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APPENDIX 1

The instrument used for data collection and the request letter to the respondent.

Request Letter

Dear Sir,

The failure of software development projects is a common occurrence in many organizations around the world. Software development projects are risky endeavors that many companies are undertaking with disastrous results.

To reduce the high rate of failure in software projects, managers need better tools to assess and manage the risks associated with a software development effort. However, before such tools can be developed, a better understanding of the dimensions of software development risk and the risk management practices is required.

At School of Management Studies, Cochin University, I am conducting a research to address these issues and to develop a usable tool for software project risk and risk management assessment. I have reviewed international studies on similar topics and developed a questionnaire.

As an individual who has participated in software development projects you are in a unique position to comment intelligently on risk factors that affect software projects. Your response is very important, as I am only able to administer this survey to a limited number of individuals involved in software development projects. You may be assured of complete confidentiality. The results of this research will ultimately help the profession by creating a usable tool for software project risk assessment and risk management.

The results of the final study will be summarized and be made available to you.

Thank you for your assistance.

Sincerely,

Mr. Sam Thomas
Research Scholar,
School Of Management Studies,
Cochin University of Science & Technology,
Cochin 22
sam@rajagiri.edu
Ph: 98461 52127
This survey is carried out to study the risk and risk management practices associated with software development projects in India. Based on your experience with software development projects, you are identified by your organization as a qualified respondent to participate in this survey.

Please answer these questions on the basis of your last completed project for which you are selected as a representative:

**PART A**

1. Which of the following best describes your role in the project?
   - o Project manager
   - o Project leader / assistant project leader
   - o Member of the development team
   - o Member of the quality assurance team
   - o System analyst
   - o Member of the implementation team
   - o Others [please specify]

2. Which of the following best describes your most recently completed project?
   - o Software developed by your organization for internal use in your organization
   - o Software developed by your organization for the internal use of the client
   - o Software developed for external sale as packaged software by your organization
   - o Software developed for external sale as packaged software by the client
   - o Other [please specify]

3. The software developed was
   - o Business application software
   - o Engineering application software
   - o System software
   - o web application software
   - o Other [please specify]

4. If the client was a foreign organization, please specify the country of its location.

5. What was the estimated duration of the project (in calendar months)?

6. In how many calendar months was the project actually completed?

7. How many members were there in the project team?

8. Which country are you stationed at currently
   - o a) India
   - o b) USA
   - o c) UK
   - o d) Other [please specify]

9. What percentage of this project was done on site and offshore
10. By approximately what percentage, if any, did actual costs for the project exceeded originally budgeted costs? __________% 

11. By approximately what percentage, if any, did actual completion time for the project exceed originally budgeted completion time? __________% 

12. Please indicate the extent to which each of the statements accurately characterizes your project. Mark your response as 1 if you Strongly disagree, 2 if Moderately disagree, 3 if Neutral, 4 if Moderately agree, 5 if Strongly agree

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
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<tbody>
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<td>1</td>
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a) The software developed is reliable
b) The software developed is easy to use
c) The software developed is easy to maintain
d) The software developed is portable
e) The software developed is flexible (can be modified and upgraded in future)
f) It is easy to test whether the system working correctly
g) The software developed is well documented 

13. What is the approximate number of employees in your organization?:

14. How do you describe your company?
   a) A locally registered company with domestic business
   b) A locally registered company with international business
   c) Branch/unit of a company with operations across India
   d) Branch/unit of a multinational company
   e) Others

17. The major focus of your company is

   Domestic market          International market

18. How old is your company (in years)
19. The major software development activities of your company are related to
   a) Engineering applications
   b) Business applications
   c) Web-based applications
   d) Device drivers
   e) Embedded applications
   f) Others

20. The annual turnover of your company

   g) < 10 crores
   h) 10 – 100 crores
   i) 100 – 500 crores
   j) 500 – 1000 crores
   k) > 1000 crores

21. What are the certifications (such as CMM, ISO) your company have?

22. How many years of experience do you have in the software field?

23. How many years of experience do you have in the present organization?

24. How many projects have you completed in your career before this project?

25. Your age? __________

26. Gender?     Male   Female

27. Educational qualifications:

28. Software certifications you possess:
### PART B – RISK FACTORS

Please indicate the extent to which you agree that each of the following statements applied to your project. Your response can be indicated by "√" mark in the appropriate column against each item.

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<tr>
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1. Top management support was lacking for the project
2. Adequate time was not spent on various phases of software development (such as coding, testing, documentation)
3. Client expectations were unrealistic
4. Clients did not have software experience
5. Documentation was very poor
6. Facilities such as video conferencing were unavailable
7. Frequent conflicts occurred among members of the project team
8. Frequent shuffling of project team affected productivity
9. Hardware infrastructure available was poor
10. Inappropriate development methodology was used in the project
11. Adequate reference material were not available
12. Insufficient resources were provided for the project
13. Large number of links were required to other systems
14. Members who had developed the system specifications were doing the coding
15. Performance measurements of individual members was correctly done
16. Politics in the organization had a negative impact on project
17. Reward structure for performance was poor
18. Project goals and objectives were not agreed upon
19. The project had highly complex requirements
20. The project leader was inexperienced
21. The project leadership did not have “people management skills”
22. The project manager had the freedom to select the project team
23. The project manager was ineffective
24. Project manager had multiple projects to manage at the same time
25. The project planning was very poor
26. The project progress was not monitored closely
27. The project required a change in currently used tools and techniques
28. The project requirements were changed continuously

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29. Project schedules and budgets were continuously revised
30. Project team communication was ineffective
31. The project team had the freedom to select the development platforms and tools
32. Project team members were inadequately trained
33. The project team was a highly diversified group
34. The project was started without proper feasibility studies
35. Resource requirements were incorrectly estimated
36. Responsibilities for project assignments were not clearly defined
37. Staff motivation was very low
38. Subcontractors were not meeting their commitments
39. The team faced cross cultural issues in working for a foreign client
40. Team member turnover (members resigning) was very high
41. Team members lacked communications skills in English
42. Team members were mostly inexperienced
43. Team members were not familiar with the type of application being developed
44. The corporate environment in the organization was not professional
45. The offshore team did not fully understand the priorities of the on site team
46. The procedures prescribed by quality standards were not strictly followed
47. The project had a clearly identified client/sponsor
48. The project involved modification of an existing software
49. The project necessitated working on outdated technologies
50. The project was over dependent on a few key people
51. The telecommunication network was slow and unreliable
52. The work pressure was so high that most of the employees had to work beyond the office hours
53. There were lot of communication gaps when out on an onsite assignment
54. There was a lack of cooperation from clients
55. There were conflicts among client representatives
56. There were restrictions on working hours for women members
57. This was one of the largest projects attempted by the organization
58. Too many external agencies were involved in the development project
59. Visa rejections to foreign countries was a major risk
60. Women members had restrictions while traveling and staying outside
PART C – RISK MANAGEMENT PRACTICES

Using the following scale, please read through the list of statements that follow and indicate with a checkmark ("√") the extent to which each of the following statements accurately applied to your project

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1. Individuals were held accountable for the tasks assigned to them
2. Adequate training is given to employees to make them competent
3. An assistant project manager / leader was appointed for the project
4. Attendance was strictly enforced in the organization
5. Benchmarking was applied to ensure best quality software
6. Compatibility analysis was done for sub-contractors and suppliers
7. Coordination with the user was ensured through formal procedures
8. Detailed, multi-source cost and schedule estimation was done as part of project planning
9. Always attempted to hide the complexity from the user
10. Employees were asked to sign bonds to ensure their stay with the organization for a minimum period
11. Employees were consulted before they were assigned to a project
12. Formal review of status reports versus plan was made periodically
13. Formal user specification approval process was followed
14. HR department was very proactive and helpful
15. Job-matching was done to ensure that the right person gets the right job
16. Minutes of the project team meetings were prepared and circulated among members
17. Modifying the existing system was preferred to development from scratch
18. Once requirements were frozen, no request for change was entertained
19. The organization had very flexible working hours and focus was on completing the work in time.
20. Outside technical assistance was sought whenever required
21. Planning tools were extensively used in the project
22. Post-project audits are carried out to learn from previous projects
23. Project leaders were trained in project management techniques
24. Promotions and salaries were tied to individual performance
25. Prototyping methodology was used in most of the cases
26. Regular technical status reviews were conducted
27. Unnecessary requirements were removed before the development started
28. Risk assessment was performed regularly throughout the project
29. Simulation and scenario analysis was performed to anticipate future problems
30. Software was re-used wherever possible
31. The organization structure was very flat
32. The software was always designed at minimum cost
33. There was an effective configuration management system
34. There were informal contacts and communication channels between project members and the users
35. The user steering committee was very active
36. Users evaluated the progress of the project regularly
37. User manuals were carefully prepared
38. Working beyond office hours was recognized and rewarded
APPENDIX 2

A Note on Self Reporting Methodology Used In the Study

In spite of its limitations with respect to reporting bias, perceptual measures are very commonly used in management research. Perceptual measures are a viable alternative as long as rigorous examinations of validity are performed and multiple items are used (Ketokivi & Schroeder). Presence of risk items and use of risk management strategies in a software project are largely internal issues of the project. Hence measuring the perception of the project stakeholders is the best way of characterizing these constructs. The tool used in this study has 60 items measuring risk and 38 items measuring risk management. Quality is measured through 7 items. These measures were subjected to a range of reliability and validity tests.

The best way of measuring the project outcome would be to personally verify the project records by the researcher. But these records are strictly confidential and none of the organizations were willing to disclose these records directly to the researcher. The user could be thought of as another source for collecting data on project outcome. But again, most of the companies refused to part with contact details of the user. Also, most of the software development in India happens for foreign clients and hence a survey on the user was practically very difficult. Hence the next best way was to request the respondent to check with the records/concerned authorities and then commit an answer.

As seen in the MTMM tests, the high level of agreement between the user representative and the project representative is another reason why the data was collected from the project representative only.

A single respondent or informant was used in this study. Although it has been suggested that the administration of a single instrument to a single informant to simultaneously measure both independent and dependent variables may result in bias (Venkatraman & Ramanujam, 1987), it is common to use a single respondent in academic research (Pinsonneault & Kraemer, 1993).

For administrative reasons it was not possible to obtain a large number of multiple respondents from the same project. The MTMM tests also showed high consensus among project representatives. Measures based on perceptions of single respondent have become particularly prominent in literature. As mentioned
in literature review, the measurement model for risk and project outcome is taken from Wallace (1999). Barki (1993) had developed and validated an instrument to measure risk using self-reporting methodology. The famous Nidumolu study (1996) and its replications in other countries (Na et. al., 2006) linking project performance to risk used self-reporting from project participants. There are many refereed studies such as Jiang and Klein (2000), Ropponen and Lyytinen (2000) and Deephouse et al (1996) who have developed their arguments based responses from a single informant a survey among project members collecting their perception on presence of risk, risk management and the project outcome.

Furthermore, the researcher has taken measures such as scale reordering which can minimize the common method bias (Podsakoff & Organ, 1986). Harman’s one factor test is an indicator of common method variance. In an exploratory factor analysis, if all the variables under a construct load on to one factor or if the factors are too general to be named, high level of common method variance can be assumed. This was not applicable in this research as seen in the factor structure.

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