Artificial Intelligence in Project Management: Study and Analysis with perception of Project Managers and Executors

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Abstract

AI in Project Management is a process of system that can execute different projects simultaneously without many multiple resources thus saving time and cost. With the power of artificial intelligence, the tasks of projects can be executed automatically within time and cost schedule. AI enables to take decisions pertaining to the projects and helps in managing the skills and capabilities of team members which are part of the project.

In this paper, Percentage analysis, Five point-scaling technique and Average score analysis has been attempted considering Project Manager/executors perception of DPSUs with respect to usage of Artificial Intelligence in project management.

Keywords: - Artificial Intelligence, Machine Learning, Project Management, SWOT Analysis, Percentage analysis, Average score analysis, Five point-scaling technique

1. Introduction

Project management for an organization is a tool to achieve excellence in performance catering employee satisfaction to the highest level. To harness the maximum potential of an organization its manpower and the resources, Project Management Practices are being followed systematically in various Defence Public Sector Units. DPSUs are well aware that effective Project Management System (PMS) brings the real value to the firm in terms of Time, Cost and

Quality of the projects.

AI in Project Management is a process of system that can execute different projects simultaneously without many multiple resources thus saving time and cost. With the power of artificial intelligence, the tasks of projects can be executed automatically within time and cost schedule. AI enables to take decisions pertaining to the projects and helps in managing the skills and capabilities of team members which are part of the project.

In this paper an attempt has been made to analyse the DPSU executives knowledge of Project Management, Artificial Intelligence and Usage of Artificial Intelligence in Project Management. On line questionnaire comprising of personal factors, experience factors, Project Management, Artificial Intelligence and Usage of Artificial Intelligence in Project Management were utilised to obtained the inputs from the Project Managers and Executors of DPSUs. The collected data were depicted in various forms in the suitable tables and following tools were employed in tune with the objectives of the study.

- Percentage analysis
- Five point-scaling technique
- Average score analysis

2. Analysis Methods

The percentage analysis is an important tool to identify the distribution of the respondents for various category which facilitates comparison. Appropriate figures are also drawn for selected tables in improving the understanding of the readers.

Scaling technique is mainly employed to convert the qualitative information into a quantitative one. In this study a five-point scaling technique also known as Likert scaling is engaged to assess the depth of agreeability of various category of respondents on the different aspects relating to Project Management System and SWOT analysis of AI in project Management within DPSUs. Average score is calculated to assess the level of opinion / agreeability of the various category of respondents on the different aspects relating to project management practices of DPSUs.

3. Data Analysis and Findings
3.1 Profile of Respondents
3.1.1 Designation
The Management level wise distribution of respondents is selected for the study. The level considered are lower, middle and upper level Management. The Figure 1 presents a pictorial representation on the bifurcation of the respondents based on Management Level.
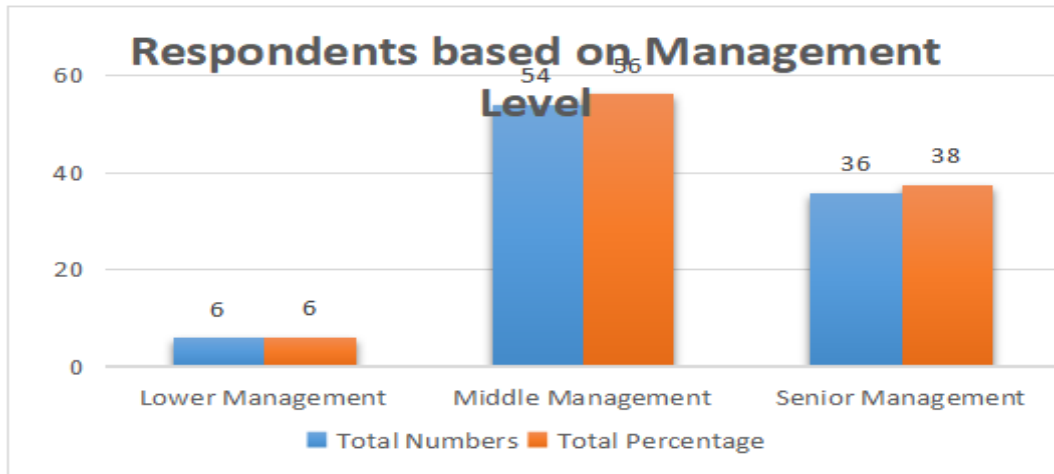
Figure 1 Bifurcation of respondents based on Management Level

It is found from Figure 1 that 6 (6%) of the respondents are Lower Management Level, 54 (56%) of the respondents are Middle Management Level and 36 (38%) are Senior Management Level.

It is concluded that maximum (56%) of the respondents are from Middle Management Level.

3.1.2 Experience

Figure 2 is a pictorial representation on the distribution of respondents with their work experience.
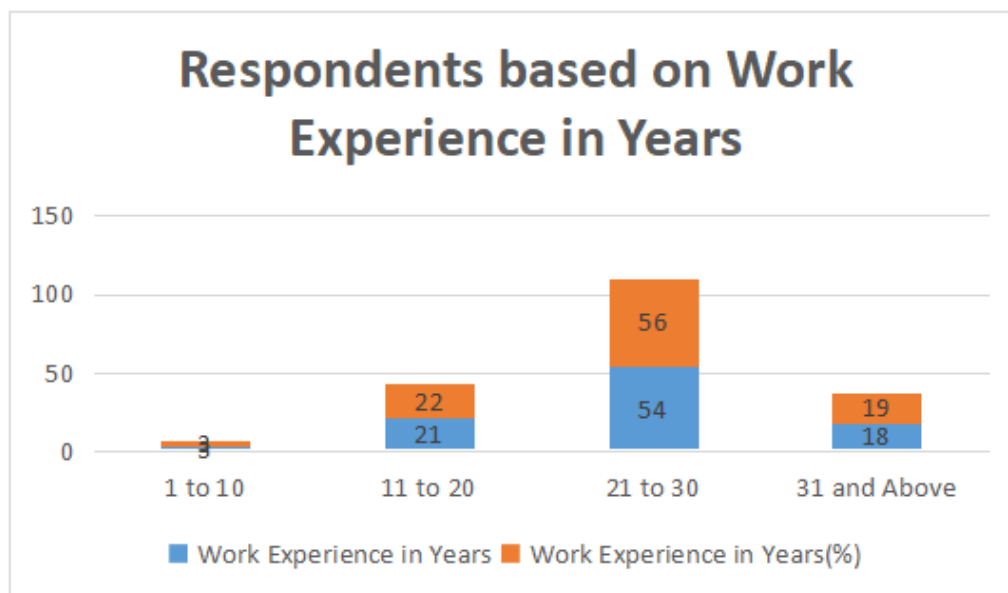

Figure 2 Work experiences of the respondents

It is found from Figure 2 that 3 (3%) of the respondents have an experience upto 10 years, 21 (22%) upto 20 years, 54 (56%) have an experience upto 30 years and 18 (19%) respondents have an experience above 30 years.

It is concluded that the majority of the respondents (56%) have more than 20 years of experience.

3.1.3 Educational Profile

Figure 3 shown below is a pictorial representation of the distribution of respondents based on their work experience.
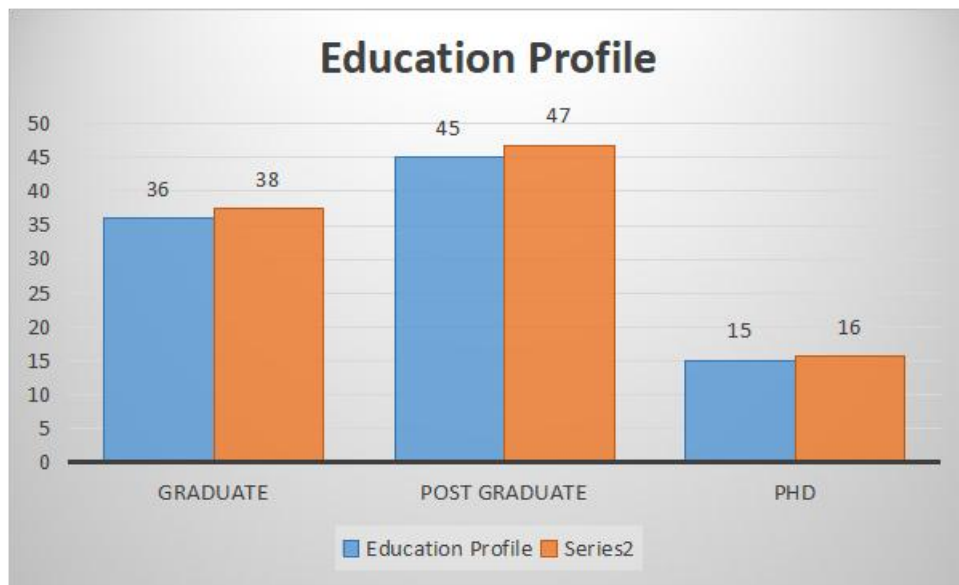

Figure 3 Education Profile

It is found from Figure 3 that 36 (38%) of the respondents are Graduate, 45 (47%) are Post Graduate and 15 (16%) are PHD education profile

It is concluded that the majority of the respondents (47%) are of Post Graduate education profile.

3.2 Project Management Knowledge
3.2.1 Project Management Knowledge – Percentage Analysis

The Table 1 examine the project management knowledge and practices being followed by Project executors / Managers working in Defence Public Sector Units

The insight about the project management knowledge like project definition, cost estimation of project, Risk and Risk management, cost overrun, stakeholder management were identified w.r.t DPSU and compared with personal profile.

Table 1 Project Management Knowledge

S.No.	Variables	Strongly Agree	Agree	Undecided	Disagre	Strongl
1	Project Management is need of hour for Project Success	72(75)	21(22)	0(0)	0(0)	3(3)
2	Project is defined as a temporary endeavour undertaken to create a unique product, service or result	42(44)	42(44)	6(6)	3(3)	3(3)
3	While estimating the project cost ant duration, past project data (estimates, risks, assumptions etc) of similar projects executed in the Organization is often refereed.	30(31)	66(69)	0(0)	0(0)	0(0)
4	Operations are different than Projects i.e Operation is Ongoing and Repetitive	33(34)	48(50)	15(16)	0(0)	0(0)
5	Best Definition of Risk in Project is event which will impact project positively or negatively	36(38)	39(41)	0(0)	15(16)	6(6)
6	Risk Management are planned to Increase the Probability of positive event and decrease the Probability of negative event	51(53)	42(44)	3(3)	0(0)	0(0)
7	Cost overrun is major risk in execution of DPSU Projects	27(28)	39(41)	18(19)	9(9)	3(3)
8	Stakeholder Management is a key for project success	39(41)	57(59)	0(0)	0(0)	0(0)

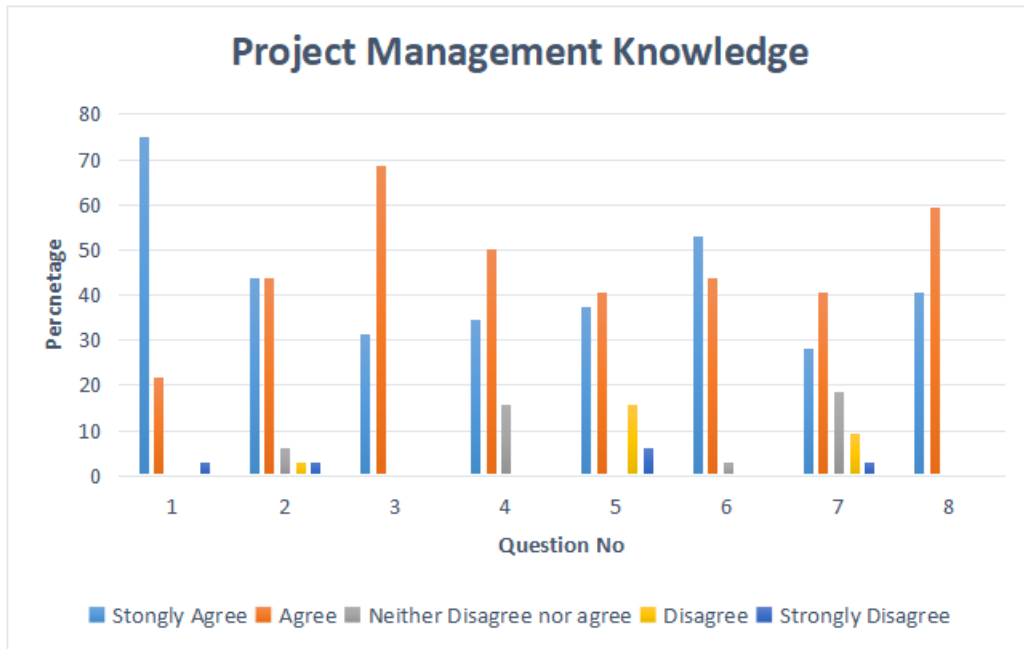[Note: Values in () are in percentage]

Figure 4 Project Management Knowledge – Percentage Analysis

Following findings emerged from Table 1 and Figure-4

1. Majority of the respondents 72 (75%) have s t r o n g l y agreed, and 21(22%) ofthem have agreed, on the requirement of Project Management for Project Success.

2. 42 (44%) of the respondents strongly agreed and 42(44%) agreed that Project is   as a temporary endeavour undertaken to create a unique product or service or result.

3. 30 (31%) of the respondents strongly agreed and 66(69%)   agreed that while estimating the project cost ant duration, past project data (estimates, risks, assumptions etc) of similar projects executed in the Organization is often refereed.

4. 33 (34%) of the respondents strongly agreed and 48(50%) agreed that Operations are different than Projects i.e Operation is Ongoing and Repetitive.

5. 36 (38%) of the respondents strongly agreed and 39(41%) agreed that Best Definition of Risk in Project is event which will impact project positively or negatively.

6. 51 (53%) of the respondents strongly agreed and 42(44%) agreed that Risk Management are planned to Increase the Probability of positive event and decrease the Probability of negative event.

7. 27 (28%) of the respondents strongly agreed and 39(41%) agreed that Cost overrun is major risk in execution of DPSU Projects event.

8. 39 (41%) of the respondents strongly agreed and 57(59%) agreed that Stakeholder Management is a key for project success.

It is concluded that all the respondents are well versed with the Project Management Knowledge and it practices.

3.2.2 Project Management Knowledge – Average Score Analysis

Table-2 is the Average Score Analysis which depicts the view of the respondents based on the Personal Factors like occupational position and number of years of experience of the respondents on the variables relating to Project Management Knowledge through a Five-point Likert Scaling.

Table 2 Personal Factors and Project Management Knowledge

S.No.	Variables	Management Level						
		Lower Management	Middle Manage	Senior Manag	1 to 10	11 to 20	21 to 30	31 and Above
1	Project Management is need of hour for Project Success	4.5	4.8	4.1	4.0	4.7	4.6	4.8
2	Project is defined as a temporary endeavour undertaken to create a unique product, service or result	4.5	4.2	3.7	4.0	4.3	4.1	3.0
3	While estimating the project cost ant duration, past project data (estimates, risks, assumptions etc) of similar projects executed in the Organization is often refereed.	4.5	4.4	4.2	4.0	4.7	4.2	4.2
	Operations are different than Projects i.e Operation is Ongoing and Repetitive	4.5	4.1	3.8	5.0	4.4	3.9	3.2
5	Best Definition of Risk in Project is event which will impact project positively or negatively	5.0	4.0	3.7	5.0	3.9	3.8	4.0
6	Risk Management are planned to Increase the Probability of positive event and decrease the Probability of negative event	5.0	3.6	3.6	5.0	4.7	4.1	3.7

S.No.	Variables	Management Level						
		Lower Management	Middle Manage	Senior Manag	1 to 10	11 to 20	21 to 30	31 and Above
7	Cost overrun is major risk in execution of DPSU Projects	5.0	4.3	3.9	4.0	4.1	3.5	4.2
8	Stakeholder Management is a key for project success	4.5	3.6	3.3	4.0	4.4	4.2	3.7

From Table 2, it is observed that the average analysis is within 3 to 5 and hence can be concluded that all the respondents are well versed with the Project Management Knowledge and it practices.

3.3 Artificial Intelligence Knowledge
3.3.1 Artificial Intelligence Knowledge – Percentage Analysis
The Table 3 e x p l o r e the understanding of Artificial Intelligence knowledge of Project executors / Managers of Defence Public Sector Units.

The perception about the Artificial knowledge such as Artificial Intelligence definition, Artificial Intelligence applications, Artificial Intelligence algorithms, Artificial Intelligence platform requirements were captured and compared with personal profile.

Table 3 Artificial Intelligence Knowledge

S.No	Variables	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	Artificial Intelligence (AI) has become one of the most deeply researched and developed technologies in recent years	39(41)	57(59)	0(0)	0(0)	0(0)
2	In AI the machine basically learns from its mistake so if the prediction is wrong, it will only get more accurate in the future.	39(41)	54(56)	3(3)	0(0)	0(0)

S.No	Variables	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
3	The data should be organized (structured like a database) for AI Applications	21(23)	45(48)	9(10)	15(16)	3(3)
4	Various algorithms are used for development of AI Model	24(25)	45(47)	15(16)	12(13)	0(0)
5	AI platform depends on ability organization to capture right data at different stages in a	33(34)	63(66)	0(0)	0(0)	0(0)
6	Artificial Intelligence is about making a machine Intelligent	30(31)	66(69)	0(0)	0(0)	0(0)
7	Ways to achieve AI is Machine Learning and Deep Learning	30(31)	48(50)	9(9)	9(9)	0(0)

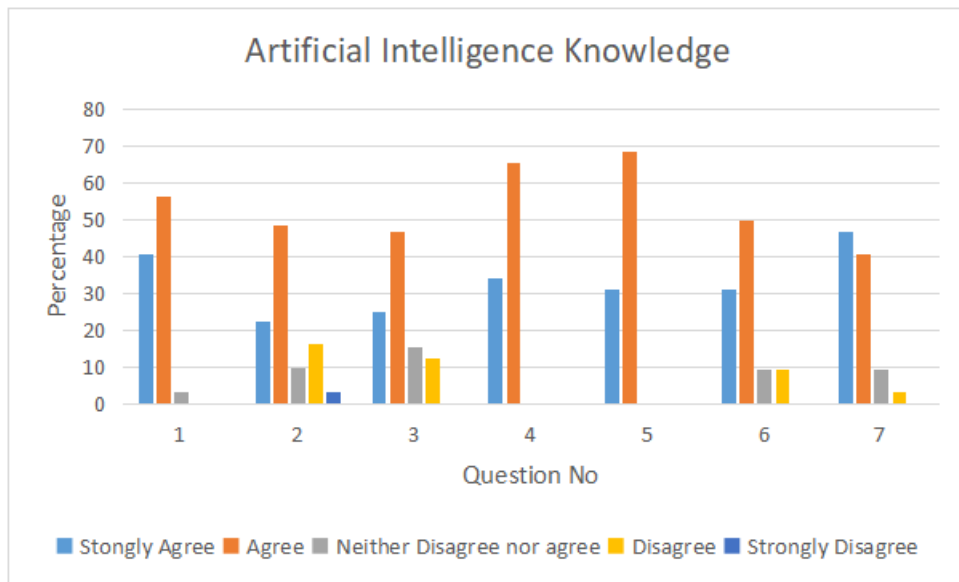[Note: The value in brackets are in percentage]

Figure 5 Artificial Intelligence Knowledge – Percentage Analysis

Following findings emerged from Table 3 and Figure-5

1. Majority of the respondents 39 (41%) have s t r o n g l y agreed, and 57(59%) of them have agreed that Artificial Intelligence (AI) has become one of the most deeply researched and developed technologies in recent years

2. 39 (41%) of the respondents strongly agreed and 54(56%) agreed that in AI the machine basically learns from its mistake so if the prediction is wrong, it will only get more accurate in the future.

3. 21(23%) of the respondents strongly agreed and 45(48%) agreed that the data should be organized (structured like a database) for AI Applications.

4. 24(25%) of the respondents strongly agreed and 45(47%) agreed that various algorithms are used for development of AI model.

5. 33(34%) of the respondents strongly agreed and 63(66%) agreed that AI platform depends on ability organization to capture right data at different stages in a project.

6. 30(31%) of the respondents strongly agreed and 66(69%) agreed that Artificial Intelligence is about making a machine Intelligent.

7. 30(31%) of the respondents strongly agreed and 48(50%) agreed that Ways to achieve AI is Machine Learning and Deep Learning.

It is concluded that all the respondents are well versed with the Artificial Intelligence Knowledge and its applications.

3.3.2 Artificial Intelligence Knowledge – Percentage Analysis

The Average Score Analysis is a tool to measure the opinion of respondents based on the Personal Factors like occupational status and number of years of experience of the respondents akining to Artificial Intelligence Knowledge with Five-point Likert Scaling.

Table-4: Personal Factors and Artificial Intelligence Knowledge

S.No.	Variables	Management Level						
		Lower Management	Middle Manage	Senior Mana	1 to 10	11 to 20	21 to 30	31 and Above
1	Artificial Intelligence (AI) has become one of the most deeply researched and developed technologies in recent years	4.5	4.1	4.2	4.0	4.7	4.3	4.2
2	In AI the machine basically learns from its mistake so if the prediction is wrong, it will only get more accurate in the future.	4.5	4.2	3.9	4.0	4.0	3.0	3.3
3	The data should be organized (structured like a database) for AI Applications	4.5	3.4	2.9	4.0	4.1	3.6	3.8

S.No.	Variables	Management Level						
		Lower Management	Middle Manage	Senior Mana	1 to 10	11 to 20	21 to 30	31 and Above
	Various algorithms are used for development of AI Model	4.5	3.7	3.2	4.0	4.7	4.1	3.3
5	AI platform depends on ability organization to capture right data at different stages in a project	4.5	4.1	3.9	4.0	4.4	4.2	4.4
6	Artificial Intelligence is about making a machine Intelligent	4.5	4.1	3.8	4.0	4.1	3.7	3.7
7	Ways to achieve AI is Machine Learning and Deep Learning	4.5	3.8	3.6	4.0	4.6	4.3	4.2

From Table 4, it is observed that the average analysis is within 3 to 5 and hence can be concluded that all the respondents are well versed with the Artificial Intelligence Knowledge and its applications.

3.4 Artificial Intelligence in Project Management
3.4.1 Artificial Intelligence in Project Management – Percentage Analysis
Table 4 explore the understanding of usage of Artificial Intelligence in Project Management of Project executors / Managers of Defence Public Sector Units.
The specific requirements for AI implementation in Project Management of Project executors/Managers of Defence Public Sector Units were captured and compared with personal profile.

Table 5 Artificial Intelligence in Project Management

		Strongly	Agre	Undec	Disagr	Strong
1	AI in Project Management will help project managers to take smart decisions and effectively manage the triple constraints (Cost, Time , Quality) of project	21(22)	60(63)	6(6)	9(9)	0(0)

2	AI in Project Management will automate mundane tasks and understand key project performance parameters	18(19)	57(59)	21(22)	0(0)	0(0)
3	AI in Project Management will take over basic project management tasks, like reminding team members of pending status updates	33(34)	60(63)	3(3)	0(0)	0(0)
4	AI in Project Management will have to assess proposed project plans based on historical data and past team performances	33(34)	63(66)	0(0)	0(0)	0(0)
5	AI in Project Management will Highlight potential scheduling conflicts	21(22)	63(66)	6(6)	6(6)	0(0)
6	Artificial Intelligence may completely transform the Project Management in coming years	9(9)	78(81)	9(9)	0(0)	0(0)
7	AI based systems are being used in your organisations	21(22)	60(63)	15(16)	0(0)	0(0)

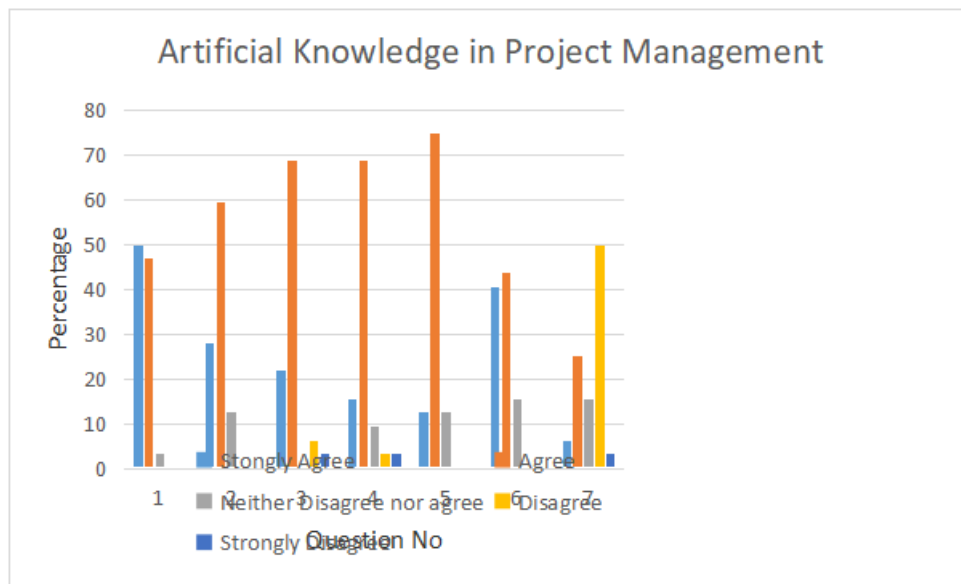[Note: The value in brackets are in percentage]

Figure 6: Artificial Intelligence in Project Management Knowledge – Percentage Analysis

Following findings emerged from Table 5 and Figure 6

1. Majority of the respondents 21(22%) strongly agreed, and 60(63%) of them agreed that AI in Project Management will aid project managers and executors for smart decisions aiding effectively management of the triple constraints (Cost, Time, Quality) of project

2. 57 (59%) of the respondents strongly agreed and 21(22%) are neutral that AI in Project Management will automate routine tasks and understand key project performance values.

3. 33(34%) of the respondents strongly agreed and 60(63%) agreed that AI in Project Management will do basic project management tasks, like reminding pending status and status updates to the project team members.

4. 33(34%) of the respondents strongly agreed and 63(66%) agreed that AI in Project Management will have to measure future project plans based on past historical data and \team performances

5. 21(22%) of the respondents strongly agreed and 63(66%) agreed that AI in Project Management will highlight potential scheduling conflicts

6. 9(9%) of the respondents strongly agreed and 78(81%) agreed that Artificial Intelligence may completely transform the Project Management in coming years

7. 21(22%) of the respondents strongly agreed and 60(63%) agreed that AI based systems are being used in your organisations

It is concluded that all the respondents have understanding of specific requirements for AI implementation in Project Management.

3.4.2 Artificial Intelligence in Project Management – Average Score Analysis

The Average Score Analysis aid to measure the views of the respondents based on the Personal Factors like occupational status and total number of years of experience of the respondents on the variables relating to specific requirements of Artificial Intelligence in Project Management with Five-point Likert Scaling.

Table-6 Personal Factors and Artificial Intelligence in Project Management

S.No.	Variables	Management Level						
		Lower Managem ent	Middle Manage	Senior Mana	1 to 10	11 to 20	21 to 30	31 and Above
1	AI in Project Management will help project managers to take smart decisions and effectively manage the triple constraints	4.5	4.0	4.1	4.0	4.7	4.2	3.5

2	AI in Project Management will automate mundane tasks and understand key project performance parameters	4.5	4.2	4.1	4.0	4.4	4.0	4.2
3	AI in Project Management will take over basic project management tasks, like reminding team members of pending status updates	4.5	3.9	3.8	4.0	4.3	3.7	3.2
	AI in Project Management will have to assess proposed project plans based on historical data and	4.5	3.8	3.5	4.0	4.1	3.8	3.8
5	AI in Project Management will Highlight potential scheduling conflicts	4.5	3.7	3.5	4.0	4.0	3.7	3.3
6	Artificial Intelligence may completely transform the Project Management in coming years	4.5	3.6	3.8	4.0	4.3	4.3	3.8
7	AI based systems are being used in your organisations	4.5	4.1	3.7	4.0	2.7	2.7	2.2

From Table 6, it is observed that the average analysis is within 3 to 5 and hence can be concluded that all the respondents are well versed with the Usage of Artificial Intelligence in Project Management.

4. Conclusion

Based on the analysis carried out it is concluded that:

- Project Managers and Executors are well versed with the Project Management and Artificial Intelligence Knowledge and it practices

- Project Managers and Executors have understanding of specific requirements of Artificial Intelligence implementation in Project Management.

References:

1. A guide to the Project Management Body of Knowledge, PMBOK 5