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Role of Human Resource Flexibility and Coordination in Project Performance: A study in the Indian IT Industry

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ROLE OF HUMAN RESOURCE FLEXIBILITY AND CO-ORDINATION IN PROJECT PERFORMANCE: A STUDY IN THE INDIAN IT INDUSTRY

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ABSTRACT

SHRM literature has proposed a framework of HR flexibility that focuses on three points: (1) developing HR systems that can be adapted quickly, (2) developing a human capital pool with a broad array of skills, and (3) promoting behavioural flexibility among employees. Literature has also extensively covered flexibility that depends jointly on *Resource flexibility* which is the extent to which a resource can be applied to a larger range of alternative uses, the costs and time required to switching the use of a resource from one alternative use to another; and *Co-ordination flexibility* which is the extent to which the firm can reconfigure the chain of resources and redeploy them. The different dimensions of HR flexibility, individually and collectively, affect the *firm-level* human, operational, and financial outcomes. However, there is not much empirical work to establish the impact of HR flexibility on *project performance*. Hence, this paper discusses the impact of HR flexibility on IT project performance in the global delivery model. The paper also highlights the antecedents to superior project performance and the challenges posed due to requirement volatility and coordination issues. In this study, project leads and managers from leading IT firms have been interviewed to establish the need for flexibility for project success owing to aspects such as requirement volatility, unavailability of the right resources and lack of client information and involvement.

KEY WORDS

Indian IT Industry, Global Delivery Model, Project Performance, HR flexibility

1.0 INTRODUCTION

Majority of the IT firms in India have adopted a unique approach to IT implementation projects using globally distributed teams. This is termed as Global Delivery Model. In this approach, projects are broken down into logical components and distributed to different locations (onsite, nearshore and offshore) to optimize value offerings to the client (Delong, 2006). Infosys claims

that the GDM cuts project costs by 30 percent, and reduces time to market since the combined work of teams distributed around the world makes a 24-hour project workday a reality. This model can be applied to integrate the business consulting and technology implementation lifecycle. This approach is called the "1-1-3 model" – one consulting resource and one technology resource at onsite and three technology resources at offshore (Delong, 2006).

The term offshore development once meant contracting out low-end labor-intensive tasks to developing countries to reduce costs (Budhwar, Luthar & Bhatnagar, 2006). The global delivery model or the offshore development centers (ODC) model was initiated around cost reduction (Gopal *et al*., 2003) but now focuses on time-to-market and service quality advantages for organizations to architect, design, develop, and maintain large applications. ODC vendors are also setting up Centers of Excellence (CoE). "From the initial predominance of application outsourcing, the current trend is moving toward infrastructure and business process outsourcing. Recently, what began as a labor arbitrage has moved toward optimization and digitization of a wide range of business processes" (Chandrasekaran & Ensing, 2004:2). The offshore development approach has progressed beyond IT solution delivery to IT-enabled services such as business process management where the vendor takes complete responsibility for providing "technology freedom" to its customers (Chandrasekaran & Ensing, 2004). There are several benefits of adopting GDM – availability of cheap, skilled labour, process arbitrage, consolidation advantage (for example application retirement and server consolidation), provision of onshore-offshore mix, the ability to adopt technology faster and some degree of risk proofing from natural or other disasters (http://en.wikipedia.org/wiki/Global_delivery_model).

With all these benefits, GDM has certain limitations. There are coordination and communication problems faced by the employees. Often, projects do not reach completion due to lack of proper understanding between onsite and offshore. ODCs face a variety of coordination challenges including communication, culture, infrastructure, political concerns and business continuity plans (Chandrasekaran & Ensing, 2004). GDM also lays additional burden on the project manager who is expected to work as a liaison between the multiple locations of work. All these aspects of the software industry call for emphasis on the human resource practices of IT companies. HR practices such as training and development exercises, communication mechanisms can effectively handle several issues related to onsite offshore coordination. (Cappelli & Neumark, 2004). There is an inherent need for flexibility at various levels owing to project implementation being carried out at different locations and thus, different time zones. Skill, functional, behavioural, numerical and technical flexibility are all required for work under the global delivery model. HR issues such as recruitment, training and development, performance appraisal and compensation, and employee turnover and retention are especially important for the Indian ITeS industry owing to the global delivery model (Budhwar, Luthar & Bhatnagar, 2006).

This study attempts to investigate the various factors that contribute to superior project performance. Specifically, the thesis aims to study the effect of human resource flexibility on

project performance. There has been some research conducted on understanding the influence of HR flexibility on *firm performance* (Bhattacharya, Gibson & Doty, 2005; Ketkar & Sett, 2009). However, there has been no study conducted to understand the role of HR flexibility in IT project performance. Further, because of the dynamic nature of the IT projects and their multi-location dimension, not only resource flexibility but also mechanisms to coordinate these resources during the project are required. This calls for investigation of interactive effects of resource flexibility with coordination on project performance. This way, the study attempts to enhance the body of literature present on project performance. It is also meant for practitioners as the findings can give prescriptions on the antecedents to superior project performance.

2.0 LITERATURE REVIEW

2.1 Indian Software Services Industry

The Indian software services industry is relatively young, with many of its most mature companies incorporated in the late-1970s and early 1980s. The domestic market for IT services was always small and continues, even today, to account for only about 25–30 percent of the industry's sales (Nasscom, 2001). The Indian industry received a big boost in the early 1990s when the demand for skilled manpower in IT services in the developed world outstripped the available supply. India enjoys the advantages of "people attractiveness" and "location attractiveness" (Budhwar, Luthar and Bhatnagar, 2006) in the IT sector. India, during early 1990s was graduating 150,000 English-speaking engineers a year with only a limited demand for their services within the country, was well placed to take advantage of this opportunity (Ethiraj et al., 2005). Faced with a small and undeveloped domestic software services market, Indian software firms focused primarily on the export market. Their early work, however, was neither technologically very sophisticated nor critical to clients' businesses. The origin of the Indian software industry was firmly rooted in performing low-end, technically less demanding and labor-intensive work for the global IT industry and exploiting labor cost arbitrage opportunities between India and developed country markets (Nasscom, 2001). Between 1989 and 1998, over 3000 software services firms were founded that aspired to serve export markets. Firms also needed to improve the productivity of labor to compete effectively in the market (Ethiraj et al., 2005).

In purely onsite projects, the Indian firm supplies software professionals who possess the requisite technical skills that the clients demand. The entire project is then developed and executed at the clients' site. In purely offshore projects, in contrast, the Indian firm typically sends a few software professionals to the client site to understand its requirements and specifications, but thereafter the entire software is developed in India. The post-development support and maintenance of the software is also carried out largely from India. In some cases, a hybrid of the two types is also observed. Obviously, the offshore development model is more cost effective due to labor market arbitrage (Chandrasekaran & Ensing, 2004). In the early days

of the Indian software industry, Indian companies executed a majority of the projects onsite. This happened because, first, the overseas clients had limited confidence in the Indian firms' ability to execute projects in conformance to their needs. Second, the Indian firms also had only a limited understanding of clients' needs and often required close and regular interaction with the client (Ethiraj et al., 2005).

Since the mid-1990s there has been a distinct shift in the nature of software projects executed by the leading Indian software firms. They gradually shifted their role from that of merely implementing a design provided by their overseas clients to becoming active participants in the design of the complete application product. "As a consequence, they now span the full spectrum of jobs from highly labor-intensive code migration work such as the integration of old mainframe-based systems into new e-commerce platforms, or developing new code for pre-designed applications and software tools, to projects that involve both conceptual design and implementation of customer relationship applications and supply-chain management systems" (Ethiraj et al., 2005: 26). All such developments and trends have serious implications for the Human Resource Management (HRM) function given that the software industry is primarily people-driven (Budhwar, Luthar and Bhatnagar, 2006). The existing literature, however, contains no empirical studies conducted in India that highlight the need for flexibility relevant to the Indian IT sector with respect to the global delivery model.

2.2 Global Delivery Model

The global delivery model as pioneered by Infosys Technologies Limited had distinct, distributed responsibilities for onsite and offshore employees. At the client location, activities such as analysis and planning, High level design (HLD), User interface design (UID), project co-ordination, onsite testing and implementation are carried out during different phases of the project. *High level software design*, also called software architecture is the first step to analyze and consider all requirements for a software and attempt to define a structure which is able to fulfill them (Briand, Morasca & Basili, 2002). For this, the non-functional requirements also have to be considered, such as *scalability*, *portability* and *maintainability*. This first design step has to be more or less independent of a programming language. The goal of *user interface design* is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals—what is often called user-centered design. At the offshore development centers, tasks such as project management, detailed/low level design, coding, testing and documentation can be done effectively. At ODCs, post implementation support such as bug fixes, warranty support and maintenance can be done in a cost efficient manner. These tasks require less analytic and consulting competence. These are more standardized and repetitive in nature and do not require clients' input at regular intervals and hence can be "outsourced" to offshore centers (Budhwar, Luthar & Bhatnagar, 2006).

GDM is applied to deploy a vendor's team at onsite (client site) to work with the client. The onsite team works with the client during the day to capture the design of the process object. At night, the offshore team converts the design templates into a software configuration. The next day, the onsite team would test the configuration with the client and undergo a second iteration accordingly (Delong, 2006). As the configuration is tested on real-time basis, the end result tends to be exactly what the client wants because the iterations are tested for user acceptance during the design and configuration process. Using this model, Infosys has been able to perform major engagements for a lesser blended rate than the traditional model where all tasks are performed at the same location (Stanford case – SM 151, 2006). GDM results in the improvement of business process metrics such as time-to-market, efficiency and effectiveness related metrics. All these influence the client's success in the market by enhancing its revenue and hence impacting shareholder value.

2.3 Specificity of Project Requirements

Project requirements are descriptions of how a product or service should act, appear, or perform. Wiegers (1999) discussed that due to diverse definitions from multiple sources, no single clear-cut definition of software requirements was available. In one of the earlier attempts, software requirements were addressed as follows (IEEE 610 12-1990):

1.) A condition or capability needed by a user to solve a problem or achieve an objective
2.) A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.
3.) A document representation of a condition or capability as in (1) or (2)

Davis (1993) defined requirements as "A user need or necessary feature, function, or attribute of a system that can be sensed from a position external to the system". Project requirements are defined during early stages of a system development as a specification of what should be implemented. They are descriptions of how the system should behave, or of a system property or attribute. They may be a constraint on the development process of the system (Sommerville & Sawyer, 1997). Functional requirements define system services or functions. Nonfunctional requirements can be process as well product related and describe the constraints placed on the system.

Firming up the requirements before starting is the industry best practice because specifications form the foundation of the design and coding activities. Requirements specification begins, first with external source requirements (Costello & Liu, 1995). External source requirements may have several sources, for example, the customer, current and potential users, and existing systems with which the new system must interface. After the contract is awarded, teams spent effort for the right requirements specification—that is, one that completely, consistently,

and clearly specifies what the customer wants (Reifer, 2000). “Project complexity hinders the clear identification of goals and objectives of major projects” (Baccarini, 1996).

“*Requirements engineering* is the process of conceptualizing, specifying, and validating the specification of the required behavior of a system” (Costello & Liu, 1995). The major objective of requirements engineering is to reach agreement on what is to be produced and document that agreement such that it will be clearly understood by all affected parties and so that compliance with the terms of the agreement can be verified.

2.4 Degree of resource alignment

The ability of an organization to use the flexibilities of its firm specific and firm-addressable resources effectively and efficiently over a range of operating conditions leads to superior outcomes (Sanchez, 2004). Flexibilities result from the collective capabilities of a firm’s human resources—its front-line managers and employees— to sustain efficient use of available resources when facing a range of variations in inputs, in required outputs and in the environmental conditions affecting the operations. A certain set of HR practices when tied to a goal of long-term survival and growth of the organization in a dynamic environment can collectively define a context that shapes individual and collective behavioural orientations conducive to achieving simultaneously fit and flexibility (Ketkar & Sett, 2009)..

The need for flexibility can be translated on a project-level just as in case of firms as discussed above. The author’s experience in the IT industry suggests that a blend of both fit and flexible resources is needed for a project. Project complexity influences the selection of project inputs, example the expertise and experience requirements of the management personnel (Baccarini, 1996). In fact, in most complex projects with either unclear or volatile requirements, flexible resources are the best fit. The project work division is such that different phases of the project may need different degrees of flexibility. Typically, at the start of the project, uncertainties are higher due to lack of clarity and as the implementation proceeds, requirements become clearer. Thus, a standard practice is to have technologically and behaviorally flexible resources during the initial phases of the project. Usually, the architects and business analysts are required to be more flexible as they directly work with the clients.

Resource requirements need to be determined early in the project and often exceed initial estimates and the inability to secure resource commitments up front may doom project efforts. An organization’s failure to commit the required human resources has been found to be a problem in software project implementations (Somers & Nelson, 2001). Thus, in order to cater to the specific requirements demanded by the client, the manager of a project should have an adequate resource pool of relevantly skilled resources to allocate from (Barner, 2006).

Hypothesis 1: The specifiability of project requirements has a positive influence on the degree of resource alignment.

Hypothesis 2: Availability of resources moderates the relationship between the specificity of project requirements and degree of resource alignment.

2.5 Requirement Volatility

Kotonya and Sommerville (1998) indicated that requirements changes can occur at multiple points in the development process, like at the start, during project execution or after the system has gone into service. Requirement changes can be in the form of addition, deletion and modification. The measure of requirements volatility is defined as the ratio of the number of requirements change (i.e. addition, deletion, and modification) to the total number of requirements for a certain period of time (i.e. development phase).

They attributed volatility to a combination of factors like (1) requirements errors, conflicts and inconsistencies (2) evolving customer/end-user knowledge of the system (3) technical, schedule, or cost problems (4) changing customer priorities (5) environmental changes and (6) organizational changes. Requirements uncertainty results from ill-defined software requirements and results in instability which means project delays (Ebert & De Man, 2005). Software projects often begin with unclear, ambiguous, and incomplete requirements which give rise to intrinsic volatility (Javed, Maqsood & Durrani, 2004). If the client or some of the key stakeholders of the project are not involved from the initial stages, requirements gathering would be incomplete and worse still there will be unexpected dependencies between the relationships that will be uncovered during project implementation (Ebert & De Man, 2005).

Zowghi et al. (2000) carried out a survey based study on the effect of requirement volatility on developer productivity and software quality. In a follow up study, Zowghi and Nurmuliani (2002) investigated the impact of changing requirements on organization size, project size and project performance. Results, of both studies, indicated significant negative relationship between requirement volatility and software project performance, measured by project completion time and cost. A slight change to requirements can profoundly affect cost and schedule because their definition underlies all design and implementation (Reifer, 2000). Requirement volatility provides an insight into the system maturity and stability and aids in predicting future requirements, design, and code volatility (Costello & Liu, 1995).

A dimension of project complexity is uncertainty in both project goals and in the means used to achieve them. “Uncertainty in this case refers to the extent to which project goals and means are ill- defined and thus subject to future changes; uncertainty in systems requirements/scope and in new information technologies are examples of goal and mean uncertainties” (Xia & Lee, 2004). Pfahl and Lebsanft (2000) performed simulations to demonstrate that software requirements volatility is extremely effort consuming for the software development organization and that investments in systems engineering in order to stabilize requirements definition would well pay off.

Hypothesis 3: Requirement volatility would reduce as the specifiability of the project requirements increases.

2.6 Software Project Performance

Researchers have pointed out that project performance is a multidimensional construct (DeLone & McLean, 1992). Nidumolu (1996) considered two important dimensions of software-development project performance:

- *Process control*: the extent to which the development process is under control
- *Product flexibility*: the extent to which the software developed at the end of the project is able to support distinctly new products or functions in response to changing business needs

Between these two performance variables, there is typically a tradeoff. In order to meet tight deadlines and budgets, software developers often develop systems that meet the immediate needs of users without adequately considering the long-term flexibility of such systems, therefore increasing the cost of maintaining them (Nidumolu, 1996).

Quite often, *project performance* is assessed by how well the project's immediate goals – time scales and budget were met. Shenhar et al. (2001) have termed this as the 'first dimension' of success across different project types. The other dimensions of project success are benefit to the customer and benefit to the performing organization. Software project success can also be assessed subjectively under three preferred notions namely satisfaction of business objectives, meeting user expectations and creating value for the vendor organization (Kerzner, 1995; Thomsett, 2003). The definition of project terms of success, or failure, needs to be established for each individual project at its inception. This may encompass any or all of the following views – 1.) The Internal View of Process: budget, time and functionality, 2.) External View of Product: quality, requirements, 3.) Stakeholders: development team, suppliers, customers, and executives, and 4.) Business Value. The tradeoffs, in terms of which these are critical to the definition of success, should be project and organization dependent (Ahiable & Dalcher, 2005).

The complexity of the project affects objectives of time, cost and quality (Baccarini, 1996). Software projects are inherently complex, risky and require careful planning. Planning software development, estimation, requirements capturing, risk and change management control procedures, user interface prototypes and overall project control have to be taken care of (www.stylusinc.com). Lack of competent staff is a one of the sources of poor project performance. However, a survey over 8000 projects undertaken by 350 US companies revealed that major source (about half) of project failures are poor requirements (Lamsweerde, 2000) – more specifically, the lack of user involvement (13%), requirements incompleteness (12%), changing requirements (11%), unrealistic expectations (6%), and unclear objectives (5%).

Hypothesis 4: Degree of resource alignment has a positive influence on project performance.

Hypothesis 5: Requirement volatility moderates the relationship between degree of resource alignment and project performance.

2.7 Coordination Challenge

In a survey by IBM, 55 percent of software projects exceeded their budget, 68 percent exceeded their schedule, and 88 percent had to be significantly redesigned (Gibbs, 1994). Performance risk is an important intervening variable that mediates the effects of requirements uncertainty and the coordination mechanisms on project performance. Performance risk refers to the difficulty of estimating a project's performance consequences (Nidumolu, 1996).

Time bound projects such as product design and development change as they move through different stages of implementation (Bailetti et al., 2002). The structural contingency perspective suggests that the fit between coordination and requirements uncertainty influences performance. Nidumolu (1996) hypothesized that software performance risk mediates the effect of vertical coordination and requirements uncertainty on process control. Horizontal coordination appears to have a direct and unmediated positive effect on product flexibility but is unrelated to either software performance risk or process control. The findings suggest that practitioners could benefit from awareness of the different capabilities provided by the two coordination mechanisms. "Vertical coordination enables project managers to bring projects to closure by reducing performance risks and increasing control over the process, whereas horizontal coordination leads to flexible software applications because it allows exploration of ideas and issues" (Nidumolu, 1996).

A key reason for project failures is insufficient management of changing requirements during all stages of the project life cycle (Ebert & De Man, 2005). Conflict and its resolution are more likely to occur when users can exercise their influence in the development process (Robey & Farrow, 1982). The relevance and significance of these factors may vary across different projects and clients. Indeed, the client frequently has an essential part in the project (by necessity), needing to approve sub-project milestones or intermediate product documentation in order to progress to the next stage of design. However, as well as this facilitating role, the client can cause effects detrimental to the project. The client can require changes to the product definition or the project work scope; cause delays in documentation approval; cause delays in supply of essential information (for example about the environment within which the product must operate, or interface details); require a high level of budget and progress reporting; or can tighten milestone schedules.

The project management literature identifies a number of project dimensions and characteristics as constituents of coordination challenge in software project implementation. It can be defined in terms of the number of these elements and their interdependency (Xia & Lee, 2004). Applying this concept, it defines two types of project complexity: organizational (types of and number of

relationships among hierarchical levels, formal organizational units, and specialization) and technological (types of and number of relationships among inputs, outputs, tasks, and technologies). Greater complexity is associated with delayed project delivery, cost overruns, reduced system functionality, and lower end-user satisfaction (Xia & Lee, 2004).

Hypothesis 6: Coordination challenge moderates the relationship between degree of resource alignment and project performance.

2.8 HR flexibility

A firm is a bundle of path dependent knowledge bases: 1.) capabilities involve the deployment of resources and generate rents, 2.) capabilities tend to evolve over time (they are a combination of learning by doing and deliberate firm level investments) and 3.) Capabilities are path dependent and thus, hard to imitate (Penrose, 1959; Teece & Pisano, 1994). For the Indian IT industry, two types of capabilities have been found to cause superior firm performance– client specific capabilities and project management capabilities. *Client specific capabilities* constitute tacit domain knowledge and operating routines. They reduce project execution costs and help in improving the project contribution. *Project management capabilities* are acquired through deliberate and persistent investments in infrastructure and systems to improve the firm's software development process (Ethiraj et al., 2005).

The concept of flexibility denotes a dynamic capability of a firm to pro-act, or to respond, to changing competitive environments and thereby develop and/or maintain competitive advantage over time (Teece, Pisano and Shuen 1997; Eisenhardt and Martin 2000; Winter 2003; Teece 2007). The focus is on three points for flexibility: 1.) developing HR systems that can be adapted quickly, 2.) developing a human capital pool with a broad array of skills, and 3.) promoting behavioural flexibility among the employees (Bhattacharya, Gibson & Doty, 2005). The need for firms in dynamic environments is to reconfigure the firm's asset structure and to accomplish the necessary internal and external transformations. Flexibility is thus, a fundamental approach to the management of uncertainty (Sanchez, 1993), and it "enables a firm to exercise choices or real options on its asset base to exploit opportunities and/or contain downside loss that may result from uncertainties in the environment" (Ketkar & Sett, 2009: 2).

A concept of strategic flexibility in product competition is developed in which flexibility depends jointly on resource and coordination flexibility (Sanchez, 1995). *Resource flexibility* is the extent to which a resource can be applied to a larger range of alternative uses, the costs and difficulty of switching the use of a resource from one alternative use to another and the time required to switch. Individual skill breadth and ability to acquire new skills are strategic HR indicators of resource flexibility (Wright & Snell, 1998). Management by objectives as an appraisal technique and skill based pay plans resemble flexible processes. Mental abilities, flexible behaviors and even personality traits are associated with adaptability to change (Sanchez, 1995).

Co-ordination flexibility is the extent to which the firm can reconfigure the chain of resources and redeploy the resources. These flexibilities are choices that firms make with respect to the dynamic environment. Variety of skills in the workforce and ability to acquire diverse skills from contingent workforce are the indicators of coordination flexibility (Wright & Snell, 1998). Firms create flexibility through hiring people based on their potential for creating value. Employees of any firm possess a broader repertoire of behaviors than simply those relevant to the current strategy of the firm (Bhattacharya, Gibson & Doty, 2005). This can be achieved by introducing changes in recruitment and selection processes for skill flexibility and changes in the appraisals, rewards and recognition system to initiate behavioral flexibility. On similar lines, Atkinson (1984) argued that firms could be *functionally flexible,* such that a stable cohort of skilled, cross-functional employees adapt according to different requirements. Or firms could be *numerically flexible*, adjusting the workforce itself to changes in demand, hiring to bring in new skills as needed and presumably implementing layoffs to eliminate redundant or obsolete skills, as well as relying more on "contingent" work. The more sophisticated version of this argument assumes a continuum between the two where greater functional flexibility reduces the need for numerical flexibility (Cappelli & Neumark, 2004).

HR flexibility has been perceived as a capability that helps the organization to adapt to changing environmental contingencies. Wright and Snell (1998) conceived HR flexibility as consisting of three distinct dimensions, namely, flexibilities of skill, behaviour, and HR practices. Skill flexibility refers to two attributes: the number of potential alternative uses to which employee skills can be applied (resource flexibility) and how individuals with different skills can be quickly redeployed (coordination flexibility). Skill flexibility can be gained in two ways by any organization; acquiring small number of employees with broad skills or having a large set of employees with narrow but specialist skills. Employees with enhanced learning capabilities means that organization does not need to hire new people with new attributes to address environmental changes (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997).

Behavioural flexibility signifies the availability of a sufficiently broad range of behavioural scripts among employees, which they can adapt to the demands of situations while maintaining similarity of responses by different members to similarly perceived situations (Ketkar & Sett, 2009). HR practice flexibility is about the firm being more readily adaptable in changing its HR practices.

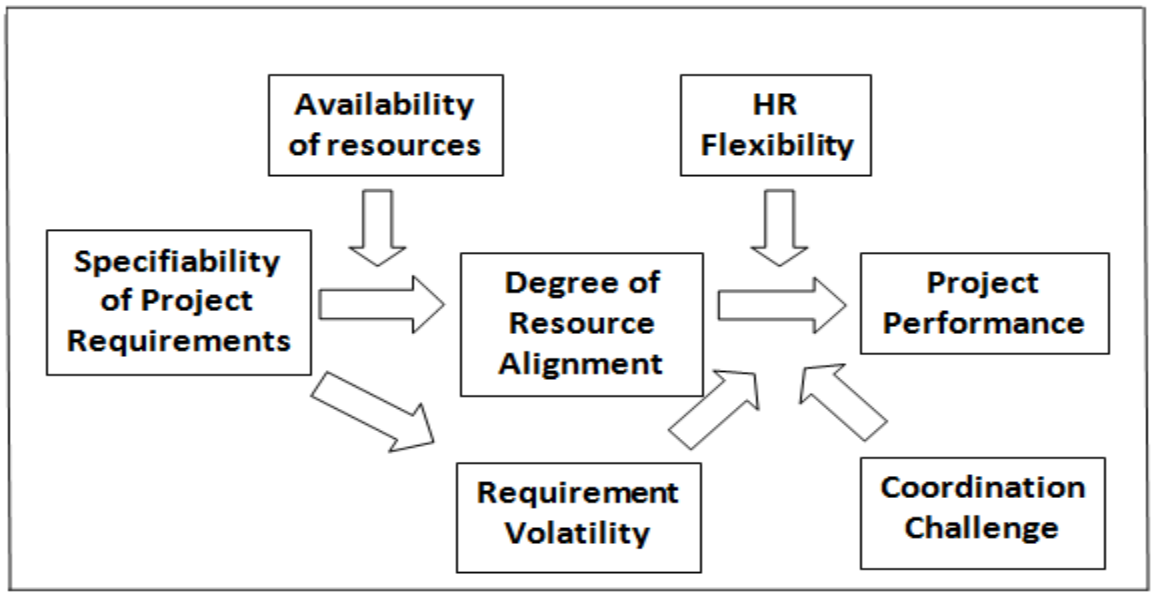
Flexibility in employee skills, employee behaviors and human resource practices has a profound effect on the performance (both financial and non-financial) of the firm. Skill flexibility for instance, contributes to the cost efficiency of a firm (Bhattacharya, Gibson & Doty, 2005). In the longer run, acquiring, motivating and developing intellectual assets can be a source of competitive advantage (Eisenhardt & Martin, 2000). HR flexibility can affect firm profitability through improved labor productivity, cost efficiency and by adding value through human assets. The different dimensions of HR flexibility, individually and collectively, affect the firm-level

human, operational, and financial outcomes. This has been tested using a multi-level model that attempts to establish these inter-linkages based on a study of 98 manufacturing and 103 service firms in India (Ketkar & Sett, 2009).

Thus, researchers have established the effect of flexibility on the firm level performance. This study attempts to study the need and impact of flexibility on *project level performance* within a firm. Skill and behavioural flexibility leads to superior project performance in the IT industry under global delivery model.

Hypothesis 7: HR Flexibility moderates the relationship between degree of resource alignment and project performance.

FIGURE 1



3.0 METHODOLOGY AND DATA COLLECTION

This study is exploratory in nature and a qualitative approach of research has been adopted. Based on the literature available, a potential research gap was identified. In order to understand the IT industry, software project implementation, Global delivery model and the need for HR flexibility, a preliminary schedule (refer to Appendix 1) was prepared to gather insights from practitioners and academicians. Semi-structured interviews which included open ended questions were conducted.

Consecutive interviews were spaced such that responses from the first interview could enhance our understanding of the subject and the subsequent interviews could be enriched accordingly. The respondents chosen range from less to highly experienced project leads and managers;

respondents chosen were also working in various verticals or SBUs. Their range of total experience in the IT industry is from 33 months to 264 months. Most people have worked for projects of varying complexity and of both types – Time & Material and Fixed Price[1] and have thus, dealt with all challenges related to project management.

Also, most respondents have worked at both onsite and offshore and therefore, understand the global delivery model. Interviews were also conducted with two academicians from Management Information Systems department such that an academic view of the topic could be gained. Some telephonic interviews were also conducted for industry executives who could not be interviewed in person. A point to be noted here is that majority of the respondents have quit their jobs for higher studies and hence have been completely unbiased in their views thereby making our findings more reliable. All this variation (Kuzel, 1999; Patton, 2001) has helped us ensure that there is no bias in our responses and hence the results.

The responses of the interviewees were then collated and categorized (Strauss & Corbin, 1990) under several heads to uncover patterns. The responses were codified, the codes being generated from the data, rather than predetermined. Each code representing a theme or idea with which each part of the data was associated. The codes that had common elements were subsequently merged to form categories (Strauss & Corbin, 1990). The criterion for judging when to stop theoretical sampling is the category's or theory's 'theoretical saturation'. By this term Glaser and Strauss (1967) refer to the situation in which "... no additional data are being found whereby the (researcher) can develop properties of the category. As he sees similar instances over and over again, the researcher becomes empirically confident that a category is saturated ... when one category is saturated, nothing remains but to go on to new groups for data on other categories, and attempt to saturate these categories also". The need for taking more interviews was not felt because the pattern of responses had started repeating (Yin, 2003) and with each new interview the scope of getting additional information had reduced. These respondents helped us identify some aspects of IT project performance along with the importance of HR flexibility and thus, helped in refining the model depicted in Figure 1. After interviewing respondents (refer to Table 1), each construct in the model was defined.

In order to perform a quantitative study, a questionnaire had to be prepared with items measuring the different constructs of the model. Some constructs have been measured in literature and hence, scales were available for the same. Thus, items for constructs - client involvement (Barki & Hartwick, 1989; 1994; Baroudi, et al., 1986; Franz and Robey, 1986; Olson and Ives, 1980;

[1] In fixed price contracts the vendor charges a fixed fee for its services, which is usually negotiated before the start of the project. Although the vendor bears most of the risk in this case, efficient project management can yield potentially higher margins. In a T&M contract, the vendor provides services at a pre-negotiated rate for every person-hour of effort expended on the project and receives payment either at the end of the project or at periodic intervals when project milestones are reached (Banerjee & Duflo, 2000).

1981; Robey, Farrow & Franz, 1989), requirement volatility (Thakurta, 2009; Costello & Liu, 1995) and project performance (Svensson & Aurum, 2006; Shenhar et al., 2001; Niazi, Wilson & Zowghi, 2006)) were available. The items for the rest of the constructs were generated from existing literature and inputs from the respondents. Content validity refers to the representativeness and comprehensiveness of the items used to create a scale. It is assessed by examining the process by which scale items are generated (Nunnally, 1978; Straub, 1989). A few items were also added for confirmation and some to ensure completeness, resulting in a final list of 48 participation questions (refer to Appendix 3). Construct validity was established with the help of academicians and practitioners. The final questionnaire has been divided into two sections – Fact Sheet and Item-wise questions related to the constructs. A pretesting of this questionnaire has been completed as the next phase of research. The questionnaire has been tested on 14 respondents, some of whom have been initially interviewed.

TABLE 1

S. No.	Name	Company	Total Experience	Designation
1	HV	Infosys	103 Months	IT Consultant
2	PG	TCS	108 Months	Account Manager
3	AD	Patni Computer Systems	80 Months	Project Lead
4	AT	TCS	75 Months	Technical Analyst
5	CKJ	Tech Mahindra	125 Months	Project Manager
6	NA	Infosys	126 Months	Programme Manager
7	AB	Wipro Technologies	132 Months	-
8	UB	Oracle India Pvt. Ltd.	94 Months	Research Analyst
9	KP	IBM India	98 Months	-
10	AmD	Infosys	68 Months	Technology Lead
11	TT	TCS	66 Months	IT Analyst
12	PSB	IIM Calcutta	-	MIS Group
13	PRR	IIM Calcutta	-	MIS Group
14	AS	Microsoft	58 Months	Senior Software Developer
15	MK	Infosys	73 Months	Technology Lead
16	RC	Cognizant	264 Months	Director
17	AK	Citrix Systems (Product Company)	33 Months	Software Development Engineer
18	RG	Infosys	44 Months	Test Manager

4.0 RESULTS

PHASE I: In-Depth Interviews

One hypothesis of this study is that owing to the dynamism involved in the global delivery model and coordination challenges of IT project implementation, HR flexibility leads to better project performance. Respondents were positive about the fact that a project manager, with 3-5 projects under her, can rank project performances based on the resource and co-ordination flexibility. One respondent felt that the two flexibilities are the *drivers* of project success. There are several performance matrices maintained by organizations to gauge project success or failure. People who have worked in project management of IT industry said that despite resource and co-ordination flexibility, projects still fail or perform poorly owing to reasons such as user involvement or lack of it, project complexity and dynamism of project requirements. Also, co-ordination of projects is a multifold challenge.

Critical success factors:

The respondents gave several important details about the measurement of project performance for a firm that has adopted the global delivery model. Most Service Level Agreements (SLAs) and performance criteria that are set by the client are covered under a contract that is signed by both parties before the commencement of the project. In most cases, any additional requirements are billed to the client unless the vendor wants to maintain long term relations with the clients and hence, overlooks the exceeded expectations. Fixed price projects are more risky for the vendor and hence, are bid at higher prices. T&M projects often are bid for very low prices, often for maintaining relationships.

Apart from some metrics such as *On Time Delivery* (OTD) and estimated budget that are standard for all companies and projects, there are quality related metrics such as *First Time Right* (FTR), requirement deviation percentage, deviation causes and most importantly customer satisfaction surveys. There are many matrices to document the performance. Operational efficiency, defect removal efficiency, milestones achieved, number of escalations made and their causes, review effectiveness (stage when the defect was uncovered), use of coding standards, resource utilization matrix, project health-sheet (status green, red etc. based on the schedule adherence) are some of the measures that the project manager takes to ensure project success. Different companies have different terminologies to measure roughly the same performance criteria. One respondent talked about metrics such as ‘Schedule Adherence or Deviation’, ‘Effort Adherence or Deviation’, effort percentage, defect rate for each phase, defect reduction in each phase, cost of quality, slippage to the client, *engagement feedback*, and escalations in the last 2-3 weeks of the projects. One respondent informed that some mature clients such as Fortune 500 companies tend to have special type of SLAs also such as six sigma level quality, relationship level contracts (such as how many days did it get to deploy the required resources, time taken to resolve issues etc.)

Project Requirements and Requirement volatility:

A *Statement of Work* (SoW) is usually created before the commencement of the project and is signed off by the client. The SoW is a like a project plan and includes time and manpower estimations for the project. Details such as onsite-offshore ratio for different project phases are also discussed before the start of the project. In some companies, a pilot or *Proof of Concept* (PoC) is first undertaken by the client and the vendor together in order to get to the contract. According to the respondents, it is important to have clear set of requirements before the project starts because changing requirements at any later stage can mean a lot of additional work for the resources. Often clients make demands which create a co-ordination challenge for the manager and make it very difficult for the resources to complete the project on schedule.

Any change from Service Level Agreements (SLAs) means that a *Change request* (CR) will have to be raised with the clients and if approved, it usually means additional costs. The requirements gathering phase is generally long, especially when the client does not have much knowledge about the implementation of the project. It often happens that the client understands only his business requirements and hence considerable amount of analysis and planning are needed to convert the business requirements into functional specifications. One respondent told that if employees are flexible in terms of their role, skills and most importantly behavior, they would find it easy to cope with the changed requirements and hence resources are selected based upon the complexity and dynamism of the project.

Coordination challenge:

One of the respondents explained that often projects can fail due to changes from the clients' end that are not directly associated to the project. He remembered a case in point where the client side management underwent restructuring and the new management insisted on working with less than half the existing resources. Such incidents are common and are cases where projects have performed below expectations owing to factors other than HR related flexibility.

Functionally, working on dynamic project specification can be very challenging. Few respondents however felt that an effective project manager can be prepared for such out of contract changes and can successfully tackle situations to complete the project without having his resources to stretch. The PM has an important role to play as she may or may not accept the changes demanded by the client; if the same were not stated in the initial specifications or may ask for appropriate amount of time for the same. The more dynamic the requirement, the more challenging it is for resources to perform project functions. Apart from these dynamic needs, there can be regulatory changes which also factor in the performance of the project.

The role of project manager is different because she has to keep in mind the profitability of all the projects. She may also require some of her resources to work in multiple projects and hence the need for co-ordination increases across projects. The role is different more so because for

each project, the PM will have a point of contact who is responsible for the technical issues that the project faces. Within a project, the PM has technical responsibilities; however, across projects the role of the project manager is more administrative in nature.

The primary determinant of onsite-offshore ratio is the phase that the project is in. In the initial phases, the need for people at the onsite is more and then ramp-downs happen according to the progress made. Other factors are client needs, project margins and budgets, project complexity, and resource availability. For real time solutions, there are more people at the client end. For maintenance projects, support staff is kept at offshore. At Patni Computers Limited, there are some projects that are strictly offshore. He would always want to move up the value chain. In certain long term projects, fixed, preset ratios are worked with. Around 25% people at onsite are due to factors that do not include the tasks or the projects. These factors include availability of Visa, parallel domain or technology know-how, incentive for the employee who might leave otherwise, presence of spouse in the country etc.

Need for Flexibility:

The need for role and skill flexibility is much higher for projects with more complexity and requirement volatility. Respondents mention that the fate of a project depends on the change management of the project manager. There can be a technology change at the client side for which the end users will have to be prepared. There has to be a consensus in terms of the requirements amongst various units of the client. Almost all respondents felt that the emphasis on modularization in the IT industry is to increase flexibility. Respondents explained that modularity increases flexibility because the manager can assign the onus of a task/module to one resource or team handling the module. This makes it easy to track a resource and re-deploy it if necessary. Some respondents, however, felt that modularization tends to create specialists at tasks and hence, comes in the way of flexibility.

Most respondents felt that a mix of flexible resources and resources that fit the project requirements is selected for a project depending upon the phase of the project and the level of expertise and domain knowledge required. Respondents feel that projects look for best *fit* instead of very *flexible resources* when the project requirements are clearly laid down. Unless drastic changes are expected in the project due to its newness or due to the past experience with the client, most “aligned” resources are sought for. Flexible resources are preferred by the PMs for long term relationships. It is handy for a PM to always have ‘flexible’ resources in his pool for forthcoming projects or contingencies.

In order to create a ‘flexible’ resource base, resource managers maintain the pool, there are inter-SBU movements and trainings and certification courses provided. Another way to create a ‘flexible’ resource base is through appraisal process. Adaptable employees are given better performance appraisal ratings. Freshers are more flexible than the resources at the higher level (where “resource flexibility narrows down” according to a respondent). Technical flexibility is

easier to obtain; functional flexibility is an issue for most companies doing high end consulting projects. Behavioural flexibility although very important may not be available. GDM needs more behavioral flexibility since co-ordination is needed. Measurement of 'excitement level' of the employees and then gauging the interests of the employees can help in controlling the behavioural flexibility. Also, the PM should motivate the resources under her, empower them and continuously show them their future growth in the company.

Some respondents felt that their need for functional and role flexibility as PM, was higher from the senior team members and lower from others. One respondent, for instance, felt that his expectation from the coders was not to be flexible but to have the right set of skills and domain knowledge to code their modules. The project managers, team leads and developers should be flexible. Business analysts should have in depth knowledge of the domain. Therefore, the

TABLE 2

Issue	Affirmative Respondents
Resource flexibility alone (without proper co-ordination) cannot suffice for project success	All respondents
Factors such as client involvement and requirement volatility have an impact on project performance	All respondents
Need for flexibility is higher in global delivery model	2,3,5,7,10,11,13,14,1,5,16,17
Modularization increases flexibility	1,2,3,5,8,9,13,17
GDM increases stress and coordination for the coordination manager	2,3,4,8,11
Role of the PM is different within and across different project	2,4,5,7,8,10,13,14,15,16,17
Resources are shared in IT projects - quality is supplemented by quantity	1,3,5,10,11,16
Initial phases of the project demand more resources at Onsite	All respondents

Depending on the project requirements, a mix of both fit and flexible resources are needed for a project	1,2,3,4,5,6,7,10,12,14,15,16,17,18
Less complex projects (testing, support and maintenance) may not need HR flexibility	2,3,5,6,7,10

business analysts and architects should not be flexible across verticals. Domain knowledge is more important for middle level resources in a project. The developers may not have extensive domain knowledge as their task is to develop or code for specific functionalities.

Alternate Project Methodologies

All the respondents felt that GDM poses coordination and communication challenges. Since project work takes place at more than one location, managing can become a very challenging task. Many of them said that since the PM acts as the liaison between the clients, his onsite resources and his offshore team, his work of coordination can be "stressful". At both onsite and offshore, over-commitment is an issue which can lead to the failure of projects. The problem is that there is no clear demarcation of modules yet, which makes division of tasks more difficult as per GDM. Some respondents felt that GDM also poses culture and language related issues for resources at onsite.

Although respondents confirmed that the concept of nearshore in GDM has not been implemented in the Indian IT firms, the presence of onsite itself poses additional work on behalf of the manager. Even though the concept of GDM is a 'win-win for both the clients and the vendors', its execution and implementation is difficult. GDM is more or less a hygiene factor according to the respondents. In the absence of GDM as a model, the industry would have gradually aligned itself to a similar work model. One respondent feels that GDM is also "evolutionary" in some sense. However, GDM has made the whole working more coherent. To combat the lack of comfort that the clients felt in "body-shopping", there are video conferences arranged in IT companies such that clients can attach faces to the names they work with. Infrastructurally, GDM is highly successful as projects easily run on client servers as desired. In the context of high end IT consulting also, GDM is relevant and would optimize the working model. GDM has brought in a lot of 'structure' in the work methods. It is now necessary for CMM level 5 accreditation etc. and this model is the most cost-effective way of doing a project.

Owing to the limitations suggested by the respondents, we studied some other methods of software implementation projects such as "body shopping". One respondent gave a very important input about Agile Scrum technology which is an alternate to the global delivery model. **Scrum** is an iterative, incremental methodology for project management often seen in agile

software development. Scrum is for the management of software development projects, run software maintenance teams or as a general project/programme management tool. The aim is to increase *speed and flexibility* in new product development. The main roles (Pig Roles) in Scrum are *Scrum Master, Product Owner and Team.* The Chicken roles are stakeholders (customers and vendors) and managers. Scrum encourages *co-location* of all team members. A key principle of Scrum is its recognition that during a project the customers can change their minds about what they want and need (often called requirements churn), and that unpredicted challenges cannot be easily addressed in a traditional predictive or planned manner. Scrum adopts an empirical approach – accepting that the problem cannot be fully defined. All is '*timeboxed*' in the project. There are daily scrums, sprint planning meeting, sprint review meetings and sprint retrospective. Metrics include product backlog, sprint backlog and burn down chart.

Where most respondents felt that "body-shopping" or all people at onsite is very expensive and hence not viable, some felt that Scrum technology is also not feasible because the clients would have to stay at the vendor's site. Clients outsource such projects so that they can concentrate on their core value chain. Thus, one of the key finding here is that most project managers prefer the global delivery model and feel that it is the most cost effective arbitrage of labour and time. The senior most respondent in the sample, however, felt that the future will see a mixed version of global delivery model and agile technology. One respondent confirmed that he has seen several projects which follow the scrum agile model at multiple locations.

Thus, based on Figure 1 and the responses of the industry executives, the following issues are clear. In order to maintain a 'flexible' resource pool and for their deployment into the projects, HR flexibility as a capability is a must for IT firms operating under the global delivery models. Despite resource and coordination flexibility, project performance can be below expectation owing to dynamism in the project or project handling from the client side. One respondent said that resource and coordination flexibilities ensure only the supply side success of a project. GDM is a highly successful way of doing a project with coordination being the only limitation. Even though the concept of nearshore has not picked up that well, most respondents concluded that this is the most cost effective way of implementing a project. The roles and responsibilities of HR in successful functioning of GDM have however increased substantially.

PHASE II: Pretesting of Questionnaire

Questionnaire pretesting was done with several objectives. In order to gauge respondent comprehension, burden and interest, some respondents who had not been interviewed initially were contacted. The 14 respondents helped in understanding the *sampling* for the actual survey – the eligibility rates, response rates and completeness. One key motive of pre-testing the questionnaire was to check if there is an acceptable level of variation in the responses such that further analysis is possible. In some cases, post questionnaire filling, some probe questions were asked to look for ambiguities and misunderstood items.

Some of the items were re-worded for the respondents after construct validity phase. Few new items added to ensure completeness. After finalizing the questionnaire, it was tested on 14 IT practitioners (not necessarily PMs). Based on this pre-test, several crude yet valuable insights have been gained. Variables, specificity of project requirements and requirement volatility have a negative correlation. There is a positive correlation between degree of resource alignment and project performance. As literature suggests, the specificity of project requirements has been reported as low. However, the construct 'client involvement' is not giving the desired results. Since, the number of records was less; nothing can be said about the pattern of responses in different types of projects – development, testing and maintenance. There has been a mixture of T&M and fixed price projects in the responses which indicates that in the final survey, it should not be difficult to observe a distinct pattern of relationships for the two types of projects.

5.0 LIMITATIONS

A major limitation of this research is the timing of the survey with regard to the completion date of project implementation. Retrospective data for the study were collected after the systems were developed. Subjects' responses may have been influenced by the ultimate success or failure of the systems. Also, the entire model – the antecedents and the outcomes have been tested on the project manager, which is likely to bring in a common method bias. However, matching two respondents for one completed project, data collection would become cumbersome.

APPENDIX 1

SCHEDULE FOR PILOT STUDY

OPEN ENDED QUESTIONS (for discussion)

Part I – Need and availability of skill and behavioural flexibility

1. Does an organization performing in the global delivery model need skill and behavioural flexibility from its employees?
2. How do organizations create a 'flexible' resource base?
3. How do skill and behavioural flexibilities impact project performance?
4. Does domain knowledge generate flexibility or inflexibility? How important is it?
5. How different is the need for flexibility across projects from the need for flexibility within a project?
6. Do projects look for specific resources? In that case, is it not more of "fit" rather than "flexibility"?
7. How important is it for resources to be adaptable to changing requirements?
8. How well can an IT firm supplement quality with quantity (importance of "bench" and contingent workforce)?

9. Are skill and behavioural flexibilities more relevant for product based IT firms than the service providers?

Part II – Importance of and mechanisms of co-ordination flexibility

1. Is coordinating IT projects a big challenge? If yes, what are the factors that make it challenging?
2. Who is responsible for co-ordination flexibility?
3. Can resource flexibility alone suffice for satisfactory project performance? Does coordination flexibility moderate the relationship between resource flexibility and project performance?
4. What are the mechanisms used by co-ordination managers to ensure that redeployment and reconfiguration of resources is done?
5. Do the 24-hour working model and global presence of IT projects, put excessive burden on the coordination manager? Is co-ordination a limitation of the global delivery model?
6. Is standardization being attempted by IT firms to reduce the limitations of GDM? What happens to flexibility in such an environment?
7. What are the determinants of *offshore-onshore mix* in the global delivery model?
8. How different is the coordination managers' responsibility across and within projects in a typical IT firm?
9. Does the coordination manager keep the firm strategy in mind (and also re-synthesizes it) while coordinating projects?
10. What all parameters, other than project related division of tasks, are considered before deciding the offshore-onshore mix in the global delivery model?

Part III – Metrics of project performance, effects of project complexity

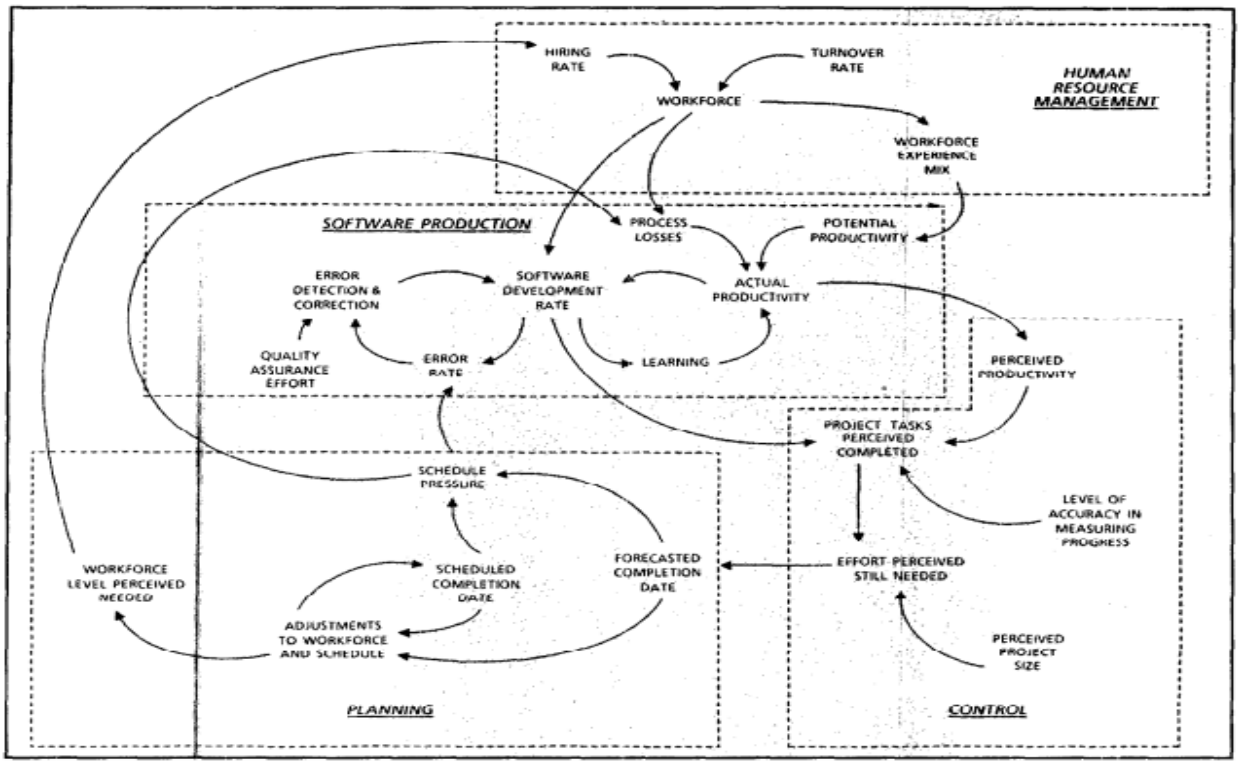
1. What are the metrics that define the success of a project?
2. Is modularization of work, a source of flexibility for organizations?
3. Are these metrics dynamic in nature or are signed as a contract at the start of the project?
4. How tough is it for employees to cope up with changing client requirements?
5. Does the task complexity of a project determine the resources needed and does it in turn, have a bearing on the success of the project?
6. Based on the effects of resource and coordination flexibilities, can a project manager rate the performance of the project?

Part IV – Additional questions

1. What are the limitations of GDM?
2. How successful is GDM in the context of high end IT consulting?
3. Do firms strictly follow the global delivery model or has it turned into a fad?
4. Are models such as 'Body Shopping' or 'Scrum' methodology better than GDM?

APPENDIX 2

Model of Software Project Delivery



Source: Hamid & Madnick, 1991

APPENDIX 3

ROLE OF HUMAN RESOURCE FLEXIBILITY AND COORDINATION IN PROJECT PERFORMANCE: A STUDY OF THE INDIAN IT INDUSTRY

Indian Institute of Management Calcutta

Questionnaire

Dated:

Dear Sir/Madam,

I am a doctoral student at IIM Calcutta specializing in Human Resource Management area. As a part of the requirement for my doctoral degree, I have to conduct research and a write a defensible thesis in my chosen area. I have chosen the following topic: **"Role of Human Resource Flexibility and Coordination in project performance: A study of the Indian IT Industry"**. This study is conducted in the context of *global delivery model* (GDM) adopted by the Indian IT companies. This research is being done under the guidance of Professors Amit Dhiman, Debashish Bhattacherjee, Rahul Roy and Biswatosh Saha of IIM Calcutta.

A questionnaire is presented here to elicit your responses on the project performance and its antecedents as per your experience. The questionnaire seeks only your opinion; it does not ask questions on any sensitive aspect of the business of the firm or information about the client and/or project, as such. It takes only about fifteen minutes to complete the questionnaire. The results of this questionnaire survey will be kept strictly confidential and they will be used solely for purposes of academic research. The results and findings will be shared in the form of a report with your organization.

The study attempts to study the antecedents of superior project performance in the IT industry. The aim is to study the impact of human resource flexibility and coordination challenge on project performance and also the degree of resource alignment required based on specificity of project requirements. Kindly feel free to contact the researcher in case of any doubts.

All the questions need to be answered. I request you not to leave any of the questions unanswered because incomplete questionnaires will not be useful for the study and will lead to waste of valuable time.

I thank you for your time and effort on behalf of IIM Calcutta for participating in my research as a respondent.

Regards,

Avantika Tomar

Fellow Programme in Management – HRM

Indian Institute of Management, Calcutta

Phone: 09748857344

Email: avantikat08@email.iimcal.ac.in

SECTION I - Fact Sheet

1. **Please let us know about you:**

Your Designation	
Your total years of experience	
Your years of experience in the current organization	
Your Department and Vertical/Domain/SBU	
Your Qualifications	
Number of grades/levels in the Organization	
Your Grade/Hierarchical Level	
Your Email ID (for future correspondence, if needed)	

2. **General Project information:**
   (Kindly share the following information about ALL the projects that have been completed under you in the LAST 2 YEARS, only. SECTION II of the questionnaire would have to be filled for each project SEPARATELY.)

Project No.	1	2	3	4	5
Type of Project (Development/ Maintenance/ Testing/ Combination of the above)					
Effort (Person Months)					
Calendar Time (Months)					
Team Size					
Number of hierarchical levels in the team under you as the PM					
Life cycle model used (Waterfall/Agile/Others)					
T&M or Fixed Price Project					

SECTION B

Kindly respond to the following statements using the 7-point scale below.

Strongly Disagree **(1)**	Disagree **(2)**	Somewhat Disagree **(3)**	Undecided **(4)**	Somewhat Agree **(5)**	Agree **(6)**	Strongly Agree **(7)**

Please choose only ONE option for each statement. Kindly refer to the legend above to know what each option means. All questions are to be responded.

A1	I was aware of the project implementation cycle followed by the client.	1	2	3	4	5	6	7
A2	I knew the end usage of the client's product/application being developed.	1	2	3	4	5	6	7
A3	I knew the revenue (offered by the client) contribution of this project to my company.	1	2	3	4	5	6	7
A4	I understood the project operating procedures of my clients.	1	2	3	4	5	6	7
A5	All SLAs set by the client were contractual in nature.	1	2	3	4	5	6	7
B1	Client feedback was frequently available in the project.	1	2	3	4	5	6	7
B2	Clients worked with the team to make requirements clear.	1	2	3	4	5	6	7
B3	Client was involved through all stages of project implementation.	1	2	3	4	5	6	7
B4	Client involvement was more for complex requirements (if any) of the project.	1	2	3	4	5	6	7
B5	In case of queries in the project, client side experts explained the functionality demanded.	1	2	3	4	5	6	7
C1	Project requirements given by the client were clear.	1	2	3	4	5	6	7
C2	Project requirements were very specific.	1	2	3	4	5	6	7
C3	System requirements of the project were adequately defined.	1	2	3	4	5	6	7

C4	My team had information about the SLAs to be met for the project as expected by the client.	1	2	3	4	5	6	7
C5	All stakeholders of the project (clients, onsite and offshore teams) had the same understanding of the requirements.	1	2	3	4	5	6	7
C6	Project specifications provided at the start of the project were correct.	1	2	3	4	5	6	7
D1	Needed human resources were always available irrespective of the project requirements.	1	2	3	4	5	6	7
D2	Specialist human resources for the project were difficult to find.	1	2	3	4	5	6	7
D3	Adequate bench strength was available for me to allocate resources from.	1	2	3	4	5	6	7
E1	There were additions and deletions in the requirements after the start of project implementation.	1	2	3	4	5	6	7
E2	Modifications to the project requirements happened early in the project implementation phase	1	2	3	4	5	6	7
E3	Requirements kept changing throughout the implementation of the project.	1	2	3	4	5	6	7
E4	Dynamic requirements needed more effort required (in person-hours) in the project.	1	2	3	4	5	6	7
E5	There was considerable change from the client's side in the requirements after they had been defined	1	2	3	4	5	6	7
E6	Changing requirements were faced at all stages of project implementation.	1	2	3	4	5	6	7
F1	While allocating resources to project, I accurately knew the skill set required.	1	2	3	4	5	6	7
F2	The human resources at the start of the project were exactly what the project requirements demanded.	1	2	3	4	5	6	7
F3	At the start of the project, most human resources deployed by me had a broad skill set.	1	2	3	4	5	6	7
F4	My team had resources that could work, if need be, on multiple modules within the project.	1	2	3	4	5	6	7
F5	The experience level of the resources deployed was very high.	1	2	3	4	5	6	7

F6	Project requirements could be directly mapped to the human resource deployed on them.	1	2	3	4	5	6	7
G1	Coordinating resources across different locations was a challenge.	1	2	3	4	5	6	7
G2	Changes in the team composition (such as attrition, resource sharing etc.) made coordination difficult.	1	2	3	4	5	6	7
G3	Some human resources deployed on the project had prior experience of working with each other.	1	2	3	4	5	6	7
G4	Coordinating human resources was not an issue in the implementation of the project.	1	2	3	4	5	6	7
H1	During the implementation of the project, resources under me were shared across different projects.	1	2	3	4	5	6	7
H2	Some resources working under me were made to work in different roles due to their broad skill set.	1	2	3	4	5	6	7
H3	Most resources under me could perform equally well at both onsite and offshore, during the implementation of the project.	1	2	3	4	5	6	7
H4	During implementation, my team was quick to respond to any uncertainties.	1	2	3	4	5	6	7
H5	During project implementation, I got additional skilled resources as and when desired.	1	2	3	4	5	6	7
H6	During implementation, I had to deploy more resources than were being billed by the client for the project.	1	2	3	4	5	6	7
H7	Training sessions had to be arranged for the resources during the implementation of the project.	1	2	3	4	5	6	7
I1	The project under consideration was completed on time.	1	2	3	4	5	6	7
I2	The project under consideration was completed within the estimated budget.	1	2	3	4	5	6	7
I3	All SLAs were met in the project.	1	2	3	4	5	6	7
I4	The project met the quality thresholds (defect rate related).	1	2	3	4	5	6	7
I5	The application was produced to all specifications.	1	2	3	4	5	6	7
J1	The application/product met the requirements of all stakeholders.	1	2	3	4	5	6	7

J2	The client was satisfied with the project implementation.	1	2	3	4	5	6	7
J3	The client gave repeat orders to my company.	1	2	3	4	5	6	7
J4	My company's processes became better after the implementation of the project under consideration.	1	2	3	4	5	6	7
J5	As per the client, the interim milestones of the project were met.	1	2	3	4	5	6	7

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