



Skills of junior project management professionals and project success achieved by them

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Abstract:

New graduates are often placed into project management roles, but may face challenges in these roles. This study surveyed managers from Brazilian organizations and gathered information on the environment, practices and results of projects where new graduates were in project management roles. In-depth interviews were executed with a subset of these managers to further collect insights into issues surrounding new graduates' performance in project management. This paper examines the preparation and performance of new graduates in project management roles. It addresses specific project management skills and competencies that are involved in delivering successful projects and how these relate to project success or failure. The conclusions determined that new graduates are often not fully prepared for project management roles and fail to conduct comprehensive project preparations, often missing risk management; their soft skills are not fully developed creating further challenges; and the corporate environment towards project management may not lead to developing well-prepared project managers.

Keywords:

new graduates; project management; soft skill; project success; Brazil.

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1. Introduction

No matter the size of the organization involved, project management is closely related to current performance. When proven project management practices are implemented in organizations, organizations have higher rates of project success and are more successful in achieving business outcomes [1]. Project management has also been shown to be highly related to project success [2]. Use of a project management methodology (PMM) and use of a PMM that is robust enough to guide the project manager in comprehensive management of their projects both lead to higher levels of project success [3]. This makes project management a key skill for organizations to develop. Eighty percent of organizations consider that developing leadership and technical skills for managing projects is a priority for their organization [1]. This need to develop (or acquire skills) has also been shown to be important for program management [4], as well as project management. It has been noted that a “project manager’s level of competency is often not equal to the new and dynamic challenges they encounter” [5], and their educational preparation may be lacking [6]. This need to develop effective project management skills may be especially true for new project managers.

Organizations hire new graduates who participate in and contribute to managing projects. The main research question of this study is:

RQ: How do new graduates perform in roles as project managers?

This paper addresses several fundamental questions about new graduates and their performance in project management roles. At what rates do organizations experience project success or failure, and what are the causes? Is the environment in their organizations adequately preparing new graduates for their project management roles? Are the project management skills needed present in new graduates when they leave their schools? Are these new graduates prepared for managing projects in their organizations? Are the project management methodologies used by these graduates sufficiently robust to lead to project success in their organizations? This paper examines the preparation and performance of new graduates in project management roles. It addresses specific project management skills and competencies that are involved in delivering successful projects, and suggests what can be improved so new graduates are prepared to manage projects and organizations can achieve the best results from developing and applying the skills and competencies of new graduates.

The next section presents a literature review of the theoretical background relevant to the research. The section that follows provides a description of the research methodology, the data analysis methods used, and the research results obtained. Interpretation and discussion of the results follow. The final section of this study contains concluding remarks about the research and the list of main research findings, followed by research limitations.

2. Literature Review

2.1 Challenges of Preparing Project Managers

Project management remains a skill set that is in strong demand, not only in project management as a profession and career [7], [8], but also in other professions such as banking [9], construction management [10], information technology [11],[12], librarianship [13],[14], operations research [15], supply chain management (SCM) [16], and technical communication [17]. One study found that approximately 37% of jobs being recruited for in one professional field require project management skills [15]. A limited supply of project management resources has been acknowledged for quite some time [18]. The need for project management professionals continues apace, with a projection that 22 million new project management roles would be created around the world by 2027, with demand for project managers growing faster than that for workers in other occupations [19].

A recent study of American four-year college graduates and their employers found that “many employers see these new hires as poorly prepared for life on the job” [20]. The study goes on to indicate that thirty percent of graduates feel that their education did not well prepare them for their initial employment, and more specifically, that 19% of four-year graduates and 25% of two-year college graduates feel underprepared in project management. Most recent graduates

(67% of recent graduates) feel that they are very or completely prepared to manage projects using key steps, resources, and timelines [21]. However, the same study reports that 46% of hiring managers feel that recent graduates are very or completely prepared to use their skills in their new organization prepared to manage projects using key steps, resources, and timelines [21].

Institutes of higher education, including colleges, universities and polytechnics, are primary sources of education of new graduates entering the work force. Their education covers technical skills relating to project management, soft skills relating to people and relationships, and career readiness relating to a successful transition into the workplace [22], [23]. Graduates develop skills in project management skills (planning, leading, organizing, coordination and control through group projects in their education [24]. However, they noted that students had less experience with planning and especially with leading in projects in their academic settings.

The primary cause of failed projects is an inexperienced project manager in 20% of failed projects [1]. Another study [25] determined that there is a difference between the importance of individual project management skills in students' perceptions and the importance placed by employers and recruiters.

Project management capabilities (or the lack of them) have been shown to influence project success and failure [26-30],[2]. These capabilities span the typical project management lifecycle, but also include the front-end of projects before these typical project lifecycles begin, addressing program and portfolio management, development of the business case, benefits/value management and stakeholder management [26]. Capabilities addressing the front-end of projects have been shown to have a large influence on project outcomes [26]-[30], with Ahonen and Savolainen [27] finding that some projects were cancelled due to mistakes made before the project is started.

Sage et al. [31] suggest that project management failure is often assumed to be an evidence of deficient management, and thus, a problem that can be overcome by better management. It has been shown that investments in a project management, including dedicated Project Management Offices (PMOs), project management processes, standardized training and use of trained project management personnel, project management career paths, and standardized project management methodologies were found to be positively related to qualitative and quantitative benefits accruing to the organization [32]. While it has been shown that these investments can lead to positive outcomes, it has also been shown that project management methodologies are sometimes not followed by project managers [33].

Organizations have needs for both training to accomplish current role assignments of their personnel, and competency development to address the future needs of the individual and the organization [35],[22]. Organizational efforts in project management training have been shown to impact project success, specifically a positive significant impact on schedule performance [36]. Organizations that invest in formal development of their project management personnel experience not only greater retention of those critical competencies than in organizations which do not invest in development, but also to greater project success in the organization [37]. This paper makes a contribution by addressing the need for competency development, which is not a common theme in studies of project success [38].

2.2 Need for Soft Skills as well as Project Management Skills

Technical, or hard skills, in project management are comprised of the project management competencies used in implementing common project management life cycles, embodied in standards and handbooks, such as the PMBOK [39]. Söderlund and Maylor [40] argue that the hard skills in project management are necessary, but not sufficient, to be successful in delivering projects and their benefits. Others, such as Ruuska and Vartiainen [41] have found that traditional project management competencies, even though they are perceived as being critical, are not in themselves sufficient, and there is a need for project managers to develop soft skills, such as communications. Mateo et al. [42], determined that the work environment of project managers demand both hard and soft skills. Recently, it has been predicted that the emerging work environment will place a greater importance on soft skills [43].

The International Competence Baseline defines project management competencies in three categories: technical, behavioral, and contextual competencies [44]. Soft skills encompass the behavioral and portions of the contextual competencies of the IBC4. One study determined that these soft skills were more important in hiring new graduates than

the technical skills [45],[46]. Soft skills have been identified as necessary competencies for project managers by numerous studies [10],[47]-[49],[34],[50]-[54]. In her review of generic qualities that are most valued by employers, Cicekli [55] determined that many of the skills sought by employers are generic or soft skills. These skills include communication, interpersonal and persuasive, and teamwork skills, time management, flexibility and the ability to deal with ambiguity and change, motivation, ownership and sense of achievement, organizational effectiveness, and leadership skills [48],[55]-[58].

However, Carvalho, Patah and Bido [36] concluded that the various bodies of knowledge [59] defining project management and their related maturity models focus mainly on the hard skills. There is a need for organizations to develop the project management competencies [22],[60] needed to effectively engage in project management roles by their new staff members. These needed competencies encompass not only the technical competence, but also contextual competence, addressing the context of the project and organization, and behavioral competence, relating to those soft skills and leadership skills necessary for project success [61],[47],[1],[44]. Azim et al. [56] argue that the importance of people aspects of projects and the underlying soft skills are essential for project success, while another study [58] concluded that soft skills have more influence on projects' success than do technical skills.

2.3 Project Management in Brazil

Among Latin American countries, Brazil is seen as having a leading role in the PM area, due to its large numbers of chapters of the main project management associations (PMI and IPMA), and has more than 15,000 certified Project Management Professionals (PMPs) [62] (cited in [36]). Benitez Codas [63] provides a historical perspective on project management in Brazil, emerging from industrial firms, construction, and hydroelectric projects. Brazil has been characterized "as an emerging economy is becoming a significant global player, not only in economic terms and the growing global impact of its multinationals, but also for its increasing role in science and technology." [64]. This background provides a rich organizational context for examining project management. Of the top 100 organizations in Brazil, sixty-four percent of these organizations have adopted some manner of formalized project management processes [65].

Project management skills are in demand in Brazil across multiple industry sectors [66], with a forecasted job demand of over one half million new project management roles forecast to be created by 2027 [19]. Studies focusing on project management issues within the Brazilian setting are rapidly emerging [34],[36],[51],[67]-[76], reflecting the growing importance of, and demand for, project management expertise in the region. However, in a recent study of project management in a large Brazilian financial institution, it was determined that a lack of adherence to project management methodologies was influenced by a lack of knowledge regarding project management and the methodologies in use [67]. This reported knowledge deficiency motivates this study of project management skills of new graduates in Brazil.

3. Method

This study focuses on understanding the performance of new graduates as project managers, and how their organizations and their processes enable or inhibit performance by new graduates in project management roles.

3.1 Research questions

The research questions are:

- RQ1: What rates of project success/failure and causes for failure do organizations experience?
- RQ2: What are the key attributes of the organizational environment that new graduates performing project management operate within?
- RQ3: Which skills were presented by new graduates as project managers?
- RQ4: What are the organizational needs and project management skills and how well are new graduates meeting these needs?

3.2 Research approach

This is a descriptive research study [77] that aims to observe and report certain phenomena relating to the skills of new project managers and the project success they achieve in Brazil. It is based on a mixed methods approach utilizing both survey research and interviews. In this study, the mixed methods approach allows triangulation by obtaining interview insights beyond the survey research.

A questionnaire-based survey technique has been widely employed in project management research [78],[79]. A questionnaire-based survey was used in the first phase of this research to collect the professional views on soft skills and project success. While the first phase of the research used survey-based research among managers, the second phase consisted of in-depth interviews with a subset of survey respondents. We validated survey responses and gained additional insights from the in-depth interviews.

3.3 Participants

Participants were volunteers and were recruited through their involvement in executive education programs or the American Chamber of Commerce.

In the first phase, the survey was conducted with mid-level and senior managers from several types of corporations in Brazil. Most of the participants' firms are multinational corporations or large Brazilian companies. Each participant was selected in order to ensure that each participant met these three criteria: (1) had experience with project management practices, (2) manage a team that executes projects, and (3) include within their reporting staff (during the recent past) project managers who were recent graduates.

The second phase, field research conducted in parallel with the survey, telephone interviews were held with a subset of the survey respondents. The six respondents who were selected from the survey population to take part in these interviews were all managers at multinational companies operating in Brazil; three were general managers and three were senior managers. The six interviewees met the selection criteria described above, including having recently had new graduates in project management roles in their reporting staff.

3.4 Materials

The online survey was developed and deployed using SurveyMonkey. The survey was structured as a questionnaire with multiple-choice responses. The questionnaire addressed the following topics:

- Project success: Project success was examined to understand the frequency of project success or failure, as well as eliciting which project success criteria [52],[68],[78],[80] were the proximate causes of project failures experienced. Chipulu et. al [68], have argued that cultural backgrounds may influence perceptions of project success/failure factors. For this reason, the second phase interviews were planned to better understand how new graduates performed and how their performance related to project success/failure.
- Evaluation of the organizational environment for project management: The company environment for the execution of projects was examined to understand the environment in which new graduates were employed. The intent was to explore if the environment was conducive to a successful project management across all phases (planning, execution and conclusion). The questions in this section were divided between evaluating the users' role and organization's project management environment.
- Evaluation of skills presented by new graduates as project managers: The skills of new graduates during the execution of projects was evaluated to determine which skills were more used and which skills were most lacking. The questions in this section were divided among these topics: scope definition, execution skills, and soft skills.
- Results of projects managed by new graduates: The results of projects managed by new graduates can be traced back in part as a result of their demonstrated project management skills. The questions in this section requested information on project failure rates (for the projects managed by new graduates), as well as the reasons for their failures and success.

- Needs of the company for project managers: What does the organization expect from new graduates' project management skills? What is the organization's perception of how well their new graduates are performing as project managers?

It was determined that the survey has face validity as, on review by the researchers of both the instrument and responses, the questions measure what they are intended to measure. The researchers also determined the survey has content validity as both researchers reviewed questions and ensured they cover relevant aspects to address the research questions being measured. Further reliability of the survey instrument was confirmed through the in-depth interviews as a means of assessing alternate-form reliability.

3.5 Procedure

The survey was available for a period of one month. The in-depth follow-up interviews were conducted during the same period. Interviews went into greater depth on the survey topics, emphasizing the interviewees' perceptions regarding new graduates as project managers, their performance and challenges.

4. Results

Seventy-two participants meeting the criteria were invited to complete the survey. Forty-five participants returned a survey and 38 completed the full survey, resulting in a participation rate of 52.7%. Respondents were from Brazilian firms and multi-national firms operating in Brazil from numerous industries, including banking and financial services, educational institutions, retail and consumer goods, high-technology, manufacturing, pharmaceutical, and transportation. The survey results were collected and tabulated in Excel and analyzed for the frequency of the responses. The following tables present the survey results addressing each of the topics surveyed.

Table 1 depicts the project failure rates in the participant's organizations. 21.05% of respondents report that projects usually fail in their organizations, while 78.95% report that projects occasionally fail. Respondents note that their organizations do not always have successful or failed projects, but that all organizations report that they have experienced failed projects.

Table 1. Project Failure Rates ($N = 38$)

	Never Fail	Occasionally Fail	Usually Fail	Always Fail
How often projects fail in your organization?	0.00%	78.95%	21.05%	0.00%

Table 1 illustrates that all respondents' organizations experienced both successful and failed projects. Table 2 addresses the causes of project failure and success reported by participants in their organizations. This table depicts common causes recognized by respondents, but does not explore the root causes behind these reasons for project failure and success.

Table 2. Reported common causes of project failure and success ($N = 38$)

Cause of Failure	Frequency of Occurrence	Cause of Success	Frequency of Occurrence
Lack of performance or did not achieved the specified outcome	13.16%	Performance or specified outcome achieved	76.32%
Overrun in costs	13.16%	Costs under budget	18.20%
Over the deadline	13.16%	Delivered before deadline	5.36%
Changes on scope during project execution	28.95%	Other	0.00%

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Cause of Failure	Frequency of Occurrence	Cause of Success	Frequency of Occurrence
Changes in resource allocation during project execution	10.53%		
Risk factors not identified initially	18.42%		
Other	2.63%		

The organizational environment for project management addresses the interplay of the roles of end users, as stakeholders, and the authority which the organization assigns to project managers. Table 3 presents survey responses regarding the roles of stakeholders while Table 4 depicts the survey responses regarding the authority of the project manager regarding the project.

Table 2. Organizational Environment: End User Role ($N = 38$)

In a typical project, the end users describe:	Never	Occasionally	Usually	Always
What the best project return would be for them	2.63%	10.53%	39.47%	47.37%
What the minimum acceptable outcome of the project for them	0.00%	31.58%	44.74%	23.68%
The bottom line impact of the project	0.00%	18.42%	31.58%	50.00%
Desired deadline and milestones of the project	2.63%	26.32%	42.11%	28.95%
Clear outcomes for the project	0.00%	13.16%	44.74%	42.11%

Table 4. Organizational Environment: Authority of the Project Manager ($N = 38$)

In a typical project, the project manager has authority to:	Never	Occasionally	Usually	Always
Terminate a project without obtaining the planned results when facts to base this decision on are presented	39.47%	34.21%	21.05%	5.26%
Select and/or change project participants	2.63%	31.58%	52.63%	13.16%
Propose modifications to the scope in order to achieve a cost, schedule and performance balance	0.00%	26.32%	34.21%	39.47%
Recognize project participants	2.63%	21.05%	42.11%	34.21%
Penalize participants that do not deliver in their commitments?	10.53%	31.58%	39.47%	18.42%

As new graduates join their organizations they are assigned to project management roles and perform in those roles. As we saw from the literature review, they must perform both project management activities and exercise tasks requiring soft skills as they perform in these project management roles. Table 5 presents the extent to which these new graduates in project management roles perform these tasks. Table 5 focuses on tasks in two key areas of project management: scope management (covering skills in project initiation and planning) and project execution (covering skills in planning, execution, monitoring and control of the project). Table 6 shows the performance of tasks requiring the use of soft skills by the new graduates.

Table 5. Typical project management activities performed by new graduates as project managers ($N = 38$)

	Never	Occasionally	Usually	Always
Scope definition: does the project manager conduct interviews that request:				
What resources would be available to complete the project	2.63%	18.42%	47.37%	31.58%
Who should participate on the project	0.00%	23.68%	42.11%	34.21%
Who are the key stakeholders	5.26%	31.58%	34.21%	28.95%
Previous experiences with similar projects	0.00%	26.32%	42.11%	31.58%
Reporting needs from end users	0.00%	28.95%	44.74%	26.32%
Execution: does the project manager develop, negotiate and maintain:				
Work Breakdown Structure	0.00%	39.47%	36.84%	23.68%
Project Schedule	2.63%	0.00%	34.21%	63.16%
Task list and Priorities	0.00%	2.63%	44.74%	52.63%
Risk / Potential Problems management	5.26%	39.47%	28.95%	26.32%
Commitments from the project participants to complete their project tasks on schedule and delivering the requested result.	0.00%	18.42%	53.26%	26.32%
Documentation and Review routines	0.00%	31.58%	50.00%	18.42%
Reporting	0.00%	28.95%	36.84%	34.21%

Table 6. Typical soft skills activities performed by new graduates as project managers ($N = 38$)

	Never	Occasionally	Usually	Always
Soft skills employed:				
The project manager sells the upgrade to participants and end users before or during the conduct of the project when a project objective can be upgraded (better result, lower cost, faster completion, longer commercial viability, etc.)	2.63%	21.05%	44.74%	31.58%
The Project Manager is able to persuade people to support the project using benefit-focused techniques.	0.00%	34.21%	39.47%	26.32%
When benefit-focused persuasion techniques are ineffective and the success of the project is put in doubt, the Project Manager is prepared to and effective at generating project support by appealing to authority.	0.00%	52.63%	36.84%	10.53%
Coaching is provided or arranged by the Project Manager for reluctant, underperforming participants before they compromise the project schedule.	0.00%	26.32%	52.63%	21.05%
Delegation is only used with project participants who are not fully skilled in their assigned tasks but who are motivated enough to learn how to perform them successfully.	0.00%	28.95%	50.00%	21.05%
Able but reluctant project participants are pre-sold on the project to gain their commitment and are regularly re-sold until their project responsibilities are completed.	5.26%	26.32%	60.53%	7.89%

The previous Tables examined which skills were utilized, but do not delve into the capabilities of the project managers in those projects. As project manager capabilities can influence the outcome of projects, we examined the skills and competencies of these new graduates performing in project management roles. Table 7 reports respondents' evaluation of the skills and competencies of new graduates in project management roles, in light of their organizations' needs.

Table 7. Evaluation of skills of new graduates in project management roles ($N = 38$)

	Poor	Below Average	Average	Very Good	Excellent
Ability of gather information and define project scope	7.89%	42.11%	28.95%	21.05%	0.00%
Evaluate project risks and manage them	26.32%	47.37%	18.42%	7.89%	0.00%
Evaluate resources needed and manage them	21.05%	50.00%	28.95%	0.00%	0.00%
Create a WBS (work breakdown structure) and/or Project Schedule	7.89%	28.95%	39.47%	21.05%	2.63%
Execute the project according to the plan	2.63%	28.95%	44.74%	23.68%	0.00%
Coordinate adjustments to the project, as needed	7.89%	52.63%	28.95%	10.53%	0.00%
Report out project completion rate and next steps	2.63%	26.32%	34.21%	31.58%	5.26%
Complete the project within the performance, time and costs planned	5.26%	26.32%	39.47%	26.32%	2.63%
Execute post-mortem analysis and gather learnings	5.26%	39.47%	39.47%	15.79%	0.00%

Table 8 presents the manager's ratings of the importance of project management skills of newly hired graduates, given their understanding of the needs of their organization.

Table 8. Importance of project management skills of newly hired graduates ($N = 38$)

	Not Needed	Optional	Required	Important
Project management	5.26%	23.68%	47.37%	23.68%
Project scope management	2.63%	10.53%	44.74%	42.11%
Project risk management	5.26%	7.89%	26.32%	60.53%
Manage project execution	0.00%	21.05%	65.79%	13.16%
Influence people to achieve goals	0.00%	15.79%	23.68%	60.53%
Conflict management to resolve project issues	2.63%	13.16%	18.42%	65.79%
Reporting and presenting skills	0.00%	15.79%	42.11%	42.11%
Different methods of project management (i.e., Agile, SCRUM, etc.)?	5.26%	50.00%	28.95%	15.79%
Project management software skills	2.63%	26.32%	55.26%	15.79%

5. Discussion

5.1 *The organizational environment for project management*

A total of 86% of all surveyed managers responded that, in a typical project environment, project customers usually or always describe what the best project return would be, and 82% of customers usually or always communicate what is the “bottom line” of the project.

Related to the authority that is given to the project manager, the majority of respondents showed that the project manager cannot terminate a project, even when it is proven that the scope received is unattainable. Respondents reported that these terminations are allowed in 6.7% of their organization, but 77% of respondents described that the project manager is allowed to propose modifications to the scope to achieve the project results.

The project managers have limited freedom to select project participants (82% of the respondents described that a project manager usually or occasionally could select the project participants). Most organizations allowed recognition of project participants (80% of responses of “always” and “usually”), but did not support penalizing project participants who do not deliver their commitments (55% of the responses).

In the direct interviews a strong bias towards execution emerged. Few of the interviewed managers described all the phases of project planning, including risk management. The preparation phase was often confused with an initial interview where the goals of the project and deadlines were described, suggesting that project managers get directly into execution phase.

Summarizing the information collected in this part of the survey and the interviews regarding the organizational environment for project management, it can be concluded that in the typical project setting project managers have no clear planning phase where the desired project results are communicated, and very little attention is dedicated for project evaluation including risks analysis of the project. There is a strong focus on execution. In the execution phase, the project managers have relatively good freedom to select and recognize the project participants, but restricted freedom to address low performance. This is in contrast to more experienced project managers who tend to take a longer-term view and a higher-level view of their projects [79].

5.2 *Results of projects managed by new graduates*

Survey participants responded the main causes of project success as being when they achieve the desired outcome (76%) or when costs were under budget (18%). Fewer respondents (5%) indicated that executing projects within the agreed deadlines was the main cause of project success.

An estimated 55% of projects are described as failing in some aspect. It was also responded that projects led by new graduates “occasionally” (78.90%) fail in their organizations and the main causes are scope changes during project execution and risks that were not identified initially taking place. Changes in project scope and risks encountered account for 48% of project failures.

5.3 *Evaluation of skills presented by new graduates as project managers*

Organizations identify project management skills, emphasizing scope management and risk management, and soft skills, emphasizing influencing skills, conflict management, and communication (reporting and presenting) as important skills that newly hired graduates should have, as shown in Table 8. They also identify as necessary skills for managing project execution and using project management software. Knowledge of a diversity of project management methods was perceived as having lesser importance for new graduates.

Most of the responses showed that new graduates are usually executing interviews, meetings and information gathering to define a project scope but with some faults: 79% of responses showed that “always” or “usually” the new graduates as project managers collect information on resources available for the project and participants, but there is slightly

reduced attention to collect information on who should participate in the project, who are the key stakeholders, previous experiences of similar projects and the reporting needs of project customers. Over 5% of responses indicate that new graduates never address identifying who are the key stakeholders for their projects.

Table 7 shows that new graduates performing in project management roles are ranked average or below average for many of their project management skills. The weakest skills noted were risk management, resources evaluation/management, and making coordinating changes in the project. Stronger skills were noted in project execution-focused skills, such as executing the project, reporting on project status, and driving the project to completion.

In the interviews, it was also found that there is a lack of attention to risk management as no interviewed managers showed that new graduates executed any form of risk evaluation and management plan during the scope phase. This is consistent with other recent studies of project risk management which identified lack of competence or a fear of being perceived as not having competence as reasons for disengagement from risk management [81].

Related to project execution skills, the data collected shows that new project managers are focused on using a schedule and task list for managing their projects. New graduates use schedule and task lists as their main tools (97% respondents showing it as “always” and “usually”) but a much smaller number of the new graduates are using WBS (work breakdown structure) and risk management as part of the project management (60% of respondents showed that WBS is at least “usually used” and 55% showed that there is active risk management for their projects). As a practice, routine reviews and reporting were rated lower with 50% of the responses showing that these actions “usually” take place in projects.

The soft skills of new graduates as project managers were noted as a concern by interviewees, consistent with the survey data collected. Of all skills assessed the majority of respondents felt that, at best, the new graduates “usually” showed the desired soft skills. This result is consistent with other studies of project management practice, as Carvalho [34] reports a lack of efficient use of performance reporting and communication planning, and that communications processes documented in organizations’ project management methodologies are “neither followed nor prioritised by project managers”. However, this skill assessment contrasts with the results of this and other studies [48] that have placed high importance on the soft skills needed by project managers.

“Selling up” was the only soft skill considered to be strong (76% of responses in “always” and “usually”); persuasion, delegation and coaching were considered weaker (44 to 52% of the responses showed that these were behaviors only seen “usually”) but addressing low performance and issues were rated as weak (use of authority when needed was 52% in “occasionally”). This importance on influencing others is consistent with other studies, which have identified this as a highly important skill [50].

The lower frequency of demonstrated desired soft skills by new graduates could be related to their limited experience as professionals, but also with a lack of preparation during their academic life. Most interviewed managers believe that a better job must be done to develop such skills prior to the entry of graduates into the work life.

5.4 Future organizational needs for project managers

Survey respondents were requested to consider their organizations and their future needs in identifying what were the key aspects of project management that were needed, as well as ranking them in importance. The project management skill itself was considered as minimum required or very important by 71% of the respondents. Within the other most important skills were conflict management (65%), followed by the ability of influencing people to achieve goals and risk management, which has been identified by other studies as a critical dimension of project manager competencies [47].

As minimum skills required the ability to manage the project execution, ability to work with project management software and scope management were identified. Knowing different project management methodologies were considered to be less important.

Survey participants were requested to rate the skills of new graduates as project managers as compared to what was desired of new graduates. In all the aspects, new graduates were rated mainly between “below average” and “average”, as shown in Table 7. Managers identified as stronger aspects of new graduates’ performance their ability to create a WBS or schedule and then execute and complete a project according to a plan, and to report progress and next steps, while coordinating adjustments to the project, risk management, and evaluation and management of resources needed were rated as poor.

When asked the importance of skills, the most important, must-have skills are risk management, influencing skills, and conflict management. The skills that respondents felt were required of new graduates were project execution and ability to use project management software. The skill that respondents felt was not important at the entry-level was an understanding of a diversity of project management methods. It is very important to note that the very important skills for the organization are the ones that are being rated poorly for new graduates in their project management roles, especially risk management and soft skills. This is consistent with prior risk management research that showed that the soft side of risk management explains over 10% of project success [51].

A study focusing on the most important skills for successful project management identified that leadership and people-related skills were slightly more important than project planning and execution [5]. This contrasts with the results found with new project managers who were strongly biased towards project execution, lacked planning skills and were less effective in using the people and soft skills necessary to accomplish their roles successfully. Abramo and Maltzman [5] identify communication as both the most important project management knowledge area and as the most important personal competency for a project manager. This study shows that new project managers are rated poorly in this aspect of their performance.

5.5 Implications for Practice

A number of actions could be undertaken to improve the success of new graduates in project management. These actions could include actions undertaken by educational institutions, employers, and by new graduates themselves.

There is a perceived gap between what educational institutions are offering and what is needed to deal with projects in the ever-increasingly complex work environment, especially regarding soft skills [82]-[84],[43]. Educational institutions could explore ways to reinforce the preparation of their students to manage projects. A special focus must be on the project preparation phase (scope, WBS, risk management) and on soft skills; proficiency in these skills should be demonstrated by students in practical projects during their academic preparation. The PM Curriculum and Resources [85] establishes a proposed set of learning objectives and curricula that can be adapted by educational institutions to support development of project management educational offerings, including courses on project management foundations and on project teams, leadership, and communication.

Organizations could consider developing competency development actions for new graduates, including mentoring opportunities making available more experienced professionals to coach new professionals. This study confirms earlier research [6], as it shows that graduates are often arriving at their organizations with a basic education and set of skills, but they do not have all of the skills they will need to be successful project managers. Not all organizations are taking the steps needed to develop the needed skills and competencies. Worldwide, sixty percent of organizations provide training on project management tools and techniques, while 45% of organizations have a formal process for project management competency development [1]. Coaching and mentoring have been identified as critical capabilities in the competency development of an organization’s human capital [26]. Mentoring has been identified as a technique for developing project management [86]. New graduates often do not have deep exposure to the organization’s environment and will copy current project management practices, such as a bias toward direct execution. Good coaching can also assist to develop the needed soft skills that most of new graduates have not yet developed, but which are skills where the competency development mechanisms in the workplace may contribute more to their development than academic courses or formal training [87].

New graduates could take responsibility for ensuring the development of their competencies in all aspects of project management – not just the technical skills, but also in the soft skills and leadership aspects and the knowledge, skills and ability to follow proven project management methodologies.

6. Conclusion and Study Limitations

During the interviews, several managers reinforced that the performance of new graduates as project managers was a direct reflection of their poor preparation during their college studies. The results of this study show, that while there is good reason for these opinions, that is the not the single cause of the poor performance. New graduates are leaving college demonstrating good skills to execute a basic project preparation and to execute projects, but not executing important project management requirements as risk management, change management and ongoing management of work breakdown structures and schedules. It was pointed out that their projects fail most due to changes of scope and risks that were not planned for. The current environments at the surveyed organizations do not foster good project management practices. Furthermore, they have a strong bias toward direct execution. In this environment, coupled with new graduates' skills for basic project preparation and execution, the new project managers tend to follow this practice of focusing on project execution and reporting.

New graduates may not have enough of the work-life experiences that provide them with the needed soft skills for successful project management. Many of these leadership and soft skills have been found to be correlated with project success [88] and have been perceived as more important skills for project managers than their technical skills [89]. Recent studies indicate that leadership skills have a direct influence on the success of project managers and projects with 66 percent of organizations identifying leadership skills as being most important for the early success of project managers [90].

In their review of Brazilian management studies, Rodrigues et al. [64] explore the role of an inside-out approach to research, learning from indigenous questions and informing global research understanding. This paper, while addressing indigenous project management performance in Brazil, may also contribute to the development of universalistic theory [64] by exploring issues of new graduates in project management roles in Brazilian organizations that may provide insights into similar issues and needs for qualified new graduates in other global organizations. It points out the need for providing, and the consequences of not providing, continued project management competency development in organizations to adequately prepare new graduates for increasing responsibilities. With the projected growth in demand for project managers and project management competencies, need for continued growth in project management competencies as new hires move toward mid-level roles, and continuing difficulties in recruiting sufficient numbers of personnel, investing in competency development for project managers can lead not only to increased success, but also to greater retention of those competencies in the organization through less employee turnover [37],[91].

Regarding study limitations, the data analysis was conducted on a single sample in a single country whose size is limited, but adequate, for this research design. Consequently, no generalizable confirmation of the findings was done, although interviews did confirm our survey results. The data were collected from a single country, so the obtained results could be generalized only for the population from which the sample was drawn. The focus of the study was on organizations and their experiences with new graduates in project management roles. Future studies may remedy the above noted limitations by addressing these limitations.

The method used to gather survey data may have limited the participants to those individuals of leading firms who engaged in professional development of their employees (through executive education) or to those active in business and trade (through the Chamber of Commerce), and may be biased in several ways. First, the sample may be biased towards larger organizations more capable at selecting and developing its employees. Second, it may be biased towards organizations focused on international trade, neglecting firms with a domestic focus. These biases could influence the results, but the expected direction would be towards greater capability and project performance, which may suggest that with a wider sample it is possible that the picture painted by this study may be too positive, with actual results from a wide census of organizations possibly reflecting lower overall project management performance.

A second limitation to this study lies in the use of a survey research methodology for primary data collection. There is possibility that a potentially sensitive topic as performance (of new graduates and projects in the organization) might cause a social desirability bias in responding to the survey. This potential limitation was offset by securing managers' cooperation and willingness to participate in response to invitations to participate that guaranteed anonymity to respondents. A large percentage (over 50 percent) of those initially contacted completed the online survey. Follow-up interviews with a selected sample of managers and senior managers, drawn from the survey respondents, indicated they had no hesitation in expressing their perceptions about performance of new graduates and projects in their organizations.

A third limitation is the selection of project managers to focus on in this study. This study focused on project managers who are recent graduates, but does this without comparing them with the more senior or more experienced project managers. While we assume that more experienced project managers might perform better because of their experience, we cannot demonstrate that in this study.

Subsequent studies could explore a variety of other factors that may impact the types of results found in our study. These studies could include factors such as the performance of both new and experienced project managers, organizational capabilities, the length of a normal or representative project in the organization, industry sector, focus of the projects undertaken by the organization, size, complexity, or budget of projects, international involvement, project management methodologies in use, or greater examination of soft skills in the project management setting.

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References

- [1] PMI, *Success Rates Rise: Transforming the high cost of low performance (PMI's Pulse of the Profession)*. Newton Square, PA, USA: Project Management Institute, 2017.
- [2] C. Iriarte and S. Bayona, "IT projects success factors: a literature review," *International Journal of Information Systems and Project Management*, vol. 8, no. 2, pp. 49-78, 2020.
- [3] R. Joslin and R. Müller, "Relationships between a project management methodology and project success in different project governance contexts," *International Journal of Project Management*, vol. 33, no. 6, pp. 1377–1392, 2015.
- [4] R. A. Teubner, "IT program management challenges: insights from programs that ran into difficulties," *International Journal of Information Systems and Project Management*, vol. 6, no. 2, pp. 71-92, 2018.
- [5] L. Abramo and R. Maltzman, *Bridging the PM Competency Gap: A Dynamic Approach to Improving Capability and Project Success*, Plantation, FL: J. Ross Publishing, 2017.
- [6] J. Thomas and T. Mengel, "Preparing project managers to deal with complexity – advanced project management education," *International Journal of Project Management*, vol. 26, no. 3, pp. 304-315, 2008.
- [7] K. Bredin and J. Söderlund, "Project managers and career models: An exploratory comparative study," *International Journal of Project Management*, vol. 31, no. 6, pp. 889-902, 2013.
- [8] K. Hölzle, "Designing and implementing a career path for project managers," *International Journal of Project Management*, vol. 28, no. 8, pp. 779-786, 2010.
- [9] E. Cicekli, "Graduate skills requirements for effective performance in the banking sector," *Business: Theory and Practice*, vol. 17, no. 4, pp. 317-324, 2016.

- [10] P. E. Love and N. S. Haynes, "Construction managers' expectations and observations of graduates," *Journal of Managerial Psychology*, vol. 16, no. 8, pp. 579-593, 2001.
- [11] CIO. (2016). *Project managers, tech sales pros are in high demand*. [Online]. Available: <http://www.cio.com/article/3053093/careers-staffing/project-managers-tech-sales-pros-are-in-high-demand.html>
- [12] J.-H. Wu, Y. Chen and J. Chang, "Critical IS professional activities and skills/knowledge: A perspective of IS managers," *Computers in Human Behavior*, vol. 23, no. 6, pp. 2945-2965, 2007.
- [13] J. M. Mathews and H. Pardue, "The Presence of IT Skill Sets in Librarian Position Announcements," *College & Research Libraries*, vol. 70, no. 3, pp. 250-257, 2009.
- [14] J. C. Clark, "What Employers Want: Entry-level Qualifications for Music Librarians," *Notes*, vol. 69, no. 3, pp. 472-493, 2013.
- [15] M. S. Sodhi and B.-G. Son, "ASP, The Art and Science of Practice: What Employers Want from Operations Research Graduates," *Interfaces*, vol. 38, no. 2, pp. 140-146, March-April, 2008.
- [16] V. Hegde and Z. Radovilsky, "Shift in Supply Chain Job Requirements and its Impact on Supply Chain Management Curriculum," *Journal of Academy of Business and Economics*, vol. 12, no. 4, pp. 28-38, 2012.
- [17] A. Whiteside, "Investigation of Technical Communication Graduates, Managers, and Curricula," *Journal of technical writing and communication*, vol. 33, no. 4, pp. 303-318, 2003.
- [18] N.M.L. Barnes and S.H. Wearne, "The future for major project management," *International Journal of Project Management*, vol. 11, no. 3, pp. 135-142, 1993.
- [19] PMI. *Project Management Job Growth and Talent Gap 2017–2027*. Newton Square, PA: Project Management Institute, 2017.
- [20] McKinsey & Company. *Voice of the Graduate*. McKinsey & Company, 2013.
- [21] Chegg. (2013, October 31). *Bridge That Gap: Analyzing the Student Skill Index*. [Online]. Available: <http://www.businessinsider.com/college-graduates-overestimate-skills-2013-10>
- [22] S. Loufrani-Fedida and S. Missonier, "The project manager cannot be a hero anymore! Understanding critical competencies in project-based organizations from a multilevel approach," *International Journal of Project Management*, vol. 33, no. 6, pp. 1220–1235, 2015.
- [23] NACE, (2019). *Career Readiness for the New College Graduate: A Definition and Competencies* [Online]. Available: <https://www.nacweb.org/uploadedfiles/pages/knowledge/articles/career-readiness-fact-sheet-jan-2019.pdf>
- [24] S. M. Shariff, Z. J. Johan and N. A. Jamil, "Assessment of Project Management Skills and Learning Outcomes in Students' Projects," *Procedia - Social and Behavioral Sciences*, vol. 90, pp. 745-754, 2013.
- [25] M. Sołtysik, M. Zakrzewska, A. Sagan and S. Jarosz, "Assessment of Project Manager's Competence in the Context of Individual Competence Baseline," *Education Sciences*, vol. 10, no. 5, 146, 2020.
- [26] P. W. G. Morris, "Managing the Front-End: how project managers shape business strategy and manage project definition," in *Proceedings of the 2005 PMI Global Congress Proceedings*, Edinburgh, Scotland. Newtown Square, PA: Project Management Institute, 2005 [Online]. Available: <https://www.pmi.org/learning/library/managing-front-end-project-business-strategy-7500>
- [27] J. J. Ahonen and P. Savolainen, "Software engineering projects may fail before they are started: Post-mortem analysis of five cancelled projects," *The Journal of Systems and Software*, vol. 83, no. 11, pp. 2175-2187, 2010.
- [28] P. W. G. Morris, *The management of projects*. London: Thomas Telford, 1994.

- [29] B. Flyvbjerg, N. Bruzelius and W. Rothengatter, *Megaprojects and risk: an anatomy of ambition*, Cambridge: Cambridge University Press, 2003.
- [30] R. Miller and D. R. Lessard, *The strategic management of large engineering projects: shaping institutions, risks and governance*. Cambridge, MA: The MIT Press, 2001.
- [31] D. Sage, A. Dainty and N. Brookes, “A critical argument in favor of theoretical pluralism: project failure and the many and varied limitations of project management,” *International Journal of Project Management*, vol. 32, no. 4, pp. 544–555, 2014.
- [33] M. Lappe and K. Spang, “Investments in project management are profitable: A case study-based analysis of the relationship between the costs and benefits of project management,” *International Journal of Project Management*, vol. 32, no. 4, pp. 603–612, 2014.
- [34] M.M. Carvalho, “An investigation of the role of communication in IT projects,” *International Journal of Operations & Production Management*, vol. 34, no. 1, pp. 36–64, 2014.
- [35] B. Curtis, W. E. Hefley and S. A. Miller, *The People CMM: A Framework for Human Capital Management (2nd Edition)*, Boston: Pearson, 2009
- [36] M. M. Carvalho, L. A. Patah and D. S. Bido, “Project management and its effects on project success: Cross-country and cross-industry comparisons,” *International Journal of Project Management*, vol. 33, no. 7, pp. 1509-1522, 2015.
- [37] B. Ekrot, A. Kock and H. G. Gemünden, “Retaining project management competence — Antecedents and consequences,” *International Journal of Project Management*, vol. 34, no. 2, pp. 145-157, 2016.
- [38] F. J. Machado and C. Dai Prá Martens, “Project Management Success: A Bibliometric Analysis,” *Revista de Gestão e Projetos - GeP*, vol. 6, no. 1, pp. 28-44, 2015.
- [39] PMI, *PMBOK® Guide, Sixth Edition*. Newton Square, PA, USA: PMI, 2017.
- [40] J. Söderlund and H. Maylor, “Project management scholarship: Relevance, impact and five integrative challenges for business and management schools,” *International Journal of Project Management*, vol. 30, no. 6, pp. 686–696, 2012.
- [41] I. Ruuska and M. Vartiainen, “Critical project competences – a case study,” *Journal of Workplace Learning*, vol. 15, no. 7/8, pp. 307-312, 2003.
- [42] J. R. San Cristóbal Mateo, E. Diaz Ruiz de Navamuel and M. A. González Villa, “Are project managers ready for the 21th challenges? A review of problem structuring methods for decision support,” *International Journal of Information Systems and Project Management*, vol. 5, no. 2, pp. 43-56, 2017.
- [43] I. S. Ozguler, “Project Management After Covid-19,” *PM World Journal*, vol. IX, no. V, May, 2020.
- [44] International Project Management Association (IPMA), *IPMA Individual Competence Baseline, Version 4.0 (IPMA ICB®)*, Nijkerk, The Netherlands: International Project Management Association, 2015.
- [45] A. Zaharim, M.Z. Omar, Y.M. Yusoff, N. Muhamad, A. Mohamed and R. Mustapha, “Practical Framework of Employability Skills for Engineering Graduate in Malaysia,” in *IEEE EDUCON Education Engineering 2010 – The Future of Global Learning Engineering Education*, Madrid, Spain, 2010, pp. 921-927.
- [46] A. Zaharim, I. Ahmad, Y. M. Yusoff, M. Z. Omar and H. Basri. “Evaluating the Soft Skills Performed by Applicants of Malaysian Engineers,” *Procedia - Social and Behavioral Sciences*, vol. 60, pp. 522-528, October, 2012.
- [47] R. Müller and R. Turner, “Leadership competency profiles of successful project managers,” *International Journal of Project Management*, vol. 28, no. 5, pp. 437-448, 2010.

- [48] D. J. Stevenson and J. A. Starkweather, "PM critical competency index: IT execs prefer soft skills," *International Journal of Project Management*, vol. 28, no. 7, pp. 663-671, 2010.
- [49] L. Crawford and A. H. Nahmias, "Competencies for managing change," *International Journal of Project Management*, vol. 28, no. 4, pp. 405-412, 2010.
- [50] E. Fisher, "What practitioners consider to be the skills and behaviours of an effective people project manager," *International Journal of Project Management*, vol. 29, no. 8, pp. 994-1002, 2011.
- [51] M.M. Carvalho and R. Rabechini Junior, "Impact of risk management on project performance: the importance of soft skills," *International Journal of Production Research*, vol. 53, no. 2, pp. 321-340, 2015.
- [52] F. Musa, N. Mufti, R. A. Latiff and M. M. Amin, "Project-based learning (PjBL): inculcating soft skills in 21st century workplace," *Procedia - Social and Behavioral Sciences*, vol. 59, pp. 565 - 573, 2012.
- [53] A. Bucero, *The Influential Project Manager: Winning Over Team Members and Stakeholders*. New York, USA: Auerbach Publications, 2014.
- [54] S. Flannes and G. Levin, *Essential People Skills for Project Managers*. Vienna, VA, USA: Berrett-Koehler Publishers, 2005.
- [55] E. Cicekli, "Human Resource Needs of Organizations in Terms of the Qualities They Need and Seek from New Graduate Employees," *International Journal of Business and Social Science*, vol. 4, no. 1, pp. 49-58, January, 2013.
- [56] S. Azim, A. Gale, T. Lawlor-Wright, R. Kirkham, A. Khan, and M. Alam, "The importance of soft skills in complex projects," *International Journal of Managing Projects in Business*, vol. 3, no. 3, pp. 387-401, June, 2010.
- [57] S. Ravindranath, "Soft Skills in Project Management: A Review," *IUP Journal of Soft Skills*, vol. 10, no. 4, pp.16-25, December, 2016.
- [58] L. F. C. S. Durão, M. V. F. Grotti, P. R. M. Maceta, E. S. Zancul, F. T. Berssaneti and M. M. Carvalho, "A review of the soft side in project management: concept, trends and challenges," *GEPROS. Gestão da Produção, Operações e Sistemas*, vol. 12, no. 2, pp. 157-176, April-June, 2017.
- [59] P.W.G. Morris, L. Crawford, D. Hodgson, M.M. Shepherd and J. Thomas, "Exploring the role of formal bodies of knowledge in defining a profession – The case of project management," *International Journal of Project Management*, vol. 24, no. 8, pp. 710-721, 2006.
- [60] S. Brière, D. Proulx, O. N. Flores and M. Laporte, "Competencies of project managers in international NGOs: Perceptins of practitioners," *International Journal of Project Management*, vol. 33, no. 1, pp. 116-125, 2015.
- [61] I. de los Ríos-Carmenado, I. Ortiz and J.M. Díaz-Puente, "Project Management Teaching in Engineering Higher Education: A New Perspective for Developing Competencies," in *Selected Proceedings 12th International Congress on Project Engineering* (Zaragoza, July 2008). AEIPRO. International Project Management Association, pp. 418-427, 2009.
- [62] M. Carneiro, "Uma entrevista com Margareth Carneiro: Primeira latinoamericana no Board do PMI," *Revista Mundo PM*, vol. 10, no. 55, pp. 24-27, 2014.
- [63] M. M. Benitez Cudas, "Development of project management in Brazil - a historical overview," *International Journal of Project Management*, vol. 5, no. 3, pp. 144-148, 1987.
- [64] S. B. Rodrigues, R. Gonzalez Duarte and A. De Padua Carrieri, "Indigenous or Imported Knowledge in Brazilian Management Studies: A Quest for Legitimacy?" *Management and Organization Review*, vol. 8, no. 1, pp. 211-232, 2011.

- [65] S. A. Simões, L. C. Rodrigues, E. A. Maccari and M. F. Pereira, "Managing IT as a Business: The Lutchen's Gap in the 100 Top Organizations Based in Brazil," *Journal of Information Systems and Technology Management (Revista de Gestão da Tecnologia e Sistemas de Informação)*, vol. 8, no. 3, pp. 717-748, 2011.
- [66] PMI, "Different Skills, Different Fates," *PM Network*, vol. 26, no. 3, pp. 12, 2012.
- [67] M. A. Terlizzi, F. S. Meirelles, and H. R. O. C. Moraes, "Barriers to the use of an IT Project Management Methodology in a large financial institution," *International Journal of Project Management*, vol. 34, no. 3, pp. 467–479, 2016.
- [68] M. Chipulu, U. Ojiako, P. Gardiner, T. Williams, C. Mota, S. Maguire, Y. Shou, T. Stamati and A. Marshall, "Exploring the impact of cultural values on project performance: The effects of cultural values, age and gender on the perceived importance of project success/failure factors," *International Journal of Operations & Production Management*, vol. 34, no. 3, pp. 364-389, 2014.
- [69] J. C. Esquierro, A. B. Valle, C. A. P. Soares and D. C. Vivas, "Implementation of a Project Management Office in a Public Sector Organization: A Case Study Involving a Sanitation Institution," *International Review of Management and Marketing*, vol. 4, no. 1, pp. 1-12, 2014.
- [70] R. Rabechini Junior, R. and M. M. Carvalho, "Understanding the Impact of Project Risk Management on Project Performance: An Empirical Study," *Journal of Technology Management & Innovation*, vol. 8 (Special Issue ALTEC: Social and Sustainable Project, Knowledge and Innovation Management), pp. 64-78, 2013.
- [71] I. Rodrigues and R. Sbragia, "The Cultural Challenges of Managing Global Project Teams: a Study of Brazilian Multinationals," *Journal of Technology Management & Innovation*, vol. 8 (Special Issue ALTEC: Social and Sustainable Project, Knowledge and Innovation Management), pp. 38-52, 2013.
- [72] R. O. Moraes and F. J. B. Laurindo, "Maturity and Performance in Information Technology Project Management," *Journal of Technology Management & Innovation*, vol. 8 (Special Issue ALTEC: Social and Sustainable Project, Knowledge and Innovation Management), pp. 25-37, 2013.
- [73] R. O. Moraes and F. J. B. Laurindo, "Performance Evaluation of IT Projects - The Shenhar and Dvir Model," *Journal of Technology Management & Innovation*, vol. 8 (Special Issue ALTEC: Social and Sustainable Project, Knowledge and Innovation Management), pp. 15-24, 2013.
- [74] V. A. Martins and M. R. Martins, "Outsourcing Operations in Project Management Offices: The Reality of Brazilian Companies," *Project Management Journal*, vol. 43, no. 2, pp. 68-83, 2012.
- [75] T. D. V. A. de Macedo-Soares, E. F. Mayrink and A. Cavalieri, "Strategic Fit of Project Management at a Brazilian State-Owned Firm: The Case of Electronuclear," *Journal of Global Business and Technology*, vol. 5, no. 2, pp. 1-14, 2009.
- [76] M. M. Carvalho, F. J. B. Laurindo and M.S.P. Pessôa, "Information technology project management to achieve efficiency in Brazilian companies," in *Managing Globally with Information Technology*, S. Kamel, Ed., Hershey, PA: IRM Press, 2003, pp. 260–271.
- [77] K. Kelley, B. Clark, V. Brown and J. Sitzia, "Good practice in the conduct and reporting of survey research," *International Journal for Quality in Health Care*, vol. 15, no. 3, pp. 261–266, May, 2003.
- [78] J. Zuo, X. Zhao, Q. B. M. Nguyen, T. Ma and S. Gao, "Soft skills of construction project management professionals and project success factors: A structural equation model," *Engineering, Construction and Architectural Management*, vol. 25, no. 3, pp. 425-442, 2018.
- [79] V. R. Montequin, A. G. Nieto, F. Ortega and J. Villanueva, "Managerial style profiles of successful project managers: a survey," *Procedia Computer Science*, vol. 64, pp. 55-62, 2015.

- [80] O. Pankratz and D. Basten, "Ladder to success – eliciting project managers' perceptions of IS project success criteria," *International Journal of Information Systems and Project Management*, vol. 2, no. 2, pp. 5-24, 2014.
- [81] E. Kutsch, D. Denyer, M. Hall and E. Lee-Kelley, "Does Risk Matter? Disengagement from risk management practices in information systems projects," *European Journal of Information Systems*, vol. 22, no. 6, pp. 637-649, 2013.
- [82] L. Crawford, P. Morris, J. Thomas and M. Winter, "Practitioner development: From trained technicians to reflective practitioners," *International Journal of Project Management*, vol. 24, no. 8, pp. 722–733, 2006.
- [83] I. Pant and B. Baroudi, "Project management education: The human skills imperative," *International Journal of Project Management*, vol. 26, no. 2, pp. 124–128, 2008.
- [84] J. Ramazani and G. Jergeas, "Project managers and the journey from good to great: The benefits of investment in project management training and education," *International Journal of Project Management*, vol. 33, no. 1, pp. 41–52, 2015.
- [85] Task Force on PM Curriculum, *PM Curriculum and Resources*. Newton Square, PA: Project Management Institute, 2015. [Online] Available: <http://pmiteach.org>
- [86] PMI, *Spotlight on Success: Developing Talent for Strategic Impact*. Newton Square, PA: Project Management Institute, 2014.
- [87] F. T. Edum-Fotwe and R. McCaffer, "Developing project management competency: perspectives from the construction industry," *International Journal of Project Management*, vol. 18, no. 2, pp. 111-124, 2000.
- [88] P. Nixon, M. Harrington and D. Parker, "Leadership performance is significant to project success or failure: a critical analysis," *International Journal of Productivity and Performance Management*, vol. 61, no. 2, pp. 204-216, 2012.
- [89] S. El-Sabaa, "The skills and career path of an effective project manager," *International Journal of Project Management*, vol. 19, no. 1, pp. 1-7, 2001.
- [90] PMI, *PMI's Pulse of the Profession In-Depth Report: Navigating Complexity*. Newton Square, PA: Project Management Institute, 2013.
- [91] T. Goles, S. Hawk and K. M. Kaiser, "Information technology workforce skills: The software and IT services provider perspective," *Information Systems Frontiers*, vol. 10, no. 2, pp. 179-194, 2008.

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