooled and they are named as available for deployment (AFD). Customer interviews these identified resources and assess their capability to further engage them in the project. Only those resources finalized by customer to get engaged in their project will be billed by the customer on their effort and utilization. The amount of time a resource being utilized in a software project is quantified in the units of FTE¹ and revenue generated by utilizing these resources in a project is economic utilization². In any IT project customer is billed at an hourly rate and an employee is paid at another hourly rate [3]. This is known as rate card or bill rate. The billing rate depends on specifications like experience of resources, role in a project, skill set, certifications they hold it. Bill rate is the amount charged hourly on an invoice for all work an employee does [4]. A project manager being a captain of the ship holds the responsibility for smooth sailing from planning to closure. As indicated by Project Management Institute project manager makes project goals their own and uses their skills and expertise to inspire a sense of shared purpose within the project team, they enjoy the organized adrenaline of new challenges and the responsibility of driving business results [5]. Today, IT projects face shrinking demand from customers and as a cost reduction measure IT companies shift their focus on hiring fresh graduates and replace them with experienced to leverage cost advantage. The profit margin (PM %) is the most important financial metrics which are being tracked by project delivery management. For a project manager to achieve and maximize higher project margins project manager must have an optimum composition of fresh graduates and experts throughout the project lifecycle. Being a project manager he or she holds the accountability of identifying, onboarding, deploying, effectively utilizing graduates and

¹ FTE – Full Time Equivalent = (total number of paid hours during the period/number of working hours)

² Economic Utilization = project resources being billed by the customer for the work delivered. Economic utilization and billing by customer for the efforts are synonymous

experts throughout the project lifecycle. The research was administered to explore the challenges faced by project managers in economically utilizing fresh graduates in projects (Phase1) and to identify vital competencies required for project managers to overcome the challenges identified in Phase 1.

Objective of the study

1. To determine the challenges encountered by project managers to deploy fresh graduates in application development, support and maintenance projects.
2. To identify essential competencies a project manager should have or develop to effectively manage deployment of fresh graduates and economically utilize the resources.

Scope

The study covers (1) Graduates working in application development and application support, maintenance project will be taken into study. (2) Graduates deployed or identified for deployment in Time and Material (T&M), Staff Augmentation (SA) contract are considered for the study. The study excludes (1) Graduates working in other IT project types like consulting, migration, transition, PMO operations etc. (2) Graduates deployed into Research and Development (R&D), non-billable projects (3) Fixed price projects and Recurring Fixed pricing projects

Methodology

The study is divided into two stages. In stage1 the review of literature was done on people management practices, challenges in hiring and deploying fresh graduates in IT projects. Based on the reviews of relevant researches a detailed questionnaire was developed. The questionnaire had 4 sections. Section1 captured the demographic details of the respondents. The section2 had the list of 53 complex challenges in deploying and managing fresher graduates derived from the literature. 5 point Likert’s scale was used to capture the responses where 5 - strongly agree, 4 -agree, 3- irrelevant, 2-disagree, 1-strongly disagree. Section3 of the questionnaire had the list of people management competencies identified through literature review. The response scale ranged from 1-4 where 4 - extremely important, 3 - important, 2 - important, 1-least important. Relative Important Index (RII) = $(4*N1+3*N2+2*N3+1*N4) / 4*N$, where N= number of respondents, N4 = number of responses for extremely important, N3= number of responses for important, N2 = number of responses for moderately important, N1=number of responses for least important. The survey questionnaire was mailed to 200 project managers who have an experience of managing a team size of more than 10 resources in their project in last 12-24 months. 183 responses were collected from project managers who are in development and maintenance projects from 8 different Indian IT companies. Responses from 17 managers were not considered for analysis as the responses were incomplete and ambiguous. The primary data was collected during May-July 2015.

Findings

Phase 1: Challenges for a project manager –

[6]The KMO statistic is a Measure of Sampling Adequacy, both overall and for each variable as stated by kaisen in 1970.

TABLE. 1 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.867
Bartlett's Test of Sphericity (Approx. Chi-Square)	193.8
Sig.	0.000

KMO value of sample adequacy 0.867 indicates that the sample taken for the study is adequate. Kaisen recommend 0.5 as minimum (barely accepted), values between 0.7-0.8 acceptable, and values above 0.9 are superb [6]. In Bartlett's Test of Sphericity H0: The correlation matrix is an identify matrix H1: The correlation matrix is not an identify matrix. The significance value (.000) reveals that the null hypothesis should be rejected. Principal component analysis requires that the probability associated with Bartlett's Test of Sphericity to be less than the level of significance. From the significance value obtained in the above table it is inferred that null hypothesis shall be rejected. The result satisfies the requirement.

TABLE.2. Total Variance Explained

Component	Initial Eigenvalues			
	Total	% of Variance	Cumulative %	TTTotal
1	2.802	19.129	19.329	2.706
2	1.644	12.454	31.783	1.744
3	1.412	9.431	41.294	1.332
4	1.222	8.678	50.095	1.232
5	1.028	7.357	57.652	1.058

Cumulative proportion of variance criteria can be met with 5 components to satisfy the criterion of explaining 57.652% or more of the total variance. Only 5 components shall be extracted as they have Eigen value more than 1.000.

TABLE.3. Component Matrix

Component	Initial Eigenvalues			
	Total	% of Variance	Cumulative %	Total
1	2.802	19.129	19.329	2.706
2	1.644	12.454	31.783	1.744
3	1.412	9.431	41.294	1.332
4	1.222	8.678	50.095	1.232
5	1.028	7.357	57.652	1.058

TABLE.4. Total Variance Explained Continued

component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings	
	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	19.329	19.329	2.437	17.410	17.410
2	12.454	31.783	1.797	12.832	30.243
3	9.511	41.294	1.353	9.666	39.909
4	8.800	50.095	1.331	9.506	49.415
5	7.557	57.652	1.153	8.237	57.652

		Readiness to up skill and reskill themselves	0.445
4	Ability to communicate	Less proficiency in communication (language)	0.612
		Inability to articulate	0.823
5	Ideation	Ability to ideate	0.756

TABLE 5 Component Matrix

	Component				
	1	2	3	4	5
Lack in basic programing skill and Software fundamentals	0.677	-0.297			
Inadequate application oriented learning	0.666	-0.134	0.123		-0.157
Inability to learn from mistakes/peers	0.630	-0.409	0.179	-0.252	-0.197
Less proficiency in communication (language)	0.306	-0.292	-0.235	0.612	0.238
Inability to understand the requirements	0.406	0.735	-0.192		0.103
Logical thinking and Reasoning	0.343	0.737	-0.106		-0.176
Ownership and accountability	0.151	0.309	0.612	0.112	-0.551
Ability to adapt to situations	0.427		0.529	-0.150	0.341
Readiness to up skill and reskill themselves	0.365	0.209	0.445	-0.366	0.133
In ability to articulate	0.340	0.108		0.823	
Ability to ideate		0.336	0.525		0.756

TABLE 6: Factor Loading

Component	Factor Name (label)	Variables	Factor Loadings
1	Learnability	Lack in basic and foundation technologies	0.667
		Inadequate application oriented learning	0.666
		Inability to learn from mistakes/peers	0.630
2	Skill of reasoning	Inability to understand the requirements	0.735
		Logical thinking and reasoning	0.737
3	Individual excellence	Ownership and accountability	0.612
		Ability to adapt to situations	0.529

The key challenges highly loaded on factor 1 are fresh graduates with low proficiency in base or fundamental technologies (0.697), lack of practical exposure/ hands-on expertise (0.676), and inability to learn from mistakes or absence of peer learning (0.650). The challenges which are loaded in factor 1 shall be groped and named as “Technical knowledge and Learnability”. Though various literature reviews elucidates that technology in IT domain is ever changing and need to keep them in phase with the upcoming technologies, fresh graduates must possess the skill of basic programming concepts and foundation technologies. The foundation/base technologies are Java, C, C++, Microsoft technologies like VB,.net, data base concepts, testing etc. Though fresher’s knowledge on evolving technologies is listed as one of the 53 questions this has not loaded as important challenge in the factor analysis. Inability to understand the requirements (0.735), logical thinking and reasoning (0.737) are highly loaded in factor2 and the factor shall be called “skill of reasoning”. Ownership and accountability (0.612), ability to adapt to situations (0.529), readiness to up skill and reskill (0.445) together constitutes the factor 3 which is labeled as individual excellence. Proficiency in communication (0.612) and engineer’s ability to articulate (0.823) are highly loaded in factor 4 which is named as “Ability to communicate “. Fresh graduate’s ability to ideate (0.756) has been highly loaded in component 5.

Phase 2: Competencies of managers

TABLE.7. Project Manager’s competencies

Competencies	Relative Important Index (RII)	Rank (R)
Ability to assess team members skills and competencies	0.852	1
Ability to identify right role for the skills possessed by the team members.	0.7567	2
Ability to motivate project team	0.7467	3
Ability to create learning environment in project	0.7400	4
Ability to mentor and coach fresh graduates	0.7384	5
Ability to assign SMART goals and continuous feedback	0.6984	6
Ability to communicate effectively with the project team members	0.575	7
Ability to secure team members trust on you	0.5067	8

Hold self-responsible for any project issues	0.4883	9
Ability to control stress and guide team in unambiguous, volatile situations	0.4875	10

The research demonstrates 10 competencies needed for IT project manager to manage and deploy fresh graduates into application development, support and maintenance projects. The competencies of project manager are ranked from 1-10 based on relative importance index. Project manager must have the ability to explore the skills of project team, identify strength and developmental areas. This will help project team to focus on their strength area and to chart out individual development plan to improve in their developmental zone. Ability to assess team member's skills, competencies and ability to assign team members skills to appropriate role are the two primary skills needed for the project manager (0.852) and (0.7567) which are loaded in factor 1. The project manager must be careful, not to create situations that cause individuals to become discouraged [7]. It is believed and supported by various researches that motivation in work place will stimulate workforce to achieve goal and attain optimal results, it is evident from this research as well, project manager must possess the skill of creating a learning and motivating environment. A leader with the motivational attribute has the drive and energy to complete tasks and achieve results. They also have the ability to continue their pursuit of demanding goals even in the face of rejection and questions [8]. The graduates believe that learning stops at campus. Learning is always continuous process, upgrading and updating oneself will help them to sustain in the IT business. Ability to motivate project team members is ranked at 4 with an RII of (0.7400). One of the best ways to hold employees self-accountable is to have them own the tasks, motivate and empower them to execute the same. This will help project managers to strengthen the skill of delegation. Project manager need to be a coach and mentor RII (0.7384) secured 5th Position in the top 10 skills required for any project manager in handling resources. Project manager must strengthen the project team with the skill of facing a customer interview and educate them with the business requirements. By exposing to simulation environment and business scenarios project manager can facilitate in hand-on or application oriented learning. Being a good mentor a project manager shall shape the destiny of the project. Project manager has to break complex task into SMART³ goals and manager to provide feedback to fresh graduates to overcome the challenges if they face any during executing any task. Ability to assign SMART goals and candid feedback to team members with an RII of 0.6984 is placed as 6th important skill. Leaders have the ability to communicate procedures, instructions, and their vision to the project teams and resources, with a delivery that best conveys the message to the audience. Their method often. Ability to communicate effectively with project team members has been ranked as 7th with RII of 0.575. Effective communication always leads to better project results. Leading from front a project manager

³ SMART – Specific, Measurable, Achievable, Result oriented , Time bound

holds the responsibility of project failure or success. A project manager shall exhibit the leadership skill by making himself or herself self-accountable in times of failures. Ability to hold self-responsible for problems and charting out steps to overcome the hurdles is one of the key competency a project manager. It is ranked at 9th important competency with an RII of 0.4883. Ambiguous project roles and continuous changes in plans will result in psychological stress [9]. Project Manager must have an absolute control over the situational stress and direct team members during volatile and ambiguous scenario. The author says [10] Out of the uncertainty and chaos of change, leaders rise up and articulate a new image of the future that pulls the project together. With an RII of 0.4875 control over ambiguous situation and guidance holds the rank of 10.

Conclusion

The research reveals the key challenges encountered by Indian IT project managers in deploying fresher graduates in the development, maintenance projects and subsequently necessary competencies required to overcome these challenges. Skill, learnability and being proficient in fundamental technologies will enable the fresh graduates for quick on-boarding into IT projects. One of the important outcomes of the research is that graduates lack application oriented knowledge. The output emphasizes for application oriented learning in graduate and postgraduate curriculum in Indian universities. Graduates must go beyond text book thinking. Absence of hands-on experience will be an impediment for graduates to get deployed in IT projects. Effective communication plays a vital role next to technical knowledge to deploy fresh graduates in IT projects. Graduates fail in articulating their thoughts and also they lack in English communication. To summarize learnability, skill of reasoning, individual excellence, communication and ideation are the five focus areas for the graduates to stay competitive in IT projects. The behavioral skills like team work, time management, listening skills, conflict and negotiation has not figured as a major focus area for graduates. The phase 2 of the research report highlights that project manager with the capability to analyze the skills of the graduates, aligning them to the right role and by coaching or mentoring they shall help with quick deployment of fresh graduates. The competencies identified through this research are 1. Project managers must have capability to analyze project team's skills which will help to identify expertise area of each individual in the project team. The strength area of team members shall be leveraged to have the right fit of team member to role. By creating a continuous learning atmosphere project manager can keep their team abreast of technology and business concept. 2. With reference to listed competencies (table 7) 4, 5, 6 it is inferred that project managers must make the graduates realize their accountability for the tasks through continuous feedback. By following principles of management by objectives project manager could create an efficient project team and utilize them to the optimum. 3. Being a role model to the team, project manager should have the ability to build trust and guide them in ambiguous, volatile scenarios. An ideal project scenario will have no change in project scope, on time and on

budget project progress and no escalations. In today's context of business complex, unambiguous scenarios are inevitable. By being cool and calm under pressure and with proper direction from project managers IT engineers could be deployed into projects with maximum economic utilization.

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