Research Report

Managing Distributed Technology Projects: Within and Between Firms, and National Boundaries

A 2007 Survey of Information Technology and Product Development Projects

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August 2007

Acknowledgements

The support of Project Management Institute’s Information Systems Specific Interest Group (PMI-ISSIG) and the Carlson Family Foundation is gratefully acknowledged. The assistance of Alison Davis-Blake and Rachna Shah in designing and reviewing the survey, and Paul Krebs and Annie Wiest in implementing the survey is greatly appreciated. Special thanks are due to the PMHUB community and PMI Pune Chapter members for their assistance in pilot testing the earlier drafts of the survey questionnaire, and to all PMI-ISSIG members who took the time to complete the survey questionnaire.
# Table of Contents

1. An Overview .............................................................................................................. 2

2. Summary of Key Findings ......................................................................................... 3

3. Detailed Description and Graphs

   I. Sample Characteristics
      - Project Type ..................................................................................................... 12
      - Industry Type .................................................................................................... 13
      - Project Organization Type ................................................................................. 14
      - Project Client/Client Firm Location ............................................................... 15
      - Project Team/Vendor Firm Location .............................................................. 15
      - Project Budget .................................................................................................. 16

   II. Respondent Characteristics
      - Primary Role in a Project ................................................................................ 16
      - Affiliation ......................................................................................................... 16
      - Years of Work Experience ............................................................................ 17

   III. Project Team Characteristics
      - Project Team Size ........................................................................................... 17
      - Average Work Experience of a Project Team ................................................. 18
      - Work Experience in Similar Projects ............................................................. 19
      - Diversity within a Project Team ..................................................................... 20
      - Employee Turnover ......................................................................................... 21

   IV. Performance Outcomes
      - Project Performance ........................................................................................ 22
      - Task Module Integration Performance ........................................................ 23

   V. Project Characteristics
      - Technological Uncertainty ............................................................................. 24
      - Complexity ....................................................................................................... 25
      - Requirements Uncertainty ............................................................................. 26

   VI. Project Management Practices
      - Project Control ................................................................................................ 27
      - Project Autonomy ............................................................................................ 28
      - Risk Management ............................................................................................. 29
      - Agile Project Management Practices ............................................................... 30
      - Internal Knowledge Sharing .......................................................................... 31
      - External Knowledge Sharing .......................................................................... 32

   VII. Behavioral Dynamics
      - Face-to-Face Interaction between a Project Client and the Project Team .......... 33
      - Shared Context between a Project Client and the Project Team ..................... 34
      - Relationship Conflict ..................................................................................... 35
      - Task Conflict .................................................................................................. 37

4. Appendix: Data Collection and Methodology ......................................................... 39
   References ............................................................................................................. 40
   Authors’ Bios and Contact Information ................................................................. 40
1. An Overview

Each time a firm considers “outsourcing” a technology project (e.g., an information technology or a new product development project), managers are posed with a number of project organization choices. As shown in Figure 1, the choices include: (i) Collocated Insourcing, where a firm assigns project work to a collocated inhouse team, (ii) Distributed Insourcing, where a firm assigns project work to its division/unit in a different city but in the same country, (iii) Outsourcing, where a user firm/client firm contracts project work to a vendor firm in the same country, (iv) Offshoring, where a user firm/client firm assigns project work to its division/unit in a different country and (v) Offshore Outsourcing, where a user firm/client firm contracts project work to a vendor firm in a different country.

Recent media reports as well as articles by academics and practitioners suggest that the choice of project organization for a technology project with the potential to be outsourced is anything but straightforward. Simplistic guidelines for choosing project organization, such as those based on potential cost savings only, have proven to be misleading and dysfunctional by way of project performance outcomes.

This Carlson School research report presents the findings based on analysis of detailed data collected recently, between February to April 2007, on 665 technology projects from around the world. Each of the five types of project organization is represented in the study sample: Collocated

![Figure 1: Types of project organizations](image)

Insourcing (246); Distributed Insourcing (102); Outsourcing (150); Offshoring (51); and Offshore-Outsourcing (116). The technology projects are drawn from more than 25 industries, with the dominant industries being information technology (109), banking (79), insurance (56), health care (55) and manufacturing (42).

The report sheds light into variation, both within and across the five types of project organizations, with respect to: performance (adherence to schedule, budget and quality; technical performance; and overall satisfaction); project characteristics (technological uncertainty, complexity, and requirements uncertainty); project management practices (related to control, autonomy, risk management, agile project management, internal and external knowledge sharing); and behavioral dynamics (related to face-to-face interaction and shared context between project client and project team; relationship and task conflict).
2. Summary of Key Findings

Performance Outcomes

- Project performance is measured along five dimensions: (i) Adherence to schedule, (ii) Adherence to budget, (iii) Adherence to quality, (iv) Technical performance, and (v) Overall satisfaction. While projects with distributed project organizations (Distributed Insourcing, Outsourcing, Offshoring and Offshore-Outsourcing) have lower project performance compared to the Collocated Insourcing projects, this decrease in performance is more significant in the case of the Offshoring and Offshore-Outsourcing projects. Nearly 41% of Offshoring projects and 57% of Offshore-Outsourcing projects failed to meet expected performance goals compared to 24% of Collocated Insourcing projects, 30% of Distributed Insourcing projects, and 32% of Outsourcing projects.

The study sample of 665 technology projects is analyzed in three different ways to investigate the variation in project performance within and between the five types of project organization. Following are some key insights:

(a) Comparison of the means of project performance across the five types of project organization

The projects in the study sample are grouped into three categories based on the overall project performance metric (i.e., the mean score across all five dimensions of project performance): (i) Top 10% project performers, (ii) Bottom 10% project performers and (iii) Middle 80% project performers (see Figure 2).

As Figure 2 indicates, for the Top 10% project performers within each type of project organization, the variation in project performance across the five project organization types is minimal. Even though
there are significant performance differences between *Offshoring* projects and the domestic projects (*Collocated Insourcing, Distributed Insourcing* and *Outsourcing*), and between *Collocated Insourcing* and *Offshore-Outsourcing* projects, the top 10% performers within each type of project organization do exceedingly well and surpass expected performance goals. Hence, for practical purposes, the top 10% performers across the five project organization types can be considered as having comparable levels of overall project performance.

Next, a comparison of the middle 80% of the project performers across the five types of project organization indicates that the variation in performance across the domestic project organizations (*Collocated Insourcing, Distributed Insourcing* and *Outsourcing*) is minimal. The level of overall performance for both *Offshoring* and *Offshore-Outsourcing* projects is significantly low compared to the domestic projects. The magnitude of these differences is also large compared to the differences observed among the top 10% project performers. The differences between domestic projects and projects that span country boundaries become increasingly apparent among the middle 80% project performers.

Finally, a comparison of the bottom 10% project performers across the five types of project organization indicates that among the domestic projects, the performance of *Outsourcing* project organization is significantly lower than the *Collocated Insourcing* projects. Furthermore, the performance of project organizations that span national boundaries is even more significantly lower than the domestic projects. Specifically, the bottom 10% project performers among *Offshoring* and *Offshore-Outsourcing* projects have significantly lower level of overall performance compared to the domestic projects. A comparison of the variance in project performance between the top 10% project performers and the bottom 10% project performers indicates five times greater variance in project performance for the latter group of projects, compared to the former.\(^1\)

**(b) Comparison of the best, worst and average performers across the five types of project organization**

The variation in overall project performance across the five types of project organization becomes even more obvious when comparing the proportion of projects in each type of project organization at the two ends and at the mid-point of the 7-point performance scale. Specifically, the 7-point performance scale is split into three categories (i) Best performers (mean rating of 6 and above) (ii) Average performers (mean rating between 3.5–4.5) and (iii) Worst performers (mean rating of 2 and below).

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\(^1\) Variance for the top 10% project performers ($\sigma_1^2$) = 0.12, while the variance for the bottom 10% project performers ($\sigma_2^2$) = 0.57.
As shown in Figure 3, the proportions of projects across the various project organization types in the best performer category are very comparable to each other and the variation between these proportions is low (between 11%–19%). Similarly, in the case of average performer category, there is very little variation in the proportions across the various project organization types, with proportions ranging between 34%–42%. However, the variation across the project organization types becomes significant in the case of the worst performers, where the proportion of such projects is negligible in Collocated Insourcing and Distributed Insourcing project organizations, but increases significantly and progressively in the following order: Outsourcing, Offshoring and Offshore-Outsourcing.

(c) Comparison of project performance distributions across the five types of project organization

Figure 4 depicts the distribution of overall project performance by project organization type. For domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing), the shape of distributions are very comparable and show a certain degree of skewness towards the higher end of the project performance scale. This skewness indicates that a major proportion of the domestic projects have greater than average performance with little or no presence in the lower tails of the distribution.

On the other hand, for Offshoring and Offshore-Outsourcing projects, the performance distribution closely resembles a normal distribution with no presence of skewness, indicating that the proportion of projects that have below average performance and lie towards the lower tail of the performance distribution is much higher compared to the domestic projects.
Overall Implications

Across the five types of project organization, comparable high levels of overall project performance can be attained. The same is not true at the low end of overall project performance. For Offshoring and Offshore-Outsourcing projects, the low end of the overall project performance is significantly lower than domestic projects (Collocated Insourcing, Distributed Insourcing, and Outsourcing). In essence, when things go wrong, they really go wrong with Offshoring and Offshore-Outsourcing projects. Penalty for mistakes is significantly higher for project organizations that cross country boundaries compared to the domestic project organizations, and potential cost savings from labor arbitrage can easily be eroded. Hence, from a project management standpoint, the implications of these findings are that managers should make a concerted effort to assess all potential risks and have clearly outlined contingency plans prior to opting for an Offshoring or Offshore-Outsourcing project organization. Further, during the project execution phase, managers need to be particularly concerned should things start going wrong, as things are likely to really go wrong!
Project Team Characteristics

- Project teams with distributed project organization are larger in size compared to Collocated Insourcing projects. Specifically, the average team size increases by more than 60% from 21 members in Collocated Insourcing projects to 34 members in Offshoring projects and 37 members in Offshore-Outsourcing projects.

- The average experience of team members decreases as project organizations become more and more distributed. The average team experience of Offshoring and Offshore-Outsourcing projects is significantly less than other project organization types. Approximately 11% of Collocated Insourcing projects, 14% of Distributed Insourcing projects, and 17% of Outsourcing projects have average team experience less than 4 years. This proportion nearly doubles to 33% for both Offshoring and Offshore-Outsourcing projects. Further, while almost 60% of the project teams in domestic project organizations (Collocated Insourcing, Distributed Insourcing and Outsourcing) have average experience levels above 6 years, only 40% of Offshoring project teams and 30% of Offshore-Outsourcing project teams have the similar experience levels. Taken together, these statistics highlight the problem of inexperienced manpower in offshore destinations.

- Team diversity – a composite measure created by capturing differences in (i) functional background (ii) years of work experience (iii) cultural background and (iv) language within the project team – is significantly higher in Offshoring and Offshore-Outsourcing project organizations compared to domestic projects (Collocated Insourcing, Distributed Insourcing, and Outsourcing). Approximately 55–60% of Offshoring and Offshore-Outsourcing projects have high levels of team diversity (greater than 3 on a 5-point scale) whereas this proportion is about 30–35% in the case of domestic projects. Differences in language and cultural background of team members are the biggest contributors of diversity in Offshoring and Offshore-Outsourcing projects.

- Employee turnover is among the lowest in Collocated Insourcing projects and only marginally higher for Distributed Insourcing and Outsourcing projects. The differences are significant when comparing Collocated Insourcing with Offshoring and Offshore-Outsourcing projects, with the latter project organization types encountering significant turnover of critical team members midway through the life of a project. A comparison of employee turnover across different project organization types indicates the following: Approximately 15% of Collocated Insourcing projects, 20% of Distributed Insourcing and Outsourcing projects, and 30% of Offshoring and Offshore-Outsourcing projects exhibit high levels of employee turnover (greater than 3 on a 5-point scale).
Project Characteristics

- Technology uncertainty – defined as the extent to which team members lack an understanding of technical requirements and relevant technical knowledge for the project tasks – is higher in Offshoring and Offshore-Outsourcing projects compared to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing projects). Technological uncertainty in a project can arise in two ways: one, due to the inherent difficulty of the project, and second, due to the project team’s lack of experience with the technology used in the project.

If technological uncertainty arises mainly from the inherent difficulty of the project, the above suggests that project clients are Offshoring and Offshore-Outsourcing more difficult projects and keeping simpler projects domestic. Some indirect evidence of this being a possibility can be inferred from the manner in which project team size varies across the different project organization types. Both Offshoring and Offshore-Outsourcing projects have larger team sizes compared to the domestic projects. Larger team sizes indicate larger projects and more potential sources of uncertainty, chief among them being uncertainty about technology.

At the same time, there is also evidence of low project team experience in offshore destinations as being one of the possible reasons for higher technological uncertainty in Offshoring and Offshore-Outsourcing projects. Approximately 60–70% of Offshoring and Offshore-Outsourcing project teams have average experience levels below 6 years whereas less than 40% of domestic project teams have experience levels below 6 years.

- Architectural uncertainty – defined as the extent of difficulty faced in dividing the project into task modules and in developing a clear understanding of interdependencies across the task modules – is the highest in Offshore-Outsourcing projects. While 14% of Outsourcing and 12% of Offshoring projects exhibit high levels of architectural uncertainty (greater than 3 on a 5-point scale), this proportion increases to 23% for Offshore-Outsourcing projects. Surprisingly, however, both Collocated Insourcing and Distributed Insourcing projects displayed comparable degree of architectural uncertainty with Offshore-Outsourcing projects, with proportions ranging from 18-20% across these project organizations.

- Across the life of a project, requirements uncertainty – defined as the extent to which team members are familiar with the project client’s requirements – is comparable across the five types of project organization. However, a comparison of the percentage of projects with high levels (greater than 3 on a 5-point scale) of requirements uncertainty across the project organization types indicates the following: Approximately 44% of Collocated Insourcing projects, 49% of Distributed Insourcing and Outsourcing projects, 43% of Offshoring projects and 51% of Offshore-Outsourcing projects, have
high levels of requirements uncertainty. In essence, fluctuating requirements is a “fact of life” for one out of every two projects, regardless of the type of project organization.

**Project Management Practices**

- **Project control** – defined as the extent to which formal procedures and a methodical approach to project management (e.g., setting milestones, performance goals) are followed – is found to be a very common approach to managing project execution. The extent to which this approach is used does not vary significantly across the five types of project organization. Specifically, more than 80% of projects in each of the five types of project organization emphasize high levels (greater than 3 on a 5-point scale) of project control.

- **Project autonomy** – defined as the extent to which team members are involved in managing the day-to-day execution of the projects, and are encouraged to provide inputs into critical project decisions (e.g., resource allocation, format of progress reviews) – is comparable across the five types of project organization. Specifically, 70% of projects in each of the five types of project organization exhibit high levels (greater than 3 on a 5-point scale) of project autonomy.

- **Project risk management** – defined as the extent to which potential risks to the project are identified at the beginning of the project, factored into estimating requirements and managed throughout the course of the project – is comparable across the five types of project organization. Specifically, between 20–30% of projects in each of the five types of project organization exhibit low levels (lower than 3 on a 5-point scale) of risk management.

- The extent to which agile project management practices – key practices include: performing multiple iterations of the product prototype in short cycles; carrying out concurrent development and testing of project tasks; assigning project tasks to team members in pairs; and encouraging them to assume collective ownership for the project – are used, varies across the five project organization types. Projects that span country boundaries (Offshoring and Offshore-Outsourcing) encourage collective ownership of the project significantly less than their domestic counterparts. While 20% of Collocated Insourcing, Distributed Insourcing and Outsourcing projects show below average levels of collective ownership of a project, this percentage increases to 35–40% in Offshoring and Offshore-Outsourcing projects. Further, not all agile project management practices are emphasized equally. It is a common practice for teams across the five types of project organization to simultaneously carry out development work as well as testing; review component designs for efficiency when adding more functionality; and go through multiple iterations of the prototype. However, the practice of assigning project tasks to team members in pairs and that of carrying out frequent small releases of the prototype are not widely used.
The practice of knowledge sharing about project details (such as project reports, analytical techniques, and project goals) internally among project team members and externally with the project client is quite common across the five types of project organization. Nearly 80% of projects in each of the five project organization types exhibit high levels of both internal and external knowledge sharing.

With the exception of agile project management practices, the lack of variation in other project management practices (Project control, Project autonomy, Risk management and Knowledge sharing internally among the project team members and externally with the project client) across the five types of project organization is puzzling and a matter of concern. Distributed project organizations have greater culture diversity (both in terms of organizational culture and national culture) and pose greater coordination problems and risk due to geographic separation between the project client and the project team, compared to Collocated Insourcing project organizations. With so much inherent variation among project organizations, it was expected that project management practices would be tailored for each type of project organization to achieve better performance outcomes. The lack of variation in the above set of project management practices across the five types of project organization is a concern. It indicates that a "one size fits all" approach is still used in managing projects, and geographical and cultural differences among the different types of project organization are not being taken into consideration.

Behavioral Dynamics

The extent of face-to-face interaction between the project client and the project team at the beginning of the project (for the purpose of gathering project requirements) is significantly lower in Offshoring and Offshore-Outsourcing projects compared to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing). The percentage of projects that exhibit low levels (lower than 3 on a 5-point scale) of face-to-face interaction between a project client and the project team differs across the five type of project organizations: Nearly 25% of Offshoring projects exhibited low levels of face-to-face interaction between the project client and the project team compared to only 10–15% for other project organization types.

Distributed Insourcing and Offshore-Outsourcing projects consistently show low levels of shared context between a project client and the project team compared to Collocated Insourcing projects. Shared context arises when team members have access to the same information and share the same tools, work processes, and work cultures. More specifically, Offshore-Outsourcing projects exhibit high levels (greater than 3 on a 5-point scale) of (i) incompatibility between the project client and the project team with respect to tools and work process and (ii) mis-understanding of a project team’s work culture by the project client. Similarly, Distributed Insourcing projects also exhibit high levels of
information asymmetry between a project client and the project team compared to *Collocated Insourcing* projects.

- **Relationship conflict** – that arises from feelings of anger, frustration, and distrust – between a project client and the project team is higher in distributed project organization types compared to *Collocated Insourcing*. While approximately 17% of *Collocated Insourcing* projects report high levels (greater than 3 on a 5-point scale) of relationship conflict between a project client and the project team, this proportion increases to nearly 24% for all other types of project organizations (*Distributed Insourcing, Outsourcing, Offshoring* and *Offshore-Outsourcing*).

Relationship conflict within a project team is consistently high in *Offshore-Outsourcing* projects compared to the other types of project organizations. A comparison of the percentage of projects with high levels (greater than 3 on a 5-point scale) of relationship conflict within a project team across the different types of project organization reveals the following: Nearly 24% of *Offshore-Outsourcing* projects have high levels of relationship conflict within the project team compared to 15% for *Collocated Insourcing* projects, 17% for *Distributed Insourcing* projects, 16% for *Outsourcing* projects and only 7% for *Offshoring* projects.

- **Task conflict** – that arises from differences in understanding or interpretation of task requirements and in the execution of project tasks – between a project client and the project team is higher in distributed project organizations (*Distributed Insourcing, Outsourcing, Offshoring* and *Offshore-Outsourcing*) compared to *Collocated Insourcing*. Although the differences are significant when *Offshore-Outsourcing* projects are compared to *Collocated Insourcing* projects, there is no clear trend in the extent of task conflict across project organizations: Approximately 21% of *Collocated Insourcing* projects show high levels of task conflict between the project client and the project team, whereas this proportion rises to 30% for *Distributed Insourcing* projects, 29% for *Outsourcing* projects, 23% for *Offshoring* projects, and 33% for *Offshore-Outsourcing* projects.

Task conflict within a project team is significantly higher in *Offshore-Outsourcing* projects compared to the other types of project organization. A comparison of the projects with high levels (greater than 3 on a 5-point scale) of task conflict within a project team across the different types of project organization indicates the following: While 30% of *Offshore-Outsourcing* projects have high levels of task conflict within a project team, this proportion is lower at 18–23% in other types of project organizations.
3. Detailed Description and Graphs

I. Sample Characteristics

Project Type

The total sample of 665 projects is broadly classified into three main categories:

(1) **Physical Product Development / System Software Development / Embedded Software Development** – 107 projects, 16% of the total sample.

(2) **Application Software Development** – 480 projects, 72% of the total sample.

(3) **Enterprise IT Infrastructure Development Projects** – 78 projects, 12% of the total sample.

Figure 5 represents the distribution of projects across the three project types in the sample.

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Figure 5: Project type
Industry Type

The projects in the sample represent a wide variety of industries. Figure 6 provides the distribution of project by industries in the sample. Major industry representations include:

Information technology (109 projects, 16.4% of the total sample), Banking (79 projects, 11.9% of the total sample), Insurance (56 projects, 8.4% of the total sample), Healthcare (55 projects, 8.3% of the total sample) and Manufacturing (43 projects, 6.3% of the total sample).

Figure 6: Distribution of projects by industry type
Project Organization Type

While the increasing globalization of technology development work has opened up a multitude of possibilities for managers and armed them with various choices for organizing and executing product development and software projects, a lot of confusion exists about what these choices really are and how these choices structurally differ from each other in terms of project organization, as is evidenced from the following quote:

“…most companies don’t realize that outsourcing is no longer an all-or nothing choice—that they have a continuum of options. At one end, there’s executing processes in-house; at the other, there’s outsourcing them to service providers. Along that continuum, companies can buy services from local providers (a lot of outsourcing is local), enter into joint ventures, or set up captive centers overseas. Most businesses don’t consider all the available options and end up using organizational forms that are inappropriate for their purposes.” Aron and Singh (2005, p. 136)

In this study, a simplified two-by-two classification scheme (see Figure 7) is used to group the project organization choices. This classification scheme is based on two key dimensions: (1) the vertical axis which represents the geographic distribution of project organizations (intra-country, inter-country) and (2) the horizontal axis which represents the distribution of project organization within or across firm boundaries (intra-firm, inter-firm).

Using this classification scheme five project organization types are identified.

• **Collocated Insourcing:** Firm assigns project tasks to a collocated in-house team
• **Distributed Insourcing:** Firm assigns project tasks to its division/unit at a different city in the same country
• **Outsourcing:** User firm/Client firm contracts project tasks to a Vendor Firm in the same country
• **Offshoring:** User firm/Client firm assigns project tasks to its division/unit in a different country
• **Offshore-Outsourcing:** User firm/Client firm contracts project tasks to a Vendor Firm in a different country

For a recently completed project (i.e., within the last one year), survey respondents were asked to select the appropriate project organization type from among five types that best reflects how their own project was organized. Figure 8 provides the distribution of projects by their organization type in the sample.
Collocated Insourcing is the most representative form of project organization in our sample with 246 projects (37% of the total sample), Distributed Insourcing project organization is represented by 102 projects (15% of the total sample), Outsourcing project organization is represented by 150 projects (23% of the total sample), Offshoring project organization is represented by 51 projects (8% of the total sample) and finally, Offshore-Outsourcing project organization is represented by 116 projects (17% of the total sample).

Project Client/Client Firm Location

Locationwise, a large majority of the project client/client firms are located in North America. Nearly 77% of the total sample of projects have the project client/client firm located in North America whereas Europe and Asia come a distant second and third with only 7% and 6% representation in the total sample, respectively. In terms of country location, USA has the highest representation of project clients/client firm at 66% of the total sample of projects. About 3% of the total sample of projects have the project client/client firm distributed across multiple locations and are grouped under the category ‘Global’. Figure 9 summarizes the distribution of project client/client firm location in the sample.

Project Team/Vendor Firm Location (for Offshoring and Offshore-Outsourcing Projects)

The majority of Offshoring and Offshore-Outsourcing projects are carried out by project teams/vendor firms in the Asian Continent: 65% of the sample of Offshoring and Offshore-Outsourcing projects are carried out by project teams/vendor in Asia, while North America comes a distant second at 17% of the sample. In terms of country location, nearly 56% of the sample of Offshoring and Offshore-Outsourcing projects are carried out in India. Figure 10 summarizes the distribution of project team/vendor firm locations for Offshoring and Offshore-Outsourcing projects.
II. Respondent Characteristics

Primary Role in a Project

Nearly 75% of respondents have the primary role of a project manager in their project, 11% of respondents have more strategic roles as Project Sponsor or Portfolio Manager or Program Manager, while the remaining 14% of respondents are into more specialist positions (Team Member/Other). The distribution of survey respondents based on their primary role in the project is summarized in Figure 12.

Affiliation

To get a better understanding of the respondent profile, respondents were asked to answer about their affiliation with respect to the project based on three choices: Project Team/Vendor Firm or Project Client/Client Firm or External Consultant. Nearly 57% of respondents are affiliated with Project team/Vendor firm, 29% of respondents are affiliated with Project Client/ Client Firm while the remaining 14% of respondents are affiliated with External Consultant. Figure 13 provides the
breakdown for affiliation with respect to the five project organization types. A majority of responses in Offshoring and Offshore-Outsourcing project organizations are answered by the project client/client firm.

Figure 13: Affiliation with respect to the project

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Project Client / Client Firm</th>
<th>Project Team / Vendor Firm</th>
<th>External Consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore-Outsourcing</td>
<td>16%</td>
<td>26%</td>
<td>59%</td>
</tr>
<tr>
<td>Offshoring</td>
<td>10%</td>
<td>31%</td>
<td>59%</td>
</tr>
<tr>
<td>Outsourcing</td>
<td>19%</td>
<td>43%</td>
<td>39%</td>
</tr>
<tr>
<td>Distributed Insourcing</td>
<td>12%</td>
<td>13%</td>
<td>75%</td>
</tr>
<tr>
<td>Collocated Insourcing</td>
<td>13%</td>
<td>10%</td>
<td>77%</td>
</tr>
</tbody>
</table>

Years of Work Experience

As Figure 14 indicates, on an average, respondents have more than 20 years of overall work experience out of which more than 10 years of experience are in project management role. Across the five project organization types, the mean overall work experience for respondents ranged from 20–24 years with the mean experience in project management role ranging from 11–12 years.

Figure 14: Years of work experience

III. Project Team Characteristics

Project Team Size

A comparison of project team size across the different project organization types yields an interesting finding (see Figure 15). The average size of the project team showed more than 60% increase from 21 members in Collocated Insourcing projects to nearly 37 members for Offshore-Outsourcing projects.

Figure 15: Project team size
Average Work Experience of a Project Team

The average work experience of a project team is captured on a categorical scale represented in the following manner: Category 1: <2 years, Category 2: 2–4 years, Category 3: 4–6 years, Category 4: 6–8 years, Category 5: 8–10 years and finally, Category 6: >10 years. As Figure 16 indicates, the average work experience of a project team in Offshoring and Offshore-Outsourcing project organization is significantly lower than domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing).

Figure 16: Average work experience of a project team

![Bar chart showing the average work experience of a project team across different project types.](image-url)
Work Experience in Similar Projects

As the title of this section suggests, this measure captures the extent to which the project team and the project manager have the experience of working on similar projects in the past, i.e., projects that are similar in terms of the type of project organization, scope/size and project client/client firm requirements. As Figure 17 indicates, there are no significant differences across the project organization type on any of the measures. While most projects have project managers with extensive experience of working on similar projects, project team members have much less experience working in similar projects.

Figure 17: Work experience in similar projects
1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

- The project manager had past experience or working in a similar project organization
- Team members had dealt with user firm requirements of similar type in past projects
- The project manager had past experience of managing projects of similar scope/size
- Team members had worked on similar projects in the past
Diversity within a Project Team

Diversity within a project team is significantly higher in project organizations that spanned country boundaries (Offshoring and Offshore-Outsourcing) compared to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing). Both language and cultural background differences are among the key contributors to team diversity in Offshoring and Offshore-Outsourcing projects (see Figure 18). Diversity in Years of work experience for Offshore-Outsourcing project teams is much higher compared to other types of project organization. However, functional diversity of the project team members does not differ significantly across the project organization types.

Figure 18: Diversity within a project team
1= Very Small|2= Small|3= Neutral|4= Large|5 = Very Large

Language
- Collocated Insourcing: 1.86
- Distributed Insourcing: 1.96
- Outsourcing: 2.03
- Offshoring: 3.11
- Offshore-Outsourcing: 2.91

Years of work experience
- Collocated Insourcing: 2.03
- Distributed Insourcing: 2.96
- Outsourcing: 2.89
- Offshoring: 3.13
- Offshore-Outsourcing: 3.42

Cultural background
- Collocated Insourcing: 2.97
- Distributed Insourcing: 2.84
- Outsourcing: 3.18
- Offshoring: 3.62
- Offshore-Outsourcing: 3.60

Functional background
- Collocated Insourcing: 3.03
- Distributed Insourcing: 3.13
- Outsourcing: 3.38
- Offshoring: 3.14
- Offshore-Outsourcing: 3.13
Employee Turnover

Employee turnover in a project team is measured along two key dimensions: (1) whether transition of members within the project team is carried out satisfactorily and (2) whether team members stayed on the project for a satisfactory duration of time. A total of three measures are used to capture these dimensions.

Employee turnover is among the lowest in Collocated Insourcing projects and marginally higher across Distributed Insourcing, Outsourcing and Offshoring project organizations (see Figure 19). The differences are prominent when Collocated Insourcing projects are compared to Offshoring and Offshore-Outsourcing project organizations, with the latter encountering departures of critical team members midway into the project. A comparison of employee turnover across the different project organization types reveals some key statistics: Approximately, 15% of Collocated Insourcing projects, 20% of Distributed Insourcing and Outsourcing projects, and 30% of Offshoring and Offshore-Outsourcing projects, exhibit high levels (lower than 3 on a 5-point scale that is reverse coded) of employee turnover.

Figure 19: Employee turnover in a project team


The management of transitions of members within the project team was satisfactory
- Collocated Insourcing: 3.49
- Distributed Insourcing: 3.40
- Outsourcing: 3.54
- Offshoring: 3.50
- Offshore-Outsourcing: 3.79

The duration of stay of members in the project team was satisfactory
- Collocated Insourcing: 3.62
- Distributed Insourcing: 3.72
- Outsourcing: 3.87
- Offshoring: 3.86
- Offshore-Outsourcing: 4.11

Critical member(s) left the project team, midway into the project
- Collocated Insourcing: 2.51
- Distributed Insourcing: 2.47
- Outsourcing: 2.47
- Offshoring: 2.36
- Offshore-Outsourcing: 2.09
IV. Performance Outcomes

Project Performance

Project performance is measured across five distinct dimensions: (1) Adherence to schedule, (2) Adherence to budget, (3) Adherence to quality, (4) Technical performance and (5) Overall satisfaction.

As Figure 20 indicates, project performance on all the five dimensions is relatively lower in all the distributed forms of project organization compared to Collocated Insourcing project organization. Both Distributed Insourcing and Outsourcing projects have similar performance on all the measures, while Offshoring projects do marginally better than Offshore-Outsourcing projects on the same dimensions. Further, the drop in project performance is quite distinct as project organization crossed country boundaries: Both Offshoring and Offshore-Outsourcing projects performed poorly when compared to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing). A comparison across different project organization types yields some interesting findings with respect to the percentage of projects that fail to meet their expected goals (lower than 4 on a 7-point scale): Approximately 24% of Collocated Insourcing projects in, 30% of Distributed Insourcing projects, 32% of Outsourcing projects, 41% of Offshoring projects and 57% of Offshore-Outsourcing projects, fail to meet their expected performance goals.

Figure 20: The five dimensions of project performance
1 = Significantly Worse|2 = Worse|3 = Somewhat Worse|4 = About Same|5 = Somewhat Better|6 = Better|7 = Significantly Better

<table>
<thead>
<tr>
<th></th>
<th>Collocated Insourcing</th>
<th>Distributed Insourcing</th>
<th>Outsourcing</th>
<th>Offshoring</th>
<th>Offshore-Outsourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adherence to schedule</td>
<td>3.84</td>
<td>4.00</td>
<td>4.64</td>
<td>4.76</td>
<td>4.91</td>
</tr>
<tr>
<td>Adherence to budget</td>
<td>3.84</td>
<td>4.06</td>
<td>4.66</td>
<td>4.69</td>
<td>4.96</td>
</tr>
<tr>
<td>Adherence to quality</td>
<td>3.64</td>
<td>3.96</td>
<td>4.53</td>
<td>4.62</td>
<td>4.91</td>
</tr>
<tr>
<td>Technical performance</td>
<td>3.84</td>
<td>4.14</td>
<td>4.14</td>
<td>4.28</td>
<td>4.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collocated Insourcing</td>
<td>Distributed Insourcing</td>
<td>Outsourcing</td>
<td>Offshoring</td>
<td>Offshore-Outsourcing</td>
</tr>
<tr>
<td>Adherence to schedule</td>
<td>3.84</td>
<td>4.00</td>
<td>4.64</td>
<td>4.76</td>
<td>4.91</td>
</tr>
<tr>
<td>Adherence to budget</td>
<td>3.68</td>
<td>3.80</td>
<td>4.00</td>
<td>4.18</td>
<td>4.19</td>
</tr>
<tr>
<td>Adherence to quality</td>
<td>3.64</td>
<td>3.96</td>
<td>4.53</td>
<td>4.62</td>
<td>4.91</td>
</tr>
</tbody>
</table>

Figure 20: The five dimensions of project performance
1 = Significantly Worse|2 = Worse|3 = Somewhat Worse|4 = About Same|5 = Somewhat Better|6 = Better|7 = Significantly Better
Task Module Integration Performance

Following the development of individual task modules, their effective integration as a collective unit is a critical milestone in any product development or software project. When task modules are functionally interdependent and share design interfaces (such that one of the task modules in a design interface may signal or transfer information to the other task modules for proper functioning), it is expected that team members developing such task modules are likely to be involved in extensive sharing of design and functionality information for their seamless integration.

Task module integration – defined as the extent to which task modules that share common design interfaces and functional dependencies are aligned and perform together as a system when integrated – is significantly lower (see Figure 21) in projects that spanned national boundaries (Offshoring and Offshore-Outsourcing) compared to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing). While 27% of Collocated Insourcing projects have low performance (greater than 3 on a 5-point scale that is reverse coded) during task module integration, this proportion rises to 35% in the case of Distributed Insourcing and Outsourcing projects, 47% in the case of Offshoring projects and 53% in the case of Offshore-Outsourcing projects.
V. Project Characteristics

Technological Uncertainty

Technological uncertainty captures the extent to which project team members understand the technical requirements of the project, and use their existing technical knowledge to carry out the project tasks. Technological uncertainty is higher in projects that span country boundaries (Offshoring and Offshore-Outsourcing projects) compared to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing). As Figure 22 indicates, project team members in Offshoring and Offshore-Outsourcing projects not only have more difficulty in understanding the technical requirements, but also have less experience of working on similar technologies in the past.

A comparison of differences in technological uncertainty levels between Outsourcing and Offshore-Outsourcing projects reveals the following statistics: While only 9% of Outsourcing projects show high levels (less than 3 on a 5-point scale that is reverse coded) of technological uncertainty in Outsourcing projects, this proportion more than doubles to 20% in Offshore-Outsourcing projects.

Figure 22: Technological uncertainty in projects

1 = Strongly Disagree|2 = Somewhat Disagree|3 = Neutral|4 = Somewhat Agree|5 = Strongly Agree

- The technical objectives of the project were well defined for the project team
- An understandable sequence of steps was used by the project team during the project
- Existing technical knowledge of the project team was used during the project
- Technical requirements of the project were well understood by the project team

Collocated Insourcing | Distributed Insourcing | Outsourcing | Offshoring | Offshore-Outsourcing
### Complexity

The measure of complexity captures two dimensions: (1) the size of the project in terms of the number of task modules and the extent of interdependencies among task modules and (2) the extent of architectural uncertainty in the project – i.e., the degree of difficulty encountered in dividing the project into task modules and in clearly identifying the interdependencies across the task modules. A total of four questionnaire items are used to measure the complexity of a project.

As Figure 23 indicates, there are no significant differences in the mean values of the responses to the questionnaire items, across the five types of project organizations. However, a comparison of the percentage of projects in each project organization type that have high levels (lower than 3 on a 5-point scale that is reverse coded) of architectural uncertainty reveals an interesting statistic: While only 12% of Offshoring projects show high levels of architectural uncertainty, this proportion almost doubles to 23% in the case of Offshore-Outsourcing projects.

#### Figure 23: Complexity of projects

1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Collocated Insourcing</th>
<th>Distributed Insourcing</th>
<th>Outsourcing</th>
<th>Offshoring</th>
<th>Offshore-Outsourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was easy to define the interdependence among task modules in the project</td>
<td>3.20</td>
<td>3.41</td>
<td>3.47</td>
<td>3.44</td>
<td>3.39</td>
</tr>
<tr>
<td>The project consisted of a large number of task modules</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The task modules in the project were highly interdependent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interdependencies across task modules were clearly defined</td>
<td>3.43</td>
<td>3.52</td>
<td>3.53</td>
<td>3.66</td>
<td>3.89</td>
</tr>
<tr>
<td>The project could be easily divided into task modules</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.86</td>
</tr>
</tbody>
</table>
Requirements Uncertainty

A requirement is a necessary attribute in a system, a statement that identifies a capability, characteristic, or quality factor of a system in order for it to have value and utility to a user. According to Steve McConnell in Software Project Survival Guide (1997):

“The most difficult part of requirements gathering is not the act of recording what the users 'want'; it is the exploratory developmental activity of helping users figure out what they want.”

The questionnaire items for requirements uncertainty measure the extent to which project requirements (as stipulated from the project client/client firm side) vary through the duration of the project. As Figure 24 indicates, project client/client firm requirements are highly volatile during the starting phase of the project but decrease as the project progresses. There are no significant differences in the levels of requirements uncertainty at any stage of the project across the different project organization types. However, a comparison of the percentage of projects with high levels (greater than 3 on a 5-point scale) of requirements uncertainty across the five types of project organization reveals some interesting facts: Approximately 44% of Collocated Insourcing projects, 49% of Distributed Insourcing and Outsourcing projects, 43% of Offshoring projects and 51% of Offshore-Outsourcing projects, have high levels of requirements uncertainty, thereby suggesting that fluctuating requirements is a “fact of life” for one out of every two projects.

Figure 24: Requirements uncertainty in projects

1= Strongly Disagree|2 = Somewhat Disagree|3 = Neutral|4 = Somewhat Agree|5 = Strongly Agree
VI. Project Management Practices

Project Control

Project control refers to the extent to which formal procedures are pursued by the project team during the execution of the project. This style of management is characterized by a methodical, calculated approach that emphasizes strict adherence to project deadlines. Project control is measured using four questionnaire items.

The mean values of items measuring project control for each of the five project organization types reflect a clear trend (see Figure 25) – most projects tend to follow a formal approach to project execution, irrespective of whether or not a project organization spans firm boundaries or country boundaries or both. The extent to which this approach is used in projects does not vary significantly across the five project organization types. On an average, more than 80% of the projects in each type of project organization exhibit high levels (greater than 3 on a 5-point scale) of project control.

Figure 25: Project control

![Figure 25: Project control](image)
Project Autonomy

While the use of strict project policies and guidelines for project execution is a fairly common practice in product development and software projects, it presumes a level of stability that is seldom found in such projects. As a result, team members may be required to use their discretion to devise variations to prescribed methods (prescribed project outcome standards) in order to successfully accomplish their tasks. Project team members based on the understanding of their tasks may also modify task execution procedures and devise their own way of performing them.

Project autonomy is measured by three questionnaire items and captures the extent to which project team members have the responsibility of managing the day-to-day execution of the projects and are encouraged to provide inputs into critical project decisions (e.g., resource allocation, format of progress reviews).

As Figure 26 indicates, most projects exhibit low to medium levels of autonomy, with no significant differences across the different project organization types. Nearly 30% of the projects in each of the five project organization types exhibit low levels (lower than 3 on a 5-point scale) of project autonomy.

![Figure 26: Project autonomy](image)
Risk Management

Unforeseen situations and uncertainties are intrinsic to most product development and software projects, and can be harmful for projects which have tight budgets and schedules to adhere to. Project risks can arise from a multitude of factors – e.g., unrealistic schedules and budgets, continuous requirement changes, lack of technical knowledge and employee turnover.

Risk management measures the extent to which potential risks to the project are identified at the beginning of the project, factored into requirements estimate and managed throughout the course of the project. As Figure 27 indicates, the extent to which risk management practices are pursued in projects does not significantly differ across the five types of project organization. Further, the low average values on the measures of risk management imply that most projects exhibit only a minor propensity towards risk management and there is little commitment or focus towards developing a detailed risk management plan. Approximately 20–30% of the projects in each type of project organization exhibit low levels (lower than 3 on a 5-point scale) of risk management.

### Figure 27: Risk management in projects

<table>
<thead>
<tr>
<th>Statement</th>
<th>Collocated Insourcing</th>
<th>Distributed Insourcing</th>
<th>Outsourcing</th>
<th>Offshoring</th>
<th>Offshore-Outsourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency plans for the project were prepared to minimize project risks</td>
<td>3.33</td>
<td>3.26</td>
<td>3.41</td>
<td>3.54</td>
<td></td>
</tr>
<tr>
<td>The project team managed potential risks throughout the project</td>
<td>3.56</td>
<td>3.62</td>
<td>3.64</td>
<td>3.83</td>
<td></td>
</tr>
<tr>
<td>Requirement estimates for the project accounted for potential risks</td>
<td>3.30</td>
<td>3.17</td>
<td>3.48</td>
<td>3.46</td>
<td>3.18</td>
</tr>
<tr>
<td>Potential risks were identified by the project team at the start of the project</td>
<td>3.53</td>
<td>3.62</td>
<td>3.84</td>
<td>3.62</td>
<td>3.87</td>
</tr>
</tbody>
</table>
Agile Project Management Practices

The role of agility in project management is being increasingly stressed as a way of achieving fast responsiveness to changing requirements and improve project success rate. Some key practices of this approach include: carrying out multiple iterations of the project prototype in short cycles, concurrent development and testing of project tasks, assignment of project tasks to team members in pairs and encouraging team members to assume the collective ownership for the project.

As Figure 28 indicates, the extent to which projects lay stress on the agile approach varies across the different agile practices. Most project teams across the different project organization types tended to pursue an iterative approach to developing the project prototype, simultaneously carrying out development work as well as testing, and reviewing component designs for efficiency when adding more functionality. However, the practice of assigning project tasks to team members in pairs is not widely used. Further, projects that spanned country boundaries (Offshoring and Offshore-Outsourcing) encourage the practice of collective ownership of the project much less than domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing): While nearly 20% of domestic projects show low levels (lower than 3 on a 5-point scale) for the practice of collective ownership of the project, this figure ranges from 35–40% in Offshoring and Offshore-Outsourcing projects.

Figure 28: Agile project management practices

1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

- Team members pursued the practice of collective ownership of the project
- Team members were assigned project tasks in pairs
- Component designs were reviewed for efficiencies when adding more functionality
- Test plans and development work were carried out concurrently
- Small releases of the prototype were carried out frequently
- There were several iterations of the prototype during the project

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Managing Distributed Technology Projects: Within and Between Firms, and National Boundaries

30
Internal Knowledge Sharing

The measure of internal knowledge sharing captures the extent to which key details about a project (such as project reports, analytical techniques, and project goals) are shared among the members of the project team. Three questionnaire items are used to capture the extent of internal knowledge sharing.

The mean values for the measures of internal knowledge sharing, as shown in Figure 29, indicate no significant differences across the five project organization types. In majority of the projects, general overviews about the project (e.g., project goals, milestone estimates, or member responsibilities) as well as progress reports (e.g., status updates, resource problems, or personnel evaluations) are shared with the team members, compared to exchange of technical knowledge (e.g., statistical tools, detailed methods, or testing procedures). Nearly 80% of the projects in each type of project organization exhibit high degree (greater than 3 on a 5-point scale) of knowledge sharing among the project team members.

Figure 29: Internal knowledge sharing (among project team members)
1 = Strongly Disagree|2 = Somewhat Disagree|3 = Neutral|4 = Somewhat Agree|5 = Strongly Agree

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Collocated Insourcing</th>
<th>Distributed Insourcing</th>
<th>Outsourcing</th>
<th>Offshoring</th>
<th>Offshore-Outsourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progress reports</td>
<td>4.07</td>
<td>4.07</td>
<td>4.31</td>
<td>4.12</td>
<td>4.07</td>
</tr>
<tr>
<td>Analytical techniques</td>
<td>3.36</td>
<td>3.50</td>
<td>3.28</td>
<td>3.47</td>
<td>3.72</td>
</tr>
<tr>
<td>General overviews</td>
<td>3.95</td>
<td>4.02</td>
<td>4.01</td>
<td>4.21</td>
<td>4.06</td>
</tr>
</tbody>
</table>
External Knowledge Sharing

The measure of external knowledge sharing captures the extent to which key details about a project (such as project reports, analytical techniques, and project goals) are exchanged between the project client/client firm and the project team. The same set of three questionnaire items are used to measure the extent of external knowledge sharing, as previously used in measuring the extent of internal knowledge sharing.

The average values for the measures of external knowledge sharing, as shown in Figure 30, indicate no significant differences across the five project organization types. In most project teams, general overviews about the project (e.g., project goals, milestone estimates, or member responsibilities) and progress reports (e.g., status updates, resource problems, or personnel evaluations) are shared to a great extent between a project client/client firm and the project team, compared to exchange of technical knowledge (e.g., statistical tools, detailed methods, or testing procedures). Nearly 80% of the projects in each type of project organization have high levels (greater than 3 on a 5-point scale) of external knowledge sharing between the project team members.

**Figure 30: External knowledge sharing (between a project client/client firm and the project team)**

1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

- Progress reports (e.g., status updates, resource problems, or personnel evaluations):
  - Collocated Insourcing: 3.95
  - Distributed Insourcing: 4.33
  - Outsourcing: 4.10
  - Offshoring: 4.22
  - Offshore-Outsourcing: 4.10

- Analytical techniques (e.g., statistical tools, detailed methods, or testing procedures):
  - Collocated Insourcing: 3.20
  - Distributed Insourcing: 3.56
  - Outsourcing: 3.15
  - Offshoring: 3.24
  - Offshore-Outsourcing: 3.21

- General overviews (e.g., project goals, milestone estimates, or member responsibilities):
  - Collocated Insourcing: 3.91
  - Distributed Insourcing: 4.12
  - Outsourcing: 4.01
  - Offshoring: 4.22
  - Offshore-Outsourcing: 3.94
VII. Behavioral Dynamics

**Face-to-Face Interaction between a Project Client and the Project Team**

The measure for “Face-to-Face Interaction” captures the extent to which a project client/client firm and the project team have face to face interactions primarily during the initial stages of the project. Three questionnaire items are used to measure the extent of “Face-to-Face Interaction”.

As Figure 31 indicates, the extent of face to face interaction is significantly lower in project organizations that span country boundaries (Offshoring and Offshore-Outsourcing) compared to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing). The differences across project organizations are significant particularly in the extent to which a project team met with the project client at the start of the project to identify their requirements. The percentage of projects with low levels (greater than 3 on a 5-point scale) of face-to-face interaction between a project client and the project team is the highest in the case of Offshoring projects: Approximately 25% for Offshoring projects compared to 10–15% in other types of project organizations.

---

**Figure 31: Face-to-Face interaction between a project client/client firm and the project team**

1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

- **Key team members and the client firm met face-to-face initially to discuss their expectations**
  - Collocated Insourcing: 3.98
  - Distributed Insourcing: 3.74
  - Outsourcing: 4.29
  - Offshoring: 4.15
  - Offshore-Outsourcing: 4.15

- **Atleast one or more team members were in constant face-to-face contact with the client firm**
  - Collocated Insourcing: 3.75
  - Distributed Insourcing: 3.36
  - Outsourcing: 3.81
  - Offshoring: 3.92
  - Offshore-Outsourcing: 3.96

- **Initially face-to-face interaction was used to gather client firm requirements**
  - Collocated Insourcing: 3.90
  - Distributed Insourcing: 3.56
  - Outsourcing: 4.04
  - Offshoring: 4.36
  - Offshore-Outsourcing: 4.24
Shared Context between a Project Client and the Project Team

A shared context exists between a project client/client firm and the project team when each side has access to the same information and shares the same tools, work processes, and work cultures. Because they are geographically, culturally and temporally distant from each other, a project client/client and the project team have difficulty establishing a shared context. Absence of shared context can make it more difficult for each party to develop a common orientation toward a particular object or approach, in developing a mutual understanding with the other party, and in establishing common behavioral norms.

As Figure 32 indicates, the majority of projects across the five project organization types show high levels of shared context. However, compared to the Collocated Insourcing projects, both Distributed Insourcing and Offshore-Outsourcing projects show consistently low levels of shared context: Offshore-Outsourcing projects exhibit relatively high levels of incompatible tools/work process between a project client/client firm and the project team as well as relatively high levels of misunderstanding of a project team’s work culture by the project client/client firm. Similarly, Distributed Insourcing projects also exhibit high levels of information asymmetry between a project client/client firm and the project team compared to Collocated Insourcing projects.

Figure 32: Shared context between a project client/client firm and the project team

1 = Strongly Disagree|2 = Somewhat Disagree|3 = Neutral|4 = Somewhat Agree|5 = Strongly Agree
Relationship Conflict

Relationship conflict arises from problems members have with other personalities or dispositions. It results from an awareness of interpersonal incompatibilities arising from differences in personality and is typically characterized by negative feelings like anger, frustration, and distrust. Relationship conflict is examined in the following two ways:

(1) Between a project client/client firm and the project team: A total of four questionnaire items are used to measure the extent of relationship conflict between a project client/client firm and the project team. The low mean values of the responses in Figure 33 indicate that relationship conflict between a project client/client firm and the project team is not a major issue across different types of project organization. However in comparison to domestic projects (Collocated Insourcing, Distributed Insourcing and Outsourcing), both Offshoring and Offshore-Outsourcing projects show relatively high levels (greater than 3 on a 5-point scale) of relationship conflict between a project client/client firm and the project team. The percentage of projects with high levels of relationship conflict between a project client/client firm and the project team is approximately 17% in Collocated Insourcing projects. This proportion increases to almost 24% for other types of distributed project organization.

![Figure 33: Relationship conflict between a project client/client firm and the project team](image)

1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

- How much emotional conflict was there between the project client and the project team?
- How much tension was there between the project client and the project team?
- How much personality conflict was there between the project client and the project team?
- How much friction was there between the project client and the project team?
(2) **Within a project team:** Overall, as Figure 34 indicates, most projects across the five project organization types show low levels of relationship conflict within the project team. However, a closer look at the figure reveals that relationship conflict within the project team is relatively higher in *Offshore-Outsourcing* projects compared to the other project organization types. Further, a comparison of the percentage of projects across the different project organizations that have high levels (greater than 3 on a 5-point scale) of relationship conflict within the project team provides some interesting statistics: While almost 24% of *Offshore-Outsourcing* projects have high levels of relationship conflict within the project team, this proportion ranges from 7–17% in other project organization types.

![Figure 34: Relationship conflict within a project team](image-url)

1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

- **How much emotional conflict was there between the project team members?**
  - Collocated Insourcing: 2.09
  - Distributed Insourcing: 2.14
  - Outsourcing: 2.19
  - Offshoring: 2.18
  - Offshore-Outsourcing: 2.32

- **How much tension was there between the project team members?**
  - Collocated Insourcing: 2.19
  - Distributed Insourcing: 2.35
  - Outsourcing: 2.32
  - Offshoring: 2.22
  - Offshore-Outsourcing: 2.52

- **How much personality conflicts were there between the project team members?**
  - Collocated Insourcing: 2.26
  - Distributed Insourcing: 2.33
  - Outsourcing: 2.25
  - Offshoring: 2.22
  - Offshore-Outsourcing: 2.38

- **How much friction was there between the project team members?**
  - Collocated Insourcing: 2.19
  - Distributed Insourcing: 2.34
  - Outsourcing: 2.27
  - Offshoring: 2.19
  - Offshore-Outsourcing: 2.37
Task Conflict

Task conflict arises between individuals or groups due to disagreement between the two sides on issues primarily concerning the project tasks. Different individuals or groups have differing understanding of the project tasks which may lead to differences in opinion and conflict situations. However, task conflict as opposed to relationship conflict, can also improve decision-making outcomes and group productivity by increasing decision quality through incorporating devil's advocacy roles and constructive criticism. Groups use members' capabilities and prior knowledge better when the conflict is task-focused, rather than when conflict is absent or relationship-focused. Task conflict is examined in two ways:

(1) Between a project client/client firm and the project team: Task conflict between a project client/client firm and the project team is marginally higher in distributed project organizations, compared to that in Collocated Insourcing (see Figure 35). The differences are more prominent when Offshore-Outsourcing projects are compared to Collocated Insourcing projects. Approximately 21% of Collocated Insourcing projects, 30% of Distributed Insourcing projects, 29% of Outsourcing projects, 23% of Offshoring projects and, 33% of Offshore-Outsourcing projects have high levels (greater than 3 on a 5-point scale) of task conflict.

Figure 35: Task conflict between a project client/client firm and the project team
1= Strongly Disagree|2 = Somewhat Disagree|3 = Neutral|4 = Somewhat Agree|5 = Strongly Agree
(2) **Within a Project team:** As Figure 36 indicates, the mean values of task conflict within the project team are visibly higher in *Offshore-Outsourcing* compared to all the other forms of project organizations.

A comparison of percentage of projects across the different project organizations that have high levels (greater than 3 on a 5-point scale) of task conflict within the project team reveals an interesting fact: While nearly 30% of *Offshore-Outsourcing* projects have high levels of task conflict within the project team, this proportion is lower in other project organization types and ranges from 18–23%.

**Figure 36: Task conflict within a project team**

1 = Strongly Disagree | 2 = Somewhat Disagree | 3 = Neutral | 4 = Somewhat Agree | 5 = Strongly Agree

- How often did the project team members have differences in opinion?
- How frequently did the project team members disagree about project requirements?
- How much conflict of ideas was there between the project team members?
4. Data Collection and Methodology

The goal of this study was to identify the differences between the different types of distributed technology project organization and understand how project management practices vary across these project organization types. Hence, it was necessary to cast a wide net and collect data from a large sample of technology projects, within and between firms and national boundaries. This variety in projects would not only provide sufficient representative sub-samples of different project organization types within the overall sample (to carry out robust statistical analysis), but also increase the generalizibility of the findings and make this study “truly global” in character.

To initiate data collection, a preliminary version of the web survey was designed and pilot tested with the help of two professional project management associations—the PMHUB (http://www.pmhub.net) and Project Management Institute’s (PMI) local chapter at Pune, India (http://www.pmipunechapter.org). The pilot testing helped to gauge the initial reactions to the survey and identify survey questions that were confusing and prone to misinterpretation by respondents. At the same time, academic experts were consulted to design and frame survey questions. This consultation resulted in multiple rounds of revision of the questionnaire draft. The final version of the web survey was e-mailed to the members of a professional project management association namely the Project Management Institute – Information Systems Specific Interest Group (http://www.pmi-issig.org). The Information Systems Specific Interest Group (ISSIG) has the largest membership within PMI, serving a broad range of industries in project management for the Information Systems sector. Two follow-up reminders sent approximately one week and four weeks apart from the date of the first mailing. A total of 665 usable responses have been received for our survey that formed the study sample.

To check whether non-response bias was present in the sample, the extrapolation method (Armstrong and Overton, 1977) was used. This procedure involves classifying the sample into early and late respondents and performing a series of comparisons on many different demographic variables to identify if there are differences across the respondent groups. The underlying assumption for this procedure is that the late respondents are similar to non-respondents as their responses are obtained after multiple contacts. Based on this assumption, the sample was split into two respondent groups—the early respondent group of 255 respondents who participated in the survey following the first contact; and the late respondent group of 410 respondents who participated in the survey following the two reminder mails. The results of the analysis indicated that the differences across the groups were not statistically significant, implying that non-response bias was not present in the data.
References


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