Influence of fit and flexible human resources on IT project performance

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Abstract

skill aligned or fit (HRs) on project performance. The study argues that the human resources that are narrowly and exactly skill alignedto the clear project specifications provide productivity gains, and flexible human resources provide project slack of experience and multiple skills to cope up with the

during project execution. Latter also help to cope up with the uncertain coordination problems cropping up during project execution. Both exactly mapped HR ability (fit) and HR flexibility (HRF) show unique influences on PP. The planned slack of HRF influences PP mediated by executed HRF of skill and behavioural kind. Skill flexibility moderates negative influence of changes requests and coordination challenge on PP. The HR planning models in the extant research in IT project management implicitly assumes that all project needs are known at planning stage and required HR skills are available whenever needed. This research refutes these assumptions and tests a dual- dynamic model of HR planning and execution embedded in the theoretical framework of HR ambidexterity.

Keywords: IT Project performance; Human resource allocation; Human resources fit and flexibility; Human Resource ambidexterity.

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De Man, 2005; Wallace & Keil, 2004). The aforementioned dynamism and unpredictability result in high performance risks (Nidumolu, 1996). This risk needs to be responded by incorporating dynamic element to the human resource allocation and planning, not captured in the model based research cited above.

This study addresses the above research gap by proposing that project managers during HR planning build up a slack of experienced and multi- skilled human resources by drafting in such resources

would crop up during the project execution. Though such a buffer HR flexibility raises the project cost, the paper argues that alternative of just-in-time drafting of HR skills in response to contingencies is less feasible in IT projects. This HR flexibility is complemented with planning and drafting of lesser experienced and narrowly skilled low cost team members, who align exactly to the part of the project needs that are well defined, specific, and certain, thus providing productivity gains and lower costs of project execution. Lower overall costs and faster execution are the competitive advantages of the outsourced IT projects executed by the Indian IT firms. This research investigates the influence of such a dual HR capability- of exactly aligned HR, and flexible HR on project performance (PP), and the moderating effect of HR flexibility in mitigating the negative influence of unpredictable requirement

project success and this study empirically investigates it, a research gap left unaddressed in the extant literature.

This research contributes to the IT project management literature by applying the theoretical

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ambidexterity (Gibson & Birkinshaw, 2004) to HR planning in uncertainty. It extends the notion of resource- need fit, dealt as a static unidimensional construct in the modeling based research, to a construct that is dual- dynamic ambidextrous. This dynamism and ambidexterity is demonstrated by investigating the duality of HR fit and flexibility at the project planning and the execution stages and studying its role in managing the performance risks and the project performance. To the best of autho

2004). ThusIT projects provide unique attributes that are distinct from other project contexts. The globally distributed nature of project teams, simultaneous emphasis on low costs and flexibility, higher degree of dynamism and uncertainty (Huemann et al., 2007), knowledge and higher end skills centricity, relatively shorter duration of projects, and international clients are such features that make investigating IT projects context relevant to the research questions raised in this study.

2.1 *IT Project Performance: Criterion variable*

In the case of IT projects, the definition of a project and its success factors are complex and multi-dimensional owing to the environmental dynamism, skill requirements, and multi-location execution. Nidumolu (1996) considered *process control* and *product flexibility* astwo important dimensions of software-development project performance.Measurement of software project performance may encompass the process objectives (budget, cost, and efficiency), product features (quality, features, and price), stakeholders expectations (meeting business objectives, development team learning, and customer satisfaction) and the business value of the project for the client and the vendor organizations (DeLone & McLean, 1992; Kerzner, 1995; Nidumolu, 1996; Shenhar et al., 2001; and Thomsett, 2003). Project Performance (PP) in this research is defined as *the assessment of how well the project's objective parameters – time scales and budget were met along with the subjective parameters such as satisfaction of client's business objectives, meeting user expectations, and creating value for the vendor organization at each milestone of the project.*

3.0 Key Performance Risks and IT Project Performance (PP)

The key sources of uncertainty inthe IT projects are the unanticipated change -requests raised by the client during the project execution and various coordination challenges arising within the project team and from the client side. These two factors enhance the performance risk and are often viewed as the highest contributors to the inefficiency and poor performance of a software project (Keil et.al., 1998; Lamsweerde, 2000). This is especially true for the projects that are outsourced to the global vendors such

coordination issues can be detrimental to the PP (Ebert & De Man, 2005; Xia & Lee, 2004) if not controlled by proper planning and able leadership. It is hypothesized that:

Hypothesis 2:*Coordination challenge originating from the client end or from within the project team has*

As cost efficiencies obtained in execution of outsourced IT projects are critical for project success, close alignment of HR needs and team capabilities is one important goal of project planning. In projects with clearly laid out requirements, known technology base and longtime clients, it is possible to exactly map the human resource capabilities according to the initial project specifications. In routine projects with far lesser performance risk of change requests from the client end, the project managers would like to allocate lesser experienced, narrowly skilled, cheaper resources and focus on higher productivity to gain profits (Otero, et. al., 2009).

repeat orders from the same clients (Ethiraj et. al., 2005). This strategy helps in reducing the project risk significantly by making uncertainties driven by client fairly predictable or foreseeable. The IT vendor develops explicit or tacit k

for efficiency gains is important, but the execution of skill and behavioral flexibility is more critical when many new requirements and coordination challenges crop up during the project implementation (Wright & Snell, 1998).

Drawing from the

of the project and quality of project management, we are able to demonstrate that human resource flexibility is essential for success in any IT project.

9.0 Method

9.1 *Research Design and Data Collection*

We have used survey method to collect data from the IT firms in India. The questionnaire used has 31 items and we sought around 200 data points for hypotheses testing to achieve adequate power of test (Nunnally, 1978). The unit of analysis of the study is firm. We collected data from firms withCMMi (Capability Maturity Model Integration) level 5 and ISO 2000 quality certifications. These criteria ensured that all firms had similar standardized software development process, thereby controlling for the influence ofsoftware development process maturity. We chose those companies which are into all ranges of software projects in orderto capture representative sample of the population studied.

There were fifty one firms based in India meeting the criteria defined above. Out of these firms we approachedeighteenfirms that hadcomparable standing in terms of size, performance, and the nature of projects. Only threefirms decided to participate with one providing data from two locations. The first author visited all four locations to collect data aiming for around fifty data points from each location. In order to achieve external validity, the sampling plan covereddifferent types of projects, as is evident from table 1.

Insert Table 1 about here

Project managers (PM)were the respondents for the study. Theyhad the overall responsibility of project management including responsibility for managing the human resources of the projects. In HRM research focused on organization level policies or processes, single respondent design has often been used (e.g. Batt, 2002; Ketkar and Sett, 2009) and so it was considered appropriate for this study as well. The

respondents on an average had

(EFA) on each scale separately to test the dimensionality.The respondent and the project profiles were similar to the main study data. In pilot test all the values of Cronbach alpha were above 0.6excepting that for coordination challenge, acceptable for developmental scales (Nunnally, 1978). In EFA tests all individual items had a minimum factor loading of 0.5,though some items cross loaded on other factors. Since all scales were new, many scales/ items did not behave as expected in these tests. Post analysis probe questions were asked from respondents to look for ambiguities, double barrel items, and misunderstood items. Some of the items were added, deleted and re-worded after the pilot test.

CFA and Convergent- Discriminant Validity*:*Since changes were made in the scales after the pilot, to confirm dimensionality,predictorand PP scale items were separately allowed to freely load (EFA) on to the latent factors. As is evident in the tables 2 and 3, most of the items loaded as expected on the defined constructs. PHRF and executed skill flexibility aligned on one factor representing the shared variance,and items related to customer coordination challenges cross loaded on requiremenF2 11.04 -4(t)6(e1vde)-2ted

varie-0.6691JETfQ-0.00000912 0 612 792 reW* nBT/F2 11.04 Tf1 0 0 1 72.024 659.02 Tm02 T10 G[(c)9(t)-4(s,Egun)7140(cha)-M-4(rd

has with all other constructs (Fornell &Larcker, 1981). For all combinations, including PHRF and executed skill flexibility, client coordination challenge and requirement volatility, the discriminantirement volatilit

moderating effect of SF only, the only significant moderating effect. Themoderating effect was in the expected direction providing partial supportto hypotheses 5 and 6. Notablythe effect size of moderating effects of SF was comparable to the direct effects of SF.

Insert table 6 about here

11.0 Discussion

11.1 Project Planning in Uncertainty: Duality of ERA and HR flexibility as fit

By investigating the impact of human resource planning and executed flexible behaviors, this research contributes to an under researched area of studying impact of HRM onproject performance (Turner &Muller, 2003; Huemann et al., 2007; Silva & Costa, 2013; Keegan et al.,2012; Keegan et al., 2018). At

performance. In this research, 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

to provide efficiency gains, and resources that are multi-skilled and/or more experienced enlisted in the project to provide flexibility in managing the anticipated project level

expected high requirement volatility and/or internal/external coordination challenge. The multiskilled

in cases of uncertainty. It is pertinent to note that both high productivity and low costs and management of the performance risks are critical for the success of outsourced IT projects.

It needs to be emphasized that in this research the dimensions of planned human resource flexibility was conceptualized as a construct distinct from exact resource alignment, as per the

in HRM literature (Wright & Snell, 1998).

The EFA (Table 2) convergent- discriminant construct validity test confirmed the distinctive unique nature of ERA and PHRF.However, the EFA tests on DoRA items in the pilot and main studies revealed

single factor implying shared variance between the two dimensions. This shared variance represents some threshold need for HR Flexibility in any project, especially in global delivery model. Thus, even though human resources might be closely mapped to clear specifications, they still are expected to exhibit flexibility even for simple routine project, and vice versa is also true that flexible experienced resources also contribute to achieve the efficiency goals in the projects. This was verified by respondents who explained that even routine projects are broken down into modules, and to counter concomitant coordination issues, flexibility is required. This flexibility is not so much of the skill form but pertains more to certain adaptable behaviours such as collaborating with other modules, working across different schedules, and stretching.

This research contributes significantly to the mainstream HRM literature by conceptualizing and testing DoRA, thus explicating the intricate dual nature of HRM planning in the context of dynamic/ unpredictable environments. Specifically, exact resource alignment and PHRF respectively represents the

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Hall & Lengnick- Hall, 1988; Wright& Snell, 1998). However, this research could explore the distinct nature as well as the relation between the two by identifying the common underlying secondorder latent construct of overall fit or DoRA, and this has not been previously attempted in the HRM research at any level. With respect to flexibility dimensi

resources

project managers build structural ambidexterity (Gibson & Birkinshaw, 2004) in projects. It would be manifested during project execution in ambidextrous behaviors of exact routines followed and skill and behavioral flexibility demonstrated quite independently.Thus the dual features complement additively in influencing PP.

The conceptualization of duality of HR planning is a departure from the extant research in IT project HR planning (Tsai et al., 2003; Otero et al., 2009; Andre et al., 2011; Kang et al., 2011; Silva & Costa, 2013) focused on models optimizing skill, behavioral, and experience profiles with objective

behaviour, and skill based pay are needed to evoke such flexibility. Future research can investigate impact of such policies on evoking flexible behaviours in project teams.

The executed HR flexibility of the team members and its two dimensions-

negative influences on project performance of client driven requirement changes and coordination issues are greater than the internal team issues (Table 5). Though, it needs to be emphasized that many times the trigger for internal coordination issues is rooted in the frequent changes

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Type of Project	**Life Cycle model used (Number of projects)**			**Pricing Model used (Number of projects)**			**Avg. Effort (In person months)**
	Waterfall	**Agile**	**Others (Spiraletc.)**	**Fixed Price**	**Time & Material**	**Mixed**	

My team had resources that could work, if need be, on multiple modules within the project.	.395	.631