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EVALUATION OF MICROSOFT PROJECT AND PRIMAVERA P6 AS CONSTRUCTION PROJECT MANAGEMENT SOFTWARE IN INDIA

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ABSTRACT
Since 2000's, construction sector an observing use of Software for various activities. The last decade a seen a substantially increase in use of project management software. However, the companies still don't have the process to compare two software and find which software is suitable for their use. The objective of this study is to compare two commonly used project management software based on efficiency and effectiveness.**The software consider are Primavera P6 R16.1 Professional Project Management and Microsoft Project 2016.**To achieve the comparison objective, Performance features of the two software were selected, and a Questionnaire survey methodology was used. The survey was floated among people from different role in construction sector and were familiar with both the software. The survey results help us to compare the two software on various parameters and understand its efficiency and effectiveness. The results show that Primavera is a much more efficient software, but when it comes to effectiveness Microsoft Project is much better than P6. Also, higher star rating given to Microsoft Project further strengthen the point that people use of software is not largely govern by the advance tools and feature that the software provide, but by relatively simpler tools that gives user ease of working with the software and helping him complete his work. Microsoft Project turns out to be overall better than Primavera P6.

KEY WORDS: Project Management, Microsoft Project, Primavera P6, Software Evaluation

INTRODUCTION
The present-day business world is full of turbulence and it is need of hour to be adaptive, response fast and act even quickly. These requirements can be easily fulfilled by use of software and IT technology. The IT sector is growing in the country and construction sector is adopting IT in various domains of its life cycle.

PROBLEM STATEMENT
The construction world is growing at pace. The projects are becoming larger and more complex and we need ever better plan to execute them. The challenges such as an appropriate projects plan are needed, skills, knowledge and experience of company need to be known to ensure smooth construction work. Control and monitor is another aspect that need to be studied throughout. **Many real-estate developers, contractors and project planner believe that planning techniques and project management software should be selected after a proper need analysis for an effective and efficient project planning**. And the two most commonly used project management software that are used in Indian construction Industry are Primavera P6 and Microsoft Project. Also, no major study is done where the selection parameter and use of the two software is been done for Indian construction industry.
The research objective is to compare Microsoft Project 2016 and Primavera P6 R16.1 Professional Project Management as a Project management software.

LITERATURE REVIEW
The work done by Hawkins shows the comparison between three used Project management software, MS Project, Primavera and Sure Trak. The three are compared on features and cost associated with three software. The conclusion for research highlight that each software has its benefits, however MS project and Primavera are better than Sure Trak, and MS project stands out other two in ease of use. Also, the author

scheduled a building using all the three software, for a small project worth 3 crore and 4 Months duration. This helped him to explain the different features of three software in greater depth(Hawkins, 2007).

The works of Muhammad & Muhammad, shows us that to select an appropriate project management software, one must understand the quality of the Project management tool and how its quality can be improved in future. They compared Primavera, MS Project GanttProject, Redmine, BaseCamp, dotProject and Assembla on various parameters. They have presented an elaborated explanation of the all the above-mentioned software on an IEEE

Standard 16326-2009 grid(Muhammad & Muhammad, 2016).

In his research, Gharaibeh, H.,showed the mechanism to evaluate the software based on ISO/IEC 14,000 software evaluation criteria. The evaluation is important as it helps company decide choice of software for intended use. And thus, research tried to judge the two commonly used Project Management software Microsoft Project and Primavera P6 on basis of functionality and Price, using the questionnaire survey on an 0-3 scale.Gharaibeh concluded that functionality of software is not dominant feature for user preference to use the software, rather the ability to use a simple software, that can ease in producing the charts and reports is preferred. Also, the impact of cost was to be considered. Primavera proved to be 7% more efficient than Microsoft Project, but the cost involved was much more(Gharaibeh, H., 2014).

Planning and scheduling has always been an important strategy to reduce Project Risk and with project becoming more complex, the need is to ensure a strong and reliable Planning and scheduling. This is provided by S. & R.N, in their paper. Where they have considered Planning and scheduling of an apartment using Primavera and Microsoft Project. The conclusion supports the fact that Primavera provides detail functioning thus better decision making, while Microsoft Project provides a clear and easy to monitor schedule(S. & R.N, Nov -2016).

METHODOLOGY

The study begins by selecting the topic and collecting literature review. Suitable parameters are selected, and a Survey questionnaire is selected, based on the performance parameter suggested in the literature review to compare two project management software. The survey is analysed, and conclusion is obtained.

SURVEY DETAIL

The Survey data was collected using the online survey tool QuestionPro. The URL for the survey is:https://msp-vs-p6.questionpro.com

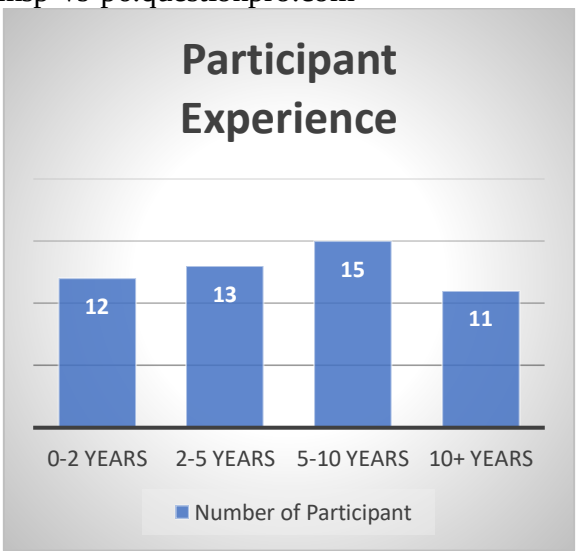

Chart 1 Participant experience

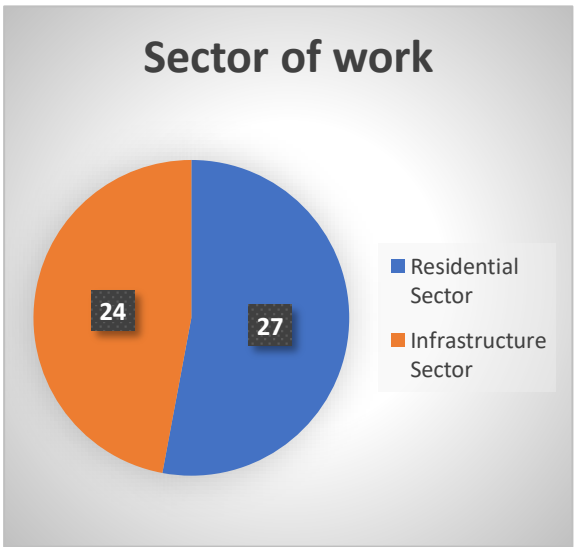

Chart 2 Participant Sector of work

Chart 3 Participant job in company

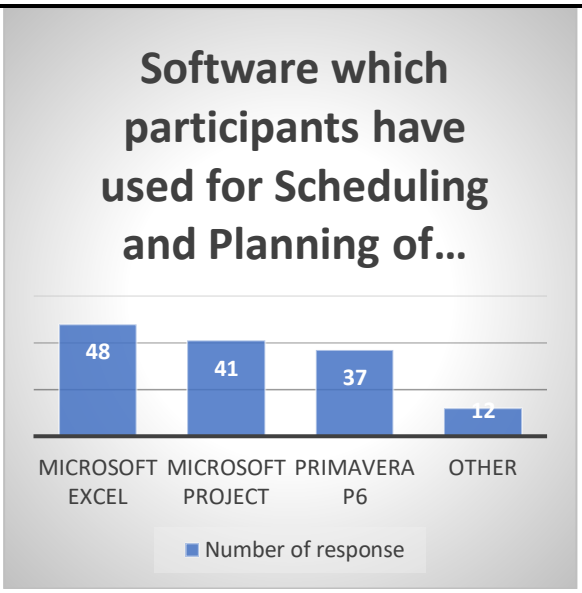

Chart 4 PM Software used by participant

SURVEY QUESTION

The various questions were as follows

Criteria A Time Management Functions

A1: How is the Setting Up project plan and activities in two software
A2: How is the Network calculation and Graphics in two software

Criteria B Resource Management Functions

B1: How is the Ability to allocate resource in two software
B2: How is the Ability of resource levelling in two software
B3: How is the Ability to handle over-allocated resource in two software

Criteria C Cost Management Functions

C1: How is the Ability to assign cost information on activities in two software
C2: How is the Ability to generate cost Breakdown structure and cost calculations in two software
C3: How is the Ability of Risk Analysis in two software

Criteria D Reporting Functions

D1: What Types of standard reports generated in two software
D2: How is the Integration with Word Processor in two software
D3: How is the Presentation of reports in two software

Criteria E Control and Monitor Functions

E1: How is the Saving project baselines in two software
E2: How is the Easy of handling WBS in two software
E3: How is the Ability to filter required data in two software
E4: How is the Multi-Project Management in two software
E5: How is the Internet capabilities to publish online in two software

Criteria F Compatibility Functions

F1: How is the compatibility with Microsoft Office applications like Ms Excel, Ms Word. in two software
F2: How is the compatibility with Another Project Management Software in two software
F3: How is the compatibility with Device Operating systems in two software

Criteria G Security Functions

G1: How is the Control on ability of User to access Project files in two software
G2: How is the Security of project baseline in two software

Criteria H Technical Support

F1: How is the Installation and Maintenance of the software
F2: How is the Ease of finding Training courses for two software

Criteria I User Friendliness

I1: More Time required to learn the software
I2: How is the System interface and ability to customize in two software
I3: How is the Help from pop-up dialogue boxes and messages in two software

Two more questions are asked. These cover two of the more important aspect. First question is asking the survey attendee to **Rank the importance of following features of project management tools for Planning and scheduling purpose in construction industry**. This will help us to determine the relative weight of each feature as per the user. Second question ask the survey attendee to give **a score to Overall Experience with the Project Management tool for Planning and scheduling purpose in construction industry.** Again, this will help us to know which software is preferable by response as an overall package.

SURVEY SCORING

A 1-5 Likert scale is used to compute the value of different parameter.

Table 1 Survey Scoring

Scoring	Condition	Interpretation
1	If the function doesn't exist in the software.	Not at all helpful
2	If the function does exist, but difficult to use.	Not so helpful
3	If the function is relatively simple to use but badly presented	Somewhat helpful
4	If the function is achieved easily and nicely presented	Very helpful
5	If the function is expressed very well, with powerful tool are present to achieve the function	Extremely helpful

SURVEY DATA ANALYSIS

SURVEY DATA

The response filled by the 51 respondent is provided, and a mean score is generated for each sub criteria, which will be used further.

Q. No.	Software Attributes		Ms Project							Primavera P6						
			1	2	3	4	5		Score	1	2	3	4	5		Score
Q1	**Time Management Functions**	A														
1.1	Setting Up project plan and activities	A1	0	17	18	7	9	51	3.16	0	3	14	21	13	51	3.86
1.2	Network calculation and Graphics	A2	0	13	27	6	5	51	3.06	0	7	4	19	21	51	4.06
Q2	**Resource Management Functions**	B														
2.1	Ability to allocate resource	B1	0	17	23	9	2	51	2.92	0	3	17	12	19	51	3.92
2.2	Ability of resource levelling	B2	0	12	32	6	1	51	2.92	0	5	12	22	12	51	3.80
2.3	Ability to handle over-allocated resource	B3	0	27	12	9	3	51	2.76	0	2	7	17	25	51	4.27
Q3	**Cost Management Functions**	C														
3.1	Ability to assign cost information on activites	C1	0	15	23	9	4	51	3.04	0	0	2	22	27	51	4.49
3.2	Ability to generate cost Breakdown structure and cost calculations	C2	12	30	6	3	0	51	2.00	0	3	11	18	19	51	4.04
3.3	Ability of Risk Analysis	C3	17	19	9	5	1	51	2.10	0	9	15	19	8	51	3.51
Q4	**Reporting Functions**	D														
4.1	Types of standard reports generated	D1	0	8	6	25	12	51	3.80	0	1	15	22	13	51	3.92
4.2	Integration with Word Processor	D2	0	7	13	27	4	51	3.55	3	11	25	11	1	51	2.92
4.3	Presentation of reports	D3	0	9	7	18	17	51	3.84	9	15	22	4	1	51	2.47
Q5	**Control and Monitor Functions**	E														
5.1	Saving project baselines	E1	0	5	17	22	7	51	3.61	0	3	12	19	17	51	3.98
5.2	Easy of handling WBS	E2	0	0	5	35	11	51	4.12	0	2	13	27	9	51	3.84
5.3	Ability to filter required data	E3	0	7	12	15	17	51	3.82	0	0	12	35	4	51	3.84
5.4	Multi-project Management	E4	17	21	12	1	0	51	1.94	0	0	11	19	21	51	4.20
5.5	Internet capabilities to publish online	E5	21	19	9	2	0	51	1.84	0	0	7	17	27	51	4.39

Figure 1Operational Characteristic Survey Response

Q. No.	Software Attributes		Ms Project								Primavera P6						
Q6	**Compatability Functions**	F															
6.1	Microsoft Office applications like Ms Excel, Ms Word.	F1	0	0	15	32	4	51	3.78		0	0	25	12	14	51	3.78
6.2	Other Project Management Softwares	F2	0	0	17	23	11	51	3.88		0	0	12	33	6	51	3.88
6.3	Device Operating systems	F3	0	0	11	17	23	51	4.24		0	0	12	31	8	51	3.92
Q7	**Security Functions**	G															
7.1	Control on ability of User to access Project files	G1	11	29	9	2	0	51	2.04		0	0	7	11	33	51	4.51
7.2	Security of project baseline	G2	12	15	19	5	0	51	2.33		0	0	5	9	37	51	4.63
Q8	**Technical Support**	H															
8.1	Installation and Maintainance of the software	H1	0	0	10	25	16	51	4.12		0	12	25	14	0	51	3.04
8.2	Ease of finding Training courses	H2	0	3	12	23	13	51	3.90		10	19	17	4	1	51	2.35
Q9	**User Friendliness**	I															
9.1	Time required to learn the software	I1	0	0	19	13	19	51	4.00		13	31	3	3	1	51	1.98
9.2	System interface and ability to customize	I2	0	0	7	20	24	51	4.33		11	15	21	3	1	51	2.37
9.3	Help from pop-up dialogue boxes and messages	I3	3	3	19	25	1	51	3.35		5	11	33	2	0	51	2.63

Figure 2General Characteristic Survey Response

Rank the importance of following features of project management tools for Planning and scheduling purpose in construction industry.

Parameter	Responses	Not Important	Slightly Important	Moderately Important	Important	Very Important	Score
Time Management Functions	51	0	0	0	9	42	4.82
Resource Management Functions	51	0	0	11	19	21	4.20
Cost Management Functions	51	0	6	13	17	15	3.80
Reporting Functions	51	0	4	12	22	13	3.86
Control and Monitor Functions	51	0	0	7	12	32	4.49
Compatability Functions	51	0	0	15	21	15	4.00
Security Functions	51	0	5	11	30	5	3.69
Technical Support	51	0	25	12	11	3	2.84
User Friendliness	51	0	6	9	11	25	4.08

Figure 3Ranking the importance of Software features

Overall Experience with the Project Management tool for Planning and scheduling purpose in construction industry.

Project Management Software	Responses	1 star	2 star	3 star	4 star	5 star	Score
Microsoft Project	51	0	0	8	20	23	4.29
Oracle Primavera P6	51	0	0	9	25	17	4.16

Figure 4Overall Experience with the Project Management tool

DATA CALCULATION AND ANALYSIS

The first part of analysis was to collect the relative weight of each parameter from the user's response. This detail is presented in**Figure 5** , where the score is converted into weight out of 1.

Parameter	Score	Weight
Time Management Functions	4.82	0.14
Resource Management Functions	4.20	0.12
Cost Management Functions	3.80	0.11
Reporting Functions	3.86	0.10
Control and Monitor Functions	4.49	0.13
Compatability Functions	4.00	0.11
Security Functions	3.69	0.10
Technical Support	2.84	0.07
User Friendliness	4.08	0.12
Total	35.78	**1.00**

Figure 5Weight of parameters

The next part was to separate these parameter on basis of two characteristic, called Operational Characteristic and General Characteristic. Now the Operation characteristic had parameters like Time Management, Resource Management, Cost Management Functions, Reporting Functions, Control and Monitor Functions. **The sum of weight of Operational Characteristic is 0.60 or 60%.** Now the General Characteristic had parameters like Compatibility Functions, Security Functions, Security Functions, User Friendliness. **The sum of weight of General Characteristic is 0.40 or 40%.**

After separation of parameters as Operational Characteristic and General Characteristic, the calculation was done separately for each characteristic and weight was calculated for each of them out of 1. This can be seen from**Figure 6** and **Figure 7**.

Rank the importance of following features of project management tools for Planning and scheduling purpose in construction industry.								
								Weight
Parameter	Responses	Not Important	Slightly Important	Moderately Important	Important	Very Important	Score	Out of 1
Time Management Functions	51	0	0	0	9	42	4.82	0.23
Resource Management Functions	51	0	0	11	19	21	4.20	0.20
Cost Management Functions	51	0	6	13	17	15	3.80	0.18
Reporting Functions	51	0	4	12	22	13	3.86	0.18
Control and Monitor Functions	51	0	0	7	12	32	4.49	0.21
							21.18	1.00

Figure 6Weight of Operational Characteristic

Rank the importance of following features of project management tools for Planning and scheduling purpose in construction industry.								
								Weight
Parameter	Responses	Not Important	Slightly Important	Moderately Important	Important	Very Important	Score	Out of 1
Compatability Functions	51	0	0	15	21	15	4.00	0.27
Security Functions	51	0	5	11	30	5	3.69	0.25
Technical Support	51	0	25	12	11	3	2.84	0.19
User Friendliness	51	0	6	9	11	25	4.08	0.28
							14.61	1.00

Figure 7Weight of General Characteristic

After the calculation of weight for individual characteristic, the average weighted score for each attribute had to be calculated. For this first the average score for the attribute had to be calculated. This average score would come from the average score of the questions within the attribute. For Example:

For **Criteria A: Time Management Functions**

A1:How is the Setting Up project plan and activities in two software has a score of 3.16

A2:How is the Network calculation and Graphics in two software has a score of 3.06

So average score of **Criteria A: Time Management Functions is 3.11 i.e. ((3.16 + 3.06) /2).** Similarly, this can be done for other attributes.

Now as stated earlier, we need to calculate the average weighted score for the attribute. The average weight of the attribute would come from **Error! Reference source not found.** and **Error! Reference source not found.**. So, considering the above example, we know **Time Management Functions is an Operational characteristic** and thus we refer Figure 11,

Weight of Time Management Functions is 0.23

So, the Average Weighted Score of the attribute is the Mean score of the attribute multiple with the weight of the attribute. Thus, average weight of **Time Management Functions is 0.71 i.e. (3.11 x 0.23).**Similarly, this can be done for other attributes. The detail calculation is shown in

Figure 8.

			Ms Project					Primavera P6			
Q. No.	Software Attributes		Score	Average score	Weight	Weighted score		Score	Average score	Weight	Weighted score
Q1	**Time Management Functions**	A		3.11	**0.23**	0.71			3.96	**0.23**	0.90
1.1	Setting Up project plan and activities	A1	3.16					3.86			
1.2	Network calculation and Graphics	A2	3.06					4.06			
Q2	**Resource Management Functions**	B		2.87	**0.20**	0.57			4	**0.20**	0.79
2.1	Ability to allocate resource	B1	2.92					3.92			
2.2	Ability of resource levelling	B2	2.92					3.80			
2.3	Ability to handle over-allocated resource	B3	2.76					4.27			
Q3	**Cost Management Functions**	C		2.38	**0.18**	0.43			4.01	**0.18**	0.72
3.1	Ability to assign cost information on activites	C1	3.04					4.49			
3.2	Ability to generate cost Breakdown structure and cost calculations	C2	2					4.04			
3.3	Ability of Risk Analysis	C3	2.10					3.51			
Q4	**Reporting Functions**	D		3.73	**0.18**	0.68			3.10	**0.18**	0.57
4.1	Types of standard reports generated	D1	3.80					3.92			
4.2	Integration with Word Processor	D2	3.55					2.92			
4.3	Presentation of reports	D3	3.84					2.47			
Q5	**Control and Monitor Functions**	E		3.07	**0.21**	0.65			4.05	**0.21**	0.86
5.1	Saving project baselines	E1	3.61					3.98			
5.2	Easy of handling WBS	E2	4.12					3.84			
5.3	Ability to filter required data	E3	3.82					3.84			
5.4	Multi-project Management	E4	1.94					4.20			
5.5	Internet capabilities to publish online	E5	1.84					4.39			
Q6	**Compatability Functions**	F		3.97	**0.27**	1.09			3.86	**0.27**	1.06
6.1	Microsoft Office applications like Ms Excel, Ms Word.	F1	3.78					3.78			
6.2	Other Project Management Softwares	F2	3.88					3.88			
6.3	Device Operating systems	F3	4.24					3.92			
Q7	**Security Functions**	G		2.19	**0.25**	0.55			4.57	**0.25**	1.15
7.1	Control on ability of User to access Project files	G1	2.04					4.51			
7.2	Security of project baseline	G2	2.33					4.63			
Q8	**Technical Support**	H		4.01	**0.19**	0.78			2.70	**0.19**	0.52
8.1	Installation and Maintainance of the software	H1	4.12					3.04			
8.2	Ease of finding Training courses	H2	3.90					2.35			
Q9	**User Friendliness**	I		3.90	**0.28**	1.09			2.33	**0.28**	0.65
9.1	Time required to learn the software	I1	4.00					1.98			
9.2	System interface and ability to customize	I2	4.33					2.37			
9.3	Help from pop-up dialogue boxes and messages	I3	3.35					2.63			

Figure 8Average Weighted Score of each attribute

After calculating the Average Weighted Score of each attribute, we'll calculate the sum of operational characteristic and general characteristic. Then we can calculate Total Weighted Score by using A*M+B*N, Where A is sum of operational characteristic and B is sum of General characteristic. M is the overall weight of operational characteristic and N is the overall weight of General characteristic. Both M and N can be computed from **Error! Reference source not found.**. Also, we know that we are using a 5-point Linkert scale, so the minimum and maximum value of the Total Weighted Score will be 1 and 5 respectively.

Efficiency of the software = Total Weighted Score / Maximum value of Total Weighted Score.

Efficiency of the software can be computed as the ratio of the Total Weighted Score of the software to the Maximum value of Total Weighted Score value possible. The details of the calculation are shown in **Figure 9**.

			MSP				Primavera P6		
Q. No.	Software Attributes		Operational characteristic (A)	General Characteristic (B)	Total Weighted Score (C)		Operational characteristic (A)	General Characteristic (B)	Total Weighted Score (C)
Q1	Time Management Functions		0.71				0.90		
Q2	Resource Management Functions		0.57				0.79		
Q3	Cost Management Functions		0.43				0.72		
Q4	Reporting Functions		0.68				0.57		
Q5	Control and Monitor Functions		0.65				0.86		
Q6	Compatability Functions			1.09				1.06	
Q7	Security Functions			0.55				1.15	
Q8	Technical Support			0.78				0.52	
Q9	User Friendliness			1.09				0.65	
	Total		**3.03**	**3.51**	**3.22**		**3.84**	**3.38**	**3.66**
	A&B(max)		5	5			5	5	
	A&B(min)		1	1			1	1	
	C(max) A*M+B*N				5				5
	C(min)				1				1
	Efficiency of software				**64%**				**73%**

Figure 9Total Weighted Score and Efficiency

COST OF SOFTWARE

The next part of the survey was to obtain the various cost related with the software from vendors and estimate the total cost required to run the software. The cost consider are General Price of software, Upgrading and Maintenance cost, and Hardware cost to run the setup. The cost is considered for operating life of two year. After calculating the cost, the next step is to calculate cost effective index.

$$Costeffectiveindex = Totalweight\ score\ of\ parameter / \textbf{maximum}\ weight\ score$$

The factor for cost and functional parameter is equal, so 50/50 will be multiplied to the cost-effective index obtained.

Cost Parameter		Ms Project (in 1000s)	Primavera P6 (in 1000s)
Price of software		₹ 72.00	₹ 160.00
Cost of Installation			
Cost to upgrade/maintenance		₹ 10.00	₹ 40.00
Hardware cost to run the system		₹ 30.00	₹ 25.00
Total cost of software (in 1000s)		₹ 112.00	₹ 225.00
Cost Effective Index		**2.8779**	**1.6260**

Figure 10Cost comparison Sheet

DATA INTERPRETATION

The responses help us figure out the relative weight of all the parameters for performance of a Project management software. Time management function (14%) dominates the preference for Planning and Scheduling software, followed with a superior Control and Monitor function (13%). Such high percentage suggest that people are dependent on these software for planning, scheduling, control and monitoring. Both the software are used as a Project management software. Both Resource Management and User friendliness had weightage of 12%, suggesting that along with operational function, people consider the ease of operating the software as a relatively high importance parameter. Following a similar pattern was Cost management and Compatibility functions which had a weight of 11% each. Some of the other function such

as reporting related, security related and technical support were less considered parameters while using a Project management software.

Time Management Functions	0.14
Control and Monitor Functions	0.13
Resource Management Functions	0.12
User Friendliness	0.12
Cost Management Functions	0.11
Compatability Functions	0.11
Reporting Functions	0.10
Security Functions	0.10
Technical Support	0.07

Figure 11Highest to lowest Weight of parameters

According to the response of the survey attendee, we were able to find out that people give more weightage to **Operational Characteristic (60%) then to the General Characteristic (40%)**. This clearly suggest that people believe that the features related with the software is to be used are more important than features that are related with general use of the software.

From the calculations we can differentiate the Parameters for Microsoft Project(MSP) and Primavera P6. Primavera has a better **Time management function** with an overall score of 0.91 against Microsoft Project which has a score of 0.71. This difference suggest that Primavera is better with network calculation and graphical re-presentation. The parameter with second highest weightage was **control and monitor** and again Primavera is better than MSP, primarily due to better WBS management and Multi-project control. Superior ability to handle **resource** with special abilities in dealing with over-allocation helps Primavera earn better score than MSP. Microsoft Project turned out to be better than Primavera P6 in terms to **user-friendliness**. This is because of less time required to learn the software, and any easy to work interface provided by MSP. Ability to assign all cost along with CBS and ability of risk analysis, Primavera is better than MSP in **Cost management**.

In terms of **compatibility** both software performs well. Both are found to be compatible with Ms office tools with a minute variation and only reason MSP score better than P6 is due to the ability of MSP to integrate with lot of Operating system than Primavera could. Although Primavera could generate lot more standard types of report, it lacks the ease of integration with word processor and in presentation of report, this makes MSP superior in **reporting function** over Primavera. **Security** was not a primary concern for the people, and Primavera score much better than MSP, especially due to the ability to restrict the user access within the file. Lastly, MSP performed well in **Technical support** feature over Primavera as people find MSP easy to install and maintain and coaching for the software are available easily.

If we compare the **operational characteristic** score of the two software, we find that Primavera P6 scores 3.84 which is more than score of Microsoft Project 3.03. So, people find P6 has functional and technical features provided by Primavera P6 are more superior than those present in MSP. Next, when we look at the **general characteristic**, we see that MSP with a score of 3.51 is slightly better than P6 3.38. This could be due the overall ease and familiarity of working on MSP over P6. Also, the market presence of Microsoft and its various products is much more than that of oracle. This too generates extra advantage for MSP. If we considered the **total weighted score**, we see Primavera P6 with a score of 3.66 out performs Microsoft Project which has a score of 3.22. With operational characteristic having more weightage and P6 having a higher operational characteristic, the total weight score was normal to be high. This suggest that Primavera P6 is a better software in terms of overall **Efficiency** than Microsoft Project.

Lastly to complete the study, cost was introduced in the survey. Cost calculation provides decision in favour of MSP over P6. The **cost effectiveness index** of MSP is 2.88 which is approximately double than that of P6 1.63. This makes MSP a better choice, even though it was second choice in the functional parameter. The large difference is due to the high initial and upgrading prices of the Primavera P6. Here the learning cost of two software has still not been added. If learning cost would have been added, the cost effectiveness of Primavera would further go down as it is expensive to learn compared with Microsoft Project.

SUMMARY SHEET

The summary of the above interpretation is provided.

Parameters	Weight	Range		Microsoft Project 2016		Primavera P6 Professional Project Management
Operational Characteristic	60%					
Time Management Functions		1-5		3.11		3.96
Resource Management Functions		1-5		2.87		4.00
Cost Management Functions		1-5		2.38		4.01
Reporting Functions		1-5		3.73		3.10
Control and Monitor Functions		1-5		3.07		4.05
Value of A (Operational Characteristic)		1-5		**3.03**		**3.84**
General Characteristic	40%					
Compatibility Functions		1-5		3.97		3.86
Security Functions		1-5		2.19		4.57
Technical Support		1-5		4.01		2.70
User Friendliness		1-5		3.90		2.33
Value of B (General Characteristic)		1-5		**3.51**		**3.38**
Value of C (Total Weighted Score)		1-5		**3.22**		**3.66**
Efficiency		**0-100%**		**64%**		**73%**
Total Cost (in 1000s)				**₹ 112.00**		**₹ 225.00**
Cost Effective Index				**2.8779**		**1.6260**

Figure 12Summary Sheet

CONCLUSION

The analyse of software performance and price of the two software is done and it suggest which software is suitable for specific purposes.

Evaluation of Primavera P6 R16.1 Professional Project Management indicate following things:

- With an overall efficiency of 73% Primavera is much better than Microsoft Project. It scores better in operational characteristic.
- Primavera has advantage in Time management, cost management, resource management and security management.
- Primavera has acceptable scores in most of the function.

Evaluation of Microsoft Project 2016 indicate following things:

- With an overall efficiency of 64%, Microsoft Project, it is not far behind Primavera.
- It scores better in general characteristic of the software.
- It performs well in reporting functions, compatibility functions, user friendliness, and technical support.
- Its smooth interface along with familiarity helps it to be software of choice.

After the cost analysis is done, we can find that Primavera may have a higher efficiency, but due to its higher overall operating cost, its cost effectiveness index is low while Microsoft Project has less efficiency

but with a lower cost has cost effectiveness index almost double than that of Primavera. This makes Microsoft project an overall better product than Primavera P6.

The choice of software is a crucial decision to be made and depends on lot of factors as discussed above. An organisation that has a complex project and needs lot of functions would go for Primavera P6 while another organisation which is not so big and want a cheaper software for a relatively small project would prefer Microsoft Project.

Software companies must take a note that with time, both software will co-exist in Indian construction industry. And companies look for both Operational and general characteristics while deciding a software. Cost of software could be a crucial parameter in deciding the software to use.

So, the software of future is which has the interface and ease of working of Microsoft Project and functional abilities of Primavera at a less cost.

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