

A Comparative Analysis Of Competency Requirements In The IT And Manufacturing Sectors

Saily Talodhikar,
MBA (HR)

Assistant Professor, JSPM's Jayawant Institute Of Management Studies, Pune

Dr.Safia Farooqui,
Director,

Dr. D. Y. Patil Vidyapeeth Centre For Online Learning, Pune

Abstract:

The abstract outlines a research paper that conducts an in-depth comparative analysis of competency requirements within the Information Technology (IT) and Manufacturing sectors. The primary objective of the study is to thoroughly examine the essential skills and competencies demanded by professionals in these two industries.

The research likely involves a detailed investigation into the specific skills and competencies deemed crucial for success in Information Technology and Manufacturing roles. This may include technical skills, problem-solving abilities, adaptability to technological advancements, teamwork, and other competencies relevant to each sector. The identification of commonalities could suggest areas where cross-industry training or skill transfer might be feasible, promoting a more versatile and adaptable workforce.

The research also includes the implications of these competency patterns on the overall development of the workforce in the IT and Manufacturing industries, considering factors such as the evolving nature of job roles and the impact of technology on skill demands.

The research contributes to a deeper understanding of the dynamic relationship between competencies, workforce development, and industry trends in the IT and Manufacturing sectors. This knowledge can be valuable for policymakers, educators, and industry professionals seeking to align workforce preparation with the evolving demands of these key sectors in the modern economy.

Keywords: *Emerging competencies, Comparative analysis, Workforce development, Competency requirements, Information Technology (IT), Manufacturing sectors, Industry trends.*

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I. Introduction

In the rapidly evolving landscape of the global economy, two pivotal sectors, Information Technology (IT) and Manufacturing, stand as pillars of innovation and economic development. These sectors, although distinct in their operational paradigms, share a symbiotic relationship, influencing and shaping each other in unprecedented ways. As technological advancements continue to redefine the contours of industries, understanding the dynamic competencies demanded by the IT and Manufacturing sectors becomes imperative for workforce development, educational institutions, and policymakers.

The transformative power of technology has propelled the Information Technology sector into the vanguard of economic progress, driving innovation, and shaping the digital infrastructure that underpins contemporary societies. Simultaneously, the Manufacturing sector, steeped in tradition yet embracing modernization, remains the bedrock of tangible production, providing goods essential for our daily lives. While these sectors may appear disparate, their interconnectedness in the modern industrial ecosystem raises crucial questions about the competencies required by the workforce to navigate the challenges and opportunities inherent in each domain.

This research embarks on a comprehensive exploration of the competency landscapes in the IT and Manufacturing sectors, seeking to identify convergences, divergences, and emergent patterns that characterize the skill demands of these industries. By undertaking a comparative analysis, we aim to shed light on the nuanced interplay between technological innovation and traditional production, unraveling the intricate tapestry of competencies that define success in both realms.

The objectives of this study encompass discerning skill gaps, informing workforce development strategies, supporting career path planning, facilitating recruitment processes, and contributing to the formulation of policies that resonate with the evolving needs of the IT and Manufacturing sectors. In doing so, our research

endeavors to provide actionable insights for organizations, educational institutions, and policymakers to navigate the dynamic terrain of workforce competencies in an era marked by digital disruption and industrial transformation.

As we delve into the comparative analysis of competency requirements in these two vital sectors, the findings of this research are poised to catalyze informed decision-making, foster collaboration, and drive initiatives that propel the workforce towards a future where the synergy between IT and Manufacturing serves as the cornerstone of sustainable economic growth.

II. Literature Review

Hanna Heikkilä , Jussi Okkonena aTampere University, Kalevantie 4, 33014, Tampere, Finland (2021) explored AI Driven Competency Development at the Threshold of Working Life to contribute practical work in competency development at micro-level and macro-level. The conclusion of the survey is that further research is needed among the employed persons who are willing to develop their own skills as well as their employee for to see evident competency gaps within the organization.

According to International Journal of Research in Engineering, Science and Management Volume-3, Issue-2, February-2020 www.ijresm.com a study was conducted on Employees Perception Towards 'Artificial Intelligence in Competency Mapping and Recruitment Process of Human Resource Management' at Wildcraft Pvt. Ltd. to identify the degree at which Artificial Intelligence is included in the HR practices of the company, to identify whether AI is involved in the competency mapping and recruitment process of the company, to Identify the employee's perception towards AI and its inclusion in the HR practices of the company.

And to find out whether Artificial Intelligence has a positive or negative impact on the HRM process followed by the company (more specific to competency mapping and recruitment). The research revealed that AI presents an opportunity for HR to automate repetitive, low value tasks and to increase focus on more strategic work. Artificial intelligence in their HR functions will help bring in a positive effect and improve the recruitment and competency mapping procedure of the organisation.

As per the International Journal of Management (IJM), ISSN 0976 – 6502(Print), ISSN 0976 – 6510(Online), Volume 3, Issue 2, May-August (2012) the competency mapping at various levels in a knowledge based organization was conducted to analyze the gaps in required skill to improve the level of competency. The investigation was carried out by taking a study on a R&D laboratory based at Chandigarh, India as a model Knowledge Based Organization. The competency mapping has not only enhanced the effectiveness of the organization, but has also played a vital role in the individual career progression.

Research Gaps

1. Further research can be done on identifying skills in IT professionals that can be flawlessly applied to the manufacturing context and vice versa.
2. The transferability of skills between IT and manufacturing sectors.
3. Understanding and devising of a model to leverage technology for bringing Innovation and enhanced efficiency.
4. There is a need to identify the competencies required for successful collaboration and between IT and manufacturing professionals.
5. To assess the effectiveness of existing training programs and professional development initiatives in both industries. Identifying gaps in preparing individuals for roles that require a combination of IT and manufacturing competencies.
6. To Identify the qualities that make effective leaders in both the environments of IT and manufacturing. Examining the competencies needed for leadership roles in the context of IT-manufacturing collaboration Analyzing the transferability of skills between IT and manufacturing.

Research Problem

The research problem addressed in this study is to explore and bridge the identified gaps in the collaboration between IT and manufacturing sectors, focusing on the transferability of skills, competencies required for successful collaboration, and the effectiveness of training programs. Specifically, there is a need to delve deeper into identifying skills in IT professionals that seamlessly apply to the manufacturing context and vice versa. Additionally, understanding and devising a model to leverage technology for innovation and enhanced efficiency is crucial for the advancement of both sectors. Furthermore, the study aims to identify the competencies necessary for successful collaboration between IT and manufacturing professionals and assess the existing training programs' effectiveness. The research also aims to identify gaps in preparing individuals for roles demanding a combination of IT and manufacturing competencies. Lastly, the study will explore the qualities that make effective leaders in both IT and manufacturing environments, analyzing the competencies needed for leadership roles in the context of IT-manufacturing collaboration and examining the transferability of skills between these two sectors. The research problem aims to comprehensively investigate the various complex aspects

of skill transferability, collaboration competencies, and leadership qualities within the dynamic Information Technology (IT) and Manufacturing sectors.

Research Questions

1. What specific skills in IT professionals demonstrate a high level of transferability to the manufacturing context, and vice versa?
2. What are the key skills and competencies that can be seamlessly transferred between the IT and manufacturing sectors?
3. What is the most effective model for leveraging technology in both IT and manufacturing to foster innovation and enhance operational efficiency?
4. What competencies are essential for fostering successful collaboration between IT and manufacturing professionals in a cross-functional team setting?
5. What gaps exist in current training approaches, and how can they be addressed to better align with the evolving needs of the IT-manufacturing workforce?
6. How does the leadership style need to adapt to ensure success in projects that involve the intersection of IT and manufacturing, and what are the implications for organizational outcomes?

Objectives:

Here are some potential objectives for such an analysis:

- a) Determine the specific skills that are in high demand and those that are lacking in both sectors.
- b) Provide insights into the career pathways within each sector, helping individuals understand the skills required for different roles.
- c) Assist in creating clear competency-based career progression models.
- d) Aid HR professionals and recruiters in understanding the specific competencies required for different positions in both sectors.
- e) Enhance the recruitment process by targeting candidates with the right skill sets.
- f) Foster collaboration between the IT and Manufacturing sectors by identifying common ground in competency requirements.
- g) Predict emerging competencies and skills that will be crucial in the future for both sectors.
- h) Help organizations stay ahead of the curve in workforce planning and development.
- i) Enable organizations to benchmark their competency requirements against industry standards and best practices.
- j) Identify successful strategies used by other organizations in similar sectors.
- k) Encourage the adoption of new technologies and methodologies to stay competitive.

Hypothesis:

1. The integration of IT and manufacturing sectors can be optimized in collaboration.
2. Identifying and developing skills in IT professionals applicable to the manufacturing context, and vice versa, enhances collaboration.
3. Effective leveraging of technology for innovation and efficiency, guided by a devised model, positively impacts both IT and manufacturing sectors.
4. Successful collaboration requires specific competencies.
5. Existing training programs may have gaps in preparing individuals for roles combining IT and manufacturing competencies.
6. Effective leadership in IT-manufacturing collaboration requires specific qualities and competencies.

III. Research Methodology:

The type of research carried out for this project is descriptive in nature. Primary data are the ones that are collected for the first time, and is one of the contemporary process. The data is collected from a structured questionnaire. The close ended questions are used in the research to extract the view points of the respondents. The type of questionnaire is a structured one. Secondary Data source of information includes the collection of data to form review of literature, introduction and company profile. It was carried out by way of referred journals, books, websites. review of literature, introduction and company profile. It was carried out by way of referred journals, books, websites.

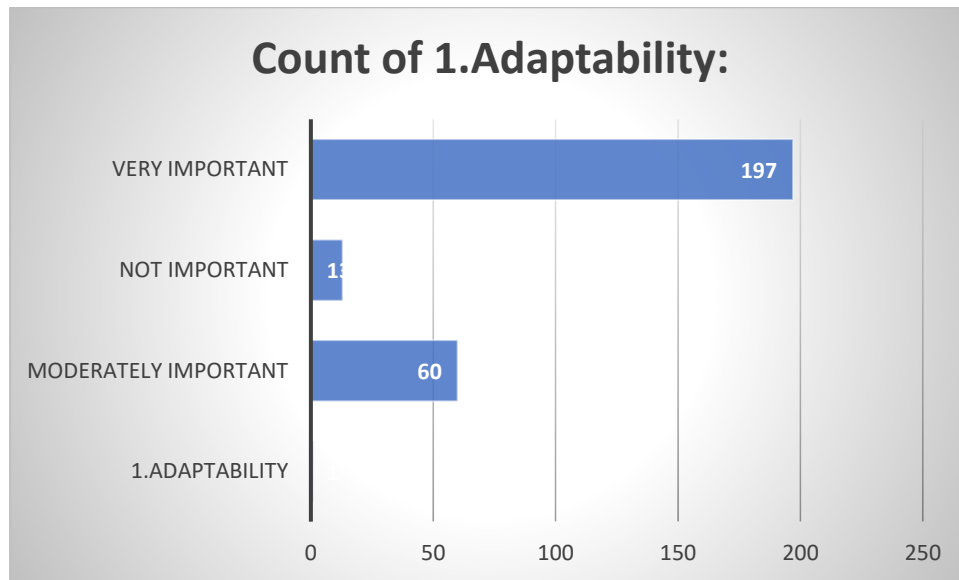
Variables of the study:

The study included both dependent and independent variables. The Independent Variables include the Skills of IT professionals, Skills of manufacturing professionals, Technology leveraging model for innovation and efficiency enhancement, Competencies for successful collaboration. The Dependent Variables are Collaboration

between IT and manufacturing sectors, Effectiveness of training programs, Gaps in preparing individuals for roles with IT-manufacturing competencies, Qualities and competencies of effective leaders in the context of IT-manufacturing collaboration.

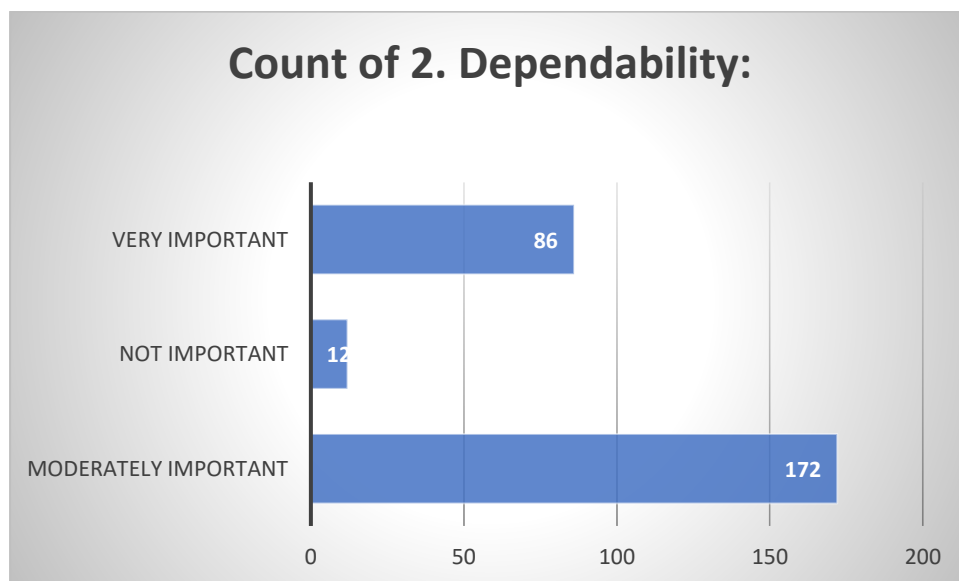
Analysis:

Column1	Count of Column1
1.Adaptability	1
Moderately Important	60
Not Important	13
Very Important	197



Analysis and Interpretation: The responses were illustrated in a tabular form with the response value. Majority (197) of the employees involved in the study recognised Adaptability as very important ,60 rated it as moderately important and 9employees rated it as not important.

2. Dependability:	Count of 2. Dependability:
Moderately Important	172
Not Important	12
Very Important	86



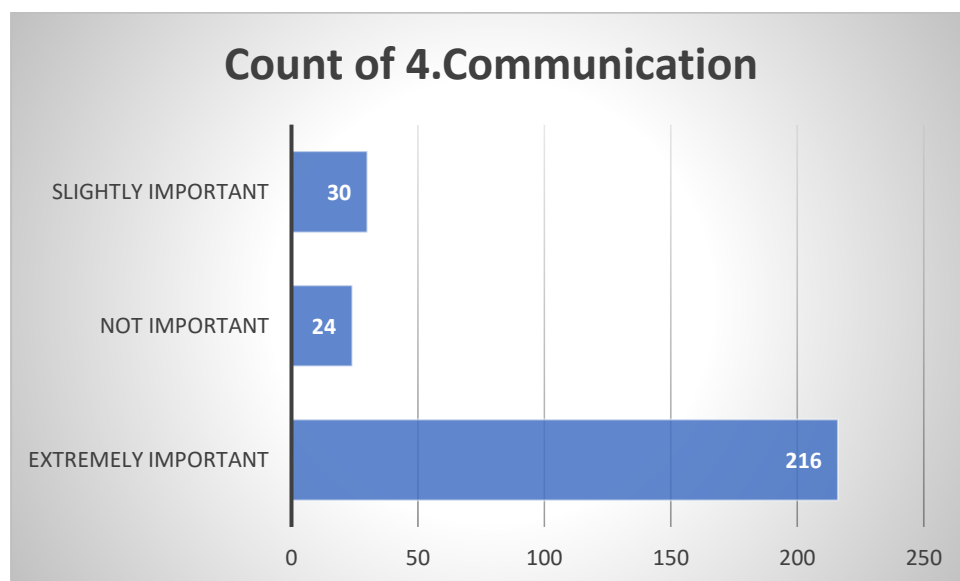
Analysis and Interpretation: The responses were illustrated in a tabular form with the response value.86 of the employees involved in the study recognised Adaptability as very important ,172 rated it as moderately important and 12 employees rated it as not important.

3. Professionalism	Count of 3. Professionalism
Moderately Important	60
Not Important	10
Very Important	200



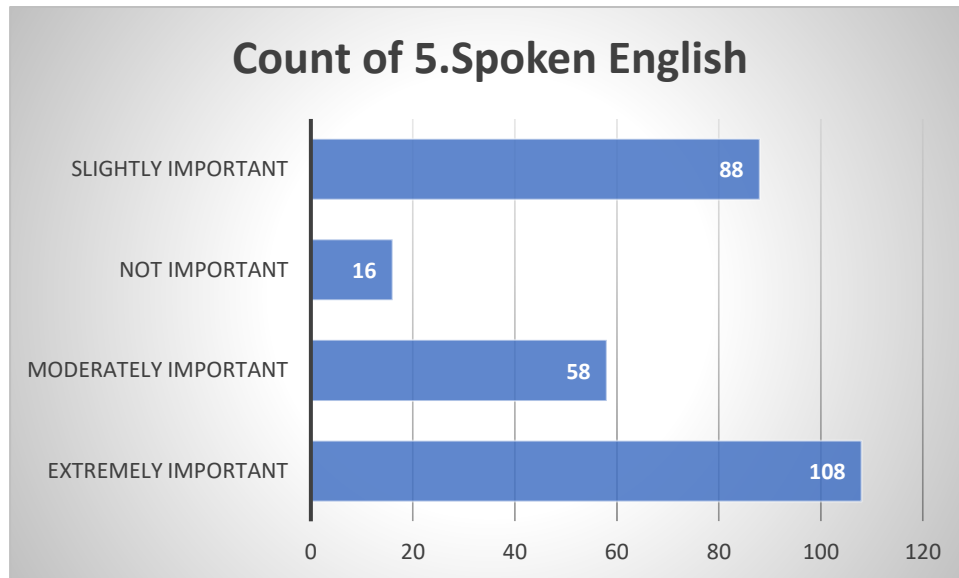
Analysis and Interpretation: The responses were illustrated in a tabular form with the response value.200 of the employees involved in the study recognised Adaptability as very important ,60 rated it as moderately important and 10 employees rated it as not important.

4.Communication	Count of 4.Communication
Extremely Important	216
Not Important	24
Slightly important	30



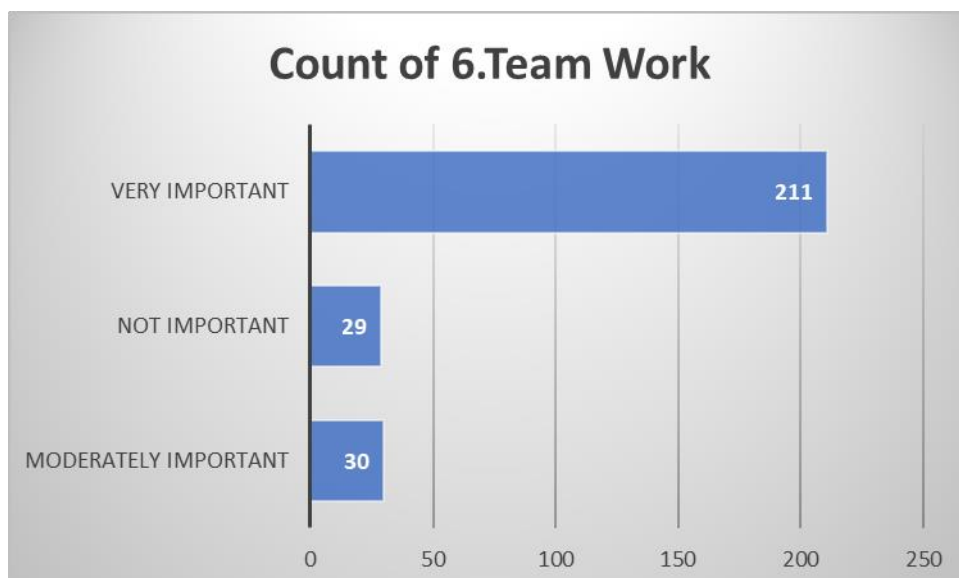
Analysis and Interpretation: The responses were illustrated in a tabular form with the response value.216 of the employees involved in the study recognised Adaptability as extremely important ,30 rated it as slightly important and 24 employees rated it as not important.

5.Spoken English	Count of 5.Spoken English
Extremely Important	108
Moderately Important	58
Not important	16
Slightly Important	88



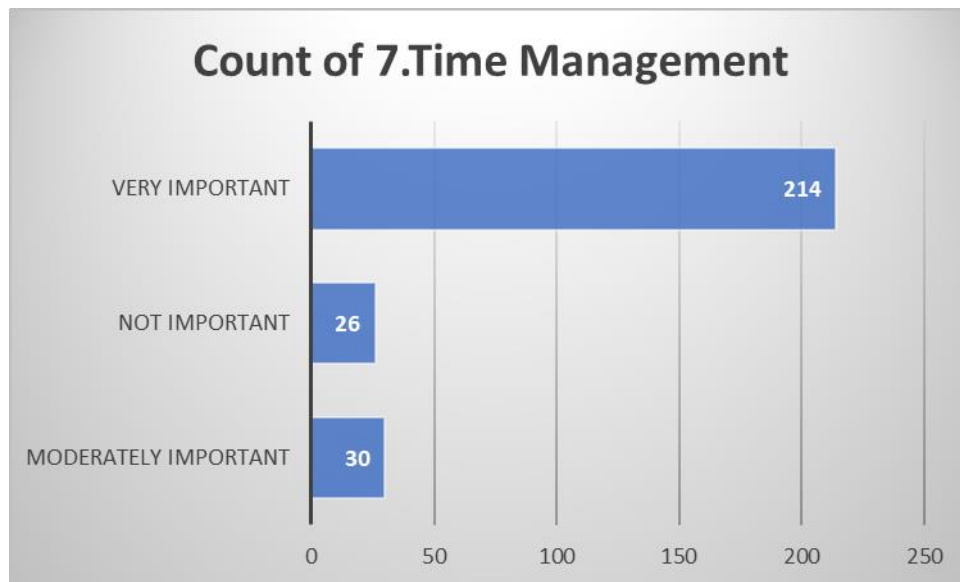
Analysis and Interpretation: The responses were illustrated in a tabular form with the response value.108 of the employees involved in the study recognised Adaptability as extremely important ,88 rated it as slightly important and 16 employees rated it as not important and 58 found it moderately important.

6.Team Work	Count of 6.Team Work
Moderately Important	30
Not Important	29
Very Important	211



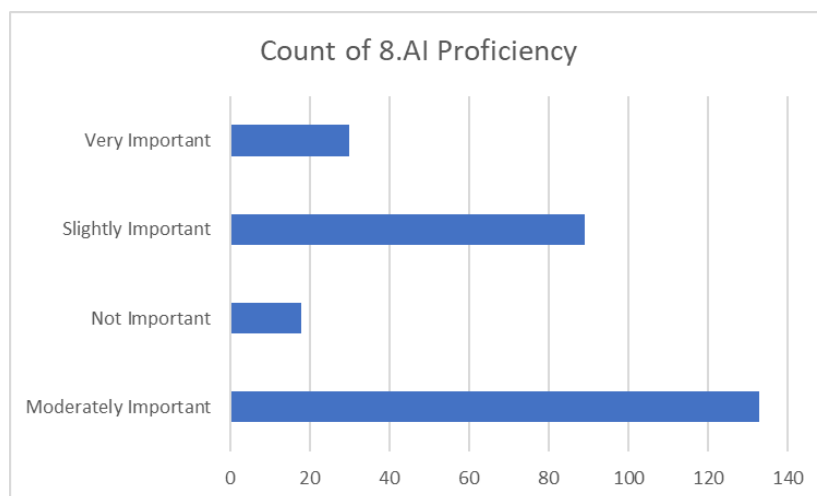
Analysis and Interpretation: The responses were illustrated in a tabular form with the response value. 211 of the employees involved in the study recognised Adaptability as very important, 29 employees rated it as not important and 30 found it moderately important.

7.Time Management	Count of 7.Time Management
Moderately Important	30
Not Important	26
Very Important	214



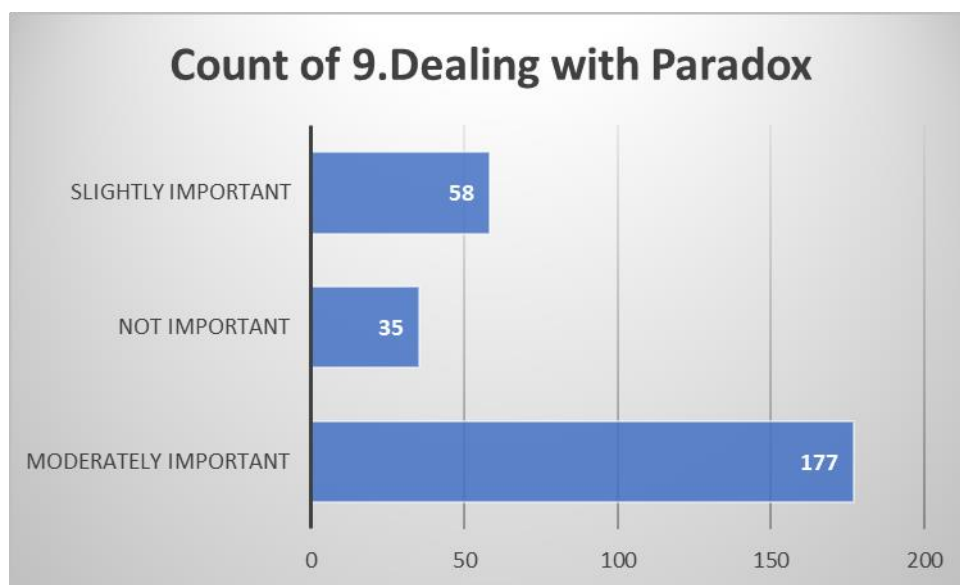
Analysis and Interpretation: The responses were illustrated in a tabular form with the response value. 214 of the employees involved in the study recognised Adaptability as very important, 26 employees rated it as not important and 30 found it moderately important.

8.AI Proficiency	Count of 8.AI Proficiency
Moderately Important	133
Not Important	18
Slightly Important	89
Very Important	30



Analysis and Interpretation: The responses were illustrated in a tabular form with the response value.30 of the employees involved in the study recognised Adaptability as very important,18 employees rated it as not important and 133 found it moderately important,89 found it slightly important.

9.Dealing with Paradox	Count of 9.Dealing with Paradox
Moderately Important	177
Not Important	35
Slightly Important	58



Analysis and Interpretation: The responses were illustrated in a tabular form with the response value.35 employees rated it as not important and 177 found it moderately important,58 found it slightly important.

IV. Results:

The findings reveal distinct competency requirements in IT and Manufacturing. Key skills in IT include AI, Communication, dealing with paradox, team work while Manufacturing emphasizes time management, dependability. Shared competencies such as adaptability and time management were also identified.

V. Findings Of The Study

The findings from the study on the IT sector reveal a substantial demand for technical skills, particularly proficiency in programming languages. The research identifies a noteworthy overlap of skills between the IT and manufacturing sectors, emphasizing the identification of common competencies crucial in both domains. Notably, competencies such as project management and adaptability emerge as essential shared skills that contribute to successful collaboration. In addition to shared competencies, the study explores unique competencies exclusive to the IT sector, shedding light on skills that are distinctively valuable within the IT industry. This differentiation recognizes the sector-specific demands and challenges, offering insights into the diverse skill sets required for effective functioning in the IT sector. These findings pave the way for a nuanced understanding of the skills landscape in the IT sector and lay the foundation for addressing collaboration gaps with the manufacturing industry.

VI. Suggestions

1. Conduct a comprehensive skill mapping exercise to identify the specific technical skills, especially in programming languages, that are in high demand within the IT sector. Explore ways to align these skills with the evolving needs of the industry to ensure that training programs and educational curricula remain relevant.
2. Develop a cross-sector competency framework that highlights the overlap of skills identified in both the IT and manufacturing sectors. This framework should emphasize the importance of common competencies, such as project management and adaptability, as essential building blocks for successful collaboration between professionals from these two domains.

3. Design and implement sector-specific training programs that address the unique competencies exclusive to the IT sector. This approach recognizes the distinct demands and challenges faced by IT professionals and aims to enhance their skill sets in areas that are particularly valuable within the IT industry.
4. Promote collaborative learning initiatives that bring together professionals from the IT and manufacturing sectors. Create platforms for knowledge exchange, skill-sharing, and collaborative problem-solving to bridge the identified gaps and foster a better understanding of the diverse skill sets required for effective functioning in the IT sector within the context of collaboration with manufacturing.
5. Conduct longitudinal studies to track the evolution of skills and competencies within the IT sector. This will provide insights into how the industry's demands are changing over time, allowing for proactive adjustments in educational and training programs to meet future needs effectively.

By addressing these suggestions, future research can contribute to a more dynamic and adaptable approach to skill development and collaboration within the IT and manufacturing sector, ensuring that professionals are well-prepared for the evolving challenges and opportunities in a rapidly changing technological landscape.

VII. Conclusions

Tables and figures illustrate key findings, trends, and comparative analyses, providing visual aids for a clearer understanding of the research outcomes.

This research paper contributes to the understanding of competency dynamics in the IT and Manufacturing sectors, offering practical insights for workforce development, organizational strategies, and educational programs.

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