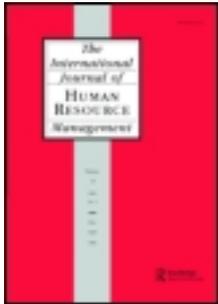


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Mediator analysis in the management of innovation in Indian knowledge workers: the role of perceived supervisor support, psychological contract, reward and recognition and turnover intention

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While examining the field of innovation, a research gap was found concerning the need to examine the contextual factors affecting management of innovation and turnover intention (TI) in knowledge workers. Investigating a sample of Indian knowledge workers ($n = 312$) and applying multilevel modelling (MLM) using structural equation modelling, the current study found that the psychological contract and rewards and recognition were strong mediators between perceived supervisor support, innovation and TI. A better fit model emerged when examining four competing models using MLM. This research examines the theoretical and practical implications of the results.

Keywords: knowledge workers; management of innovation; multilevel modelling; perceived supervisor support; psychological contract; reward and recognition

Introduction

Recently, innovation research has begun to pay attention to sociopolitical processes (Dean 1987; Wolfe 1994; Savitskaya, Salmi and Torkkeli 2010; Hjalmarsson and Lind 2011; Krapez, Škerlavaj and Groznik 2012) which throw light on how innovation is actually carried out in the real world rather than how it should be done. Making innovation every employee's job is intuitively appealing but difficult to achieve (Birkinshaw, Boquet and Barsoux 2011). A McKinsey global survey (2007) reported that finding the right people and aligning them for innovation is a greatest struggle for top management, and people in organisations are gradually engaging with innovation but to varying degrees. Further, the *Economist* Intelligence Unit's (2009) global survey on talent strategies stated that an enterprise's capacity to innovate is a critical constraint on talent.

Yuan and Woodman (2010) stated that in the field of innovation, research evidence regarding the intermediate psychological processes which would explain how and why different individual and contextual antecedents affect innovative behaviour remains inconclusive and underdeveloped (Shalley, Zhou and Oldham 2004). There is sparse literature linking how innovation is carried out with workplace attitudes and psychological processes. The current study aims to probe the contextual causes of management of innovation, as research on this topic is underdeveloped and inconclusive (Yuan and Woodman 2010; Birkinshaw et al. 2011; Bhatnagar 2012). More recently, Miron-Spektor, Erez and Naveh (2011) stated that innovation refers to the creation of new ideas and the execution of those ideas into new products, processes and procedures that are designed to

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be useful (West and Anderson 1996; Amabile 2000; cf. Miron-Spektor et al. 2011). Most innovation efforts fail due to lack of careful forethought and follow-up (Birkinshaw et al. 2011).

The current study gains significance against the backdrop of recession and economic slowdown, when controls are important for survival. The need for continued existence through self-renewal in the face of change is a central property of all living systems and applies uniformly to human organisations as sociocultural systems (De Geus 1997; cf. Dervitsiotis 2010, p. 905). However, in pursuing innovation, firms seek to optimise the exploration and blueprint of new value propositions in the form of novel products, novel processes or original ways of doing business, that is innovative business models (Dervitsiotis 2010, p. 905). This perspective holds important implications for the perceived supervisor support (PSS), psychological contract (PC) fulfilment and new value propositions in the innovation process (as defined by Dervitsiotis 2010, p. 905). Of special importance is the need for innovation in the recession-hit periods and in uncertain markets, where innovation is the only source of competitive advantage (see Scheck and Glader 2009; Dervitsiotis 2010).

In this context, rewards and recognition (RNR) also become important in a slowed-down economy, but may be endangered due to the paucity of tangible RNR for the knowledge worker. According to a recent report from a consulting firm in containing a survey on 41 organisations spread across the five locations of Bangalore, Chennai, Delhi, Hyderabad and Mumbai in India during the recession period (April–May 2009), 78% of companies surveyed stated that the rewards structure has remained relatively unchanged in the current economic downturn in India (see Deloitte Touche Tohmatsu India Private Limited report 2009). In another study conducted on *Fortune* 1000 organisations, 31% of the companies froze their defined benefit pension plans in 2009, which is more than four times as many companies as in 2004 (Society for Human Resource Management 2009b). Further, Grdinovac and Yancey (2012, p. 7) reported that standard cost-cutting practices throughout the economic crisis/recession phase included eliminating employee bonuses, not renewing contracts with existing workers and reducing work hours and pay. The survey results revealed that employee benefits have also suffered significantly, including lessening or eliminations in health care coverage, pension plans, retirement packages and flexible work programmes. This trend may lead to violation of the PC and a high turnover intention (TI).

Given the above-reported context and processes, the present study was designed and data were collected in 2009–2010, when the Indian economy was in a state of economic slowdown (Ministry of Labour, Government of India Report 2009). Such research is important because, during difficult economic times, it may be wise for organisational decision-makers to consider not only the immediate financial ramifications of their actions, but also their long-term psychological consequences (Grdinovac and Yancey 2012).

In trying to decide how to respond to an economic crisis, many Chief Executive Officers (CEOs) probably look to see how their competitors are responding. An online poll of 467 human resource (HR) professionals revealed that the four most common ways organisations cut costs between 2008 and 2009 (the period of economic crisis) were attrition (63%), hiring freezes (52%), salary freezes (49%) and layoffs (47%) (Society for Human Resource Management 2009a). This reduction in RNR would affect the intention to stay in the organisation, let alone responding to the innovative capability of the firm. Further, a knowledge worker may need the support of his supervisor in these times, which may lead to a PC and a need for RNR. The research questions in the current study are as

follows: is PSS an antecedent PC concerning RNR? Do PC and RNR act as mediators between PSS and management of innovation, with lower TI? To find answers to these questions, we have designed the research study reported in this research paper.

The paper is organised as follows: the next section examines the need for the study. The theoretical framework and development of hypotheses are then provided. This is followed by the section on the research design, which describes the measures utilised and data collection process in this research. The next section enumerates the results and discussion. This is followed by the section on conclusion, theoretical and practical implications of the research. The last section of the paper comprises limitations of the study and areas for future research.

Need for the study

Davenport (2005, p. 4) states that the augment of knowledge work has actually been foreseen for years. He points to the fact that Machlup did a lot of the initial work on both knowledge and knowledge work roles in 1958 (Davenport 2005, p. 4). The pharmaceutical, software and engineering sectors in India are at a sophisticated information storage and retrieval stage and are graduating to institutionalising best practices in knowledge management, albeit slowly (Rishikeshia 2001). These sectors employ knowledge workers, who are likely to have different sets of needs, aspirations and motivations from other workers (Tampoe 1993; Drucker 1999). Recently, it was found that knowledge workers' source of influence was the use of individual factors of innovativeness and self-efficacy, and this influence had no other significant social influences (Lewis, Agarwal and Sambamurthy 2003). Recent research by Fritz, Lam and Spreitzer (2011) on knowledge workers focused on the examination of engagement and energy management of knowledge workers. Tapscott and Williams (2006) see a strong, ongoing linkage between knowledge workers and innovation, but the pace and manner of interaction have become more advanced. A number of scholars have argued that the disruptive innovation process is brewing in today's emerging markets, especially in China and India (Markides 2012). A recent survey of senior business strategists by GE ranks India higher than the USA on interest in innovation (Minhans 2013). Studies in the Western context (Fernald 2012) have shown that recessions reduce investment in innovation, which permanently affects the path of output (see, e.g., Barlevy 2004). Yet, in a time of recession, the route from innovation to effect (government at the start and industry at the end) causes drivers to take on less risky (and hence less adventurous) projects, and therefore to opt for safer (and hence more incremental) ones (Leighton 2011). Conversely, there is an argument that during times of recession, there is the need for innovation in the recession-hit period in uncertain markets, where innovation is the only source of competitive advantage (see Scheck and Glader 2009; Dervitsiotis 2010).

Given the contradiction in research results, during the period of recession, the need for this study in the Indian context becomes important. In India, during recessionary conditions, knowledge workers and the linkage to management of innovation have not been investigated. Growth economics has developed two basic direct innovation factors – research and development (R&D) that supports technological and related innovation, and the talent base behind it (Romer 1990; Solow 2000; cf. Bonvillian 2012, p. 114). However, these elements alone are not enough for implementing and scaling innovation in society. A dynamic, 'connected' system that links these factors and the institutional innovation actors who perform them, tying them to implementation stages in industry, are also key contributors (Bonvillian 2012). We argue that the management of innovation at the firm

level is affected by PSS. This relationship is mediated by the PC and RNR, leading to lower TI. However, to the limited knowledge of the researcher, no empirical study has yet examined these links in a single study. TI remains important even if challenging economic times temporarily make retention seem to be a less pressing issue. This brings us to the need to examine each individual construct which builds the hypothesised model in our study.

Theoretical framework and development of hypotheses

Perceived supervisor support

The concept of PSS comes from organisational support theory (Eisenberger, Huntington, Hutchison and Sowa 1986; Shore and Shore 1995; Eisenberger, Cummings, Armeli and Lynch 1997; Eisenberger, Stinglhamber, Vandenberghe, Sucharski and Rhoades 2002). Kottke and Sharafinski (1988) define PSS as employees shaping global perceptions concerning the degree to which supervisors value their contributions and care about their well-being (cf. Rasheed, Khan and Ramzan 2013, p. 184). Shanock and Eisenberger (2006, p. 690) note that in line with organisational support theory, Masterson's (2001) investigation of social exchange in organisations focuses on the obligation of employees to pay back positive treatment received from the organisation. Masterson suggested that, in the case of service employees, their receipt of positive behaviour by their supervisors would have a *trickle-down effect* on their management of customers (Shanock and Eisenberger 2006, p. 690). They state that PSS should produce a desire to help supervisors reach their goals (Eisenberger et al. 2002; Stinglhamber and Vandenberghe 2003). Such efforts would include enhanced performance of standard job activities, as well as helping behaviours that go beyond assigned responsibilities (Malatesta 1995; Becker and Kernan 2003).

Recently, Karami and Ismail (2013, p. 1302) report research by different scholars, which states, about achievements among Brazilian professionals, and found that PSS was related to affective and organisational support and employee performance. The following section examines the link between PSS and PC.

The psychological contract

The conceptualisation of the PC has evolved from its historical roots in Barnard's (1938) theory of equilibrium and Gouldner's (1960) theory of reciprocity. With the employer–employee relationship undergoing a shift, and with the recent recession hitting the global economy, the construct of the PC emerges as an important area for management research, especially in terms of attribution styles and power distances (De vos, Buyens and Schalk 2005; Battisti, Fraccaroli, Fasol and Depolo 2007; Bhatnagar 2009; Bal et al. 2010; Guest, Isaksson and De Witte 2010; Chao, Cheung and Wu 2011). The PC was defined by Rousseau (1995, p. 9) as 'the individual beliefs, shaped by the organization, regarding terms of an exchange agreement between the individual and their organisation'. It is based on social exchange theory (Blau 1964), which suggests that if the organisation fails to provide reciprocal returns, employees may perceive a breach of the expected exchange relationship (i.e. the PC) and become unwilling to meet their own obligation to the organisation. In the Indian context, Bhatnagar (2009) reported that over the past decade or so, several studies have provided empirical support for the PC as an important motivator for employees (e.g. Rousseau 1995; Sturges, Conway, Guest and Liefoghe 2005; Isaksson, De Cuyper, Oettel and De Witte 2010). Yet, most research has investigated

breach of contract and its effect on employee outcomes such as job performance and organisational citizenship behaviour, as well as attitudes like commitment, satisfaction and intention to quit (Restubog, Bordia and Tang 2006; Staufenbiel and König 2010).

The existing literature distinguishes between two components of the PC, specifically the transactional and relational elements (Morrison and Robinson 1997). These two components emphasise different types of exchange relationships between the employee and employer. In a transactional exchange, organisations explicitly and/or implicitly promise to provide specified monetary remuneration for certain services performed by the employee. This may result in a short-term, almost contract-like agreement between the two groups. In contrast, the relational component emphasises a socio-emotive interaction between the employee and employer. Relational elements revolve around trust, reverence and the advancement of loyalty. Tangible levels of PC may include effort, skill, experience, proficiency and commitment provided by the employee in exchange for compensation and benefits (Buttner, Lowe and Harris 2010, p. 502).

The social exchange theoretical lens also provides insights into these contracts, with a norm of reciprocation; workers may trade efforts for fringe benefits and for care and support from their organisations (Shanock and Eisenberger 2006, p. 689; Jensen, Opland and Ryan 2010, p. 557). We will examine RNR and the linkages to PSS and PC in the next section.

Rewards and recognition

Despite their relation to transactional contracts, we investigate RNR separately, as we feel that in times of recession and in an emerging market context, knowledge workers require more than a transactional contract. Rather, they need specific opportunities for RNR so that they have a lower TI and stay with the organisation. RNR should not be confused with compensation and pay. Pay may not be as important as many managers believe, as pay level and pay satisfaction are usually moderately feeble predictors of individual turnover decisions (Allen, Bryant and Vardaman 2010, p. 54). Keeping this in mind, the current study focuses on RNR. We have taken Saks' (2006, p. 605) conceptual framework to examine this construct. He defines it as follows: 'a sense of return on investments can come from external rewards and recognition in addition to meaningful work'.

RNR is operationalised in terms of pay raises, job security, promotions, more freedom and opportunities, respect from co-workers, training and development opportunities, more challenging work assignments, some form of public recognition (e.g. employee of the month) or rewards or tokens of appreciation (e.g. lunch). While it may be challenging for organisations or managers to directly influence individual scripts, some scripts may be inclined towards this notion by linking rewards to tenure (e.g. service requirements after paying for an educational programme or retention bonuses tied to length of service; Allen et al. 2010, p. 55). In India, however, the recruitment discussions are moving away from the boom-time focus on 'How much cash will I receive? When will I get a raise?' to 'What is the business strategy? How will this boost my career?' (Singh 2012). The latter questions come from recruits, and are part of an evidence-based retention strategy (Allen et al. 2010).

More recently, in an emerging market context, research study on newly hired Chinese college graduates ($n = 143$) reported effects of contract completion, employee reports of organisational inducements (organisational support and job rewards) and supervisory reports of individual contributions (job performance and extra-role citizenship behaviour) upon changes in the graduates' PCs (Lee, Liu, Rousseau, Hui and Chen 2011, p. 201).

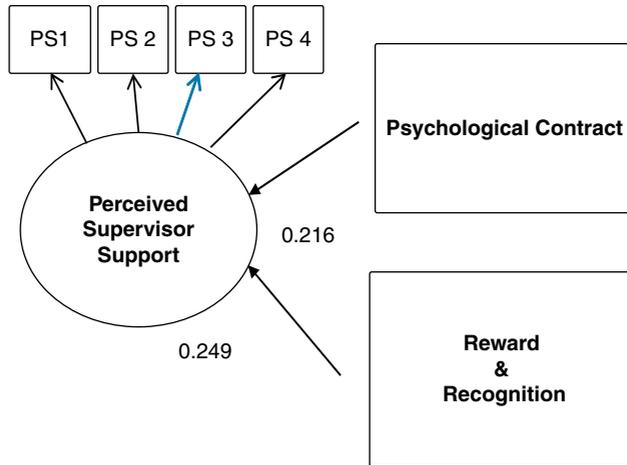


Figure 1. Hypothesised model (Lüdtke et al. 2008; Freedman et al. 2006, Stanford.edu) both latent and manifest models are showing the path analysis (β values) where perceived supervisor support is an antecedent to Psychological contract, Reward and Recognition. Note: Model 1 includes perceived supervisor support as an antecedent to psychological contract (AC); reward and recognition (RNR).

However, this research was conducted on new hires, while the current study addresses knowledge workers with the goal of exploring the relationship between PSS, the PC, RNR, management of innovation and TI. To the researcher's knowledge, no study has investigated these variables together. Based on the above literature review, the following hypothesis is posited (Figure 1):

Hypothesis 1: Knowledge workers perceived supervisor support is an antecedent to the psychological contract, along with reward and recognition practices.

In the next section, we will examine the research literature on innovation.

Innovation

In extant literature, management of innovation has received considerable research attention over the years. The literature includes evidence that competitive success is dependent upon an organisation's management of the innovation process and proposes factors that relate to successful management of the innovation process (cf. *inter alia* Globe, Levy and Schwartz 1973; Cooper 1979a, b; De Brentani 1991; Rothwell 1992; Balachandra and Friar 1997; Griffin 1997; Ernst 2002; cf. Adams, Bessant and Phelps 2006).

According to Jansen, Tempelaar, Van den Bosch and Volberda (2009), innovation management can be defined as a dynamic *capability* that refers to the routines and processes by which organisations mobilise, synchronise and assimilate dispersed contradictory efforts, and how they allocate, reallocate, amalgamate and re-amalgamate resources and assets across differentiated exploratory and exploitative units (cf. Cantarello, Martini and Nosella 2012, p. 30). Birkinshaw, Hamel and Mol (2008, p. 825) state that there are four central positions in the literature: (1) an institutional view that focuses on the socio-economic conditions in which novel management ideas and practices take shape (e.g. Guillén 1994); (2) a fashion view that focuses on the vibrant interplay between users and providers of management ideas (e.g. Abrahamson 1996); (3) a

cultural view that focuses on how an organisation reacts to the introduction of a new management practice (e.g. Zbaracki 1998); and (4) a rational view that looks at how management innovations – and the individuals who steer them – deliver improvements in organisational effectiveness (e.g. Chandler 1962; Birkinshaw et al. 2008).

In India, innovation has been addressed through entrepreneurial spirit and looking at different business models which are emerging despite the recession context (Cappelli, Singh, Singh and Useem 2010, p. 62; Bhatnagar 2012). A survey by the National Knowledge Commission, in India, has revealed that Innovation Strength (i.e. the percentage of revenue derived from products/services which are less than three years old) has expanded for large firms as well as small and medium enterprises. The deliberate prioritisation of innovation as a factor crucial to growth and competitiveness has also achieved noteworthy prominence since the start of economic liberalisation in India (NIPO 2008).

Lately, innovation research has started to pay attention to sociopolitical processes that shed light on how innovation is actually carried out in the real world rather than how it should be done (Wolfe 1994). In the knowledge management context, innovation has been extensively researched (Tushman 1977). Another stream of research warns against the difficulties associated with successful sharing and recombination of diverse knowledge into innovative outcomes (Carlile 2002). Recently, in the knowledge worker domain, cross-border simmelian ties for the generation of innovation were studied by Tortoriello and Krackhardt (2010). Yuan and Woodman (2010) examined how outcome expectations serve as a psychological mechanism to explain how and why organisational, supervisor–relational, job, social and individual factors affect individual innovation. We will examine TI in the next section.

Turnover intention

According to Egan, Yang and Bartlett (2004), scholars have determined that behavioural intentions are the single best predictor of turnover (Lee and Mowday 1987; Abrams, Ando and Hinkle 1998). The strongest turnover predictors tend to be related to the withdrawal process, such as TI and job search (Allen et al. 2010). Most of the research has examined breach of contract and its effect on employee outcomes such as job performance and organisational citizenship behaviour, as well as attitudes such as commitment, satisfaction and intention to quit (Turnley and Feldman 1999; Turnley, Bolino, Lester and Bloodgood 2003; Restubog et al. 2006; Staufienbiel and König 2010; cf. Bhatnagar and Biswas 2012). Overall, TI has emerged as the strongest precursor to turnover. The costs to the company include lost investments because of the underutilisation of employees and the cost of their replacement when they decide to leave the firm (Yan, Zhu and Hall 2002; cf. Birur and Muthiah 2013).

Consistent with our line of research, in a study of knowledge workers' TI, Chang, Chi and Chuang (2010, p. 568) echoed this line of thinking. They reported their findings based on the unfolding model of voluntary turnover (see Lee and Mitchell 1994). Moreover, Lee and Maurer (1997) and Wheeler, Buckley, Halbesleben, Brouer and Ferris (2005) propose several decision paths that knowledge workers might take during the turnover process. The major components include a first major shock, that is an unexpected comment. We feel this is the first shock or pinch point in the PC. According to Chang, Chi and Nai-Wen (2010):

these are psychological judgments that precede the turnover action (Holtom, Mitchell, Lee and Inderrieden 2005). According to the unfolding model (Lee and Mitchell 1994), employees start a series of psychological analyses and fit judgments (e.g. perceived fit with the

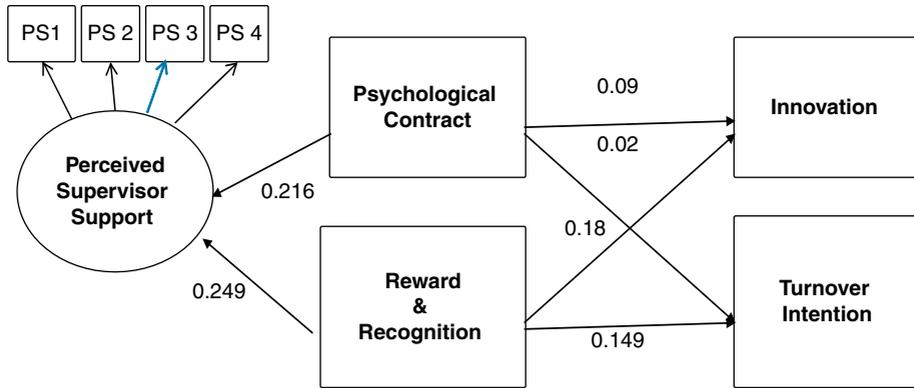


Figure 2. Hypothesised multilevel model (Lüdtke et al. 2008; Freedman et al. 2006, Stanford.edu) showing the path analysis (β values) between perceived supervisor support, psychological contract, reward and recognition, innovation and turnover intention. Note: Model 2 includes the potential mediators: psychological contract (PC); reward and recognition (RNR).

organisation and the job) after experiencing unexpected events. These judgments cause employees to take various decision paths that may precede the actual turnover process. (Chang et al. 2010, p. 556)

Based on the above literature review, the following hypothesis is posited:

Hypothesis 2: Psychological contract and reward and recognition practices mediate the relationship between perceived supervisor support, management of innovation and turnover intention.

Refer to [Figure 2](#), which illustrates the theoretical model of the study.

Research design

To carry out the present study, a survey research design was used. In the first step, five organisations in innovative R&D domains were chosen from India. These organisations represented the IT, electronics and software development and pharmaceutical sectors. In the second step, out of these five industrial organisations, 400 R&D employees were randomly selected to fill in the questionnaires. To determine whether the sample firms were high-technology firms (see Smith, Collins and Clark 2005), we had discussions with the senior HR manager at these firms. We affirmed that they were focused on innovation in their products and business strategy, as a significant percentage of their financial resources are invested in R&D. The talent pool employed at these firms consisted of a high percentage of engineers and R&D domain experts. After each firm's top management agreed to participate in and support this study, we sent the questionnaires to the HR department, which distributed them to the R&D engineers and R&D domain experts. Three hundred and twelve questionnaires were completed and returned to the researcher from a sampling frame of 400 R&D engineers and R&D domain experts. The remaining 88 questionnaires were either incomplete or the employees declined participation. Thus, the response rate for the survey was 78%. The scope of the study was limited to Indian R&D engineers and R&D domain experts. Respondents reported an average age of 35.48 years and the sample consisted of respondents from a fairly well-distributed age group varying between 21 and 59 years. The levels were top/senior, middle and junior levels.

Measures

PSS was measured by administering the four-item scale adapted from the survey of perceived organisational support (SPOS; Rhoades, Eisenberger and Armeli 2001). Participants responded using a seven-point Likert scale which ranged from (1) strongly disagree to (7) strongly agree. The alpha reliability was 0.80. PC, comprising the relational contract and transactional contract, was measured by adapting the scale developed by Raja, Johns and Ntalianis (2004). We measured *transactional contracts* with a seven-item scale and *relational contracts* with a nine-item scale. The alpha reliability for the entire scale was found to be 0.80, while it was 0.79 for transactional contracts and 0.84 for relational contracts. RNR were measured using a 10-item scale (Saks 2006). Participants were asked to indicate the extent to which they receive various outcomes for performing their job well. They responded using a five-point Likert-type scale with anchors (1) to a small extent to (5) a large extent to items such as 'a pay raise', 'a promotion', 'praise from your supervisor' and 'some form of public recognition'. The alpha reliability was 0.76.

Measurement of innovations was carried out by administering a 10-item scale (Medina and Ruffin 2009) which was based on a seven-point Likert scale. It consisted of the following sub-variables: analysis of innovativeness (Hurley and Hult 1998), analysis of innovation as the quest for new products or improvements in management processes (Han, Kim and Srivastava 1998, Kumar, Scheer and Kotler 2000), analysis of effective implementation of innovations (Vazquez, Santos and Alvarez 2001) or their application in project management and analysis of the varying degree of novelty of the innovation within the firm and within the market (Sandvik and Sandvik 2003). The alpha reliability for the innovation scale was 0.77. Finally, the TI scale was a three-item scale (O'Driscoll, Michael and Beehr 1994) based on a seven-point Likert scale (alpha reliability of 0.93). Refer to Table 1 for univariate and bivariate analysis of the variables.

Results and discussion

Descriptive statistics and correlation analysis

Means, standard deviations, internal reliabilities and inter-correlations among the variables are reported in Table 2. All measures reflected high internal reliabilities, with alpha ranging from 0.76 to 0.91. Interestingly, the mean value for the outcome variable, innovation, was the highest (4.24), followed by the mean of the second outcome variable, TI (3.49). This was followed by the mean value of the mediating variable RNR (3.42), which also had a lower standard deviation (0.40). Mean value (3.43) and standard deviation (0.51) for PSS was also observed in the expected direction. Mean value of PCs was the lowest (2.89) and this variable demonstrated a lower standard deviation as well (0.33).

The reported mean values of the demographic variables of age (35.88), gender (1.22), experience (4.10) and management levels (1.88) were in the expected direction and the standard deviation of these variables ranged from 8.84 to 0.66. Further correlation coefficients ranged from 0.70 to (0.05) and were partially significant at 0.01 and 0.05 level.

To test our hypothesis, we used multilevel modelling (MLM), as we employed cross-level data to measure perception of innovation at the firm level. Recently, MLM has been used by scholars (Snijders and Bosker 1999; Raudenbush and Bryk 2002; Goldstein 2003) focusing on the possibility of exploring relationships among variables located at different levels simultaneously (Lüdtke et al. 2008, p. 203). In the typical application of MLM, outcome variables are related to several predictor variables at the individual and group levels (Lüdtke et al. 2008, p. 203). Figure 2 illustrates the MLM model to be tested.

Table 1. Descriptive statistics and zero order correlations among study variables ($n = 312$).

| Variables | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| PSS | 3.43 | 0.512 | (0.80) | | | | | | | |
| PC | 2.89 | 0.33 | 0.07 | (0.79) | | | | | | |
| RNR | 3.42 | 0.40 | 0.14** | 0.04 | (0.76) | | | | | |
| Innovation | 4.24 | 0.74 | 0.03 | 0.09* | 0.10* | (0.77) | | | | |
| TI | 3.49 | 1.68 | 0.05 | 0.003 | 0.04 | 0.13* | (0.91) | | | |
| Age | 35.48 | 8.84 | 0.02 | 0.03 | 0.03 | 0.14** | 0.45** | | | |
| Gender | 1.22 | 0.42 | 0.07 | 0.03 | -0.05 | 0.004 | 0.24** | 0.24** | | |
| Experience | 4.10 | 1.70 | 0.02 | 0.04 | -0.07 | 0.10* | 0.35** | 0.70** | 0.38** | |
| Management level | 1.88 | 0.66 | 0.04 | 0.08 | 0.03 | 0.21** | 0.13* | 0.45** | 0.07 | 0.46** |

Note: Figures in parenthesis are alpha reliabilities.

* $p < 0.05$; ** $p < 0.01$.

Table 2. Fit indices for hypothesized model 1.

| <i>Hypothesis 1</i> | <i>GFI</i> | <i>CFI</i> | <i>NFI</i> | <i>RMSEA</i> | <i>RMR</i> | <i>Comment</i> |
|---------------------|------------|------------|------------|--------------|------------|--------------------------|
| Hypothesised model | 0.95 | 0.92 | 0.91 | 0.13 | 0.02 | Hypothesis 1 is accepted |

To assess the degree to which PSS emerged as an antecedent to the PC and RNR, structural equation modelling (SEM; Bentler 2005) with analysis of moment structures (AMOS version 20.0; Arbuckle and Wothke 1999) was used to test the model. To test PSS as an antecedent to the PC and RNR, the study followed the suggestion of Wood, Goodman, Beckmann and Cook (2008) and applied SEM procedures using the maximum likelihood estimation (MLE) algorithm. To assess PSS as the antecedent of PC, we found the values of the goodness-of-fit index (GFI) to be 0.95 (Refer to Table 1). In the literature (Byrne 1994), values of $GFI \geq 0.90$ are considered to be representative of a well-fitting model. According to Hair, Anderson, Tatham and Black (1998), the recommended fit values for a good fitting model for comparative-fit index (CFI) and normed-fit index (NFI) are ≥ 0.90 . The values obtained in our study for (CFI = 0.92) and the (NFI = 0.91). We thus accepted Hypothesis 1, which states that *knowledge workers PSS is an antecedent to PC along with RNR practices*.

A mediator is instrumental in accounting for the influence of the independent variable on the dependent variable (Cohen, Cohen, West and Aiken 2003). To test the mediation of the PC and RNR, we followed the suggestion of Wood et al. (2008) and applied SEM method. However, conceptually, our procedure of testing mediation using SEM is akin to Baron and Kenny's (1986) approach, in that we consider four competing models. Besides the main model (Model 2 in this case), we also tested three other nested (partially mediated) models, namely models 3,4 and 5 by analysing and comparing them with the hypothesised fully mediated model (following Aryee, Budhwar and Chen 2002). This provided a stringent test for our model (Platt 1964; cf. Aryee et al. 2002, p. 275).

Model 2 includes the potential mediators, that is the PC and RNR in this case, whereas Model 3 is limited to one potential mediator (PC) and examines the relation between the predictor and the criterion variables, that is the path of PSS to RNR, innovation and TI are examined. Model 4 is limited to one potential mediator (RNR) and examines the path from PSS to the PC, innovation and TI; Model 5 limits both the potential mediators (PC and RNR) and tests the direct relationship between the predictor and the criterion variables, that is PSS to innovation and TI.

The study also reports the Tucker Lewis index (TLI; Tucker and Lewis 1973), CFI, NFI (Bentler 2005), Jöreskog-Sörbom GFI and the root mean square error of approximation (RMSEA; Steiger 1990) to gauge the model fit. These indices indicate the extent to which a research model provides an improved overall fit relative to a null model or independence model in which the correlations among observed variables are assumed to be zero.

To assess the overall model, we looked at the χ^2 measure, which is the lowest value (42.19) in our best fitting hypothesised model. This proves that Hypothesis 2, which states that *both the PC and RNR practices mediate the relationship between PSS, management of innovation and TI* (Refer to Table 3 for the model fit values). Furthermore, in order to compare Models 2, 3, 4 and 5, we calculated the CFI, NFI and TLI. According to Hair et al. (1998) and Medsker, Williams and Holahan (1994), the recommended fit values for CFI, NFI, RFI and TLI are ≥ 0.90 . A model which has a higher value of the proportionate fit indices is accepted as a better fitting model. In the accepted hypothesised model, the CFI is 0.95 in hypothesised Model 2, whereas it is 0.88 for Model 3, 0.87 for Model 4 and 0.89 for

Table 3. Results of model comparison ($n = 312$).

| | <i>Models</i> | χ^2 | <i>df</i> | $\Delta\chi^2$ | Δ | <i>df</i> | <i>TLI</i> | <i>CFI</i> | <i>NFI</i> | <i>GFI</i> | <i>RMSEA</i> | <i>RMR</i> |
|---|-----------------------------------|----------|-----------|----------------|----------|-----------|------------|------------|------------|------------|--------------|------------|
| 1 | Hypothesised Model 2 ^a | 42.19 | 15 | – | – | – | 0.91 | 0.95 | 0.93 | 0.96 | 0.07 | 0.03 |
| 2 | Model 3 ^b | 80.31 | 14 | 38.12 | 1 | 1 | 0.82 | 0.88 | 0.86 | 0.93 | 0.12 | 0.05 |
| 3 | Model 4 ^c | 78.53 | 14 | 36.34 | 1 | 1 | 0.83 | 0.87 | 0.85 | 0.93 | 0.11 | 0.06 |
| 4 | Model 5 ^d | 68.69 | 9 | 26.5 | 6 | 6 | 0.81 | 0.89 | 0.87 | 0.92 | 0.14 | 0.06 |

^a Hypothesised Model 2 examines path from PSS to PC, RNR, Innovation and TI.

^b In comparison to hypothesised Model 3 examines path from PSS to RNR, Innovation and TI.

^c In comparison to hypothesised Model 4 examines path from PSS to PC, Innovation and TI.

^d In comparison to hypothesised Model 5 examines path from PSS to Innovation and TI.

Model 5. NFI is 0.93 in Model 2, while it is 0.86 in Model 3, .85 in Model 4 and .87 in Model 5. The TLI is 0.90 or more in Model 2 at 0.91, which is in the expected direction. While in the three competing models TLI is 0.90 or less, it is 0.82 in Model 3, 0.83 in Model 4 and 0.81 in Model 5.

The RMSEA is a measure of the average standardised residual per degree of freedom; a favourable value is less than or equal to 0.08, and values less than or equal to 0.10 are considered 'fair' (Browne and Cudeck 1989). The RMSEA in the hypothesised Model 2 is 0.07, which depicts a good fit, while it is 0.12 for Model 3, 0.11 for Model 4 and 0.14 for Model 5 (see Table 3 for the model fit values). The values of the competing Models 3, 4 and 5 reflect poor fit; thus, we accept Model 2 as the best fit model, and also Hypothesis 2, which states that *the PC and RNR mediate the relationship between PSS, management of innovation and TI*.

The results of the current study provided support for the proposed theoretical model (refer to Figure 2). In this section, we discuss the implications of each of the hypotheses. We confirm Hypothesis 1, which proposed that PSS is an antecedent to the PC and RNR. We also confirm Hypothesis 2, where PC and RNR are strong mediators when they appear together. They act as dual mediators between PSS and innovation and TI. The study contributes to the contextual processes needed for firm innovation, and supports the earlier work of Janssen, Van de Vliert and West (2004), which found that intrinsic psychological processes and attitudes affect the innovation process within a firm. The current study answers the call in the literature for the use of multiple perspectives to study innovation (Wolfe 1994; Abrahamson 1996).

The study investigated cross-level research, where it was found that individual managers expressed perceptions about the innovative capability of the firm through the firm's processes, products and competitor behaviour. Klein, Dansereau and Hall (1994, p. 198) make the following argument:

levels issues pervade organizational theory and research. No construct is level free. Every construct is tied to one or more organizational levels or entities, that is, individuals, dyads, groups, organizations, industries, markets, and so on. To examine organizational phenomena is thus to encounter levels issues.

It is clear that in the organisational sciences, 'micro phenomena are embedded in macro contexts and that macro phenomena often emerge through the interaction and dynamics of lower-level elements' (Kozlowski and Klein 2000, p. 7), and this is also supported by the work of Rousseau (1985, p. 2). Cross-level research is the contribution of the current study, where there is a paucity of work (Klein et al. 1994, p. 198; Schnake and Dumler 2003). The current study contributes to a multilevel framework using MLM, which very few studies have employed to examine cross-level, multilevel research (see Lüdtke et al. 2008, p. 203).

This study also addresses the caveat in innovation research following Anderson, De Dreu and Nijstad (2004), who stated there is a need to study innovation as an independent variable across cultures, within a multilevel framework, using meta-analysis and triangulation. The findings of the current study support the research of Dobni (2010) and Birkinshaw et al. (2008). Innovative organisations understand that it is the sum of the people who, through the way they think and act, allow the organisation to be innovative (Dobni 2010).

Further, Madrid, Patterson, Birdi, Leiva and Kausel (2013) found a linkage between individual innovation in which weekly moods represent a core construct between context, personality and innovative work behaviour. As is evident, a linkage with management's innovation efforts has not been addressed in the literature. The current study supports the research study of Nair and Vohra (2010). In a study on 1142 knowledge workers, these researchers found lack of meaningful work, inability of work to allow for self-expression

and poor quality work relationships to be predictors of work alienation in the Indian IT sector. Knowledge workers need the support of supervisors before they feel they are in a relational and transactional mode. They need RNR. A combination of this context may lead to management of innovation and lower TI.

Knowledge workers may need the support of their supervisors to exhibit management of innovation. Crossan and Apaydin (2010) have synthesised various research perspectives into a comprehensive multidimensional framework of organisational innovation, linking leadership to innovation as a process and as an outcome. The current study attempts to measure innovation from this perspective and analyses the innovative processes that the firm adopts (cf. Bhatnagar 2012), as an outcome, and how this process is affected by PSS. Moving to the next outcome variable, TI, Kuvaas and Dysvik (2010) examined the relationship between PSS and employee outcomes in the form of attitudes (affective commitment and TI) and work performance (work effort, work quality and organisational citizenship behaviour). Bakker, Demerouti and Schaufeli (2003) found that job resources (i.e. social support, supervisory coaching and performance feedback and time control) were the only predictors of involvement, which, in turn, was related to TI. Further, the relationship of an individual employee with his/her immediate supervisor/manager plays a critical role in many turnover decisions (Allen et al. 2010, p. 54). The current study supports this kind of research.

Conclusion and implications

Within the recession context, our study makes a significant contribution, as it not only indicates the importance of the PC, but also the need for RNR to increase innovation and decrease TI. PSS becomes important in terms of the social capital which the supervisor may provide to knowledge workers. The current work supports the research of Tortoriello and Krackhardt (2010, p. 180), who state that to leverage the benefits associated with a supportive and cohesive network of relationships and this promotes cooperation and coordination of joint activities (Burt 2005). The benefits of this integrative approach to social capital can easily be extended to a variety of organisational phenomena. Burt's (1992) *structural hole* hypothesis suggests that being with others in a social system has clear advantages because opinion and behaviour are more consistent within – rather than between – cliques; this makes an actor linked across cliques more knowledgeable concerning alternative ways of thinking and behaving. Burt claims that open networks – or bridging structural holes between cliques – is the mechanism by which brokerage becomes social capital (Hemphälä and Magnusson 2012, p. 4).

The empirical findings support the concept that social network measures are indeed powerful predictors of innovation and, further, that their effects are likely to be radically distinct depending upon the type and measure of innovation (Hemphälä and Magnusson 2012, p. 11).

There are *theoretical implications* for the job characteristics model in emerging markets like India. In the job characteristics model, one of the core dimensions that lead to beneficial work outcomes is task significance. An employee viewing of his work as worthwhile and meaningful, according to the theory, is generated through task significance (Steers and Porter 1983). Our result supports the findings of this theory. Perceiving your supervisors' support and a strong PC with meaningful RNR add to task significance and lead to higher innovation practices and TI becomes low.

Implications for innovation management at the firm level have been presented in the current study. Firm innovation may lead to lower TI for knowledge workers, provided the social, human and relational capital are present. Gauging Human capital in terms of RNR

embedded in the HR policies, processes and systems of the firms represent an important indicator, as empirically proven by the current study. The current draws significant implications on exit-loyalty-voice framework of Hirschman's (1970), cf., McClean, Burris and Detert (2013). Further, the finding of the study draws important implications for the retention literature – managers who perceive their supervisors as supporting them and who receive RNR at the right time, and who have relational as well as transactional and PCs with their firms and supervisors would perceive the innovative capability of the firm and are likely to remain loyal to the organisation, exhibiting lower TI.

Practical implications

There are also *practical implications* to designing HR interventions for HR managers in India. For knowledge workers, there is the importance of pay, as well as RNR, including physical tangible rewards. It is important for HR managers to note that it is not just the pay or benefits or relation and social capital that will retain workers; it is also important for knowledge workers to receive recognition and appreciation in public. Moreover, it is important for employees to experience more freedom and opportunities in the organisation, experience respect from co-workers, be given training and development opportunities and have access to more challenging work assignments. The need to design RNR packages which reflect the work environment of the organisation is an important practitioner implication of this study, and Indian managers will have to work on this.

The study also has implications in the innovation context, especially in India, where there is an upcoming Innovation Act. In order to promote a robust knowledge economy, the Government of India is setting up a working group at Federation of Indian Chamber of Commerce and Industries to prepare a draft legislation for such an 'Innovation Act' to spur innovation in India. The Bill has been drafted based on similar laws enacted in the USA, the EU, Brazil and China (Tripathy 2010). There are implications on the growth of innovation and for global innovators, to access Indian markets. This is present, since the presentation of the Indian financial budget in 2013. While unveiling the budget, Finance minister of India announced setting up of a new fund to support organisations that bring key innovations from the lab to the market and tax benefits for organisations that invest in setting up technology incubators in higher education institutes. Further, the India Innovation growth programme has been set up to provide funding, training and access to global markets for top innovators (Minhans 2013).

Further, practical implications are present for the innovation process and its effect on employees (Dervitsiotis 2010), where positive PC and RNR may lead to satisfaction and loyalty. Implications for organisational impact have been raised in terms of a healthy work culture and a high level of trust (Dervitsiotis 2010). Moreover, there are practical implications in terms of institutionalising the management of the innovation process. As stated by Dervitsiotis (2010, p. 905), the innovation process can be improved significantly only by institutionalising innovation management and making it a core process, in the same way as was done with quality management and finance management.

Limitations of the study and area for future research

This research has some limitations. Due to scope of the study, we could not investigate the related variables of trust, perceived organization (PO) fit and organizational citizenship behaviour (OCB) as antecedents to innovative behaviour. Further, there may be more moderators and mediators among these variables which could emerge in the PSS, PC,

RNR and management of innovation relationship, which future studies may examine. Firm performance and firm turnover may be important consequences of the management of the innovative capability of the firm, which may be investigated in future. The leadership team at the firm level may have an impact on the management of innovation and TI which future studies may consider. Moreover, follow-up studies should be conducted on specific industries that are known for innovation (i.e. high technology and science, biotechnology and pharmaceutical industries; Dobni 2010; cf. Bhatnagar 2012). Further, our choice of R&D knowledge workers in technical domains is a limitation. We cannot generalise our findings to other groups of knowledge workers.

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