

**OUTSOURCING SOFTWARE DEVELOPMENT THE REMOTE PROJECT
MANAGER'S PERSPECTIVE**

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ABSTRACT

Purpose

Our research rather than focusing on the requirements of Western based organisations outsourcing or offshoring software development considers the factors that are relevant for the recipients of this work and in particular the perspective of the remote project manager. To achieve this objective we have undertaken research with three Indian based software development organisations. Our results are focused on the specific issues which were relevant for the establishment and operation of Indian based GSD teams. The perspective is that of the Indian Project Manager and the contribution they and their teams make along with the problems they encounter and overcome.

Methodology

Given the nature of this work it was considered appropriate to implement a qualitative inductive approach. To this end the use of a sophisticated grounded theory based strategy was selected and implemented.

Findings

Given the inductive nature of our research our findings are structured under three main headings which emerged from the analysis of the data. These headings are Team Selection and Establishment, Team Operation and Level of Attrition. The team selection section presents the key factors and issues this research identified which were relevant for the selection of Indian based software development teams. It goes

on to outline how these teams were effectively established. The team operation section considers dealing with distance and the use of communication tools. It also considers the experience of Indian based Project Managers dealing with Western colleagues and clients. The level of attrition section focuses on a very serious problem which was highlighted by our study. This is how can software organisations based in India hold on to their existing staff in what is a very volatile labour market?

Limitations

Our findings are based on interviews with five senior Indian software professionals from three organisations. While in the context of our study they are considered preliminary, given the level of detailed analysis which has taken place we consider them of value. We plan to continue to expand on this work by undertaking additional interviews.

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INTRODUCTION

Having previously carried out research which considered the perspective of remote project managers and staff who had software development projects outsourced to them in the Irish context (Casey and Richardson 2004; Casey and Richardson 2005). The relevance of undertaking broader research in this area was appreciated. This was confirmed by undertaking a review of the literature. The outcome of which was the recognition that a large proportion of the published research in Global Software Development (GSD) centred on the requirements of organisations outsourcing or offshoring projects. In these circumstances it was determined of value to undertake additional research which focused on the perspective of the recipients of this type of work in a broader geographical context. In particular it was considered pertinent to focus on the perspective and experience of remote project managers. Given India's position as the primary location for undertaking offshored and outsourced software development (Rao and Mulloth 2007), Indian based software organisations were considered the ideal focus for undertaking this type of research. The findings which we present here are part of a larger study which is currently on going and will be utilised as a basis for further work in this area.

Globally distributed software development has over the last two decades become the norm for large sections of the software industry (Herbsleb et al. 2001) and its popularity continues to increase (Herbsleb 2007). A consequence of this trend is today software development can be considered a truly globally sourced commodity (Hayes 2002). The advent and subsequent popularity of this strategy has been

facilitated by numerous technical and commercial factors. These include the revolution in communication which has resulted from the development of the Internet. This incorporates the adoption of e-mail and the availability of low cost international communication tools (O'Brien 2002). These advances have been coupled with the availability in large numbers of qualified software engineers located in low cost economies who are capable and willing to undertake outsourced and offshored software development (Toaff 2002). The economic imperatives driving the globalisation of software development are based on capitalising on the perceived advantage of labour arbitrage between geographical locations (Carmel and Tjia 2005). This is coupled with the possibility for the implementation of '*follow the sun*' strategies (Carmel 1999). This approach offers the opportunity for continuous software development by leveraging temporal differences between development locations (Espinosa and Carmel 2003) and is also called 24/7 (twenty four hour a day seven day a week) software development. An additional consideration is the opportunity the implementation of a globally distributed software development strategy provides for establishing operations close to emerging markets and thereby positioning the organisation to capitalise on their future growth.

The nineteen ninety's saw the emergence of the three I's (Ireland, India and Israel) as the principle locations for significant globally distributed software development to take place (Ashish and Gambardella 2005). Recent years have seen the emergence of additional countries in Eastern Europe, Latin America and the Far East as popular locations for offshoring and outsourcing software development (Geer 2006). These countries include China, Malaysia, Czech Republic, Singapore, Brazil, Philippines, Chile, Poland Hungary Russia and Vietnam. After the end of the software boom of the

late nineties both Israel and Ireland have seen their popularity as locations for offshoring and outsourcing software development decrease. By 2004 the *Offshore Location Attractiveness Index* (A.T. Kearney 2004) positioned Ireland and Israel as being the third and second last from the bottom of its list respectively. While both countries have continued to experience economic success the focus of their respective software industries have changed from being low cost software development centres to knowledge based and niche centric to capitalise on their particular strengths (Carmel and Tjia 2005). In contrast India over the last twenty years has developed from being a relatively poor and traditional country into an economic and technology driven power house (Carmel and Tjia 2005).

While the popularity of Ireland and Israel has waned over recent years the third member of the three I's group India has seen its role in offshoring and outsourcing expand and flourish. India continues to be the undisputed most popular location for outsourcing and offshoring software development (Geer 2006; Gonzalez et al. 2006). This phenomenal success which India has achieved over the last twenty years is mirrored in the emergence of indigenous organisations like Infosys Technologies, Wipro and Tata Consultancy Services. These organisations are now considered world leaders in the software industry in their particular fields. The success of the Indian software industry has also seen the reversal of what was termed the '*brain drain*' where India was losing its educated workforce to Western countries and particularly to the United States. Today that trend is in the opposite direction and Indian professionals who have been educated and/or trained abroad are returning home in large numbers to avail of the numerous opportunities which the Indian software industry provides (Chacko 2007).

While India's economic success is recognized around the world today from the Western perspective the nation is often perceived as a homogenous society. This view is reinforced by the media who frequently portray India in a stereotypical fashion. The reality is quite different. India is a large and diverse nation which is often referred to as the '*Subcontinent*' because of its size. It is made up of 28 States and has 22 recognised languages and has many religious and culturally diverse groups. Its major religions include the Hindu, Muslim, Christian and Sikh faiths. The Indian nation has successfully accommodated diversity and is per head of population the largest democracy in the world (Saran and Guo 2005). It is of interest to note India's linguistic, cultural, and genetic diversity is only exceeded by that of the continent of Africa (Library of Congress 2004). As a result it is not surprising to discover that the Indian software industry reflects the nation's cultural, religious and linguistic diversity.

RESEARCH FOCUS

The research which we present here has centred on the perspective and experience of Indian Project Managers and the issues they consider and the problems which they and their teams experience. In this context given the inductive nature of our investigation the results which emerged from the analysis of the data focused on the specific issues which were relevant for the establishment and operation of Indian based GSD teams. In this context it is important to state these are the areas and issues which our respondents highlighted.

RESEARCH METHODOLOGY

The research methodology selected to undertake this study was a qualitative inductive approach. To this end the use of a Strauss and Corbin based grounded theory strategy (Strauss and Corbin 1998) was selected as the most appropriate . The rationale for making this selection was two fold. It was considered important that an effective inductive strategy should be employed. Given the nature of the issues under investigation it was important that voice was given to the respondents so that they were in a position to clearly articulate their experiences and views. Secondly given the professional and academic experience of the authors it was necessary that their previous experience and knowledge of the area should be acknowledged. It was equally important that this knowledge and experience should not be allowed to hinder or pre-empt the findings from this study.

Data Collection And Analysis

Our study comprised of five telephone interviews of one hour duration with provision for an additional 30 minutes when required. The participants included a Vice-President, Chief Consultant, two Senior Project Managers and a Project Manager. It was recognised that each interview had to be leveraged to ensure that the best use was made of each opportunity and the respondent's time. To achieve this a generic outline was prepared as a basis for a semi-structured approach for the interviews. This consisted of the identification of a number of broad areas and the preparation of open-ended questions to facilitate discussion, see Appendix A for further details. Given the inductive nature of our approach the objective at all times was to allow the respondents articulate what they considered relevant and to expand on these issues. The semi-structured approach was simply used as a catalyst to facilitate this. It was also flexible enough to allow additional factors which arose from the analysis of

previous interviews to be incorporated and explored further in the subsequent interviews which were undertaken.

Each interview was conducted in both English and Hindi. The choice of language was left to each respondent and in the majority of cases they chose to mix the two. Flexibility in this area was considered important as it allowed the respondents to express themselves in whichever language they felt most comfortable. Each interview was recorded with the interviewee's permission. These were then transcribed in English. The initial task undertaken after transcription was the microanalysis of each interview. Microanalysis is characterised by Strauss and Corbin (1998) as a line-by-line review of the data. The objective was to identify initial concepts and define their properties and dimensions. It was also to identify relationships between these concepts where possible. The data from each interview was analysed in this manner.

A key element of microanalysis is coding. Coding is defined as the process by which data is fractured, conceptualised and integrated to form theory (Strauss and Corbin 1998). As each line of the transcript was reviewed the questions were asked (these are outlined in Appendix B). The objective was to define, through questioning and theoretical comparison, the concepts and categories within the data and to determine their properties and dimensions. The overall goal was to gain a better understanding of the data through a combination of open and axial coding.

Open coding was used to uncover, name and develop concepts and categories which were within the data. This process is termed conceptualising. A concept is defined as significant phenomena in the data, which has been identified and labelled as such. It

could be an activity, event, happening, experience, attitude, reactions and/or outlook. Each had recognisable characteristics and dimensions, which allowed it to be abstractly defined and coded as such. In this manner the data was broken down into discrete categories based on similarities and differences.

Axial coding is a method to add depth and structure to categories that have been identified in the data. This approach helped provide insight into the structures that created the circumstances which facilitated the existence of such categories. It allowed the identification of activities and interactions that were related to and/or a result of the phenomena identified. The objective was to reassemble the data in a meaningful way to gain a better understanding of the phenomena and their internal and external relationships. Once initial categories were identified the process of axial coding could begin. Open coding and axial coding were not necessarily sequential events. Rather, they were iterative activities which required numerous re-evaluations of the data as the analysis continued.

The practice of writing memos was a key element in the open and axial iterative coding process. In the context of Grounded Theory a memo is defined as “*The researcher’s record of analysis, thoughts interpretations and directions for further data collection*” (Strauss and Corbin 1998). The practicality of implementing a creative and scientific approach required a line-by-line review of each interview. As stated earlier each sentence and paragraph was analysed in the light of the questions outlined in Appendix B. Based on this analysis memos were written focusing on the salient points which were identified (see Appendix C for a summary of the memo on Gender).

As a result of this analysis each interview provided insight and additional focus on the issues which were relevant to this investigation. This insight was incorporated and explored further in the additional interviews which took place. This is exemplified by the following example. In the first interview the issue of gender was highlighted by a respondent. This was identified from the analysis and coding of the transcript. As a result this topic was explored further in subsequent interviews. Use was made of open ended questions with the objective of facilitating the raising and discussion of relevant issues to facilitate the inductive nature of this investigation. In this way our results which we present here were identified, explored and validated.

THE ORGANISATIONS RESEARCHED

This research was undertaken with senior personnel from two large Indian based software organisations and one small Indian software company.

Profiles Of The Organisations And Individuals Interviewed

Financial Software International (a pseudonym) is one of India's top twenty companies. It was established over twenty years ago. Its focus is software development and it has made a substantial contribution to the knowledge economy of the global financial services market. It has built up expertise on Investment Banking, Retail Banking, Credit Cards, Corporate Banking, Life Insurance, etc. Its corporate headquarters is in India and has 14 worldwide offices with more than 8500 employees working at various geographical locations with different clients. We interviewed a Vice-President, and two Senior Project Managers one of whom was female from this organisation.

Conglomerate Software International (a pseudonym) is a joint venture between one of India's and the UK's largest corporate groups with headquarters in India and offices and development centres located worldwide. It is among the top ten software exporters in India and provides a wide variety of services ranging from IT strategy and consulting to system integration, design, application development, implementation, maintenance and product engineering. We interviewed a Chief Consultant from this organisation who was male.

India Moon Software (a pseudonym) is a small Indian company mostly handling small projects in various sectors. This company is owned by two partners. The number of employees range from 25-30. We interviewed a Project Manager from this company who was female.

BACKGROUND TO THIS INVESTIGATION

Given India's cultural and linguistic diversity it is not surprising that Indian software engineers come from many different cultural, religious and linguistic backgrounds. While these individuals are technically competent they may only have basic English. However, other than English, in some software teams, there may not be a common language that can be used to communicate with all team members. While Hindi is popularly used it is not universally spoken. Operating in this environment Indian Project Managers have to establish and coordinate a culturally and linguistically diverse group into a functioning team. This has to be achieved in addition to dealing with the usual problems associated with software project management (Wiegers 2002) and the need to address the external and internal factors (Carmel 1999; Herbsleb and

Moitra 2001) which arise when operating in a GSD environment. The continued success of the Indian software industry to date demonstrates that this has to some degree been accomplished. Focusing on the Indian Project Manager, the research presented here studies how this has been achieved from the software development team perspective.

TEAM SELECTION AND ESTABLISHMENT

Team selection is a key activity for undertaking successful software development. This fact was recognised by all our respondents who highlighted its importance. In this context we consider it of value to outline the team selection criteria which our respondents applied when establishing their teams.

Technical ability was considered the most important factor when selecting a team member. This included the individual's professional skill, technical experience, domain knowledge and suitability to meet the technical requirements of the project. Communication skills were sited as being the second most important factor. English is the '*lingua franca*' of the software Industry. India has the world's second largest pool of English-speaking scientific and technical professionals (Moitra 2001). It is also appreciated that there are different levels of competency in the use of the language among some of these professionals. Once the ability to communicate in English was identified, the facilities were in place to improve these skills if and when required. In all cases English was used for all external communication and a mixture of English and Hindi was used internally between team members.

The third selection factor which our research highlighted was the potential team member's attitude to work – *“the project manager looks for people ... team players with attitude and aptitude towards work and common goals irrespective of the domain knowledge”*. A need to show flexibility in working hours and a willingness to relocate if needed were also important requirements from the project manager's perspective. The ability to share the overall vision of the project was also articulated. Finally the level of confidence the potential team member displayed was mentioned as having a bearing on their selection.

The uniformity which emerged from the analysis of the data for the selection criteria for team members was unexpected, particularly given that the respondents came from three organisations which had different internal structures, market focus and size. Technical ability, communication skills and attitude to work are all relevant for team selection regardless of whether it is collocated or globally distributed. It was the consistency in the identification and ordering of these factors and their associated issues which was an unanticipated outcome, particularly as two of the organisations were large and the third was a small company.

Cultural & Religious Factors

Given the cultural and religious diversity of the Indian population it would not have been unrealistic to anticipate that these issues may have had some impact in the area of team selection. The analysis of the data clearly showed that in all cases our respondents stated it had no relevance in their decision making process. Indeed when they discussed the cultural and religious diversity of their teams it was highlighted as a positive strength. Its value was clearly demonstrated where 365 day a year cover

was required for their projects. With a cultural and religiously diverse team the opportunity was there for responsibility to be shared to provide this cover. When team members who were Hindu, Muslim, Christians, Sikhs etc. were celebrating their religious festivals they were able to take time off as their colleagues were available to provide this cover.

Gender

The respondents from both large organisations when discussing gender and its relevance to team selection made a point of stating that it was not considered relevant. Indeed it was commented on that female team members can be more productive than their male colleagues and “*are dependable when it comes to deliverables as they are sincere towards work*”. It is also of interest to note that two of the Project Managers interviewed were female therefore gender did not appear as a barrier to advancement.

What was of interest to note was the response of the Project Manager from the small company *India Moon Software* when discussing gender she stated: “*In small companies, the Project Manager will probably look for female team members who can be committed to the project*”. She went on to say “*Married female team members have obligations towards their family and unmarried female team members may have to relocate after marriage*”. The implication was gender and marital status and its impact on commitment were issues which had to be considered when employing team members in this small company.

When discussing the issue of gender with the respondents from the large organisations one of them asked “*Why do you think gender would be important?*” While it was

acknowledged married female Indian software engineers had responsibilities to their husbands and family they were also considered to be in a position to make the required commitment to their respective projects. It was of interest to note that when the respondents were asked their preferences between a married or unmarried female team member four out of the five stated they would prefer a female team member who was married. The difference in attitude which this issue highlighted is that India is considered as a modern outward looking country which has embraced technology and social change, but it is also still in some areas a traditional society.

Project Managers had to build cohesive teams from culturally and linguistically diverse individuals. This was achieved by understanding the strengths and weaknesses this diversity brings. The objective was to provide the teams with a clear vision for the projects. This was accomplished by outlining clear goals and objectives regarding what was required and clear direction as to how this was to be achieved, sometimes through a team-building exercise: *“Before the start of the project, team building exercise is conducted to establish vision statement for the work which includes implicit requirements of organisation and customers”*. Building trust and developing a team spirit were both considered key activities, as was insuring effective communication could take place. This was achieved by the provision of adequate infrastructure. Mentoring and training which covered both technical and communication related issues were also provided.

Project managers were asked about the key skills which they needed to manage projects, they identified the following:

- Ability to plan, and coordinate the project

- Ability to manage the client and team
- Be able to create trust
- Motivate team members
- Be a good communicator
- Able to identify team members technical interests
- Manage conflict and deal with ego problems within the team.

It is interesting to note that each of these would be important regardless whether the team was collocated or globally distributed. However, there were also a number of skills identified due to the distribution of the team. As would be expected, project managers needed to understand and implement structures to manage the time zone difference between them and their clients site and ensure 24/7 cover was in place. They also felt that they had to make an effort to ensure that knowledge sharing took place, particularly between distributed team members. Other important factors included addressing the tendency to revere hierarchy and the need for the team to conform to Western standards of behaviour and social norms. The managers interviewed clearly understood each of these issues, and were capable of dealing with them.

TEAM OPERATION

When coordinating the team, the Indian Project Manager must address all the internal issues which arise. This has to be done while also dealing with the other factors which are inherent to operating in a GSD environment (Carmel 1999; Karolak 1999; Herbsleb et al. 2000). While this is a difficult task the experience of having dealt with similar type issues when establishing their Indian team provides them with a level of

understanding of GSD related problems regarding cultural, religious and linguistic factors which Western managers lack.

Dealing with Distance

The important issue of distance and its associated problems (Carmel 1999; Ebert et al. 2001 ; Herbsleb et al. 2001) were dealt with in a number of ways. In some instances, to address geographical distance, team members were placed in client sites in the United States, Europe or Australia for the duration of the project. In other situations team members were rotated to these locations over the lifetime of the project. Another solution to this issue was where individual Indian based team members took specific responsibility for work at particular geographical locations.

Project managers were aware of the “*constant need of communication for 24/7 support*”. To address this, the teams normally worked in shifts and thereby provided software development and support as required. A key element of this approach is the importance of what was termed the ‘*Hand-on and Shake-off session*’. This time was used to ensure that the team members who were finishing their shift passed on all the relevant information to the next group of team members who were just starting theirs. This transition stage is the weakest link in implementing a 24/7 strategy (Carmel 1999). Therefore it was imperative that this stage was successfully concluded and supported by up to date project documentation. This requires that all relevant activities are adequately documented. There was the need for regular contact and communication between the Indian team and their remote colleagues. When issues have to be dealt with remotely, “*Distance creates delays from 1 to 2 days as it takes*

turn around time". It was noted that communication could be hampered by lack of face to face contact.

Communication Tools

Good communication is the lifeblood of all collocated software projects (Curtis et al. 1988) and is even more important when operating in a globally distributed environment (Nidiffer and Dolan 2005; Casey and Richardson 2006). Therefore the selection and use of effective communication tools is a key activity. Our respondents highlighted their three essential communication tools as telephone, e-mail and teleconferencing, with *"most of the communication is done through emails and then by 1 to 1 telephone calls"* and that *"these are easy, instant and handy and always available."* However, there is an expectation that *"project managers cannot switch off their phones, they need to answer 24/7 if required"*. Teleconferences took place on average once or twice a day and direct telephone calls took place on a regular basis. No direct barriers to communication with these tools were identified, but it was stated that at all times teleconferences and telephone calls had to be supported by e-mail. This was seen as a chore by the respondents who stated that- *"Details need to be put in black and white and reconfirmed"*, *"I have to counter check through e-mail after every call."*

It was noted that Instant Messenger was not used on any of the teams as it was seen as a possible security risk and was avoided in case of misuse. This is in contrast to its popularity and use as an effective communication tool when operating in a GSD environment (Herbsleb and Mockus 2003; Boland and Fitzgerald 2004; Chisan and Damian 2004). In this situation Instant Messenger is normally utilised as a tool to

facilitate informal discussion between remote colleagues. The objective is to provide a level of direct contact for queries to be raised and addressed similar to that which is available when operating as part of a collocated team (Nardi et al. 2000)

Dealing With Western Colleagues

The respondents outlined their experience of dealing with Western colleagues and clients as generally positive and felt that they were treated as fellow professionals – “*At times they do underestimate your skills, but give the respect you deserve and will appreciate the quality of work done*”. They believed there was a level of knowledge and acceptance of Indian culture. From the Indian perspective cultural training on how to deal with Western colleagues was available for management and team members if required and Language and comprehension were not highlighted as serious issues, other than all verbal communication had to be summarised within e-mail as previously stated.

The advantage the respondents saw they brought to their projects was their ability to work to plan and utilise temporal distance and their teams’ technical skills to deliver quality software on time and within budget. When asked if they thought that their Western colleagues underestimated their skills and ability four out of the five respondents stated they thought they did.

When the specification of project requirements was discussed *feature creep* was highlighted as a problem by a number of the respondents. While it was understood this was a problem for many collocated projects, it was felt distance had a minor impact as it sometimes took longer to communicate these changes to the remote

teams. When the level and quality of feedback provided by Western colleagues was discussed four out of the five respondents felt there was a need to improve feedback. As one respondent stated: *“There is no continuous feedback and this is necessary to improve quality”*.

Another important issue which was highlighted was four out of the five respondents had experienced some level of uncooperative behaviour from their remote colleagues. This is consistent with similar findings with software teams in Ireland who were outsourced to from the United States (Casey and Richardson 2004) . There are a number of reasons for this type of behaviour including fear of jobs being lost to remote colleagues and locations (Casey and Richardson 2006). While these were problems which had to be dealt with the respondents did their best to ensure they did not allow this to negatively impact on their projects.

LEVEL OF ATTRITION

A serious problem for our respondents which our research highlighted was the level of attrition which their Indian based teams’ experienced. High attrition levels in globally distributed teams is a recognised problem (O’Conchuir et al. 2006). This has been attributed to a number of factors which include the level of demand for skilled software engineers and the general availability of positions with new and existing organisations. In this context this demand is driven by indigenous and international organisations who continue to expand and establish new operations in India. Respondents had noticed that when people moved, they did so for their personal betterment facing new technical challenges, availing of better job and promotional opportunities and higher pay scales. Respondents recognised that *“to reduce the level*

of attrition, there is a need to understand the demands of team members and give them new challenging opportunities.” Therefore they were quite creative in solutions and apart from ensuring their pay scales were competitive, project managers, when they could:

- Provided promotion opportunities and job rotation
- Offered new technical challenges within the confines of the project
- Allocated work as per the skills and interests of the team members
- Provided the opportunity to gain new skills

While these approaches were not a hundred percent successful they did go in some way to address the challenges which high levels of attrition had on the operation of their respective software development teams.

CONCLUSION

One of the important contributions which this research makes is that it focuses on the project manager within the Indian, as distinct from the Western, software company. The issues which have been presented here were highlighted by those who are responsible for doing the work and this is consistent with our objective of providing voice to the respondents. Our work recognises that Indian project managers are faced with challenges similar to those of managers working with collocated teams in Western based organisations, but, in addition, face others which are particularly relevant or unique to the Indian situation. In this context we present a summary of our findings

Team selection has been highlighted as a key activity given its importance to the success of software projects. In this context an essential issue which the Indian

project managers emphasized was the attitude of potential team members. They need to share the goals and objectives of the project and this must be demonstrated by their level of commitment. This includes a willingness to provide support, when required 365 days a year, 24 hours a day and 7 days a week. This means they are expected to work longer hours and provide a higher level of commitment than their Western counterparts. Their attitude to relocation also emerged as an important issue. It is not unusual for Indian software professionals to have to leave their wives and families for extended periods of time to work on client sites in Europe or the United States. A willingness to provide this level of flexibility was considered very important. As a result it is not surprising given the sustained level of commitment which is required that there is a high level of what is termed 'burnout' among Indian software professionals (Rajeswari and Anantharaman 2003).

Our research has highlighted the cultural and religious diversity of the Indian software industry. While the view of India as a homogeneous society is prevalent in the West, the reality is very different. Managing software projects in a multicultural environment can be a difficult task. It can only be successfully accomplished by understanding the similarities and differences which need to be addressed and leveraged. Our respondents have highlighted how this can be achieved. In this context their knowledge and experience of operating in a multicultural environment has not been widely understood. Cultural difference in the GSD setting is normally perceived as a negative factor (Carmel 1999; Karolak 1999; Ebert and De Neve 2001; Herbsleb and Moitra 2001; Rutkowski et al. 2002). While this is a correct assessment from the outsourcer's perspective where the potential impact of cultural difference

and operating in a multicultural environment has rarely been understood or addressed. As a result it is normally associated with having a negative impact on GSD projects.

Great strides have been made in India with regard to economic expansion in the last twenty years. This is reflected in a society which has transformed itself to deal with this success. While this has happened, in some areas it still remains a traditional society. This is reflected in the role gender plays. While women have the opportunity to progress in the software industry they are still perceived as having important responsibilities to their husband and family. This means that when a female engineer marries it is expected that she may well have to relocate. In this context gender and marital status given its potential impact on commitment are issues which are considered when recruiting team members. On the other hand linguistic diversity is not considered an important issue once the potential team members have a basic knowledge of English. The Indian project manager is used to operating in a multilingual environment in contrast to their Western counterparts.

The importance of team building was appreciated given the need to establish cohesive teams from culturally and linguistically diverse individuals. In this context building trust and developing a team spirit were considered key activities, as was the provision of adequate infrastructure and training. Effective communication was also identified as essential, particularly as the Indian teams normally operate with three shifts on a 24 hour a day basis. In this context the importance of effective knowledge transfer between team members was understood. It was of interest to note that while Instant Messenger has been successfully utilised as an informal mechanism for

communication with remote teams in Europe and the Far East (Herbsleb et al. 2002). It was identified by our respondents as a security risk and was not used in their respective organisations.

An important point to emerge from our study was that four out of our five respondents felt that their Western colleagues underestimated their skills and ability. They had also experienced uncooperative behaviour from Western colleagues. This was consistent with our previous findings where Irish based recipients of outsourced work experienced similar uncooperative behaviour from those whose work was being outsourced to them (Casey and Richardson 2004). In this context it is of interest to note when some of these Irish based managers and staff had responsibility for outsourcing their work they demonstrated similar uncooperative behaviour to their remote colleagues in Malaysia (Casey and Richardson 2005).

The high level of attrition in the Indian software industry is a serious ongoing problem (Arora and Athreye 2002; Murthy and Abeysekera 2007) as it is in other popular offshoring and outsourcing locations (Lings et al. 2007). In these labour markets there is a rapidly expanding demand for technically competent staff. In this context unless software professionals are provided with a career path which includes opportunities for promotion and experience working on cutting edge technologies, or at least interesting work, they tend to seek employment opportunities elsewhere. Managing a team in these circumstances is a difficult task particularly given the nature of work commonly outsourced or offshored. The importance of addressing this problem can not be underestimated as the loss of key personnel at critical stages in a project can have very serious implications for its overall success. Holding on to staff

in a very volatile labour market is a crucial task which Indian project managers have to address on a daily basis. They endeavour to do this in whatever way they can by balancing the level of commitment required from staff and the technical constraints of their projects against the needs of their workforce for career development and advancement.

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BIOGRAPHIES

Dr. Valentine Casey is a researcher with Lero - the Irish Software Engineering Research Centre. His PhD research was carried out in the area of Global Software Development. He has over 20 years experience in the IT industry and has also lectured in the University of Limerick. He is a SEI trained CMM assessor and holds a MSc. in Software Re-Engineering and a BSc. in Economics and Organizational Theory. His last industrial role was that of Quality Manager in a virtual team based software development company. He has also provided consultancy services focusing on software testing and software process improvement to the financial and telecom sectors. His main research interests include Global Software Development, Virtual Team Operation, Testing Software Process Improvement, agile methods and component based design.

Sadhana Deshpande has more than 10 years of experience in IT industry, with formal education in Business Administration (MBA) and Computer Management (MCM). She has worked in the Indian Software Industry as Team Leader, Project Manager and Business Analyst. Her formal education and work experience has permitted her to gain insights of both business as well as technical domains and has enabled to successfully understand clients/customer and software development teams requirements from both business and functional perspective. She is currently a Researcher with Lero-Irish Software Engineering Research Centre, Ireland in the area of Global Software Development funded by Science Foundation Ireland (SFI) focusing on SME's.

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APPENDICES

APPENDIX A

AN OUTLINE OF OUR SEMI STRUCTURED INTERVIEW QUESTIONS

This document was only used as a guide and not all questions were asked at every interview. It was considered important that the interviewer did not attempt to lead the respondent, but rather to use these questions to facilitate discussion. In this context it is important to state this is not a check list. The emphasis was on the use of open ended questions. Where specific questions were asked it was only as an introduction or to provide context. As clear concepts and categories arose from the analysis of the data they were included for discussion in later interviews and this initial list was expanded to incorporate them.

- Introduce yourself and briefly outline what we are doing.
- Ask for permission to record the interview.
- Briefly discuss the respondent's role and experience. Ask questions which include their job. title, how long are they in their current role, the organisation and their previous experience?
- Explore current responsibilities i.e. What does their current role involve? Who do they report to and who reports to them? What is the most important aspect of their current position?
- As all respondents have responsibilities for software teams with GSD projects. How many teams are they responsible for, what size are the teams, what type of projects are they working on, where are the teams located and where is the work outsourced from?
- What are the key skills which are needed to manage these types of projects?

- What are the most important issues which need to be addressed to successfully manage their teams?
- Why are these things important?
- What are the advantages that operating in this environment provides?
Successes?
- What are the disadvantages? Problems or failures?
- What has positively impacted on their teams operation?
- What has negatively impacted on their teams operation?
- What are the key things required to manage this type of team?
- What are the issues which a successful remote project manager needs to consider and address?
- What are the positive aspects associated with the role of remote project manager?
- What are the negative aspects associated with the role of remote project manager?
- In your role what facilitates success?
- In your role what hinders success?
- What can be done to improve the situation?
- What lessons have been learned which you can incorporate into future projects?

APPENDIX B

ANALYSIS QUESTIONS

- What is being expressed here?
- Why is this being articulated in this manner?
- What does this tell us about the individual's perspective, situation, experience and motivation?
- What does it tell us about this person's experience and view of their position, their team, remote colleagues and managers?
- What hinders or facilitates the role of the remote project manager from this individual's perspective?
- How does this relate to what we know so far?
- What does this expand, confirm or cast doubt on?
- Are there alternative explanations for what is being expressed here to the one that first comes to mind?
- Are the concepts and categories we identify actually here in the data or are we allowing our previous research, experience and knowledge to misinterpret or distort what is actually here?

APPENDIX C

SUMMARY OF THE GENDER MEMO

In the first interview gender was raised in terms of dependability. As a result gender and dependability have been explored further in subsequent interviews.

- Gender in this context equates to females.
- How are females less or more dependable than males?
- Female marital status has relevance here.
- Married women are seen as having responsibilities to their husbands and family. Why and how does this impact on their dependability?
- Unmarried women are seen as unable to make a high level of commitment as on marrying they may have to relocate to live with their husband. This is seen as a very relevant and important issue.

Focusing on females what are the positive things they bring to the concept of dependability?

- They are perceived dependable and trustworthy
- Can be depended on to deliver their work on time
- Described as sincere toward their work.
- Seen by respondents as efficient (in one case more efficient than men)

Summary of positive contribution from each interview regarding gender

	Interview 1	Interview 2	Interview 3	Interview 4	Interview 5
Positives	Dependable & Trustworthy	Trustworthy Can depend on them for deliverables.	Work in given stipulated time.	Dependable	Dependable

The concept of dependability in this context is seen as being

- Trustworthy
- Able to deliver on time.
- Make a sincere effort
- Be Efficient

What are the negative factors associated with females in this context ?

- Due to responsibility to husband, family or fiancé limited in the level of commitment they can make to project.
- If unmarried may have to relocate
- Unable to be flexible with regard to working hours
- Not willing or able to work weekends
- Unwilling or unable to relocate at the behest of the project

Summary of negative contributions from each interview regarding gender

	Interview 1	Interview 2	Interview 3	Interview 4	Interview 5
Negatives	.Unwilling for flexible timings	Not available on weekends	Not ready for flexible working hours	Not available for extended working hours	Unwillingness for relocation

Therefore, dependability is also seen as a willingness to be flexible about working hours and location as well as those already listed.

The category of dependability is seen as being:

- Trustworthy
- Able to deliver on time.

- Make a sincere effort
- Be Efficient
- Flexible in willingness to work extra hours and weekends
- Flexible in willingness to relocate

In this context women are seen as dependable, trustworthy, sincere, and hardworking but limited in the commitment they can make in the light of their external responsibilities.

How does this impact on their career paths and opportunities?

As the interviews progressed it was recognized that gender was seen as a sensitive topic. Initially there appeared to be a reluctance to discuss it. The question was asked why we thought it was important. We thought it was important because it came directly out of the data. That is why we considered it worth exploring. When it was discussed in all cases there was an acknowledgement that responsibility to husband, family and marital status were important issues for female software professionals. We were told gender was not an important issue. When the respondents were asked their preferences between having a married or an unmarried female team member four out of the five stated they would prefer a married woman.

In contrast the reality is that women are in senior roles in the Indian software industry. This was reflected in the fact that two of our respondents were women and both held management positions. Clearly there is still a traditional view of the role and

responsibilities of females which is seen as negative. This is consistent with a society in a state of transition. Indian economic growth particularly in the software industry has been unprecedented in the last twenty years. This has taken place in what has been and in some ways remains a very traditional society with its own cultural norms and values. In this context the Indian software industry incorporates the traditional along with a more modern view of gender and the part it plays in the operation of software development teams.