**Role of Human Resource Fit and Flexibility in Software Project Performance: a study of the Indian IT Industry**

 **Abstract**

Strategic human resource management (SHRM) literature has talked about the fit and flexibility of human resource management systems, and their complementarity in the context of dynamic environments (Milliman et al., 1991; Wright & Snell, 1998). In the past, the field of SHRM has predominantly emphasized the need for ‘fit’ between firm strategy and its human resource system to enhance the performance of the firm (e.g. Delery & Doty, 1996; Youndt et al., 1996). In recent years, however, there is a growing consensus among SHRM researchers that firms need to be capable of flexibly deploying and reconfiguring its human resources for survival and subsequent superior performance uncertain environments (Wright & Snell, 1998; Ketkar & Sett, 2009).

Empirically there is support for the ‘fit’ hypothesis i.e. the alignment of HR policies with the contextual elements of business strategy will result in superior firm performance. There is evidence supporting the above hypothesis in the context of automobile industry (MacDuffie, 1995; Huselid, 1995) and BPO industry (Batt, 2002). However, in the dynamic environments, human resource management systems need flexibility such that firms can quickly realign with the changing demands. In SHRM literature, Wright and Snell (1998) conceptualized human resource flexibility and posited a framework to study its impact on the firm level performance. Empirical investigation by Bhattacharya, Gibson and Doty (2005) and Ketkar and Sett (2009) found support for ‘flexibility’ hypothesis. The strategic management challenge is to cope with the dynamism and uncertainty by continually adapting to achieve a fit between the firm’s resources and coordination mechanisms with the external challenges.

SHRM literature has identified three dimensions of HR flexibility, viz (1) HR systems that can be adapted quickly, (2) human capital pool with a broad array of skills, and (3) behavioural flexibility among employees (Wright & Snell, 1998). HR flexibility and its dimensions affect the *firm-level* human, operational, and financial outcomes. Empirical evidence suggests that flexibility in employee skills, employee behaviors and human resource practices has a significant influence on the performance of a firm (Bhattacharya, Gibson & Doty, 2005; Ketkar & Sett, 2009).

The extant empirical literature on fit and flexibility has explored influence of each independently on firm level performance parameters. However, in industries where majority of work is conducted in project mode, it will be interesting to investigate the influence of both fit and flexibility constructs on project performance. The project provides an appropriate unit of analysis to investigate the impact of both fit and flexibility constructs simultaneously because of apriori project planning and resource allocation process, and subsequent management of execution challenges involving changes in scope and requirements along with coordination issues which may crop up during project implementation. In this thesis, the interaction of HR flexibility and HR fit has been studied along with the influence that both have on project performance especially in the face of several change requests from the clients and coordination challenges with the vendor organizations.

There is no empirical study which combines the fit and flexibility hypotheses and analyses their impact on project performance. Also, there is no study to investigate the impact of HR flexibility on project performance. This thesis studies the influence of HR flexibility on IT project performance in the context of *global delivery model (GDM)*. IT project development using GDM provides an appropriate context for the study, wherein changing client requirements (Zowghi & Nurmuliani, 2002; Javed, Maqsood & Durrani, 2004; Ebert & De Man, 2005, Thakurta, 2009) and coordination challenges (Nidumolu, 1996; Keil et al., 1998; Wallace & Keil, 2004) during project execution result into a need for both a-priory alignment of human resources with the project requirements and HR flexibility while implementation of the project. In this dissertation, the aim is to contribute to the literature on human resource fit and flexibility by studying this research area. Specifically, we study the relationship between the degree of resource alignment (fit) and project performance; the impact of requirement volatility and coordination challenges on this relationship and also their independent impact on project performance. The role of HR flexibility comprising of skill and behavioural flexibility in enhancing the relationship between degree of resource alignment and project performance is also studied.

There are seven constructs in this study namely specifiability of project requirements, availability of resources, degree of resource alignment, requirement volatility, coordination challenge, human resource flexibility and project performance. The questionnaire development used for the study included both in-depth interviews and literature survey. Scales were available for constructs – Requirement Volatility, HR Flexibility and Project Performance. For the other constructs, scales were generated on the basis of existing literature and interviews with academicians and practitioners. There were minor changes in the existing scales also based on the inputs of the respondents. The questionnaire was prepared after the content, face, convergent and discriminant validity. The scales were tested using factor analysis (EFA and CFA).

The hypotheses have been tested using multivariate analysis. Data has been collected using survey questionnaire method. A pilot study was conducted prior to questionnaire based data collection. The target population of IT companies includes those that are both ISO/IEC 20000 and CMM level 5 certified. Another criterion was to collect data from companies that are into all categories of software project implementation based on the type of project – development, testing, maintenance, combination; type of life cycle model adopted – waterfall, agile, others (spiral etc.); and cost model – time and material, fixed price, others.. The data was collected on retrospective basis from project leads and project managers who have handled these projects. Data was collected on 194 projects across four organizations. After data cleaning, 189 usable sets of responses were chosen.

The results of both quantitative and qualitative studies support the HRM ‘Fit’ hypothesis at the IT project level of analysis. The degree of resource alignment has a positive impact on project performance. In this thesis, HR fit or Degree of Resource Alignment has been conceptualized to include two dimensions – resources closely mapped to the specific technical and domain requirements at the start of the project, and resources that are multi-skilled and/or more experienced enlisted in the project at the start owing to the anticipated project level uncertainty or “performance risks”. While HR Fit is a state of alignment at time t=0 i.e. at the beginning of the project, between project requirements and human resource competencies, HR Flexibility is a capability to respond to uncertainty during t=0 and t=t (Wright & Snell, 1998). The provisioning of “appropriate” slack discussed above potentiates the flexibility behaviours. The execution HRF or flexibility shown by team members driving project execution showed strong direct influence on project performance across various analyses. Execution HRF has two dimensions – execution skill flexibility and execution behavioural flexibility. The HR flexibility hypotheses is also proven at the project level of analysis. Further, execution skill flexibility and behavioural flexibility had interactive effects on PP reinforcing each other’s presence.

While the complementarity of HR fit and execution flexibility is proved by the way of co-existing independent direct effects of the two, the interaction effect was not supported. In order to understand the non-interaction better, the interaction relationships at the dimensional level for the two constructs were analysed. The effect of “slack” (DoRA Dimension) was mediated by execution skill flexibility, so only dimension of interest was execution behavioural flexibility. The apriori provisioning of slack and dynamic execution HRF are the antidotes to the negative influence of frequent changes in project scope from the client or the external and internal coordination issues during project execution. This negative influence of RV and CC was proven across analyses in this thesis. A counter-intuitive result of this thesis was the negative relationship between numerical flexibility and project performance.

This thesis contributes to the literature (Delery & Doty, 1996; Youndt et al., 1996; Ostermann, 1987; McDuffie, 1995; Batt, 2002) on the role of HR fit in enhancing firm performance. This is established in this thesis at the project level of analysis, a significant contribution. In the extant literature on human resource management in IT industry, this is first study of its kind. The thesis makes contribution in conceptualizing the HR fit construct of Degree of Resource Alignment. It is pointed to have two dimensions – resources closely mapped to very specific projects needs expressed by client , and resources with broad based technical skills and domain experience to build up ‘slack’ (March, 1979) in case of complex projects, new clients, and unclear specifications. This conceptualization extends the notion of fit to include “flexible resources as fit” in case of such requirements in certain projects. This is in line with conceptualization of ‘fit’ as a state of alignment (Wright & Snell, 1998) between the needs of one component, project requirements, with the needs of the other component, team composition (Nadler & Tushman, 1980) at time, t=0.

In IT project management literature, effort estimation and identification of appropriate resources or degree of resource alignment has been identified as a critical capability (Ethiraj et al., 2005). Thus, this thesis contributes to IT project management literature by providing support to influence of this capability on project performance.

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