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ORIGINAL ARTICLE

SKILLS AND COMPETENCIES REQUIREMENTS IN INDUSTRY 4.0 FOR ENTRY-LEVEL PROJECT MANAGEMENT POSITIONS: AN INDUSTRY PERSPECTIVE

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ABSTRACT –There are very few studies done pertaining to the skills required in Industry 4.0 for Project Management (PM) employees, and no studies explicitly focused on entry-level skills requirement for PM graduates in the advent of Industry 4.0 especially from the industry perspective. The aim of the study is to investigate the required skills of project management graduates for entry-level project management positions in various Industries. It also highlights the current skills and competencies that are of high value to organisations in Industry 4.0. This research employed a qualitative research method, gathering information from 13 experienced respondents in the Sultanate of Oman in various positions and sectors. The study found that there is indeed a significant skill gap between what the graduates have and the requirements of the organisation. The researchers have emphasised that there must be an endeavour to pour more resources into fixing these skill gaps. The findings of this study have shown linkages with past research. The study has proposed strategies for the stakeholders to ensure that fresh graduates meet the demands of Industry 4.0 and might help the universities/colleges develop a curriculum that suits the industry's needs and requirements. The study had practical applicability and contributed to the body of research.

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INTRODUCTION

Industry 4.0, dominating how we are doing and pursuing our businesses, significantly impacts project managers' roles and responsibilities. The skills and competencies are changing, and job upskilling is required (Simion, Popa, & Albu, 2018). The latest technological trends worldwide will be challenging for project managers as they must keep up with the new industry demands and expectations (Pinzone et al., 2017). Many changes are going on at the forefront, such as digitalisation, increased complexities, big data, virtualisation, and a shift from the traditional model to agile and project teams being delocalised, diverse cultures and professional backgrounds (Marnewick & Marnewick, 2020). The challenge is to integrate the teams and implement standards and risk management. It will require a different higher skill as required in the past and more autonomy in the process to meet deadlines (Rezzani, 2018; Win & Kham, 2018). It is argued that the scope of work is not limited to managing constraints, risks, costs, and schedules (Bierwolf, Romero, Pelka & Stettina, 2018). They need to foresee the upcoming technologies and demands in the market, be strategic thinkers, and be equipped with advanced communication skills and ICT tools to manage teams' and stakeholders' expectations. Leadership skills must empower people, collaborate effectively, and be connected and responsive. It significantly manages diverse teams with more virtual connectivity (Guzman et al., 2020). So, there is a need for modified and upgraded soft and hard skills, which will help the project managers to have unified skill sets which can prepare them to handle complex problems.

According to PMI's Pulse of profession report, there are six digital age skills: data science, security and privacy knowledge, innovative mindset, data-driven decisions, legal and regulatory compliance knowledge, and collaborative leadership skills (PMI, 2018). Another earlier McKinsey 2011 Global Institute Report indicated a shortage of skilled workers between 140,000 and 190,000 who require analytical skills, and there is a need for data analysts, business analysts, and technical support specialists.

In light of the above discussions, it is evident that emerging technologies and the move towards Industry 5.0 will demand new competencies, professional skills, new-age connectivity, virtual teams, and upgraded soft and hard skills. It can also usher in new job opportunities if the stakeholders are fully ready for these changes. With many opportunities available, unemployment issues, job loss, and lack of skilled workforce are paramount in the GCC region. It is one of the biggest challenges. Overstaffing and skills mismatch is other issues. Sultanate of Oman is facing the same issues, and in one of the reports by the World Bank, the estimation of unemployment has reached 49% during 2019, and the situation after the pandemic is undoubtedly a lot worse than it was due to substantial economic losses on both the public and private sector. The government is attempting to rectify these ongoing issues by diversifying its investments to include not only the petroleum and gas sector but others such as technology, manufacturing, and tourism (Al Jazeera, 2021). A new government initiative in providing skill training for Omanis in known private and public companies suggests that the matter of unemployment could be related to a lack of adequate skills (Oman Observer, 2018), which are not matching

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with the industry standards. These skills should be harnessed in such a way as to provide some solution to the unemployment problems. There is a gap where the industry-published reports promise a broad spectrum of jobs, but the reality is far from the promises.

So what does this all mean to the graduating and graduated students in Oman pursuing their studies in project management, related fields and other critical stakeholders like HEIs, ministry, associations, and industry? The quest to find this answer is the motivating factor behind this study. The study's main aim is to understand the required skill sets for graduating students for entry-level job positions in project management and related fields from an industry perspective. In this regard, the researchers seek to answer the following research questions, which form the basis of the study; (1) what are the entry-level jobs positions in different sectors of project management and related fields for PM graduates?, (2) what are the industry perspectives regarding the importance of certifications, technical and soft skills in the advent of Industry 4.0, skills gaps of fresh project management graduates, career progression of PM graduates, industry trends to be embedded in HEIs curriculum, importance of training and internship.

This study is the maiden effort to provide guidelines to the universities/colleges/institutions offering project management courses with related fields such as supply chain, operations management, business analysis etc., to meet the demands of the industry. The research intends to bridge the prevailing gap in the market related to entry-level job requirements in project management and related fields. The study's output will benefit stakeholders such as the Ministry, industry, HEIs, and most importantly, students. This knowledge will positively affect recruitment and will provide HEIs with channelised and focused efforts to train the students in the upcoming fields and prepare them for the current job demands. HEIs can use the recommendations to strengthen their programmes/curricula to meet the industry demands of entry-level positions in project management and related fields.

LITERATURE REVIEW

Job Market scenario of PM

The PMI report illustrated how the talent gap could have a worldwide economic impact. It stated that the global economy would need more than 25 million project professionals by 2030, and 2.3 million will have to enter project management-oriented employment (PMOE) to sustain the demand. The potential loss if this does not happen was estimated to be up to 345.5 billion US dollars in global GDP (PMI, 2021). The report found that the most significant PMOE growth will be in software development at an estimation of 14% by 2030. Additionally, project management jobs and business development are expected to increase continuously in the upcoming decade. This report highlights the importance of PM-related training and skills acquirement and that its importance will grow further shortly (PMI, 2021).

A study by Mckinsey (2020) found that almost 80% of business leaders have remarked that skill-building is extremely important for their firm's growth. To that end, new initiatives must be made to foster the improvement of the unskilled youth and to train them in project management skills, as two-thirds of the population of MENA is under 35, and unemployment is relatively high.

There is a mixed response related to the professional certifications of PM. Soroka-Potrzebna et al. (2021) indicated that certification is becoming less valuable as firms and organisations value experience more, which contradicts the notion of professional certifications. The study further shows that the organisations' demand is moving towards the agile approach and is expected to keep this trend due to its popularity. However, a few researchers argued that certificates give project managers an edge, and among the highly evaluated ones are the PMP, agile certifications, and Prince 2 certificates. They believe it is helpful in the recruitment stage and give an edge to fresh graduates (William, 2020; Kashyap, 2021).

Hard and soft skills in PM

According to Cicekli (2016), project management is one of the most advancing fields, as a project manager can work in many fields such as IT, supply chain management, construction management, and banking firms. A study by CIO (2016) found that 37% of the jobs in the professional field require project management skills. According to PMI, the demand for project management is increasing higher than in other fields and is projected to be 22 million by 2027. Hard skills in project management are needed but are not enough, as argued by Söderlund and Maylor (2012). They argued that for a project to be successful, a combination of both is needed. Mateo et al. (2017) agreed with the above view by stating that soft and hard skills are both required in the work environment of a project manager. A study by Demirbilek et al. (2020) concluded that more importance would be placed on soft skills in the future. Shastri, Hoda, and Amor (2021) highlighted the increased reliance on project managers and their roles in agile projects, as they still use some of the traditional project management activities such as tracking project progress and reporting its status, forecasting, and managing the workers involved in the project. The research also emphasized that project managers still carry out their usual activities, such as negotiating, coordinating, facilitating, and so on. There is a noticeable increase in demand for managers to have high levels of soft skills such as social skills, people management, and project management skills in the energy sector (Lyu & Liu, 2021).

The researcher studied the job postings in the energy sector and argued that hard skills such as general computer skills and product marketing are also heavily needed and would probably increase in need due to their high contribution to the firm's productivity. Stek and Schiele (2021) argued that purchase and supply managers (PSM) require different skillsets according to their primary objective, but they all share the need for soft skills and describe it as "necessary" for them to be able to use their complex skills in their jobs. One study stated that new graduates placed in project management positions were rarely prepared for these roles for several reasons, such as their still developing soft skills, inadequate risk

management, and failure to conduct proper project preparations. This study stresses the importance of those skills for successful project completion (Hefley & Bottion, 2021). Enabled by the new technological advancements, project managers have expanded their duties and capabilities. Due to that, a report by PMI and PwC has identified five essential skills that are now regarded as critical to succeed in project delivery: The first and top priority is relationship building. The second priority was collaborative leadership, and the third was strategic thinking. The fourth one was creative problem solving and finally, commercial awareness.

PM Competencies and Industry 4.0

Varziani (2010) explained competencies in a simplified manner. He refers to three groups of competencies; (1) social intelligence, such as relationship management and social awareness, (2) emotional intelligence competencies, such as self-awareness and empathy, and (3) cognitive competencies, such as systematic and analytical thinking. Competencies are a behavioural method for enhancing one's emotional, social, and cognitive intelligence. Meanwhile, some authors provided different categorizations for the crucial project manager competencies. According to Vale et al. (2018), four categories can be used to identify and codify competencies (behavioural, technical, managerial, and contextual). To categorize the talents of project managers, these authors also included both soft and hard skills in their categorization and classification. Further, Chipulu et al. (2012) attempted to explore the required competencies that PMs needed across several industries and found that the industry valued one above all according to PM surveys: industry-specific and general skills. It was valued above PM knowledge and expertise. Among the dimensions mentioned were managerial skills, positive personality traits, PM experience and qualifications, and risk management. In another study, Lutas et al. (2020) investigated research on PMs competencies on both their behavioural aspect and their task-related aspect in the construction industry, and the findings were that the behavioural aspects of these project managers were generic, therefore able to blend in and work in other managerial positions with no difficulty, while the task-related side was often particular to the industry they worked. Thames and Schaefer (2017) argued that the traditional project management approach had seen little change in over 30 years, as it still mostly follows the same processes, from project initiation to project closing. With Industry 4.0, a lot will change. Due to the robotization of the industry, some human factors can be eliminated in some processes in favour of a more efficient digitized approach. As such, the initiation and planning stages will have more importance due to the human factor involved. This was supported by another study which emphasized changes in PM's duties to more interaction with stakeholders (Win, Thee, Kham, & Saing, 2018).

Additionally, they will have more authority in creating project agreements, resource management, and the project team positioning in the processes, as the PM would not just be a simple position in the organization. He also emphasized that speed will be of utmost importance in Industry 4.0, therefore, communication will be critical in relaying information to stakeholders and reacting to unforeseen circumstances. As a result, problem-solving, decision-making, negotiation, and exceptional communication skills will be highly valued. When discussing PM required hard skills, the study indicated that the PM must have comprehensive knowledge of cyber-physical systems. While deep domain knowledge is required, the implementation can be delegated to the project team's specialized personnel. To this effect, the study summarized that the complex skills required experience with technology, predictive algorithms, and extensive data analysis to aid in project management.

Further, Whysall et al. (2019) highlighted the need for project managers to be adaptable to the current changes, especially to the 4th industrial revolution. The skill gap is widening between those who adapted and those who did not, as the roles and the skills needed change to adopt the new technologies. This was again proposed by Ribeiro, Amaral, and Barros (2021). Their study confirmed what other studies have mentioned concerning how PMs must adapt to the profound changes that Industry 4.0 has brought to project management. Project managers would have to take a more active role in addition to adopting new technical and behavioural skills and competencies. The study additionally said that soft skills would be of higher importance in Industry 4.0 to PMs compared to the traditional approach as there would be a higher focus on communication and interactions. The 4th industrial revolution required new skills and competencies, and many traditional project management skills would become obsolete. The skill is currently in the highest demand. Another skill in the highest demand for PMs is online communication and collaboration (Marnewick & Marnewick, 2021). The study further necessitated updating the current skill standard to include digital intelligence.

Based on the past literature review, it is evident that new skills and knowledge areas are emerging due to Industry 4.0, which has impacted PM-related jobs also. There is a need to understand the industry perspectives and what skill sets are required by PM graduates in Oman seeking entry-level job positions in different sectors.

METHODOLOGY

Research Design

The research is an exploratory study and uses a qualitative approach to investigate the skills and competencies requirements for entry-level project management positions in Industry 4.0. Qualitative research is the most suitable approach here as the purpose is to do deep analysis (Gibbs, 2008) and attach meaning to the respondent's experiences and thoughts (Ritchie & Lewis, 2003). There is a need to understand the gap and know what skills are required by Industry 4.0 in project management in current and future scenarios. Hence, open-ended questions were framed to capture the participants' thoughts, feelings, experiences, and self-reflection to gain insight into their perceptions and opinions of the topic. Based on the study requirement, the participation selection was purposive, and the snowball method was used. The selection criteria were first to identify who was best suited for the study (Creswell, 2009; Sargeant, 2012). Three inclusive

criteria' were implemented. The first was that professionals should have experience in managing big projects and a minimum of 5 years of experience in various project management domains. The second inclusion criteria were that they should be in the sector which has applicability for IR4.0. To widen the scope; the researchers have also used keywords related to PM certifications (CAPM, PMP, PMI RMP, agile etc.) to meet the requirements of one of the research questions.

Ethics

The researchers ensured that the participants understood the study's purpose by first giving a brief introduction about the study and the reason for choosing them as respondents. It was communicated that all the data and information would remain anonymous and be used only for academic purposes.

Data collection

The researchers first prepared the interview guide and used various questions about the knowledge and skills requirements, certifications, expectations from fresh graduates, training and internship opportunities, future skills requirements, and career progression. Nine open-ended questions were prepared, along with demographic and five warm-up questions. The inclusion criteria for the study were implemented, which meets the aim of the study. A two-pronged approach was followed. First, relevant people in project manager areas were contacted through emails and requested to attend semi-structured interviews, which lasted from 25-40 mins. Only five professionals agreed to be part of the study, in three sectors (IT, Logistics and Construction firms). Secondly, to increase participation and get detailed and unbiased opinions, industry experts, project managers, senior managers, project coordinators, team leaders, and CEOs were approached through LinkedIn to be the study participants, which meets our inclusion criteria. LinkedIn is a social media platform chosen as it is reported to have more professional information benefits and focus than other platforms (Utz, 2016). Several keywords were used to identify people that can fit our search criteria, such as project manager, PMP, PMI-RMP, CAPM, project leader, project coordinator, system analyst etc.

The researchers approached 1st-degree networks through LinkedIn messages and requested them to participate in the survey. A link was provided, which directed them to the Google Form with demographic and open-ended questions. Another strategy followed was to request the 1st-degree person to forward the survey link to their LinkedIn network. Around 12 networks agreed to participate in the survey, and the data collection was stopped after getting the response from the eighth respondent, as the information was repeating and saturation in responses occurred. In total, 13 responses were used for the study (5 interviews and 8 through open-ended questions via LinkedIn), which met our inclusion criteria based on experience, background, and sector.

Data analysis

All the interview answers were later transcribed, and the researchers used thematic analysis to classify the collected data using NVIVO software. This ensures that the parts of the data or excerpts are coded to give a big picture without missing any key points (Gobbs, 2008; Hesse-Biber & Leavy, 2006). First, all the data was assimilated, transcribed, systematically arranged, and loaded into the software. The primary codes were given, leading to broad themes. Names were given to the themes, and then the short report was prepared. The codes used to classify the interviews were entry-level positions, certifications, future skill needs for Industry 4.0, career progression, skills gap, training and internship.

RESULTS AND FINDINGS

The participants' demographic profile indicated that the gender was 75% male and 25% female. The age group of the participants was split, as 50% were between 25-39 and 50% were from 40-59 years of age. The majority of the participants had a role in different project management areas. The organizations that the participants belonged to had different numbers of employees. They range from 1000-9999 employees (25%), 500-999 employees (33.3%), 100-499 employees (8.3%), and less than 100 employees (33.3%).

Table 1. Respondents Demographic profile.

Respondents NO.	Age Group:	Gender:	Current Role in Organization	Years of Experience	Sector
1	25-39	Female	Project Coordinator	7+	Energy
2	25-39	Male	Project Manager	12+	Energy
3	40-59	Male	Product Manager	25+	Manufacturing
4	40-59	Male	Chief Executive Officer	35+	Construction
5	25-39	Male	Project Manager or Project Lead	15+	Construction
6	40-59	Male	Procurement Manager	25+	Logistics
7	40-59	Male	Portfolio Manager	20+	Logistics
8	40-59	Male	Project Manager or Project Lead	25+	Health Sector
9	25-39	Female	PM team member	5+	Health Sector
10	25-39	Female	Project Coordinator	8+	Petrochemical
11	40-59	Male	Senior Consultant	30+	Petrochemical
12	25-39	Male	Project team member	9+	IT firm
13	25-39	Male	System analyst	7+	IT firm

The respondents were asked to identify any college or university offering project management degree courses in Oman. Surprisingly, respondents were split on the question, as half needed to learn about any colleges or universities that offered project management courses, and the other half could identify few. The majority (67%) gave a negative answer when asked whether they have recently hired any candidate with a bachelor's and Master's degree in project management. Regardless of the result, there is an issue of information and publicity for project management programmes and courses in Oman. It is a significant point to be noted by HEIs and other training institutions in Oman offering project management programmes or related courses.

What are the entry-level jobs positions or sectors in project management and related fields for PM graduates?

Many areas or roles related to project management fields were identified by the respondents. The organizations expected to hire project managers in different fields, and the majority of the responses were to jobs related to project management such as, *"project delivery" (Respondent 1, Female), and "project development and project planning, PMO office" (Respondent 13, male). "We expect to hire them in project development, accounting and admin, and business development." (Respondent 4, Male).* Another response was *"They are expected to work in all kinds of projects within oil and gas, more specifically in concept, front-end engineering design, and design development." (Respondent 10, Female). Other identified areas were, "petrochemical, project management-construction based", "business demand management department, law, health-sector" (Respondent 2, Male), "Innovation department - PMO Office" (Respondent 5, Male)., "Logistics, Engineering co-ordination" Respondent 6, Male), "Energy sector" (Respondent 9, Male)., "manufacturing, energy, healthcare, all kind of projects within oil and gas. Concept, FEED, DD jobs" (Respondent 11, Male)., "project engineer with an experience in technical disciplines, finance and insurance." (Respondent 12, Male).* The results show that there are many departments, areas, and fields where project management graduates can be absorbed if they have the right skill sets. Regarding the entry-level positions, the majority mentioned project coordinators, administrators, planners, schedulers, members, project engineers, data analysts, etc.

Fig.1: Sectors for PM graduates(top 12) (Source: NVIVO 12-word cloud output -researchers work)

Fig.2: Entry-level job positions (top 12) (Source: NVIVO 12-word cloud output -researchers work)

Importance of Certifications

When asked about the professional certificates that can help PM graduating students find a job, it was noted that professional certificates were found to be a must by most of the respondents, and while some favoured experience, they acknowledged that gaining certification is still a worthwhile effort by answering: "*no, the experience is a must for PM team, however, CAPM/PMP certificate may be advantageous for an experienced project engineer/manager*." (Respondent 9, Female). The majority of the respondents replied that the certificate they value the most is CAPM/ PMP, while other certifications accrued fewer mentions such as RMP, PgMP, PMI-ACP, PRINCE 2, and PMI-PBA. It is worth mentioning that more than a few respondents highlighted the importance of software certifications, such as *Advanced MS Excel financial modelling, Primavera, and Microsoft Project (Respondent 3, Male).* One reason can be that some of the certificates require some experience and subject area expertise which is not feasible for graduating students seeking entry-level job positions in project management-related fields. These results are similar to Lutas, Nistor, Radu and Beleiu (2020) who also stated that project management certification appreciation varies across sectors and countries.

Technical and Soft Skills in the Advent of Industry 4.0

When questioned about the required technical skills, the respondents in the majority were those who responded with PM-related skills and software skills "*Having the knowhow on project management tools, understanding of deliverables generated by each discipline and its interface*" (Respondent 12, male), while another said, "*planning skills, as successful planning will lead to a successful project*" (Respondent 6, Male). The respondents mentioning software technical skills said "*Knowledge of Excel, Word, PowerPoint (Microsoft) would be of great help*" while another mentioned that having *data analysis skills would be excellent (Respondent 8, Male)*. One of the respondents mentioned that *"some engineering courses should be there" (Respondent 5, Male).* Other respondents added that *"templates and project management tools knowledge is required (Respondent 6, Male), "composing detailed reports" (Respondent 7, Male), and "they should be good with numbers" (Respondent 9, Female).* One of the respondents emphasized scheduling and learning to manage the interfaces "*Understanding of deliverables generated by each discipline and its interface and depending on and importance to the predecessor or successor (Respondent 10, Female).* When questioned about the most important soft skills for the current work environment, the majority agreed on communication and interpersonal skills. A respondent highlighted the importance of perseverance by saying: "*Patience and Never say Die attitude"* is important (Respondent 3, Male). Other respondents mentioned skills such as "*He must be a good learner, a good communicator with people, and a problem solver*" (Respondent 10, Female). Another skill that most respondents agreed on is the "*ability to work in a team, and have the right attitude and drive in work" (Respondent 13, Male)*, and have "*good time management skill so as to minimize time wastage, and finish projects in the allocated time" (Respondents 5, Male).*

When questioned about which skills will be more important and which will be less important in 5 years, a participant said "*multi-tasking is really important, being able to create report formats will become less important due to the new systems/ software that are currently emerging."* (Respondent 6, Male), this ties back to how Industry 4.0 will continue to change the skill requirements of PMs. Another respondent said "*The ability to lead meetings and provide valid deadlines. And the use of old fashioned PM programs will become less important*" (Respondent 1, Female). Another participant disagreed with the idea that some skills have less importance as he said "*Technical know-how, soft skills like people management etc. No skill will become less important. Anything additional is an advantage*" (Respondent 7, male). Software skills seemed to be the favorite in terms of increased importance and utility (Respondents 11, 12), as "*data integration management"* (Respondent 13, male) was also mentioned, and "*hybrid project management" (Respondent 10, Female)* techniques were additionally mentioned. One mentioned that, *"all soft skills are important and they need to learn more about market expectations (like green energy ...etc.)" (Respondent 2, Male),* another mentioned that *"more important, quick learner and problem solver (thinking out of the box)" (Respondent 5, Male).* Research skills were also mentioned (Respondent 1, Female).

Skills Gaps of Fresh Project Management Graduates

When they were asked about the skills gaps observed in graduates, the respondents mentioned that "graduates lack technical know-how" (Respondent 7, Male). As a respondent mentioned "Yes we observed many problems in technical ability in the work environment" (Respondent 3, Male) additionally another said, "lack of proficiency in computer skills" (Respondent 5, Male), while others mentioned, "inability to make use of project management tools". Another respondent stated that "they do know or have any idea how to work on team planners and tools to manage teams like slack, Jira, Trello or ClickUp"(Respondent 8, Male). Another skill gap that was observed was the "lack of English proficiency in both written and spoken aspects" (Respondent 3, Male), which is quite a surprising factor knowing that they spent almost 5 years in college or university. A respondent mentioned "they are unfamiliar with CAPEX and OPEX, unfamiliar with agile project management, unfamiliar with risk assessment tools and techniques." (Respondent 6, Male). Other observations were, "Tenacity" (Respondent 1, Male), "soft skills" (Respondent 2, Male), and "problem solver-should have another solution for each problem (Respondent 7, Male).

Career Progression of PM Graduates

A very positive and interesting glimpse of the expected positions or career progression of PM graduates was given by the respondents. As one mentioned "*starts as project controller or project admin then lead in one of the project's branches*

such as risk or supply chain" (Respondent 5, Male). Another implied that the career progression is wide as he said "*You start at a pre-management level, so the ladder up has no boundaries.*" (Respondent 8, Male). The majority agreed that the start of the career will be "*working in a project team or something similar"* (Respondent 10, Female), then as the PM accumulates more experience "*he will be given higher roles, such as project manager*" (Respondent 1, Female), and *"after leading a few successful projects they could be promoted to project director or senior project manager and so on"* Respondent 9, Female). One highlighted that, *"they can be PMO managers, after leading 3-5 projects successfully"* (Respondent 2, Male)*, and "Career growth is good for dedicated graduates with a willingness to learn" (Respondent 8, Male).* Others mentioned, "*Project engineer, senior project engineer, principal project engineer then Project manager (Respondent 6, Male)".*

Industry Trends To be Embedded in Heis Curriculum

The majority recommended HEIs offer practical experience in a real work environment, like offering their students training and internship opportunities in real organizations when asked about what can HEIs (Higher Education Institutes) offering project management courses/degrees to add to their curriculum which meets the demands of industry's current trends. Another suggestion was to *include seminars from experts in the course, to give a glimpse of what the work environment demands, and the problems that they face in their job specialization* (Respondent 7, Male). Another suggestion was to "*increase and emphasize soft skills training, and to include agile project management techniques in their courses" (respondents 3, Male)*. A unique suggestion was offered "*the ability to manage key bottlenecks in each field to meet project objectives*." (Respondent 8, Male). Other aspects that which majority mentioned were *"digital literacy"* (Respondent 11, Male), *"MS Project" (Respondent 12, Male), "Advanced MS Excel skills (Respondent 13, Male), training for good attention to detail, persuasive, responsible and accountable, good presentation skills (Respondent 1, Female), "legal understanding especially related to contracts" (Respondent 3, Male).*

When they were asked what recommendations, they might give to PM graduates which will add value to them, as per our respondents were to focus on *"social skills and software skills (excel, MS Office)" (Respondent 3, Male).* Additionally, theoretical knowledge is never enough and must be accompanied by real experience. A participant recommended, "*some knowledge about risk assessment and cost estimation, as they are an important skill for a PM fresh graduate to at least have some knowledge about them."* (Respondent 5, male). Finally, another respondent mentioned, "*it never hurts to have some knowledge about risk management" (Respondent 5, male).* One respondent mentioned that "*Fresh graduation should be prepared to take an additional role and team player apart which been studied to ensure to deliver the project" (Respondent 4, Male), "Teamwork, real practice, collaboration and all soft skills are needed (respondent 1, female), "Most students join with strength in theory but they miss core elements and practical knowledge, should be trained on cases and real data"(respondent 9, female). "Hard skills have to be highlighted and taught separately along with PM curriculum (Respondent 13, male)", "It is very important to understand the process which we are supposed to manage as PMs/PEs, so technical knowhow is very critical" (Respondent 4, Male).*

Importance of Training and Internship

Many of the respondents were agreeable to internship and training, as one respondent mentioned "*It's important and it will add value, especially since the trainee will be a recent graduate, so he could share with the company some PM techniques which have been discovered recently that they didn't know about*." (Respondent 6, Male), other respondents commented on how, *"trainees often surprised them with their level of commitment and dedication (Respondent 7, Male).* On the other hand, some respondents stated that *"our organizations didn't provide training unless the individual had some experience in the job, especially technical experience" (Respondent 8, Male).* The following table gives a summary of desired soft and hard skills in the advent of skills gap from the industry perspectives.

Table 2. Summary Table on Skills Requirement (Top 13)

Soft Skill	Hard Skill
Communication skills	Financial modeling
Negotiation skills	Project Management Sofware: MS Project, Primevera etc.
Problem solver	MS Office (especially Advanced Excel, Word, PowerPoint)
Conflict management	Team management softwares like slack, JIRA, Click Up
Emotional Intelligence	Digital skills, Digital Intelligence
Quick learner	Technical skills pertaining to sector like designing, engineering, front end, contracts etc.
Time Management	Scheduler
Multitasking	Data analysis skills, mathematical skills
Attention to detail	Interface knowledge
Ability to work in teams, facilitate workshops/meetings/conference calls work under pressure, Persistence	data integration management
Positive attitude and persistence	Research skills
Thinking out of the box	Project management knowledge areas
Leadership skills	Developing integrated complex reports

DISCUSSION

The study results are relevant not only to the academic field but also to the HEIs, industry and policymakers. Over the years, the demands of skill sets are changing for project managers and emphasize having technical skills but with digital intelligence. The output of this research shows that more than traditional hard and soft skills are needed for success, and other IT-related skill sets need to be acquired by the graduates. The study also highlighted that analytic thinking and digital literacy should be a part of the student's curriculum. The analysis of competencies, skills, and knowledge is more towards generic skills for entry-level positions apart from basic knowledge about project management. Every industry's demands are different, hence to fit into these roles, sector-specific requirements should be monitored. Hence, there is a need for industry specificity courses/training modules that will give the graduates direction while applying for jobs. This study supports the work of Park (2019) and Marnewick and Marnewick (2020) who stated that project managers should have a digital identity, digital use, knowledge about digital safety and security, digital emotional intelligence, digital communication, digital literacy, and digital rights. Furthermore, the visibility of HEIs/training centres or associations needs to be enhanced so that campus placements and visits of the companies increases.

Hefley and Bottion (2021) stated that new graduates need to perform better, which directly reflects their college or university-level studies and preparations. One of the reasons might be that more emphasis is given to the fourth year, where the student should be trained from the first year itself. The future of project management will depend heavily on technological breakthroughs like Industry 5.0; hence, HEIs/training centres/associations map upskilling paths for students. The personality, knowledge, skills, and confidence are built over the years, not in one or two semesters.

The following are some of the strategies which the HEIs can incorporate to meet the requirements and demands of the industry. First, incorporating concepts like digital intelligence, Metaverse, IoT, business analyst tools, big data tools etc., should be introduced in the form of electives so that graduating students can choose from various courses. More exposure can be given to procurement, contracts, and legal understanding. Simulation labs should be set up so that students work on actual life data and exposure. Games and exercises can be used to teach project management courses with real-life problems and issues. This will uncover factual situations which are faced by project managers (Shrivastava et al., 2021).

Many courses and areas were reflected by industry, such as excel financial modelling, working with different software packages, project management tools, and scheduling concepts. HEIs need to see how these concepts can be embedded and in which way. More emphasis was on planning the project and managing them. Rather than solely theory exams, students should be motivated to visit companies and do short projects, assignments, or primary research. Additionally, Educational institutions must focus on diverting their courses and extra curriculum activities to match the new expectations. It is advisable to see the sector-specific demands and prepare a blueprint for the academic year. The students should be guided in their career pathway so that their four years are channelized and focused. There should be vital mentoring programmes and peer-to-peer tutoring, where the graduating students take the role of instructors and interact with new intake students sharing the lessons learned. HEIs should think of a mechanism where graduating students assist the teachers in workshops and guide the new intake students. This instils confidence, communication skills, and a sense of achievement in the graduates.

There is a need to have intense industry tie-ups in Oman to provide platforms for graduating students for internships and voluntary jobs. This will give them exposure and confidence to work later in different sectors. This initiative should start from the first year itself so that students develop their soft and technical skills over the period. Students should be motivated by different professional certifications, as indicated by the respondents. They should also be exposed to a different software like Jira, Slack, ClickUp etc. This will give them a professional edge and confidence to seek jobs and excel in them. Students should be motivated to go for professional membership like PMI and Chapter memberships which gives them the opportunity for networking and various platforms to connect with it. HEIs should provide financial support

in this regard for inclusion. The focus of HEIs should be on competency development, and a strong liaison with alumni and industry can support the graduating students to get exposure to the skill sets. Success stories need to be shared with the students so that they can pave their path and know how to approach companies.

The courses and extra curriculum activities should develop the students' digital competencies, emotional intelligence (Marnewic & Marnewick, 2020), relational skills, divergent, and convergent thinking (Waller & Llod-walker, 2019), resilience, stress handling, problem-solving and negotiating skills (World Economic Forum, 2018) apart from project management knowledge and tools. There should be a more substantial initiative in teaching English to students and in ensuring their proficiency in the language, as many respondents mentioned that the language barrier was often a big issue among Omani graduates. Students should be guided and supported for project management certifications as it is perceived as a step towards their serious careers in project management. This will provide them with the knowledge and skills to manage projects (Joseph & Marnewick, 2018). Furthermore, these professional certifications will give them the needed knowledge and skills to work in entry-level job positions in project management fields. Although certifications alone cannot guarantee jobs and recruitment, they provide a competitive advantage for those graduating students who have them. It reflects their seriousness and focuses in this field, and recruiters would like to hire these candidates.

HEIs provide a curriculum with technical and soft skills related to projects and needed graduate attributes to shift to the workforce, but what is needed is how this theoretical knowledge can be polished with practical exposure and experience. One way is to expose students to work on live projects and case studies so that they know how theory is applicable in real life. Concepts of work breakdown structure, resource planning, risk management, and schedule management can be taught with live projects. More exposure can be given to procurement, contracts, and legal understanding. Another way is to motivate students to work in groups with different nationalities, religions, job experiences, and gender. It will help them to imbibe professional skills and respect workplace etiquette. Lesson plans, assessments, and class exercises should match course outcomes and indicate which skills and competencies are being developed. It will help ensure that students are being developed holistically and have the skill sets required in the future. Project management programmes/courses offered in Oman should be accredited, ensuring that the learning outcomes are current, relevant, and student-focused on meeting the demands of the industry.

CONCLUSION AND IMPLICATIONS

The research paper aimed to understand the entry-level job positions in project management and the demands of the industry from fresh graduates in the advent of Industry 4.0. The response from different business sectors showed an urgent need to revisit the curriculum to match the expectations of Industry 4.0, which will help graduates find entry-level jobs in project management and related fields. The research has contributed to the existing literature review on skills required for entry-level positions in project management. The study addresses the gap related to the demands of the industry with the advent of new and future technologies.

LIMITATION & FUTURE STUDY

One of the study's limitations is that the study's focus is Oman, and the results may not be generalized in other countries. More studies in other countries can support or show differences in the findings giving a rich perspective. Another limitation is that the focus of the study was limited to industry perspectives. It is beneficial that in future studies, students' and Heis's perspectives are also taken into consideration. Furthermore, this study is based on qualitative research. In future research, mixed methods can be used to see the triangulation and applicability of the results.

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CONFLICT OF INTEREST

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