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Project termination practices in Indian industry: a statistical review

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Abstract

The paper critically analyzes the key issues faced by project professionals in terminating projects in Indian industry. Statistical analysis was carried out after administering a questionnaire to project executing firms. While studying the major problems faced by project managers, statistical results show that negotiating claims with clients, compliance of statutory requirements, receipt of final installment of payment, performance guarantee tests, and handling claims of suppliers are the key problems faced by project managers in India in terminating projects. It was observed that the problems faced by private sector corporations are as severe as public sector companies. Various other problems encountered by project managers are also highlighted. At the end, the paper indicates further scope of expanding the present research work. © 2001 Elsevier Science Ltd and IPMA. All rights reserved.

Keywords: Project management; Project termination; India

1. Introduction

Project termination phase, the last phase of the project life cycle, plays a vital role in successful completion of a project. The process of project termination is not an easy task. It is to be planned, budgeted and scheduled like any other phase of the project life cycle. Sometimes special termination managers are put to complete the termination process. Though project termination constitutes a significant part in the total project, it is often overlooked by project managers. This not only prevents the executing firm to claim the last portion of the contractual value of the project, but also develops another series of effects, namely:

- time over-run;
- cost over-run as a direct result of time over-run in most cases;
- tarnishing the image and credibility of the project team;
- locking up valuable human and other resources, that could have been gainfully utilized elsewhere; and
- developing enormous stress on the project personnel.

Project managers loosen their grip of monitoring the time-bound projects as soon as the installed plants or services start functioning. The last few defects continue to get rectified for long periods in the process of handing over the projects to clients. By the time the last few defects are rectified, new problems crop up. It is to the advantage of the clients as their plants or services get further time to stabilize. It has been observed that plants are formally handed over with preliminary acceptance certificate (PAC), pending rectification of last few problems. This becomes a vicious cycle before obtaining the final acceptance certificate (FAC) from the client. Due to non-realization of the last contractual amount, project organizations face shortage of fund, particularly when they are engaged in multiple projects. For example, a company manufacturing material handling equipment ran a coal handling plant for a power project of a leading power generating firm for almost 10 years before it could successfully terminate the project. It was due to project manager's inability to meet the performance guarantee tests. Organizations face delay in terminating projects due to delay in furnishing post-installation documents and non-compliance of statutory requirements. Another difficult aspect is the identification of the beginning of the termination phase of a project. Project managers use their perception and judgement to identify the starting of termination phase after completion of execution, commissioning, and testing activities.

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Growth in the development of tools and techniques in project management started in late fifties. Researchers and practitioners now-a-days use a large number of efficient techniques in managing projects. While the execution stage of a project attracts major attention of all, serious efforts have not been put to emphasize the importance of project termination.

The paper analyzes the key problems faced by project management professionals in terminating projects in Indian industry. Statistical analysis of data was done after administering a survey questionnaire to project executing firms. It analyzes the problems that are considered most significant in terminating projects in Indian industry. After identifying the key problems, the paper analyzes whether these problems are equally important among the public and private sector companies. The paper also critically discusses various project success factors, like consulting the client, proper communication, contingency plans, project audit etc., over the various stages of the project life cycle.

2. Project termination: an overview

There are various reasons for termination of a project at any stage after it is started. It can be due to premature abandonment of a project. It can also be due to other reasons, like appearance of a challenger (product/process) causing a threat to the existing defender, better/faster/cheaper alternatives, failure to conform to the test results, unfavourable change in the expected profitability structure, and change in external environment. The termination phase considered in this paper is the formal close-out of a project after conceptualization, planning and execution stages. Closing of a project in the quickest possible time with least of problems, after the physical completion of work within the ambit of the contract agreement, is important from the point of view of the stakeholders of the capital projects. Early termination improves profitability by quicker return on investment.

Balachandra and Raelin [1,2] did a discriminant analysis on 23 factors involved in terminating projects. They mainly concentrated on R&D Projects. De et al. [3–7] did detailed quantitative work in taking abandonment decisions from financial angle at different context. Shafer and Mantel [8] developed a decision support system (DSS) for project termination. Though the DSS is able to perform the sensitivity of various parameters of project termination, the requirement of extensive database of different nature caused a limitation of its use to practitioners. Archibald [9] made an extensive check-list for project termination. Meredith and Mantel [10] proposed a good design of project termination. The design is given in Fig. 1. While discussing the problems of project termination, Stallworthy and Kharbanda [11] categorized the problems into emotional and intellectual problems. These are shown in Fig. 2. Some of the staff-related problems are fear of no future work, loss of interest in remaining tasks, loss of motivation, and loss of team identity. Client-related problems are change in client's attitude to the project, loss of interest in project, change in personnel dealing with the project, and non-availability of key personnel. Internal problems are certification needs, outstanding commitments, screening of partially completed tasks, closure of work orders and packages, and disposal of unused material. External problems include agreement with clients on deliverables, obtaining required certificates, agreement with suppliers on outstanding payments, communicating closure of projects, and finally closing down the facility. Pinto and Slevin [12] surveyed a large number of experienced project

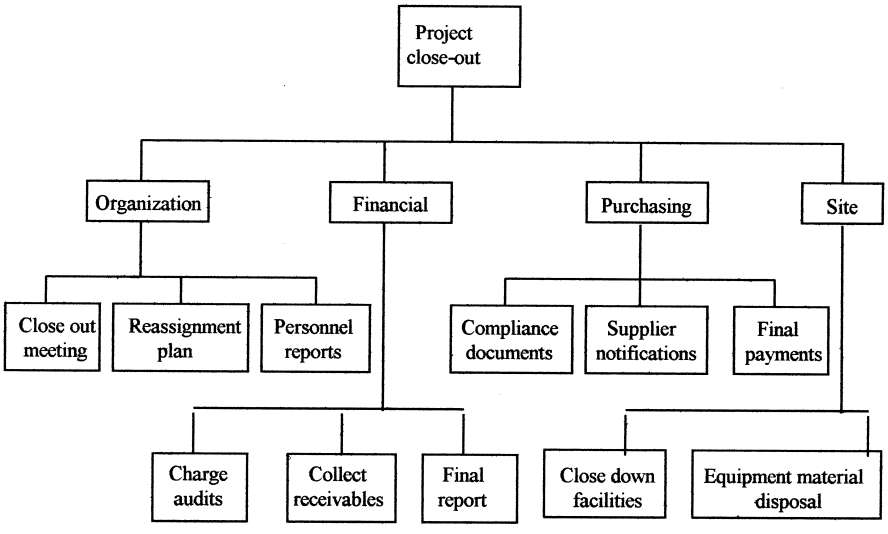

Fig. 1. Design for project termination (source: Meredith and Mantel [10]).

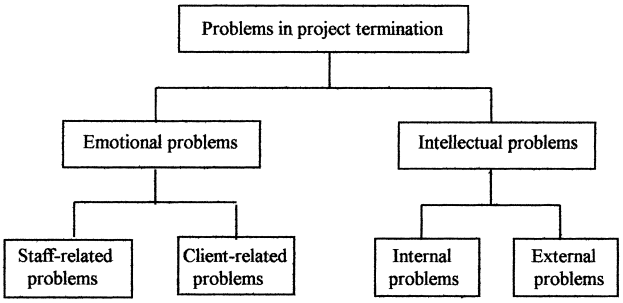

Fig. 2. Problems in project termination (source: Stallworthy and Kharbanda [11]).

managers and observed ten factors that the managers felt to be critical to successful project implementation.

3. The present study in the Indian context

3.1. The objective

Given the criticality of the termination phase in project life cycle, adequate emphasis should have been given on this aspect. Interestingly, academia and the industry alike, in India, seem to have neglected this area. Literature review showed little or no serious research on project termination in Indian context. The purpose of the present work is to study the problems faced by project managers in Indian industries during project termination. After identifying the key problems in terminating the projects, attempts have been made to check whether the problems are equally prominent in public as well as in private sector companies. This has been done using the statistical tool — analysis of variance (ANOVA).

Based on the general perception regarding the laxity in functioning of public sector companies, it may by hypothesized that the problems are more acute in case of public sector than private sector companies. Hence the hypothesis considered is "Public sector companies face more problems than private sector companies during project termination." Certain key factors, termed as project success factors (PSF), have been used to determine successful completion of projects. The importance of any success factor may vary over the project life cycle. An awareness and understanding of the variations of these PSFs provide qualitative insight leading to identification of missing processes, reinforcement of existing but appropriate processes, and hence help in increasing efficiency and performance in project termination.

3.2. Methodology, research design, and data collection

A questionnaire is designed to obtain information from a select sample of public and private sector companies in India. A sample questionnaire is given in Appendix A. The questionnaire is divided into four segments. The first segment is to know the degree of intensity of various problems faced by the project managers during project termination. The intensity is expressed through a 'Score'. The second segment is designed to capture the data for the analysis of various project success factors (PSFs). The data in the third part is to give an idea about the average percentage of time taken for project termination in project life cycle. The last portion is to look into some qualitative information regarding the preparation of project history.

The questionnaire was sent to 60 companies with a judicious blend of manufacturing and services organizations covering both public and private sector companies distributed geographically across the country. Twenty-five replies were received and the statistical analysis has been carried out using the data obtained from the questionnaire. Besides receiving the data through questionnaire, many of the project managers were contacted personally to get qualitative views related to the study.

4. Analysis of survey results

Data from the questionnaire survey and interviews were used to determine:

- *The main problems/issues experienced by project managers in terminating projects*. The sample was analysed to determine the key problems faced by companies in general. Further, a one way analysis of variance was done to test the hypothesis stated earlier.
- *The success factors and how these have changed over the project life cycle*. An analysis of the importance assigned to various project success factors (PSFs) over the life cycle of a project gives a clear picture of the shortcomings of the project management practices in Indian industry. It also indicates that the causes of problems/delays in termination are the result of problems left uncorrected in earlier stages.

4.1. Analysis of problems/issues in terminating projects

After analysis of the data, it was observed that the problems that are considered most significant by the industry, for both public and private corporations, are (Fig. 3):

1. Negotiating claims with clients.
2. Compliance of statutory requirements.
3. Receipt of the final installment of payment.
4. Performance guarantee tests.
5. Handling claims of suppliers.

The *Y*-axis in Fig. 3 gives the 'mean score' of the problems, which can attain a maximum score of 4 (reference Appendix A). The *X*-axis gives the degree of importance of the issues/problems. It is fairly evident from the figure that most of the termination problems faced by the industry are related to the financial aspects of the project, viz. negotiating claims with clients, receipt of the final installment, and handling claims of suppliers. Contrary to popular perceptions, personnel-related problems, like reassignment of personnel, retrenchment of personnel, loss of project derived motivation, and uncertainty about the future, scored very low on the importance scale (score below 2.05 on the importance scale of 1–4).

Fig. 4 illustrates the most significant problems faced by public and private sector companies in terminating projects. It is observed that both public and private sector corporations face problems in settling claims with clients (score > 3.5 for both). Performance guarantee test is given greater importance by the private sector than the public sector. Also, statutory compliance is more an issue with the private sector than the public sector. To test the statistical validity of these measures, a one-way analysis of variance was done. The statistical

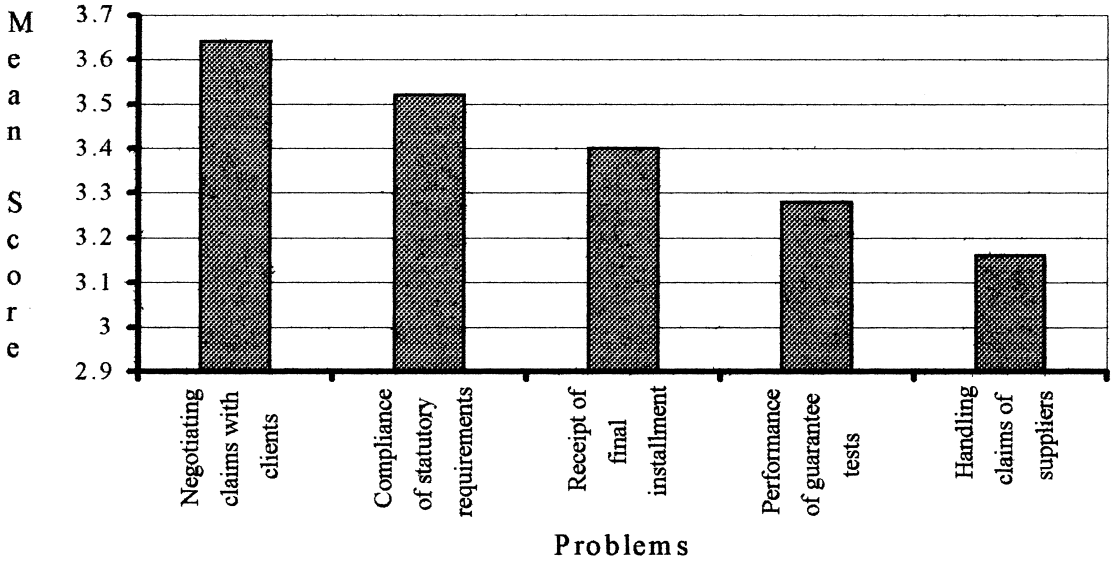

Fig. 3. The five major problems during termination faced by the project managers.

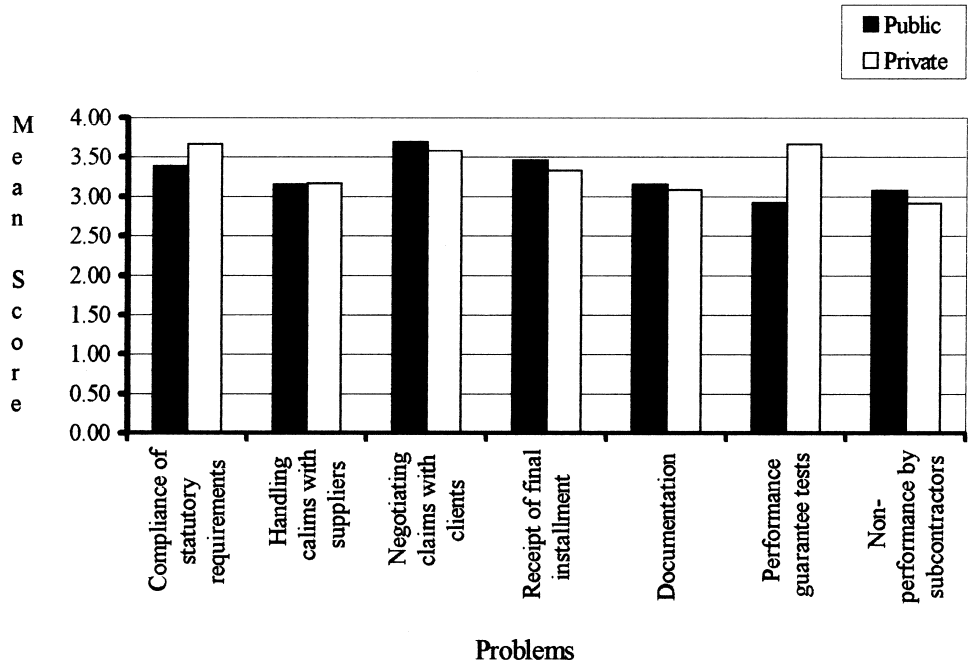

Fig. 4. Major problems faced by Indian public and private sector corporations during project termination.

results are shown in Appendix B. Interestingly, the statistical analysis showed no significant difference between private and public sectors for the most significant problems, indicating that the termination problems are as severe in the public sector as in the private sector.

4.2. Analysis of project success factors

The importance of consulting and informing the client over the various phases of project life cycle is shown in Fig. 5. It is observed that the client is consulted less in the termination phase as compared to the other phases. Lesser interaction during the termination phase is an important reason of extended termination period. It is seen that the urge to successfully terminate a project comes down from various corners after execution phase. The above finding is buttressed by the fact that training of clients received a low score of 2.24 as a problem/issue during termination, and additional features/facilities that client requests also received a low score of 2.4 as a problem/issue during termination (reference Appendix A).

The importance of establishing proper communication channels at various levels in the project team cannot be under-emphasized (Fig. 6). It is necessary that communication receives higher importance during the termination phase. Lack of proper communication attributes to many of the misunderstandings and uncertainties that occur during the termination phase.

Contingency plans are necessary to handle unexpected crises and deviations in any project. More often than not, such deviations are the rule and not the exception. Hence, if a project has to be terminated successfully, it is imperative that a detailed contingency plan is in place across the various stages in the project life cycle so that corrective strategies can be activated whenever a crisis occurs. From Fig. 6 it is evident that contingency plans are receiving low scores. Hence, it is necessary that the project managers should put contingency plans in place for each stage of the project life cycle. Project audits are required to compare the state of the project vis-à-vis the plan documents. Hence a project audit would necessarily be required at various stages of the project life cycle, and not merely at the end when the project is already completed. From Fig. 6 it is clear that Indian industry does not pay adequate importance to project audit as a critical project success factor. It is possible that, if the audit had been done at regular intervals, many of the problems that occur during the termination phase could be avoided. Hence, project managers should be exposed to the importance of project audits and institute them at regular intervals to give feedback on project status and incorporate corrective measures to minimize termination problems.

While interacting with many respondents, most of them felt that the termination stage does involve significant cost and time over-runs if sufficient importance is not attached to these factors during the previous stages. But this is not reflected in the importance that is attached to project completion within the budget and to project completion on time as critical success factors across all stages of the project life cycle. As it is evident from Fig. 7 that more importance is being attached to

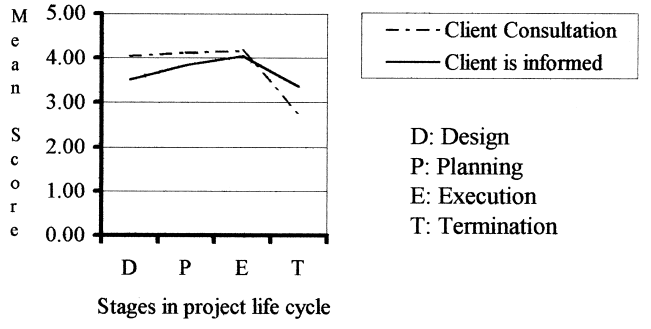

Fig. 5. Importance of consulting and informing the client over the project life cycle.

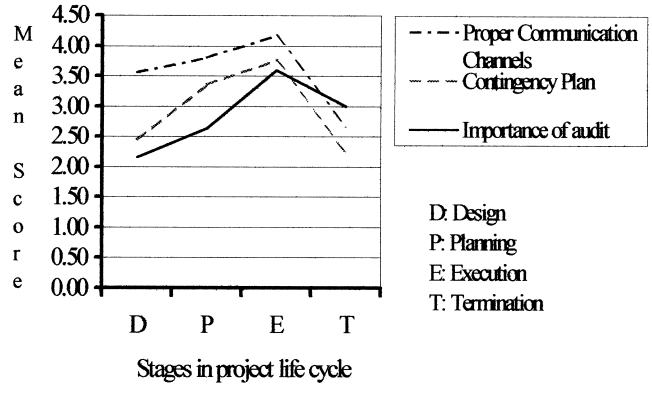

Fig. 6. Importance of proper communication channels, contingency plans and project audit over the project life cycle.

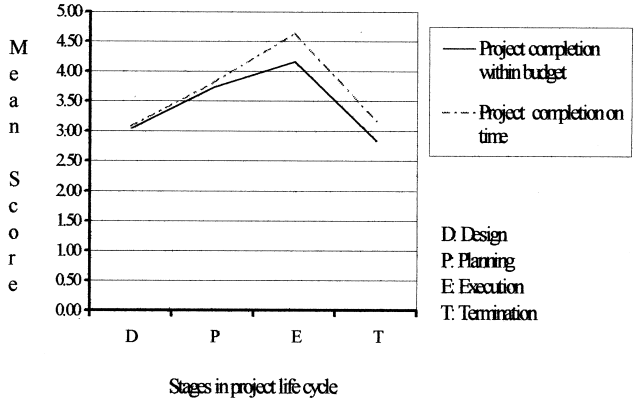

Fig. 7. Importance of project completion within budget and on time over the various project life cycle.

project completion within budget and on time during the execution phase when most of the resources have already been committed and it will be difficult to unroll existing plans. Hence, more importance should be given to both these factors during the first two phases. From discussion with some project managers, it came to light that the degree of importance that is attached to various success factors vary across the various stages of the project life cycle.

4.3. Other significant findings

1. 48% of the respondents say that the termination stage takes 5–10% of the total project life cycle time.
2. 76% of the respondents say that project history is prepared in their organisations. Interestingly, only 64% of the sample say that the recommendations of the project history is used to modify project management procedures.

5. Conclusions

It has been observed after statistical analysis that negotiating claims with clients, compliance of statutory requirements, receipt of the final installment of payment, performance guarantee tests, and handling claims of suppliers are the key problems faced by the project managers in India in terminating projects. Statistically, the problems faced by private sector corporations are as severe as public sector companies though this result is contrary to popular perceptions about the laxity of public sector companies.

Though project history is prepared in many companies, this somehow does not reflect in learning from mistakes and modifying project management procedures appropriately. It is imperative that project managers understand the significance of project history in learning to avoid mistakes in future projects. Also, project history can be useful in boosting efficiency and performance. Some of the problems that are faced in termination are the result of laying insufficient emphasis on critical success factors, like project audit, contingency plans, and lack of proper communication mechanisms across the various phases in the project life cycle.

The study can be refined by increasing the sample size. The nature of the industry can also be a moderating variable on the problems faced during termination. The study can be further expanded by comparing the Indian scenario with those of developed nations. With increasing demand of successful projects, more attention needs to be focused on project termination, particularly when the payoffs are more for early completion of projects.

Appendix A. Questionnaire for project termination

I. Please rank the issues/problems your organization encounters during project termination on a scale of 1 to 4

Rating: 4 = Very important, 3 = Important, 2 = Less important, 1 = Not important, 0 = Not applicable

		Score
1.	Disposal of unused material	
2.	Compliance of statuatory requirements	
3.	Writing of project history	
4.	Handling claims from suppliers	
5.	Negotiating claims with clients	
6.	Receipt of the final installment	
7.	Documentation	
8.	Performance guarantee tests	
9.	Training of clients	
10	Additional features/facilities that the client requests	
11.	Transfer of project manager (or allocation of new project to project manager)	
12.	Non performance by sub-contractor (leaving the job unfinished/semi-finished)	
13.	Lack of systematic project related information storage facilities	
14.	Theft/pilferage at site	
15.	Reassignment of personnel	
16.	Retrenchment of personnel	
17.	Loss of project derived motivation	
18.	Uncertainty about the future	
19.	Liabilities due to contract labour	
20.	Others (please specify)	
21.	Others (please specify)	
22.	Others (please specify)	

II. Given below are some of the overall project success factors. Rate the importance of each of the four phases seperately on a scale of 1–5

Rating: 5 = Very important, 4 = Important, 3 = Preferred, 2 = Less important, 1 = Not important, 0 = Not applicable

Key (phases): D: Definition, P: Planning, E: Execution, T: Termination

Overall Project Success Factors (How important at each phase?)	Project Phase			
	D	P	E	T
1. Client is consulted at all stages of project development and implementation				
2. Client is informed of the project status and his approval is obtained at each stage				
3. Proper communication channels are established at appropriate levels in the project team				
4. A contingency plan is in place to handle unexpected crises and deviations on the project				
5. The project is completed within budget				
6. The project is completed on time				
7. Importance of doing a project audit at this stage				

III. What is the average percentage of time taken of the project life cycle for project termination in your company?

☐ < 5%
☐ 5% to 10%
☐ 10% to 15%
☐ 15% to 20%
☐ > 20%

IV.

Is the project history prepared in your organization?
Yes/No
If Yes, are the project management procedures modified as per the recommendations?
Yes/No

Appendix B. Statistical output (using analysis of variance)

B1. Negotiating claims with suppliers (Question I(5), Appendix A)

ANOVA Table

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	0.0741026	1	0.0741026	0.08	0.7817
Within groups	21.6859	23	0.942865		
Total (corr.)	21.76	24			

Statistical interpretation

The ANOVA table decomposes the variance of the data into two components: a between-group component and a within-group component. The F-ratio for groups, which in this case equals 0.078593, is a ratio of the between-group estimate to the within-group estimate. Since the P-value of the F-test is greater than or equal to 0.05, there is not a statistically significant difference between the means of the various groups at the 5% significance level.

B2. Compliance to statuatory requirements (Question I (2), Appendix A)

ANOVA Table

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	0.24641	1	0.24641	0.35	0.5575
Within groups	15.9936	23	0.695373		
Total (corr.)	16.24	24			

Statistical interpretation

The ANOVA table decomposes the variance of the data into two components: a between-group component and a within-group component. The F-ratio for groups, which in this case equals 0.354357, is a ratio of the between-group estimate to the within-group estimate. Since the P-value of the F-test is greater than or equal to 0.05, there is not a statistically significant difference between the means of the various groups at the 5% significance level.

B3. Receipt of final installment (Question I (6), Appendix A)

ANOVA Table

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	0.102564	1	0.102564	0.07	0.7881
Within groups	31.8974	23	1.38685		
Total (corr.)	32.0	24			

Statistical interpretation

The ANOVA table decomposes the variance of the data into two components: a between-group component

and a within-group component. The F-ratio for groups, which in this case equals 0.073955, is a ratio of the between-group estimate to the within-group estimate. Since the P-value of the F-test is greater than or equal to 0.05, there is not a statistically significant difference between the means of the various groups at the 5% significance level.

B4. Performance guarantee tests (Question I (8), Appendix A)

ANOVA Table

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	6.48231	1	6.48231	4.08	0.0552
Within groups	36.5577	23	1.58946		
Total (corr.)	43.04	24			

Statistical interpretation

The ANOVA table decomposes the variance of the data into two components: a between-group component and a within-group component. The F-ratio for groups, which in this case equals 4.0783, is a ratio of the between-group estimate to the within-group estimate. Since the P-value of the F-test is greater than or equal to 0.05, there is not a statistically significant difference between the means of the various groups at the 5% significance level.

B5. Handling claims from suppliers (Question I (4), Appendix A)

ANOVA Table

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Between groups	0.186923	1	0.186923	0.28	0.5996
Within groups	15.1731	23	0.659699		
Total (corr.)	15.36	24			

Statistical interpretation

The ANOVA table decomposes the variance of the data into two components: a between-group component and a within-group component. The F-ratio for groups, which in this case equals 0.078593, is a ratio of the between-group estimate to the within-group estimate. Since the P-value of the F-test is greater than or equal to 0.05, there is not a statistically significant difference between the means of the various groups at the 5% significance level.

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