A STUDY OF INNOVATION PROCESS IN INDIAN PHARMACEUTICAL COMPANIES

Ph.D. THESIS

by

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A THESIS

*Submitted in partial fulfilment of the
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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled "**A STUDY OF INNOVATION PROCESS IN INDIAN PHARMACEUTICAL COMPANIES**", in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy and submitted in the Department of Management Studies, Indian Institute of Technology Roorkee, Roorkee is an authentic record of my own work carried out during a period from August, 2011 to October, 2014 under the supervision of **Dr. Usha Lenka**, Assistant Professor, Department of Management Studies, Indian Institute of Technology Roorkee, Roorkee.

The matter presented in this thesis has not been submitted by me for the award of any other degree of this or any other Institute.

(**MINISHA GUPTA**)

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

(Usha Lenka)
Date: Supervisor

Chairman, SRC   Signature of External Examiner

This is to certify that the student has made all the corrections in the thesis.

Signature of Supervisor (s)   Head of the Department

Dedicated to my family

ABSTRACT

This study develops a conceptual framework exploring the innovation process in research and development units of organizations. Research and development teams of pharmaceutical firms operating in India were the unit of analysis. Data were collected from 352 leaders and equal number of team members working in research and development teams. The responses were collected through questionnaire survey method. Questions to measure variables of members' proactive personality, emotional intelligence, trust, task reflexivity, team creativity, and innovation adoption were answered by team leaders. Responses on variables of resonant leadership style of team leaders, team information sharing process, and climate for innovation were answered by team members. Out of 450 questionnaires distributed, 352 completely filled responses were finally obtained having a response rate of 78%. Data were analyzed through structural equation modeling using AMOS 21.0 software package. Findings of the study reveal that members' proactive personality, emotional intelligence, and trust enhances learning of members called task reflexivity. This learning is further promulgated with the intervention of team information sharing process and support for innovation. Team creativity enhances innovation implementation in organizations. However, resonant leadership style of team leaders did not support task reflexivity. Overall, this study highlights that creativity is promulgated when information is disseminated among members in a supportive climate for innovation. Organizations can create and innovate by developing capability of members who are proactive, emotionally intelligent, and trust their colleagues. So that these team members can rationally judge organizational priorities, learn from their colleagues, plan and execute novice ideas to serve market needs.

Keywords: Resonant leaders, emotional intelligence, task reflexivity, creativity, innovation

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Abbreviations/Symbols	Definition
AGFI	Adjusted goodness of fit index
AMOS	Analysis of Moment Structures
CFI	Comparative fit index
Cronbach α	Cronbach's index of internal consistency of degree of freedom
C_i	Confidence interval
GFI	Goodness of fit index
H_i	Alternative hypothesis
LVSEM	Latent variable structural equation modeling
M	Mean(arithmetic mean)
NFI	Normed fit index
P	Probability value
PCFI	Parsimonious comparative fit index
PGFI	Parsimonious goodness of fit index
PNFI	Parsimonious normed fit index
R	Pearson product movement correlation
ξ	Error term
R^2	Correlation coefficient/measure of strength of relationship
R&D	Research and Development
RMSEA	Root mean square error of approximation
SD	Standard deviation
SEM	Structural equation modeling
SPSS	Statistical Package for Social Sciences
χ^2	Computed value of chi square test
χ^2/df	Chi-square/ degree of freedom

CHAPTER 1

INTRODUCTION

Economic liberalization, technological innovation, changing government norms, and informed customers have escalated competition in Indian market. Both service and manufacturing industries have succumbed to market dynamism. Service industries such as information technology, banking, tourism, retail, hospitality, health and wellness, fashion-textiles, and entertainment, are not bereft of the market competition. Manufacturing industries such as automobiles, high-tech, electronics, pharmaceuticals, steel, aluminum, and heavy engineering have also not remained untouched from aggressive market fluctuations. The contemporary organizations have been most vulnerable to intense competitive challenges from the multinational giants. Concern of these companies is not growing bigger, but getting better. They intend to retain their corporate sheen by transforming as a high performing organization. High performing organizations emphasize on talent acquisition and development, teamwork, and organizational capability building by coalition with partners, knowledge sharing, and promoting creativity and innovation.

1.1 Statement of the problem

Organizations carve a niche in the competitive market by leveraging on their core competence. The core competence can be acquired through physical resources as well as human competence. Innovations in banking services are disbursed through value added, fast, and efficient customer service to vital customers. Aviation, hospitality, insurance, health care, and wellness have utilized human potency or knowledge to reflect their aggressive growth. As a novice idea takes

shape to reflect innovation in service sector, so also research and development can emboss innovation in manufacturing sector. *Dettol's* hand sanitizer, battery operated vehicles, solar heater, and *Apple iphone* series have retorted to the fast changing customers' preferences. Thus, innovations address to the changing market dynamism. The innovations in product, technology, and service are quickly imitated by competitors. Therefore, sustained competitive advantage can be provided through managerial innovations. Managerial innovations are innovation in strategy, structure, and management processes to innovate and develop talent. The product innovations are endeavor of talent working in research and development and new product development units within organizations. Creativity is not transpired by an individual alone, but is a consorted effort of organizational members, departmental units, and partner firms.

1.2 Contextual variables defining competitiveness in business environment

Business environment of an organization is classified as: (a) stable and predictable (b) stable and unpredictable (c) unstable and predictable and (d)) unstable and unpredictable. The predictability-stability matrix differentiates business environment on the basis of certain parameters such as type of innovation, source of innovation, organizational structure, and rate of innovation adoption (Damanpour & Gopalakrishnan, 1998) (Fig. 1.1).

	High	**Stability**	Low

	1. Stable and predictable	3. Unstable and predictable
High	• Incremental innovation • Imitative source • Mechanistic structure • Low innovation adoption	• Incremental innovation • Imitative or incubative • Organic structure • High innovation adoption
Low	2. Stable and unpredictable • Incremental or radical • Imitative or acquisitive • Mechanistic structure • Low innovation adoption	4. Unstable and unpredictable • Radical • Acquisitive or incubative • Organic structure • High innovation adoption

Predictability

*Fi*g*ure 1.1*: Predictability-stability matrix of business environment.

Education, healthcare, oil and gas, and food packaging industries having stable and predictable environment imitate their competitors. Innovations in these industries are incremental and technical as they have mechanistic structure. Rate of innovation is low and emphasis of these companies is mostly on increasing production capacity. Music, fashion and clothing, advertising, retail, and hardware manufacturing firms operating in a stable and unpredictable environment imitate and acquire innovations from other companies. Innovations in these firms are incremental and technical and are adopted through licensing, purchasing, and merger with other firms. These firms adopt reverse engineering mechanism to modify existing products and have a mechanistic structure. Electronics, airlines, hospitality, tourism, banking and financial services operating in a unstable and predictable market adopt imitation and incubation as sustainable business strategy. Incremental, radical, technical, and managerial innovations are adopted by these firms having an organic structure. Software, telecommunications, biogenetic engineering, chemical companies,

and research oriented pharmaceutical firms have an unstable and unpredictable environment. Pharmaceutical companies face challenges of low productivity and declining approvals by *Food and Drug Administration*. It is inevitable for pharmaceutical and other industries with an unstable and unpredictable environment to adopt radical innovation by acquiring and incubating. To facilitate radical innovations, these organizations adopt an organic structure, promote teamwork, entrepreneurial, and risk taking culture to combat fierce market competition.

Prevalence of lifestyle diseases, chronic ailments, sudden outbreak of new traces of viruses and diseases, causing infant mortality add on to the challenges of pharmaceutical firms operating in India. The challenges for these companies are to provide drugs at affordable rate to the people. Government of India has taken an initiative of mass immunization program to combat deadly trends of *Rubella*, *Rotavirus*, *Japanese Encephalitis*, and *Hepatitis B* viruses to prevent infant mortality rate (Mehta, 2014). Earlier these vaccines were sold by the private health care agencies and were costlier. *Biotech* in association with *Ministry of Biotechnology* and *Indian Council of Medical Research*, has taken initiative to indigenously develop vaccines for mass immunization. 131 countries have already started developing vaccines to treat 20-22 types of diseases. India has to accelerate and promote indigenous drug development, rather than procuring from MNCs, in order to make it affordable for masses.

Therefore, there is need to develop indigenous R&D facilities, which have been neglected so far because of inadequate talent, resources, technology, investment, and support for R&D infrastructure. These companies need to improve their products and processes by generating and adopting innovations. Despite efforts to improve R&D facilities and develop a culture of innovation in indigenous firms, success in innovation process is meager. The major reason could be R&D needs certain non-technical/managerial interventions during phases of innovation

process. Innovation process moves through the phases of trial, and success is hardly a matter of chance. This declines efficiency of team members and cause high levels of frustration. To improve the efficiency and morale of human talent, there is a need to study the complex socio-psychological phenomena during innovation process in more details. Thus, to reduce production cost and procedural bottlenecks, certain measures of managerial innovations have been proposed.

1.3 Pharmaceutical industry of India

Indian pharmaceutical industry serves 70 percent of country's demand for bulk drugs, drug intermediaries, formulations, tablets, capsules, orals, and injectibles. This demand is met by 250 large and 8000 small scale pharmaceutical units in India constituting the core of this industry. Although, globally Indian pharmaceutical industry is third largest pertaining in terms of volume of sales (Pai, Sudhakar, Kamath, & Pai, 2014). However, this is mainly dominated by foreign players having subsidiaries in India like *Association of British Pharmaceutical Industry*, *European Agency for Evaluation of Medicinal Products*, *US Food and Drug Administration*, and *World Health Organization*.

1.3.1 Scenario of Indian pharmaceutical industry

Indian pharmaceutical industry had dominance of foreign players during 1970s with absence of indigenous companies. In 1980s, after the introduction of Indian Patent Act, 1970, Government of India has started controlling the market, and local companies began showing their presence. 1990s was a developmental phase for the pharmaceutical industry. Companies have invested 1.5% of its sales on R&D with an emphasis on process development. *Ranbaxy* and *Dr Reddy's* have also invested 5-10% of its total sales on R&D. Since 2000, there was a rapid expansion of

domestic market with special impetus on research and development initiatives. Their focus was on developing new drugs, modifying existing ones through new compositions and combinations, improving the manufacturing process, and production capacity (Chaudhuri, 2007). In the year 2002, more than 20,000 registered drug makers in India have sold formulations and bulk drugs of $9 billion. 85% of these bulk drugs were sold in India while over 60% were exported to US and Russia. The phase of research and innovation started in 2010, with the introduction of intellectual property laws. The following Figure 1.2 shows R&D investment of pharmaceutical industry in India for the year 2005-2010.
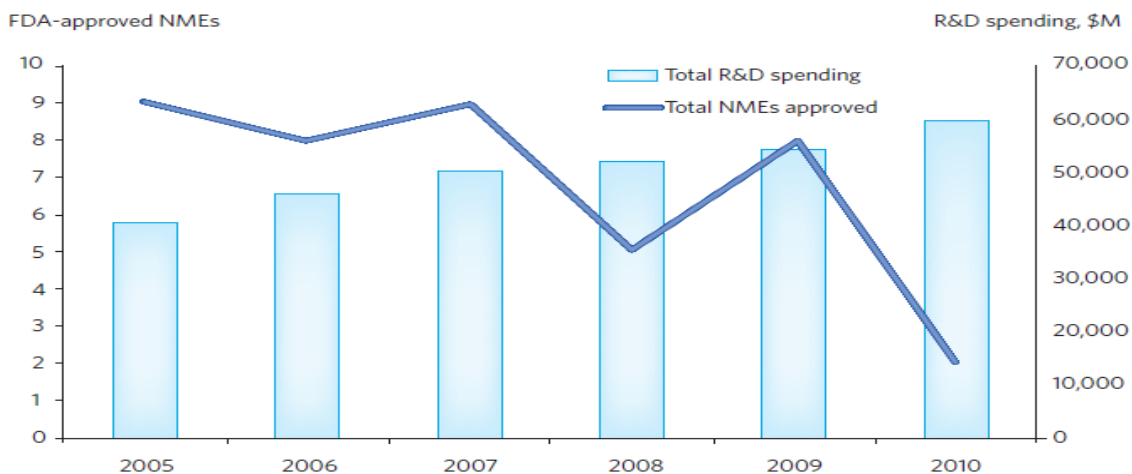
Source: Bunnage, 2011 NMEs[1]

Figure 1.2: R&D in India's pharmaceutical industry, 2005–2010 (in $ million).

Despite of rising investment in R&D, Indian pharmaceutical industry is confronting challenges from foreign players. The operations of pharmaceutical companies are limited only to drug manufacturing and exporting. They lack vertical integration and a strong supply chain, leading to high production cost and improper supply of medicines. Drug price control order is also an impediment for this industry. Three tiers of price regulations have been imposed: on bulk

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[1] NMEs: New Molecule Entities

drugs, formulations, and overall profitability. Due to control on prices, some companies are involved in duplicacy of medicines causing harm to several human lives.

To address the challenges of pharmaceutical industry in India, innovation has been given priority with a special impetus on R&D initiatives. *Sun pharmaceuticals Ltd*, *Dr. Reddy's*, *Ranbaxy*, *Lupin Limited*, *Hindustan Antibiotics*, *IndSwift*, *Glenmark*, *Piramal Healthcare*, *Wockhardt*, *Aurobindo*, *Torrent*, *Orchid*, *Alembic*, *Unichem*, *Zandu*, *Cadila health care*, *Bharat Agro Industries Foundation Laboratories*, and *National Chemical Laboratory* are few pioneers that have made remarkable contributions to spur the growth of research capabilities of pharmaceutical companies (Chaturvedi & Chataway, 2006). These companies are transforming their image from drug manufacturers to R&D initiators. They are in the process of identifying new formulations as well as developing research capabilities. With this initiative they have earned reputation of largest drug provider for US, European, and semi-regulated markets.

Although, these companies have invested in R&D, their rate of innovation is slow. Most of them are contract manufacturers and produce drugs in bulk. They do not focus on selected product portfolios of eye care, derma care, and dental care. Rather their focus is on formulation of drugs. The Indian pharmaceutical companies have invested in R&D for developing new chemical entities. The investments made by certain Indian companies in the year 2012-2013 on R&D have been given in details in Table 1.1.

Table 1.1: *Investment of Indian companies in the year 2012-2013*

S. No.	Company	Investment in R&D
1	Lupin	770 Crore
2	Dr. Reddy's	690 Crore
3	Cadila Healthcare	493 Crore
4	Ranbaxy	449 Crore
5	Cipla	425 Crore
6	Sun Pharmaceuticals	310 Crore
7	Jubliant Lifesciences	143.75 Crore
8	Unichem	103.34 Crore
9	Biocon	67.30 Crore

Source: Pharmabiz.com

These companies have not been engaged in the entire process of drug development due to inadequate talent, research capabilities, infrastructure, and financial support. Rather, they develop new drug formulations and then handover it to their partners from developed countries. *Ranbaxy* sold its 34.8% stake to *Daiichi Sankyo* to enhance its operations. R&D requires expert knowledge in biochemistry/biotechnology. India has a talent shortage in these specialized domains. Companies hire scientists working in government laboratories, MNC laboratories, and those working abroad. Moreover, Indian firms are not involved in the basic research for generation of new drugs. Some of the Indian pharmaceutical companies enjoy royalties on drugs developed by them but marketed and patented in other countries. *Dr. Reddy's* licensed its patent for an anti-diabetic compound to *Novo Nordisk*. Later on it developed two more anti-diabetic compounds and licensed them to *Novo Nordisk* in 1998 and *Novartis* in 2001 respectively. The deals were milestones for *Dr. Reddy's* as it earned $5 million. Moreover, markets in developed

countries are lucrative and provide incentives for bulk drug production. They rely on basic research facility of other companies. Their emphasis is on incremental innovation of drugs. Earlier, their emphasis was on developing new compounds and transferring license to MNC partners (Bhadoria, Bhajanka, Chakraborty, & Mitra, 2012). But, these MNCs destroy the compound obtained through licensing in order to reduce competition. *Schwartz Pharma* discontinued the clinical trials of a compound procured through licensing from *Ranbaxy*. Similarly, meager success has been reported during clinical trials of *Ranbaxy-GlaxoSmithKlene's* R&D collaboration, where *Ranbaxy* developed the anti-infectives metabolic, respiratory, and oncology drugs and *GlaxoSmithKlene's* have commercialized it. This agreement helped Ranbaxy to develop drugs at a cheaper cost. However, this collaboration failed because of fear of competitiveness of product.

However, an Indian company *Torrent* has taken initiative to develop drugs despite of lack of interest by their foreign partners. It signed an agreement with *Novartis* to develop *Advanced Glycosylation Endproducts* breaker compound having potential to treat diabetes and heart ailments. Earlier, only few drugs developed by Indian companies were approved for marketing, but by the end of 2006-07, 25 new chemical entities developed by them were undergoing clinical trials. *Ranbaxy* and *Lupin*, are involving with R&D projects to develop drugs for *Malaria* and *Tuberculosis*. With all these initiatives by Indian pharmaceutical companies and the competitive challenges faced by them, it is imperative for the industry to develop and conduct research on innovation process.

1.4 Objectives of the thesis

This study intends:

1. To develop an integrated framework of innovation process in Indian pharmaceutical companies.

2. To develop and validate scales of constructs measuring resonant leaders, proactive personality, emotional intelligence, trust, task reflexivity, team information sharing process, climate for innovation, team creativity, and innovation adoption in organizations.

3. To identify factors of organizational climate stimulating creativity and innovation.

1.5 Scope of thesis

Innovation process in R&D teams of pharmaceutical companies in India has been studied.

1.6 Organization of thesis

Chapter 1

This chapter highlights the problem statement, objectives, and scope of the thesis.

Chapter 2

This chapter critically reviews the literature of innovation process.

Chapter 3

This chapter develops a conceptual framework of innovation process by exploring the relationship between individual, team, and organizational level factors.

Chapter 4

This chapter defines the research methodology, discusses demographic details of the respondents of the study, and tests reliability and validity of the measures developed to conduct the survey.

Chapter 5

This chapter deals with the analysis of the hypothesized relationship identified in the conceptual framework.

Chapter 6

This chapter is an overall discussion of the results.

Chapter 7

This chapter summarizes the findings, develops a theoretical framework, highlights research contributions, discusses agenda for future research, and limitations of the study.

REVIEW OF LITERATURE

2.1 Introduction

Innovation gives company a sustainable competitive advantage in a dynamic environment. Schumpeter (1911) has viewed that innovation adopted by entrepreneurial and corporate firms provides them a distinct corporate identity. Entrepreneurial firms generate new ideas, products, technologies, or services. Whereas, corporate firms with established infrastructure, facilities, and resources, support innovation generation and adoption. Innovation generation is developing new products, ideas, processes, technologies, and venturing new markets. Innovation adoption is acquisition of innovation through licensing. Innovation adoption consists of initiation and implementation. Generating awareness of innovation among members, garnering their favorable attitude, and evaluating its worth to the organization is called innovation initiation. The idea approved by the management and accepted by employees is validated for final implementation in consonance with organizations' strategy called innovation implementation. The organizations support such initiatives through innovation in managerial policies. Innovation process is a complex phenomenon encompassing several social and psychological variables having interdependent relationships. Thus, academic intervention is required for scrutinizing the phenomenon of innovation process.

2.1.1 Origin of innovation process

Innovation word has its origin from the Latin word 'novus' or 'new'. It is an introduction of a new idea, methodology, device, or process. Innovation is a response to organizational change both by new and established firms (Schumpeter, 1911). Source based and user based theories

confirm that innovation is generated from a source in the form of new product, technology, or idea and is adopted by organizations and consumers (Robertson 1971; Roger 1976). Although organizations adopt innovations in the form of a new product or a process, but they consider generation and adoption as process of innovation. Rogers' unitary perspective considers innovation as a unit of analysis. He explains, diffusion of innovation as a process of communicating innovation in the organizations. Organizational innovation is communicated to all members through a multistep process. Acceptance of novel idea by these members depends on their perception towards attributes of innovation. These attributes have been identified as: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage is advantages of innovation with respect to time and cost. Compatibility is consistency of innovation with respect to organization's culture and values. Complexity is the degree of simplicity/complexity of innovation so that members easily accept it. Trialability is degree to which innovation is experimented for its usefulness. Observability is visibility of idea to members of the social system or relevance of the idea for end users/consumers. Innovation helps an organization to adapt to change by introducing new behaviors and methods (Daft, 1982; Rogers, 1983; Van de Ven, 1986). However, multidimensional perspective of innovation with organization as a unit of analysis has been explained by Klien and Sorra (1996). Innovation consists of generation and adoption. Generation is exploration of new opportunities as well as exploitation of existing resources. It is a creative process encompassing opportunity recognition, developing research design, commercializing, marketing, and distributing it (Hitt & Ireland, 2002; Roberts, 1988). Generation process requires technical, market research, information, and knowledge sharing competencies of managers (Nonaka, 1990). Adoption is a problem solving process encompassing initiation and implementation. Initiation is a process of recognizing need

to adopt new product, service, or technology, generating awareness of innovation among organizational members, evaluating its economic and technical worth, and taking decision to adopt or reject the innovation. Implementation is assimilating innovation in organization till it is routinized. Innovation adoption process requires managerial competencies (Duncan, 1976; Glynn, 1996).

2.1.2 Theories of innovation process

Ambidextrous theory shows the relationship of structural factors of organization with two stages of adoption process: pre-adoption and post-adoption (Duncan, 1976; Rogers, 1983). Pre-adoption/initiation activities result in adoption decision. Post-adoption/implementation decisions facilitate incorporating innovation in organization. The theory of innovation radicalness categorizes types of innovations as: incremental and radical. Incremental innovation is minor modification in existing products, services, or processes. Radical innovation causes fundamental transformation in existing processes of organizations (Grossman, 1970; Knight, 1967; Nord & Tucker, 1987; Norman. 1971). Dual core theory differentiates the types of innovations with respect to degree of innovation in technical and administrative processes (Daft, 1978). Technical innovation is product and process innovation. Administrative innovations consist of newness in organizational structure and administrative processes. They facilitate accomplishment of task. Four factor theory, explains the role of contextual variables supporting innovation such as: participative safety, support for innovation, vision, and task orientation (Anderson & West, 1998). Componential theory of creativity and innovation focuses on work environments influencing creativity (Amabile, 1988; Anderson, Potocnik, & Zhou, 2014).

Rogers' diffusion theory, ambidextrous theory, dual core theory, theory of radicalness, four factor theory, and componential theory have defined literature on innovation as: stages of diffusion of innovation, innovation adoption process, type of innovation, degree of innovation, and contextual factors affecting innovation. The subsequent section discusses antecedents and contextual factors, types of innovation, sources of innovation, types of organizations adopting innovations, consequences of innovation, and processes of innovation.

2.1.3 Antecedents and contextual factors of innovation process

Innovation is carried out at organizational, team, and individual level respectively. Innovation can be successfully generated or adopted with less hierarchical and centralized organizational structures (Cooper, 1998). 85 American delegates from department of Business Innovation and Skills were surveyed through questionnaire and interview method to identify enablers of innovation generation and adoption in organizations (Magadley & Birdi, 2012). Product, ideas, and process innovations are facets of innovation generation. Organizational size, structure, climate, management style, and market situations are enablers of product innovation. Employees' knowledge, functional and technical skills, experience, intelligence, talent, and self motivation influence idea generation. Communication among members, their characteristics of teamwork and learning are enablers of process innovation.

Similarly there are certain factors facilitating/impeding innovation adoption. Innovation adoption consists of initiation and implementation. 1219 managers, team members, and technology users working in 39 manufacturing plants of American companies were surveyed to study the successful implementation of computerized technology (Klien, Conn, & Sorra, 2001). There are factors that cause success/failure of both innovation adoption and implementation

(Klien & Knight, 2005). Management support, availability of financial resources, favorable organizational procedures, training and technical assistance, climate for innovation, R&D investment, learning orientation, and managerial patience are few antecedents of innovation implementation. These factors are group and organizational level factors. Support and approval to initiate, and fearless participation in decision making are group level factors and support for innovation, risk-taking, freedom to contribute their ideas, and flexible organizational structure are organizational level factors enabling idea implementation.

Similarly, there are organizational and individual factors facilitating innovation adoption (Frambach & Schillewaert, 2002). Organizational size, structure, strategies, supplier's feedback, social network, and business environment are few organizational factors.

A study conducted in health care institutions has identified perception of employees as enablers of innovation adoption process (West & Farr, 1989). Individual's attitude towards innovation, their experience, tenure, cultural background, peer influence, and organizational support gained in the form of training and development are certain individual level factors (Tripathi, Nongmaithem, Mitkovic, Ristic, & Zdravkovic, 2010). Innovation is adopted when members of the group adhere to norms, emphasize on cognitive thinking, improve quality of task under the supervision of participative leaders, and a favorable organizational climate. 178 Australian members working in 34 teams were surveyed to identify the impact of charismatic leadership style of a leader on team level innovation (Paulse, Maldonado, Callan, & Ayoko, 2009). The findings revealed that leaders' charismatic leadership style affects innovation adoption at team level. Leaders influence their followers by communicating vision and generating enthusiasm. They generate a sense of belongingness among members to work together, and minimize their interpersonal conflicts.

Earlier researchers have focused on organizational and individual level factors supporting innovation adoption, ignoring team level factors. Therefore, to address this gap, 48 teams comprising of 321 school staff members were surveyed to identify the impact of team interaction processes and structure on team level innovation (Drach-Zahavy & Somech, 2001). Team members' divergent skills and learning process are enablers of team innovation. Team interaction process mediates the relationship between team heterogeneity and team innovation. Reflections of team's objectives, strategies, and processes have enabled organizational level innovation to adapt and change. 174 Australian members and their team leaders working in 13 research and 18 development teams have also identified the impact of team climate on innovation at individual, team, and organizational level (Bain, Mann, & Pirola-Merlo, 2001). Favorable climate for innovation helps members in innovation team to express their views without fear. Task orientation facilitates completion of task in a developmental team.

2.1.4 Types of innovation

Innovation is categorized as product and process innovation (Cooper, 1998). New ideas, technologies, and services, are product innovations. Process innovation consists of initiation and implementation (Klien & Sorra, 1996; Taylor & McAdam, 2004). Process innovations are both technical and managerial/administrative innovations (Gopalakrishnan & Damanpour, 1994). Technical innovations are efforts to improve existing work methods by implementing new products, processes, or technologies. Managerial innovations are making changes in existing work culture by evaluating risk and uncertainty in the business environment. Managerial innovations are changing strategies, structures, decision making, and problem solving.

2.1.5 Sources of innovation

Sources of innovation are: imitation, acquisition, and incubation (Damanpour & Gopalakrishnan, 1998). Imitation is copying innovations of other organizations. Acquisition is procuring innovations through licensing and purchasing. Incubation is generating new ideas, products, and services through their in-house R&D and partnership with other firms. *Ranbaxy* and *Lupin*, are involved in R&D projects to develop anti-malaria and tuberculosis drugs through public-private partnerships with *Medicines for Malaria Venture* and *Indian Research Institute* respectively.

2.1.6 Types of organizations adopting innovations

Organizations can be innovative or non-innovative. They either generate/adopt or have both generation and adoption facility (Damanpour & Wischnevsky, 2006). Innovation generating organizations are suppliers of innovation. They generate new products and services through technical and market research competencies. Innovation adopting organizations are users of innovations. Managerial competence is required to adopt innovation. Initiating changes in organizational processes, strategies, structures, units, and routines is termed as managerial innovation. Since Schumpeter's focus on innovation is central to economic development, vast research has been conducted in the fields of sociology, psychology, business, and public organizations.

2.1.7 Consequences of innovation process

Consequences are the results of innovation decision. Rogers (1995) divided consequences as: direct/indirect, desirable/undesirable, and anticipated/unanticipated. Direct/indirect consequences depend upon types of changes (radical/incremental) in organization such as increased production,

high income/profits, more flexibility, and increase in cost and time. Desirable/undesirable consequences are the outcomes of innovation as functional/dysfunctional. Anticipated/unanticipated consequences depend upon the perception of organizational members accepting change. Unanticipated consequences are rejection of product and poor response to market innovation.

2.1.8 Processes of innovation

In the above discussion, innovation research discusses theories, antecedents and contextual factors, types of innovation, sources of innovation, types of organizations adopting innovation, and consequences of innovations. Process of innovation discusses generation, diffusion, adoption, and implementation. Types of innovation specify product, process, service, managerial, and technological innovation. Consequences of innovation are for firm, industry, society, and economy. From the above discussion, it becomes apparent that managerial innovation helps in long term sustainability and growth to organizations (Pandya, 2013). Managerial innovations are innovation in structures, administrative systems, management practices, processes, and techniques that could bring change in organizations (Birkinshaw, Hamel, & Mol, 2008; Kimberly, 1981). TQM, Quality circle, Just-in-time, 360 degree feedback, change in structure, and strategy are few managerial innovations. Managerial innovations help in developing strategies to facilitate organizational change and renewal. With technological innovations organizations cannot sustain for long. Thus, organizations need to emphasize on managerial innovations to compete and sustain in dynamic environment (Damanpour, Walker, & Avellaneda, 2009). Organizations implement new management practices, policies, and strategies for renewal and improvement in performance. Strategic analysis, balance score card, quality of

work life, project management, goal setting, and performance appraisal system are few such managerial innovations (Arnaboldi, Azzone, & Palermo, 2010; Birkinshaw, 2008; Bodas Freitas, 2008; Vaccaro, Jansen, Van Den Bosch, & Volberda, 2010). However, these managerial innovations have been analyzed in the form of case studies and conceptual studies. The case studies discussed failure of implementation of managerial innovations of performance appraisal system and lean manufacturing system (Arnaboldi et al., 2010). Another case study by Palmaro and Dunford (2001) compares diffusion of managerial innovation in private and public organizations in Australia. This study highlights that managerial innovations are quickly adopted in flexible organizational structure. Managerial innovations have not been empirically tested in the existing innovation literature, creating a gap for further enquiry. Therefore, there is need for developing a conceptual framework of managerial innovation to withstand competitive challenges in the environment.

Review of relevant literature on innovation have helped in identifying certain social, psychological, and contextual variables supporting managerial innovation process (Table 2.1).

Table 2.1: *Literature review*

S. No.	Variable	Author and year	Objectives	Findings
I. Team leader's leadership style				
1.		Harris & Lambert, 1998	54 managers and 199 team leaders of 34 American companies in 11 industries were surveyed to determine the impact of senior manager's role on team performance. Responses were analyzed using logistic regression.	Senior managers adopt transformational and transactional leadership style to communicate ideas, develop their potential, and reward employees for effective team performance. Transformational leaders clarify goals to the subordinates, inspire, and empower them to improve their performance. Whereas, transactional leader focuses more on organizational rules, policies and procedure rather than team performance.
2.		Kim, Min, & Cha, 1999	503 members working in 87 project teams of 6 Korean R&D firms were surveyed to identify the impact of leaders' roles such as technical expert, idea champion, gatekeeper, strategic planner, and team builder on team's performance. Responses were analyzed through correlation, regression, and factor analysis.	Various roles of the team leader are idea champions, gatekeepers, technical experts, team builders, and strategic planners. Idea champions promote innovation and facilitate communication among members. Gate-keepers monitor information. Technical experts provide solutions for technical problems. Team builders and strategic planners provide guidance and build cohesiveness. Idea champion's role is more significant as compared to others because they value low power distance, emphasize more on autonomy, and adapt to existing

			work culture.
3.	Stoker, Looise, Fisscher, & De Jong, 2001	601 members working in 80 self-managed teams of 2 Dutch firms were surveyed to identify the impact of leadership styles and members' characteristics on team performance. Responses were analyzed through correlation and regression.	Leaders display different roles at various stages of innovation. They play visionary role at project initiation stage and considerate in growth and maturity stage. Adopting these leadership roles they develop self efficacy, cohesion, organizational commitment of members resulting in job satisfaction, and effective team performance.
4.	Pirola-Merlo, Hartel, Mann, & Hirst, 2002	313 members in 54 R&D teams of 4 Australian firms were surveyed to identify the impact of leadership style on team performance with team climate as moderating variable. Responses were analyzed through correlation and partial correlation analysis.	Transformational leaders encourage and empower subordinates, inculcate confidence, and promote sense of identity within them thereby, building a positive climate. Team climate helps members manage emotions and minimize threats to nurture interpersonal relations.
5.	Elkins & Keller, 2003	The paper reviews the relationship between leadership style and R&D organizations' outcomes.	Transformational leaders encourage and motivate subordinates through idealized influence, intellectual stimulation, inspirational motivation, and individual consideration. Transactional leaders motivate subordinates to perform through reward and punishment. Leaders develop subordinates' performance through social exchange process of trust, loyalty, respect, and mutual commitment to

organizational goals.

6.	Amabile, Schatzel, Moneta, & Kramer, 2004	238 knowledge workers from 26 project teams in 7 American companies have been surveyed to identify the impact of leaders' behavior on team members' creativity. Responses were analyzed through regression analysis.	Leaders influence subordinates through their intellectual and technical competence. Their skills like conflict handling, planning and organizing, problem solving, and team building helps in integrating task to imbibe creativity. Their day-to-day interaction with members helps in assessing their perception, problems, and overall performance. Leaders generate trust among members, coordinate and monitor their progress, and motivate them by recognizing their performance.
7.	Lutzo, 2005	This paper reviews literature to conceptualize the resonant leadership style of leaders.	Resonant leaders evoke positive emotions and inspire subordinates through hope, compassion, and mindfulness.
8.	McKee & Massimilian, 2006	This paper reviews literature to conceptualize resonant leadership style of leaders.	Resonant leaders understand the emotions of their followers and empathize with them. They motivate subordinates to attain vision through their emotional intelligence.
9.	Shin & Jhou, 2007	288 employees from 75 R&D teams in 44 Korean companies were surveyed to identify the impact of members' educational diversity on team creativity	Educational diversity of team members widen their horizon, increase their access to information and enhance cognition, to promote creativity. Transformational leaders motivate subordinates, provide

		with transformational leadership as moderating and team creative efficacy as mediating variable. Responses were analyzed using confirmatory factor analysis and hierarchical regression analysis.	vision, and build sense of belongingness. Through interaction and social exchange, members develop shared belief and collective efficacy for producing creative ideas. As the members' tenure in the organization increases they become more mature and confident decision makers, reducing dependability on leaders.
10.	Paulsen, Maldonado, Callan, & Ayoko, 2009	178 Australian employees from 34 research teams were surveyed to identify the impact of charismatic leadership style on team innovation with team identity and cooperation as mediating variables. Responses were analyzed through correlation and structural equation modeling.	Charismatic leaders' reputation, commitment, risk taking, problem solving abilities, and technical expertise inspire followers. Subordinates of such leaders develop a sense of belongingness, confidence, trust, and respect. Members with team identity adopt cooperative behavior to resolve issues and participate in collective decision making to find amicable solutions.
11.	Zhang, Tsui, & Wang, 2011	973 employees of 12 Chinese companies were surveyed to compare the role of 2 different leadership styles on team performance. Responses were analyzed through structural equation modeling.	Transformational leaders improve team productivity by enhancing cognition and new insights. They make members confident to share information and develop divergent thinking. Authoritarian leaders exercise more control, discourage new ideas, and information flow thus, impeding team creativity

12.	Ishikawa, 2012	122 R&D teams of 7 Japanese companies were surveyed to compare the influence of gatekeepers and transformational leaders on team performance. Responses were analyzed through correlation analysis and structural equation modeling.	Transformational leaders clarify members' goals, coach, and develop them. They help in identifying important information and build team cohesiveness. Their focus is more on group norms which suppress followers' ideas resulting in poor team performance. However, gatekeepers encourage followers to communicate frequently even if they have strong disagreement. They understand the requirement of diversified information, personal values, and accept criticism and opinions for knowledge creation and effective team performance.
13.	Boyatzis, Smith, & Beveridge, 2012	This paper reviews the literature to identify the role of resonant leaders in coaching teams to attain desired outputs.	Through vision, compassion, and mindfulness, resonant leaders generate positive emotions among members. They use emotional and social intelligence competencies to invoke positive emotions and develop members' cognitive ability, sense of belongingness, and self esteem.
14.	Boyatzis, Passarelli, Koenig, Lowe, Mathew, Stoller, & Phillips, 2012	This review establishes a link between neurocognitive functioning of members' brain in contact with their resonant leaders.	Members feel motivated with inspiration of their resonant leaders. Neural circuits of their brain get activated with positive vibes of leader. They mimic and role play their leaders automatically.

15.	Boyatzis & Yeganeh, 2012	This study explains the role of a resonant leader in developing teams.	Shared vision, continuous learning, and team belongingness help members work effectively. Team leaders bind members with a common purpose, develop trust among them and involve them in decision making.
16.	Boyatzis, Smith, Oosten, & Woolford, 2013	This case study identifies the antecedents of resonant leadership.	Resonant leaders through their emotional intelligence, vision, and coaching skills develop subordinates. They provide direction and guidance to their followers and empathize with them.

II. Proactive personality of team members

17.	Bateman & Crant, 1993	412 American undergraduate students and 148 MBA students were surveyed to develop a scale of members' proactive behavior with respect to big five personality dimensions. The scale was tested for its validity through confirmatory factor analysis.	Members with proactive personality are those who are unconstrained by environmental uncertainty. They are curious, self driven, sociable, and are able to sense risk.
18.	Kichuk & Wiesner, 1997	419 American engineering students in product design teams were surveyed to identify the relationship of members' big five personality factors and team performance.	Team members with high levels of conscientiousness are meticulous, hardworking, and organized. Members high on extraversion are more sociable and solve complex problems. Members' neuroticism shows their degree of cohesiveness.

		Responses were analyzed through multiple and stepwise regression analysis.	Those who are agreeable are courteous, flexible, and cooperative. Members with openness to experience are more curious, intelligent, and artistic resulting in team creativity.
19.	LePine , Buckman, Crawford, & Methot, 2011	This paper reviews literature to identify the impact of team members' personality on team effectiveness.	Conscientious members perform effectively as they are organized, reliable, and hard working. Those who are agreeable and emotionally stable remain calm, secure, and steady. Social, enthusiastic, energetic, and optimistic members conform to group norms leading to more effective performance of team. Therefore, members' personality influences their work behavior and overall team performance. Members' task roles directly enhance team performance whereas their social roles impede performance.
20.	Hirunyawipada & Paswan, 2012	195 professionals associated with new product development teams in American high technology industries were surveyed to examine the effects of members' cognitive characteristics on idea generation. Responses were analyzed using correlation analysis and structural equation modeling.	Members' cognitive skills encompassing knowledge and experience help them in generating creative ideas. Team diversity increases information and knowledge sharing among members and promotes idea generation. However, highly skilled and experienced employees are impediments in the process of idea generation. Also, constraining goal reduce cognitive thinking and idea generation.

21.	Scott-Ladd & Chan, 2004	A review of literature identifies the relationship between emotional intelligence, team learning, and decision making.	Emotionally intelligent team members are better decision makers, assimilate information, make judgments, and solve complex problems.
22.	Jordan & Lawrence, 2009	Different samples consisting of 620 and 217 employees playing administrative, professional, technical and senior managerial roles in teams of Australian organizations have been surveyed to develop a conceptual model of employees' emotional intelligence. Responses were analyzed using confirmatory factor analysis.	Emotional intelligence improves members' behavior and performance through awareness and management of emotions of self and others. It contributes to team performance with better information exchange, decision making, and conflict resolution.
23.	Troth, 2009	A conceptual study was conducted to identify the relationship between members' emotional intelligence, trust, and decision making.	Emotionally intelligent members resolve conflict and facilitate decision making among members.
24.	Barczak, Lassk, & Mulki, 2010	82 students from US university were surveyed to identify the impact of members' emotional intelligence on team's collaborative culture to	Emotionally intelligent members develop trust, encourage idea sharing, develop collaborative culture, and value teamwork. Cognitive trust helps in reducing dysfunctional conflict and enhances

attain team creativity with creativity.
trust as a moderator.
Responses were analyzed
using correlation and
regression analysis.

IV. Trust among team members

25.	Chowdhury, 2005	164 part-time MBA students in 31 teams from American university were surveyed to identify the impact of affect and cognition based trust on knowledge sharing in teams. Responses were analyzed using zero order correlation.	Trust must be developed among members for knowledge sharing. Affect and cognition based trust are differently associated with knowledge sharing. Cognition based trust can be developed with members' reliable performance and professional credentials while affect based trust depends upon members' behavior and relationship.
26.	Greenberg, Greenberg, & Antonucci, 2007	This study reviews the literature to identify the role of varied forms of trust on team creativity.	Trust reduces uncertainty and risk at product development stage. During project planning, reward and training helps in developing trust. During inception trust helps in team building. At organizing stage to establish norms and task structure, trust is required to assess individual's competence. At transition stage trust maintains team's focus on accomplishment of task.

| 27. | Tsai, Chi, Grandey, & Fung, 2012 | 270 members and their leaders working in 68 R&D teams of Taiwanese high technology firms have been surveyed to identify the influence of group centrism and trust on team creativity. Responses were analyzed through hierarchical linear modeling. | Members with in-group feeling reject deviant opinions and resist change. |

V. Task reflexivity

| 28. | De Dreu, 2002 | 215 members in 32 process teams of Dutch firms were surveyed to identify the impact of minority dissent on team innovation and team reflexivity as a moderator. Responses were analyzed using principal component and hierarchical regression. | Minority dissent fosters team innovation by opposing the existing beliefs, attitudes, and procedures of majority members while decision making. Reflexive teams listen carefully when minority dissent shares their divergent thoughts. Innovative ideas and solutions which are backed up by reflexive teams promote team innovation. |
| 29. | Tjosvold, Tang, & West, 2004 | 200 Chinese employees in 100 work teams were surveyed to identify the impact of team reflexivity and goal interdependence on organizational innovation. Responses were analyzed using correlation and confirmatory factor analysis. | Members monitor and work together to develop and implement plans for improvement. Team reflexivity develops members' understanding of new work methods and respond to emerging challenges. |

30.	De Dreu, 2007	368 supervisors in 46 Dutch project teams were surveyed to identify impact of members' interdependence and mutual collaboration on team effectiveness with reflexivity as moderator. Responses were analyzed using zero-order correlation and regression analysis.	Mutual collaboration and interdependence of members shoulder the responsibility of success and failure together. Mutual interdependence motivates members to accomplish tasks and handle dysfunctional conflict. Highly reflexive team members co-operate and share information and enhance learning, facilitating processing and sharing information thereby increasing team effectiveness.
31.	Schippers, Hartog, & Koopman, 2007	454 members in 59 production teams of 14 Dutch firms were surveyed to identify the impact of team reflexivity on its performance. Responses were analyzed using exploratory and confirmatory factor analysis, scree criterion, and one way ANOVA.	Team reflexivity is a repetitive process consisting of reflection, planning and adaptation as its major components. Highly reflexive team members focus on long term planning and adapt to environmental challenges. Members' reflection helps in exploring ways to fulfill desired objectives.
32.	Pieterse, Knippenberg, & Ginkel, 2011	147 students from Dutch universities were surveyed to identify the impact of team reflexivity on its diversity and performance. Responses were analyzed using hierarchical regression.	Highly Reflexive members evaluate team processes, strategies and objectives to promote job satisfaction, commitment and enhance team performance and innovation. Reflexivity varies in different teams based on task complexities and brings diverse ideas and information to attain organizational objectives.

33.		Schippers, West, & Dawson, 2012	1156 members working in 98 Dutch health care teams were surveyed to identify the impact of team reflexivity on innovation with workload as a moderator. Responses were analyzed using correlation and regression analysis.	Workload plays significant role in team innovation. Teams with high workload develop improvised ways of working by infusing reflexivity among members leading to innovation. More the workload more would be innovation because members learn to be insightful in adverse conditions.

VI. Team information sharing process

34.	*VI (a) Information processing*	Hirst & Mann, 2004	350 members working in 56 R&D teams of 4 Australian companies were surveyed to develop team communication model. Responses were analyzed using confirmatory factor analysis.	Team communication consists of information processing and interaction. Members interact with others and boundary spanners to acquire information and resources. Clearly defined organizational objectives and customer feedback also help in getting information.
35.		Kratzer, Gemunden, & Lettl, 2008	Team leaders working in 2 multi-team projects of European space agency consisting of 23 and 26 members respectively have been surveyed to identify the impact of communication networks on creativity and efficiency of teams. Responses were analyzed using paired sample t-test and multiple regression analysis.	Communication network of members help in acquiring new knowledge. Organizations use matrix structure to accomplish projects. Informal communication stimulates creativity by acquiring timely information to create knowledge. Moderate interaction improves team creativity whereas frequent interaction can be detrimental for team's performance.

36.		Susskind, Odom-Reed, & Viccari, 2011	49 professors from 11 project teams of American universities were surveyed to identify the impact of team leaders' and members' communication network on team performance. Responses were analyzed through regression coefficient, partial, and zero-order correlation.	Team leader are effective in developing communication networks as they have more autonomy and access to information. However, members with less power and autonomy are unable to develop intra-organizational networks.
37.	*VI(b) Knowledge sharing*	Bock, Zmud, Kim, & Lee, 2005	61 employees working in 13 organizations from 7 Korean industries were surveyed to identify the factors supporting knowledge sharing intention of individuals. Responses were analyzed through partial least square method and confirmatory factor analysis.	Members' intention to share knowledge is affected by their attitude towards knowledge sharing, subjective norms, and organizational climate. Rewards for sharing knowledge, social exchange among members, and appraisal develops employees' attitude towards knowledge sharing. Organizational justice motivates employees to learn, share information, and acquire knowledge.
38.		Lee, Kim, & Koh, 2009	142 researchers in R&D teams of Korean research firms were surveyed to identify the perceived importance of knowledge portal functionalities by team and task characteristics. Responses were analyzed using	Knowledge portal functionalities are communication, collaboration, content, coordination, customization, community and connection. Out of 7 knowledge portal functionalities, communication, collaboration, coordination and connection are important because they help

		ANOVA.	geographically dispersed members in information exchange and solve complex problems. While content, customization and community do not have any impact on team performance.
39.	Huang, 2009	400 members of 60 R&D teams working in Taiwanese organizations were surveyed to identify the impact of trust, group cohesiveness, and knowledge sharing on team's collective performance with transactive memory system as mediating variable. Responses were analyzed using structural equation modeling.	Trust has non-significant impact on knowledge sharing as team diversity reduces trust. Communication and interaction enhances trust and motivates members to develop shared understanding called transactive memory system. It integrates and facilitates knowledge sharing, diffuses conflict, improves group cohesiveness, and problem solving. Social interaction and group cognition motivates members to attain common objectives. However, with increased group cohesiveness members' performance declines as they focus more on building social relationship rather than knowledge sharing.
40.	Jin & Sun, 2010	80 leaders and 128 members working in R&D teams of 4 Chinese universities were surveyed to identify the effect of team members' characteristics on its performance with knowledge sharing, communication, and integration as mediating	Team members interact and influence those with similar opinion, attitudes, behavior, and cultural background. Members share explicit and tacit knowledge for improving team performance. Coordination and cohesiveness of members help in sharing knowledge. Sharing and communication of knowledge broadens members' horizon of

		variables. Responses were analyzed through factor analysis and structural equation modeling.	interdisciplinary research leading to innovation.
41.	Liu & Phillips, 2011	301 Taiwanese employees from 52 R&D teams were surveyed to identify the influence of transformational leadership climate on employees' team identity and their intention to share knowledge for gaining team innovation. Responses were analyzed through correlation and regression analysis.	Leaders' transformational style fosters a culture of shared beliefs, vision, organizational commitment and knowledge sharing. They empower subordinates to develop their identity as well as commitment for organizational goals. With the sense of identity members trust each other and share knowledge. Team identity mediates the relationship between transformational leadership climate and knowledge sharing as it develops shared understanding, encourages coordination, and cooperation thereby increasing team innovation.
42.	Bresman, 2012	92 team members and leaders from 13 R&D units of 6 pharmaceutical firms were interviewed to identify the impact of upward lobbying and knowledge acquisition on team performance. Responses were analyzed using logistic regression, confirmatory and exploratory factor analysis.	Upward lobbying indirectly influences teams to share explicit knowledge. If upward lobbying pressurizes teams to share tacit knowledge at the time of low competition then team members get frustrated as it hurt their emotions. It depends upon the willingness and ability of teams to share tacit knowledge. At low levels of competition, teams are least interested in withholding knowledge thus upward lobbying is least significant. But during high competition upward lobbying

			significantly affects explicit knowledge acquisition.
43.	*VI (c) Collaborative problem solving*	Barker, Tjosvold, & Andrews, 1988	12 managers and 315 engineers working in 12 project teams from Canadian matrix organizations have been surveyed to identify conflict resolution approaches for effective team performance. Responses were analyzed using correlation analysis.	Conflict resolution approaches are cooperative, confirming, competitive, and avoidance. Cooperative problem solving approach is beneficial for all. Confirming approach is accepting blame imposed by others. Competitive approach is based on win-loose strategy. Avoidance approach is when members avoid conflict.
44.		Tjosvold, Hui, & Yu, 2003	200 employees and 100 managers working in 100 work teams of 150 Chinese firms have been surveyed to identify the conflict resolution style adopted to improve team performance. Responses were analyzed using structural equation modeling, correlation, and confirmatory factor analysis.	Study reveals that out of the three conflict resolution styles, cooperative conflict resolution approach is most suitable for team. Consensus on team goals helps members to solve conflict. Members develop trust to accomplish their goals. However, competitive and avoidance approach minimizes discussion and decrease members' commitment towards their work.

45.	Jordon & Troth, 2004	350 students working in 108 teams from Australian university were surveyed to identify role of members' emotional intelligence in solving problems and conflict resolution. Responses were analyzed using correlation and regression analysis.	Cognitive intelligence is considered more important than emotional intelligence for task performance at individual level. Emotional intelligence helps in resolving conflict collaboratively in teams.
46.	Chen, 2006	142 and 106 Taiwanese members in project and new product development teams have been surveyed to identify the impact of types of conflict on team performance. Responses were analyzed using correlation and regression analysis.	Conflict is categorized as task and interpersonal conflict. Task conflict arises due to diversity in teams and results in creative problem solving and decision making. Interpersonal conflict arises due to personal differences of members reducing creativity.
47.	Kankanhalli, Tan, & Wei, 2007	27 members working in virtual teams of different universities across globe were surveyed to identify their conflict resolution strategy.	Three conflict resolution strategies are integrative, distributive, and avoidance. The integrative/ collaborative approach satisfies all members. The findings confirm the results of attribution theory stating that situational attributes of an individual helps in resolving collaborative conflict.

48.	Behfar, Peterson, Mannix, & Trochim, 2008	171 MBA students employed in 57 autonomous teams were interviewed to identify conflict resolution strategies and their impact on group performance and satisfaction. Responses were analyzed using expert rating and concept mapping.	Conflict resolution style consists of conflict management process and behavior. Conflict management behavior is individuals' style and generalized behavior. The generalized behavioral approaches are avoiding, accommodating, compromising, competing, and problem solving. For effective team performance integrative conflict resolution approach is most suitable.
49.	Sikes, Gulbro, & Shonesy, 2010	A review of literature identifies the impact of conflict on team performance.	Team conflict can be: functional, related to task and dysfunctional, arising out of individual differences. Former benefits team members by raising their cognition to solve complex problems. The later impedes organizational growth deflating members' morale and relationship.
50.	Farh, Lee, & Farh, 2010	422 members and 71 managers working in 71 project teams of Chinese firm were surveyed to identify the impact of task conflict on team creativity. Responses were analyzed using correlation and regression analysis.	Moderate level of task conflict promotes team creativity as it facilitates information exchange and verifies existing status quo. Task conflict has curvilinear effect on team creativity during early phases of project life cycle as members are engaged in idea generation, whereas on later stages focus is on timely completion of task.

51.	*VII (a) Support for innovation*	Bain, Mann, & Pirola-Merlo, 2001	193 scientists working in 38 project teams of Australian R&D firms were surveyed to identify the impact of team climate on team performance and innovation in organizations. Responses were analyzed through correlation analysis.	Team climate encourages innovation by supporting creative ideas and motivating members. Team climate encompasses objectives, participative safety, support for innovation and task orientation. Participative safety helps members to bring forth new ideas without fear. Aligning individual goals with customer requirements continuously motivates them. Members' higher need of achievement facilitates innovation.
52.		Maceika & Zabielaviciene, 2012	70 European engineers were surveyed to identify the impact of organizational value system and personal qualities of members on team creativity. Responses were analyzed using regression analysis.	Organizational value system promotes creativity and innovation of teams. Such values are the resultant of members' experience, attitude, and creativity. These values are imbibed in members when their creative urge is ingrained within them.
53.		Nilniyom, 2007	96 auditors of *Thai Business Development* firms were surveyed to identify the impact of group climate constructs on team performance. Responses were analyzed through factor analysis, correlation and regression analysis.	Group climate consist of self-disclosure, psychological safety, and learning orientation. Therefore, group climate enhances members' expertise to solve problems enhancing creativity and performance. Trust within members reduces interpersonal conflict and improves cohesiveness.

54.	*VII (b)* *Intrapreneurship*	Antoncic & Hisrich, 2003	This study reviews literature to develop the concept of intrapreneurship for enhancing team creativity.	Intrapreneurship is multidimensional concept consists of autonomy, risk taking, aggressiveness, creativity, and innovation, strategic renewal, and competitiveness. Intrapreneurship promotes members to generate new ideas and enhance team creativity.
55.		Antoncic, 2007	141 Slovenian and 51 American firm owners were surveyed to analyze the impact of environmental and organizational characteristics on promoting intrapreneurship in organizations. The proposed intrapreneurship model was analyzed through structural path models.	Organizational characteristics like, communication, formal controls, environmental scanning, organizational support, competition, and person related values promote intrapreneurship. Environmental characteristics consisting of market dynamism, technological innovation, and increased customer demands encourage intrapreneurship. Intrapreneurship results in increased organizational growth and performance in the form of new products, services, and increased profits.
56.		Quesada, Onaindia, & Laburu, 2011	The paper conducts a case study to identify the organizational factors supporting intrapreneurship to improve the performance at team and organizational level.	Organizations promote intrapreneurship by having flexibility and empowering subordinates. Team members with intrapreneurial skills take risk to solve complex problems and generate creative ideas.

57.	Parker, 2011	1214 American intrapreneurs and entrepreneurs were surveyed to identify the impact of new business ventures on team creativity. Responses were analyzed using ANOVA.	Intrapreneurship helps team members to exploit business opportunities. Their experience, knowledge, and skills help them in developing ideas. Organizations promote intrapreneurship by providing incentives to members' contribution in R&D activities for enhancing team creativity.

VIII. Team creativity

58.	Amabile, 1996	This study reviews literature to highlight the importance of creativity.	Creativity is the transformation of imaginative ideas into novel and useful products. Members' personality, autonomy, talent, technical proficiency, emotional intelligence, risk taking, and knowledge help them generate creative ideas. Employees perform enthusiastically when organizational policies are favorable to them.
59.	Martins & Terblanche, 2003	This study reviews literature to identify the influence of organizational culture to generate creativity.	Organizational strategy, structure, support mechanism, and vision provide guidelines to handle challenges by knowledge sharing and developing creative ideas.
60.	Vreede, Boughzala, Vreede, & Reiter-Palmon, 2012	Behavior of 8 laboratory experts working in R&D teams of telecom sector in France was observed during training session to identify the antecedents of team creativity.	Team creativity is an amalgamation of individual's creative efforts. Clear team goals influence members to collaborate, develop trust, and foster knowledge sharing among members resulting in team innovation.

IX. Innovation adoption

61.	Roger, 1983	This review identifies the process of transferring innovation in organization.	Innovation is communicated to organizational members through attributes such as relative advantage, compatibility, complexity, trialability, and observability.
62.	Van de Ven, 1986	The review identifies problems in adopting innovation in organizations.	These problems are resistance to accept new ideas, inadequate resources, infrastructure, finance, and human competence.
63.	Avlonitis & Parkinson, 1986	The study identifies behavior of managers shown during adoption of flexible manufacturing system by surveying 31 British and West German companies.	The behavior shown in innovation adoption depends upon the awareness, interest of employees, evaluation of technical and economic worth, and decision to adopt or reject the innovation.
64.	West & Wallace, 1990	A study on UK health care teams consisting of doctors, nurses, and health visitors have examined the influence of variables like group climate, leadership style, team collaboration, participation, cohesion, role of innovation, work attitudes and perceptions, organizational commitment, and feedback on innovation in teams.	Team innovates when they get freedom to experiment, initiates and develop ideas. Team members' commitment, belief in team's goals and values, and willingness results in innovation adoption in organization. The finding revealed that open communication, information sharing, trust, and mutual conflict resolution are few characteristics of innovation team.

65.	Gopalkrishnan & Damanpour, 1994	This study reviews literature to determine generation and adoption of innovation in organizations.	Innovation process consists of generation and adoption. Generation of new idea, designing, developing, and commercializing consists of generation process. Adoption process consists of innovation initiation and implementation. Innovation initiation includes awareness of innovation, forming favorable attitude towards innovation, and its evaluation
66.	Klein & Sorra, 1996	The study reviews the literature to develop a model of innovation implementation and identify the impact of employees' perception using innovation in organization.	Innovation implementation is employees' acceptance of an idea. Members develop their competence to use innovation. Organizational climate facilitates innovation by developing favorable attitude of employees.
67.	Gopalkrishnan & Damanpour, 1997	This study reviews literature to analyze innovation research done in different fields.	Innovation process consists of generation and adoption. Innovation generation is creative process. Innovation adoption process is problem solving processes.
68.	Klein, Conn, & Sorra, 2001	1219 managers, team members, and technology users working in 39 manufacturing plants of 33 American companies were surveyed to study the implementation of computerized technology in organizations. Responses	Management support and adequate financial resources, training, technical assistance, reward mechanism, effective communication, time to adopt, and access to new technology, nurture innovation implementation.

		were analyzed using correlation and regression analysis and structural equation modelling.	
69.	Taylor & McAdam, 2004	This study reviews literature to develop a conceptual framework for innovation adoption and implementation.	Diversified skills and competencies of employees facilitates creation of products and processes to improve organizational innovation.
70.	Klein & Knight, 2005	This study reviews literature on innovation implementation process to identify the facilitators and impediments in innovation implementation.	Change in roles and responsibilities, time and cost, organizational norms, and routines are impediments of innovation implementation. Provision of training and technical assistance, establishing climate for innovation, management support, investment on R&D activities, learning orientation of employees, and managerial patience are facilitators of innovation implementation.
71.	Paulsen, Maldonado, Callan, & Ayoko, 2009	178 Australian members working in 34 teams were surveyed to identify the impact of charismatic leadership style on team innovation. Responses were analyzed using correlation.	Leaders' charismatic leadership style affects innovation adoption at team level. Leaders influence their followers by communicating vision and generating enthusiasm, developing a sense of belongingness, and minimizing conflicts.

72.	Somech & Drach-Zahavy, 2011	996 Israeli members working in 96 health care teams of 1200 clinics were surveyed through interview and questionnaire method to identify the impact of team composition on creativity leading to innovation with climate as a moderator. Responses were analyzed using multiple regression analysis.	Members' personality affects their cognition, approach to work while interacting with other members. They generate alternative solutions to solve complex problems. Conducive climate and shared organizational vision develop trust among team members.
73.	Baer, 2012	216 employees from American agricultural processing firm were surveyed to identify the implementation of innovations in organization. Responses were analyzed using correlation and regression analysis, and t-test,	Individual motivation and social networks facilitates implementation of ideas.
74.	Magadley & Birdi, 2012	85 American delegates from department of Business Innovation and Skills were surveyed through questionnaire and interview method to identify factors affecting generation and implementation of new ideas in organizations. Responses were analyzed using correlation.	Individual factors such as knowledge, functional and technical skills, experience, intelligence, talent, and self motivation influence idea generation. Members' support, approval of ideas, and fearless participation in decision making influences innovation implementation. Organizational factors such as support for innovation by risk-taking, freedom of expression, and flexible

			organizational structure facilitates implementation of ideas.
75.	Anderson, Potocnik, & Zhou, 2014	A review was conducted to identify the underlying theories and factors supporting creativity and innovation at individual, team, and organizational level.	Componential, four-factor, and ambidextrous theories support innovation implementation within the organization. Componential theory emphasizes on work environments as facilitators of creativity. Four factor theory highlights the role of team climate facilitating innovation within team. Ambidextrous theory explains the process of innovation generation and adoption in organizations.
76.	Kapoor, Dwivedi, &William, 2014	A review on Roger's innovation adoption attributes has been done to identify the various sectors in which the empirical studies were done	Most of the innovation studies have been conducted in IT and IS sectors. Though importance of innovation adoption in R&D firms have been highlighted, scarce research has been conducted.

The literature on innovation has been categorized on the basis of type of the study: review paper, conceptual studies, and empirical studies; country where the empirical study has been conducted; statistical techniques used; type of respondents; and unit of analysis: individual, team, and organizational, as illustrated in Figure 2.1.

Pictorial presentation of literature review

Period of publication

- 1911-1985
- 1985-1990
- 1991-1995
- 1996-2000
- 2001-2005
- 2006-2010
- 2011-2014

Database

- Emerald Full Text
- Elsevier
- Sage Publications
- John Wiley Publications
- Taylor and Francis
- Springer- Verlag
- JSTOR
- EBSCO

Statistical techniques

- ANOVA
- Correlation
- Factor Analysis
- Regression
- Structural Equation modeling
- T-test

Country

- Australia
- China
- France
- Germany
- Isarel
- Japan
- Korea
- Netherland
- Taiwan
- Thailand
- UK
- USA

Type of respondents

- Auditors
- Engineers
- Firm owners
- Knowledge workers
- Leaders
- Managers
- Members
- Scientists
- Students
- Supervisors
- Technology users

Type of teams

- Health care teams
- New product development teams
- Process teams
- Product design teams
- Production teams
- Project teams
- R&D teams
- Self managed teams
- Virtual teams
- Work teams

Nature of the studies

- Business development firms
- Department of Business Innovation and Skills
- Health care
- High technology firms
- Hospitals/Clinics
- Manufacturing plants
- Matrix organizations
- New Business venture
- Pharmaceutical firms
- Space Agencies
- Telecommunications
- Universities

Type of studies

- Case study
- Conceptual
- Empirical

Figure 2.1: Pictorial presentation of literature review on innovation process.

2.1.9 Major gaps in the literature

Despite four decades of research on innovation, there are inadequate theories to guide the research. There is inconsistency in literature on innovation. Managerial innovation has not been studied in detail. Innovation within departmental units has not been studied so far such as research and development and new product development units. Research and development units are innovation generating units and new product development units are innovation adoption units. Innovation generating, adopting, and integrating units within organizations facilitate innovation process. We have identified certain variables for addressing managerial innovations which will help an organization to facilitate innovation process in various units of organization such as R&D teams. R&D is core of any industry to generate long term competitiveness. Therefore, the process of innovation in R&D unit is topic of interest in this study. R&D unit of any industry generates perennial source of competitive advantage.

Focus of firms post 1990s shifted from cost saving to improving productivity and efficiency through R&D innovations. Pharmaceutical industry has taken initiative to invest in R&D. Their investment was primarily on drug development and not on new drug discovery. Only 2% of the new drugs are sent for clinical trials and 80% of which fail during development stage (Bolten & Degregorio, 2002). Innovation process in R&D units of organizations, require high level of cognitive collaboration and openness. To understand significance of innovation in R&D units and the entire process of innovation, it is imperative to unearth various social and psychological processes by developing a conceptual framework.

Leadership style of team leaders, proactive personality of members, emotional intelligence, trust among members, and certain contextual factors such as team information sharing process and climate for innovation are social and psychological variables within organization identified

through constructive review of extant literature. The integration of individual, team, and organizational level factors has been conceptualized into several hypothesized relations that have been discussed in the subsequent chapter three, in more details.
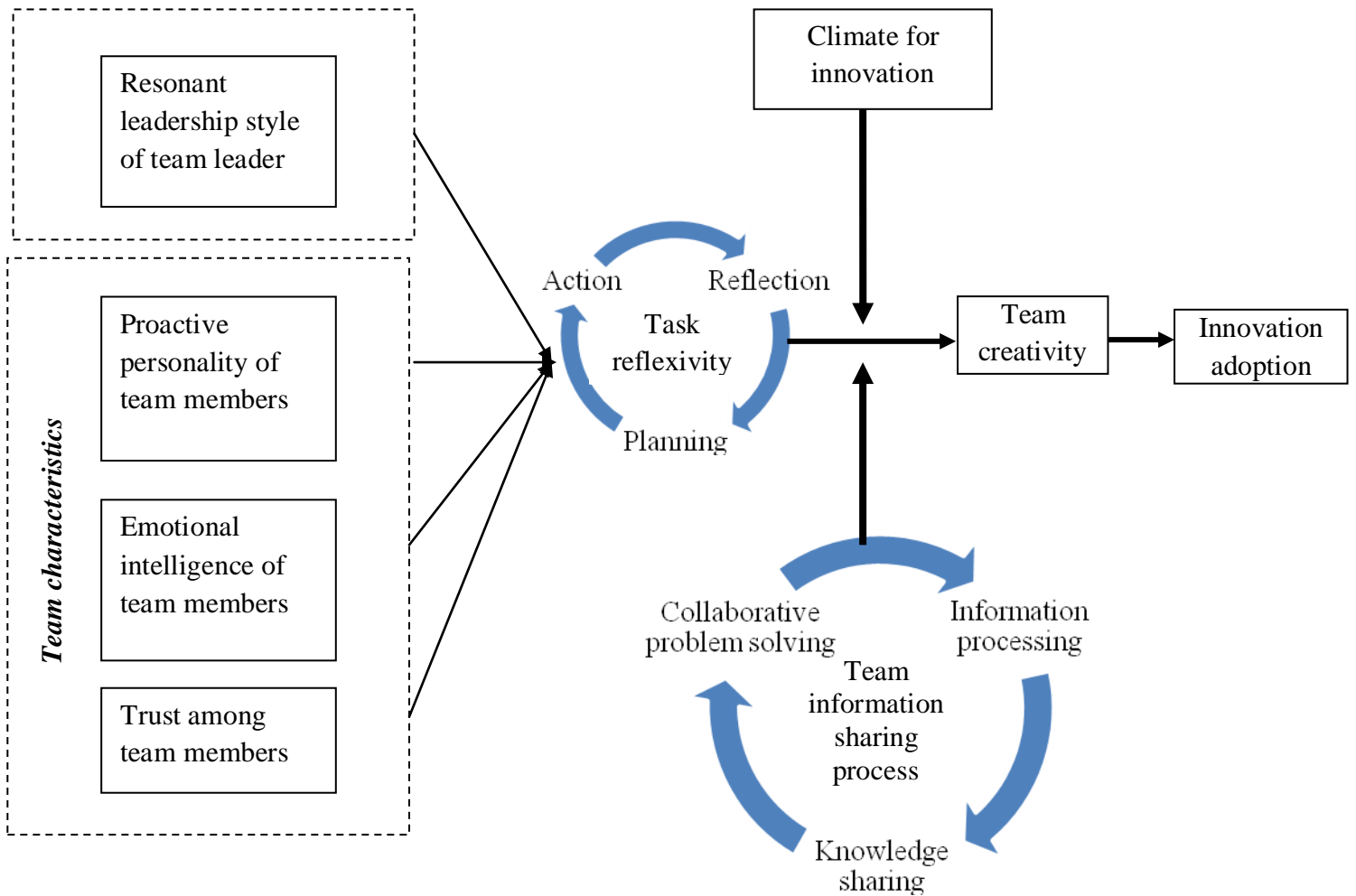
Figure 2.2: Conceptual framework of innovation process developed using literature review.

HYPOTHESES AND CONCEPTUAL FRAMEWORK

3.1 Introduction

After reviewing the literature on innovation certain social and psychological variables like leadership style of team leader, team members' characteristics such as their proactive personality, emotional intelligence, and trust have been found as enablers of creativity and innovation. Task reflexivity, which is the collective learning of team members, when they share team objectives, strategies, and actions to adapt to complexity. This common frame of reference helps team members to be creative. Or in other words, task reflexivity causes creativity among members. This creative energy is further reinforced under certain condition of adequate information processing among members and conducive climate for innovation. These variables have cause and effect relationship among them as per the input-process-output approach (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). The present study addresses the research problem and the gaps identified in the extant literature by developing an integrated conceptual framework (Lenka, Gupta, & Sahoo, 2016). The objective of the study would be fulfilled through the hypothesized relationship as explained in subsequent sections.

3.2 Hypotheses formulation

3.2.1 Resonant leaders and task reflexivity

Organizations facing unstable and unpredictable environment confront challenges such as shortage of talent, infrastructure, resources, and finance. To perform effectively in such an environment, leaders play a crucial role. Leadership is the process of influencing a group of subordinates to attain the desired goals. Leaders motivate subordinates by setting challenging

goals and act as role models for their followers. They stimulate followers to critically analyze existing situations and adopt creative tactics to solve problems. They are committed not only to organizations but also to their profession and seek changes in conventional working methods, technologies, and also leadership styles. To rejuvenate workforce in dynamic environment there is an emerging need for emotionally intelligent leaders to boost employee morale and raise their self-efficacy. Self-awareness, self-management, social awareness, and relationship management are four dimensions of emotionally intelligent leaders (Goleman, Boyatzis, & McKee, 2002). Resonant leaders are emotionally intelligent leaders who are optimistic, compassionate, and instill positive emotions within their team members through a clear vision and expunge negative emotions of fear, aggression, anger, and sadness (Boyatzis et al., 2013). Emotional contagion theory states that leaders produce emotional responses among members (Hatfield, Cacioppo, & Rapson, 1993). Their positive emotions influence followers' moods. The transfer of emotions occurs through facial expressions and verbal intonation. They mimic each other's emotional cues to develop a climate of positivity (Boyatzis et al., 2012).

However, transformational and transactional leaders also develop subordinates' potentials. Transformational leaders clarify goals, inspire, and empower followers to improve their performance (Harris & Lambert, 1998; Shiva & Suar, 2010). They motivate them through influence, inspiration, intellectual stimulation, and interact with them as individuals (Bass & Avolio, 1990). Such leaders provide vision and generate a sense of belongingness among employees. With a clear vision organizational goals seem attainable to members and they feel committed to organization. Goal-setting theory states that, members with clearly defined vision align their objectives with organizational goals and share their creative ideas with their teammates confidently and diligently (Locke & Latham, 1990; Zhang et al., 2011). Transactional

leaders also motivate subordinates through reward and punishment (Elkins & Keller, 2003). Both these leadership styles focus on the dyadic relationship between leader and follower. A study conducted on 122 R&D teams of 7 Japanese companies has identified that transformational leaders focus more on group norms and ignores followers' views disrupting team performance (Ishikawa, 2012).They encourage subordinates to follow organizational rules, policies, and procedures. However, resonant leaders are enriched with self and social intelligence. 370 leaders in American bank and 20 executives in American health care teams were surveyed through observation and interview method highlighting the contribution of resonant leaders in effective team performance (Boyatzis et al., 2012; Boyatzis et al., 2013). These leaders empathize with the frustrated members during trial and error processes. They console members by developing their self efficacy. They also develop behavioral competencies of subordinates by integrating their personal and professional goals with competitive strategy of organizations. They go beyond organizational policies and procedures to invoke positive emotions among members experiencing work stress (Boyatzis & McKee, 2005; McKee & Massimilian, 2006). A study on health care teams also reveals that resonant leaders enhance reflexive decision making among members to enhance their creativity (Boyatzis & Soler, 2012). The rejuvenated workforce is ready to expend efforts with hope, compassion, and positive mood to facilitate communication for reflexive decision making.

H_1: Higher the resonant leadership style of team leaders' higher would be task reflexivity.

Leaders alone cannot contribute to task reflexivity because reflexive decision making depends on certain other factors (Pandya & Satyre, 1996). For taking reflexive decision, members fulfill certain criteria (Widmer, Schippers, & West, 2009). These criteria are proactive

personality of members to sense opportunity/uncertainty in business environment. Members need to possess emotional intelligence to handle conflicts while solving complex problems. They should also have trust on each other to facilitate information sharing during innovation process to take mutual decisions. Reflexive decision making can be enhanced with active involvement of members having proactive personality, trust, and emotional intelligence called team characteristics. Proactive personality, trust, and emotional intelligence are collective constructs. Collective construct exhibits the characteristics of individual members interacting in a social system. Their interaction produces behavioral patterns reflecting collective identity of team members.

3.2.2 Proactive personality and task reflexivity

Members' personality comprises of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Team members with high levels of conscientiousness are meticulous, hardworking, organized, and perform tasks diligently (Kichuk & Wiesner, 1997). Members high on extraversion are sociable and solve complex problems, whereas members low on neuroticism show inability to adjust with others (Mount, Barrick, & Stewart, 1998). Agreeable members are cooperative and those with openness to experience are curious, intelligent, and artistic (Tripathi, Nongmaithem, Mitkovic, Ristic, & Zdravkovic, 2010). They access information and share ideas through social interactions (Semetko & Valkenburg, 2000; Valkenburg, Semetko, & De Vreese, 1999). They are dynamic, optimistic, innovative, and prefer working in flexible environment (Lepine et al., 2011). Socially acceptable, enthusiastic, and optimistic members conform to group norms. As per McClelland's need achievement theory (1961), members strive to attain desired objectives to improve task with motivation. A survey

conducted on 419 American engineering students working in product design teams has identified the positive impact of team member's personality characteristics on team performance (Kichuk & Wiesner, 1997). A case study conducted on Generation Y employees also reveals that, members having access to social networking promotes idea sharing within teams (DeCusatis, 2008). This study considers openness to experience, extraversion, and need for achievement to measure proactive personality of team members to generate novel solutions in ambiguous situations. Proactive personality of team members also helps in managing emotions of self and others during the innovation process when their colleagues are distressed.

H₂: Higher the team members' proactive personality, higher would be task reflexivity.

3. 2.3 Emotional intelligence and task reflexivity

'Emotional intelligence consists of self awareness, self management, social awareness, and relationship management' (Goleman, 1995). Social awareness consists of empathy and organizational awareness. Organizational awareness helps members to analyze internal/external market of organization. Members analyze opportunities and threats in external environment and capitalize on their core competencies to generate market innovations (Hambrick, Cho, & Chen, 1996). Mayer and Salovey's emotional intelligence theory (1993), also states that emotional intelligence is individuals' ability to learn and adapt. It helps them to perform as team players (Das, 2002). Members learn to control their emotions and respond to situations. They understand their colleagues' feelings through their response, body language, and facial expression. They tackle emotional demands according to the situation for better information exchange, decision-making, and conflict resolution (Singh, 2004; Singh, 2006). 817 Australian employees were surveyed to assess the impact of members' emotional intelligence on team decision making

(Jordan & Lawrence, 2009). A study conducted on 312 Indian medical practitioners has shown that emotional intelligence helps in coping work stress (Singh & Singh, 2008). Another study conducted on 82 American students has identified the impact of emotional intelligence, collaborative culture, and trust among members to enhance knowledge and expertise (Barczak et al., 2010). Emotionally intelligent members develop trust. Emotions help in generating social identity among members and improve overall team performance (Tajfel & Turner, 1979). It builds cooperation, communication, and information sharing to promote team creativity. A study conducted on 1,047 Indian respondents has revealed that emotional intelligence varies with respect to national culture (Srivastava, Sibia, & Misra, 2008).

H$_3$: Higher the team members' emotional intelligence, higher would be task reflexivity.

3. 2.4 Trust among members and task reflexivity

Trust is generated among members through communication, social interaction, and developing interpersonal relationship. Trust consists of cognitive and affective trust (Chen, Chang, & Hung, 2008; Chowdhry, 2005). Cognitive trust is generated because of the knowledge and professional competence of team members, while affective trust is generated because of their interpersonal relationship. Both cognitive and affective trust promotes knowledge sharing and problem solving among members to enthuse creativity. Emotionally intelligent members having cognitive and affective trust share knowledge and expertise. Social exchange theory states that, trust is developed through belief and reliance on each other (Homans, 1958). However, a study on 164 management students in 31 teams, state that trust alone does not lead to information sharing and decision making (Chowdhry, 2005). Rather, built in capabilities of risk taking and idea sharing having no fear of criticism/rejection, generates creative solution (Edmondson, 1999). A study

conducted on 270 Taiwanese members and their leaders working in 68 R&D teams have revealed that, creativity is more in teams having trust within (Tsai et al., 2012). Therefore, cognitive trust is an imminent requirement for knowledge sharing and reflexive decision-making. Affective trust develops psychological safety among members to express their views without fear, seek suggestions/feedback, to reflect on past performance, and resolve interpersonal conflicts collaboratively.

H₄: Higher the trust among team members, higher would be task reflexivity.

3. 2.5 Task reflexivity and team creativity

Task reflexivity is a repetitive process of reflection, planning, and action/adaptation of task, objectives, and strategies of team (Schippers et al., 2007). It is a transition period between decision and execution of task. Reflection is a consorted effort of members' behavioral competencies such as questioning, planning, analyzing, and managing knowledge and information. It helps in gauging technological/methodological obsolescence to infuse latest innovations and address customers'/stakeholders' demands. Members retrospect the objectives through their past experiences to overcome procedural bottlenecks and improve decisions. Reflexive team analyzes information procured from its business environment to develop organizational competence (De Dreu, 2002). Theory of reasoned action also suffices that, favorable attitude towards task, objectives, and strategies can reinvigorate members' action (Ajzen & Fishbein, 1977).

Planning is crucial for teams working on novel and complex assignment in ambiguous environment. It helps members to develop strategies and policies learnt from previous experiences (Das, Kar, & Parrila, 1996; Naglieri & Das, 1990). Planning includes discussion,

development, and implementation of strategies. Planning mediates between reflection and adaptation to avoid failures. Revans' theory of action learning states that, members generate new knowledge through questioning prior assumptions in a given situation (Revans, 1982; Yeo & Gold, 2011).

Adaptation is the behavior of members to acquire planned changes in teams' objectives, strategies, and processes. Highly reflexive members continuously monitor environmental demands to overcome uncertainty. Better use of members' knowledge and skills helps in accomplishing team objectives. A study conducted on 454 members of 59 production teams of 14 Dutch firms and 147 students from Dutch universities has shown that, task reflexivity evaluates processes, strategies, and objectives of team to promote job satisfaction, commitment, and team creativity (Pieterse et al., 2011).

H_5: Higher the task reflexivity, higher would be team creativity.

3. 2.6 Task reflexivity as a mediator

Reflexivity is a process of evaluating methods as well as processes to accomplish task. It is a learning behavior of team members. They generate new ideas by discussing with colleagues about group task, strategies, and adapting to an uncertain environment. They discard conventional methods/procedures and take risk in search of new opportunities by collaborating with colleagues. Members alone cannot take decisions to achieve task objectives, rather discuss with leaders to take appropriate decisions (Mohanty & Suar, 2013). Emotionally intelligent leaders high on social awareness, assess uncertainty and guide subordinates to attain team goals. Their intervention in innovation generation process reduces risk. Resonant leaders facilitate reflexivity among members. Learning among members is propagated through reflection,

planning, and action (Nongmaithem, 2009; Tripathi & Nongmaithem, 2007). Team members with proactive personality challenge existing norms and values. Members with openness to experience, extraversion, and need for achievement share their opinions without fear of criticism/rejection. Their emotional intelligence and trust with fellow colleagues also motivates them to address complex situations. Team members' characteristics consisting of proactive personality, emotional intelligence, and trust influences task reflexivity and team creativity. Task reflexivity promotes creativity and team performance in a non-routine environment (West, 1996). Reflexivity is a precondition to be creative. Therefore,

H$_6$: Task reflexivity is mediating the relationship between resonant leadership, proactive personality, emotional intelligence, trust, and team creativity.

3.2.7 Team information sharing process as a moderator between task reflexivity and team creativity

Reflexive decision-making propagates creativity among members through information exchange, learning, and collaborative problem solving termed as team interaction process (Van Offenbeek & Koopman, 1996). Information exchange facilitates sharing of knowledge and experiences to improve problem solving among members (Semetko, 1989). The competency developed through information exchange does not alone change members' behavior. But it also changes with team learning process, where members collaboratively reflect on team objectives, strategies, and processes to adopt change and creativity. Bandura's social learning theory (1977) states that, social interaction helps in identifying problems through environmental scanning which helps them in setting specific and attainable goals. Members feel confident to achieve organizational goals. These members collaboratively solve problems by inviting divergent opinions to enhance

creativity and innovation. This information exchange within members is referred as team information sharing process in this study.

Team information sharing process is an iterative process of information processing, knowledge sharing, and collaborative problem solving. Team members having diversity in age, gender, experience, expertise, and cultural background express divergent opinions (Hampel-Milagrosa, 2008). This interaction allows them to know about each other, their expertise, knowledge, and functional abilities. Information exchange among team members reinforces learning (Dasgupta, Suar, & Singh, 2012). They explore avenues for research and development and initiate new projects. They seek information from various internal and external sources like customer feedback to identify areas of knowledge creation and process it by their divergent opinions (Hirst & Mann, 2004).

The information procured from customers helps them to improve products and processes. Members' cognitively evaluate and analyze situations. They recall past experiences and tackle uncertainties. Information processing theory states that, processing the information procured from members' collective learning helps in attaining goals, rather than responding to unforeseen situations (Miller, 1956). Effective information transmission among members reinforces learning to generate new knowledge.

Social learning theory indicates that members generate new knowledge by sharing their ideas and experiences called socialization (Nonaka, 1994). Knowledge sharing is an integral part of the information sharing process where members share both tacit and explicit knowledge and experiences to learn from each other (Cho, Zheng Li, & Su, 2007; Huang, 2009). It promotes interdisciplinary research among members (Jin & Sun, 2010). Members brainstorm and provide feasible solutions to team members.

Extracting knowledge from an expert and sharing it among members for the collective use of teams is a complicated process involving interpersonal relationship among members. Experts may not be willing to share their knowledge with others. Group thinking, fear of rejection, or sense of superiority are complex social issues that need to be addressed. A collaborative problem solving approach amicably resolves such interpersonal conflict among members (Cho, Park, Kim, & Keum, 2009). Solving problems through collaboration satisfies all members of the team. Members utilize their personal skills, information, and resources to redefine a problem. It helps them in dealing with strategic issues, organizational objectives, and policies leading to team creativity. The more members share information, the better they learn to take reflexive decisions. Reflexive decision-making and information sharing among team members propagates creativity.

H$_7$: Team information sharing process acts as a moderator between task reflexivity and team creativity.

3. 2.8 Climate for innovation as a moderator between task reflexivity and team creativity

Continuous support for members' creative ideas and intrinsic motivation is a prerequisite for encouraging creativity among members. These requirements can be met by a climate which supports innovation and encourages risk taking called intrapreneurship. Support for innovation is members' shared perception of organizational policies, practices, and procedures facilitating task reflexivity of members (Anderson & West, 1998). When members' perceive their need for achievement, accepting challenging task, and aggressiveness is supported by organizational policies, they feel intrinsically motivated (Dhiman & Maheshwari, 2013; Dhiman & Singh, 2007). Social identity theory confirms that support for innovation demonstrates members' confidence (Tajfel & Turner, 1979). They introduce new and improved methods of doing things

with sense of affective commitment (West, 1990). Providing adequate resources and support to the members enhances their self-efficacy and psychologically prepares them to dispense their knowledge and creative ideas for organizational success (Bain et al., 2001; Franke, Hampel-Milagrosa, & Schure, 2007). With support for innovation, reflexive decisions of members are more likely to be transformed into creativity.

Care, concern, and empowerment bestowed by the nurturing organizational climate promote intrapreneurship and risk taking among members (Antoncic, 2007; Dhiman, 2006). Intrapreneurship is entrepreneurship within organizations and intrapreneurs are members possessing spirit to generate new ideas (Antoncic & Hisrich, 2003). They are involved in the continuous process of uncovering and developing an opportunity to create value. They take initiatives to introduce new methods or techniques, improvise traditional working methods, challenge existing norms and values, and offer insights to develop new products, services, and technologies. Intrapreneurship empowers subordinates to be aggressive and competitive to enhance their creative ability (Hampel-Milagrosa, 2013; Quesada et al., 2011). The success or failure of any team effort depends upon the team's context or its environment.

H_8: Climate for innovation encompassing support for innovation and intrapreneurship moderates the relationship of task reflexivity and team creativity.

3. 2.9 Team creativity and innovation adoption

Team creativity is the transformation of imaginative ideas into novel and useful products. It is the initial step of the innovation process. Members' personality, technical proficiency, emotional intelligence, risk taking ability, and knowledge are certain individual level factors that generate creative ideas (Amabile, 1996; Janssen, 2000). Certain organizational factors like a climate for

innovation and team information sharing process reinforce team creativity. Leaders act as facilitators to identify members' talent and encourage them to share their knowledge and experience to generate new products and improve existing processes (Nijhoj, Krabbendam, & Looise, 2002). Amabile's creativity theory (1996) proposed three major components of individual level creativity such as individual expertise, creative thinking, and intrinsic motivation, provided the members are self motivated and take challenges in the job. Individuals with proactive personality, having intense need for achievement, and internal locus of control are intrinsically motivated and strive to attain the challenging goals. Therefore, researchers' focus is on intrinsic motivation of members. Most of the existing literature on creativity verifies the role of individual and organizational level variables ignoring team level variables. However, team level variables are utmost important for innovation at research and development and new product development units of organizations confronting organizational dynamism. 8 French laboratory experts working in R&D teams have been surveyed during training session to explore antecedents of team creativity (Vreede et al., 2012). The study explicates team creativity as amalgamation of team member's creative efforts. Organizational culture, climate for innovation, and team information sharing process are certain contextual factors enhancing creativity among members (Misra, Srivastava, & Misra, 2006). However, leaders' intervention during the continuous trial and error phase of innovative R&D teams fosters employee morale. It encourages members to work collaboratively to attain challenging goals (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Nijhoj et al., 2002). Creativity enhances when innovations in one domain are incorporated in another domain to solve old problems, and inspire fresh thinking.

The successful generation and adoption of creative ideas in an organization promotes innovation (Gopalkrishnan & Damanpour, 1997). Assimilation of innovation within an

organization is otherwise known as innovation diffusion (Rogers, 1983). Innovation process is categorized as generation and adoption (Gopalkrishnan & Damanpour, 1994; 1997; Klein & Knight, 2005; Klien & Sorra, 1996; Taylor & McAdam, 2004). Generation stage encompasses idea generation, project-definition, problem-solving, design and development, production, and marketing. Adoption stage is acceptance of new ideas/products/processes and fine-tuning existing ones (Pandya & Anand, 2008). The adoption stage is further divided as: initiation and implementation (Cooper, 1998). Innovation initiation includes awareness of innovation, forming a favorable attitude, and evaluating its worth from organizational viewpoint. Innovation implementation is verifying its utility through trial and finally approving the product for mass consumption. 1219 managers, team members, and technology users working in 39 manufacturing plants of American companies have assessed the implementation of computerized technology (Klien et al., 2001). Members perceive implementation of new technology is consistent with the organizational policies as per Roger's diffusion theory (1983). Similarly, 996 Israeli members working in 96 health care teams of 1200 clinics have been surveyed to assess the impact of team composition on creativity and innovation (Somech & Drach-Zahavy, 2011). Creativity influences innovation with climate for innovation as moderating the relationship between team creativity and innovation implementation. Members' functional heterogeneity, climate for innovation, and shared vision generates trust among members to foster creativity into innovation.

H_9: Higher the team creativity, higher would be innovation adoption.

With all the proposed hypotheses, a moderated mediation model of innovation process is developed (Fig. 3.1). The moderated mediation model includes both moderation and mediation effect. In this model a variable mediates the effect of an independent variable on a dependent

variable, and the mediated effect depends on the level of moderator/s (Edwards & Lambert, 2007; Muller, Judd, & Yzerbyt, 2005).
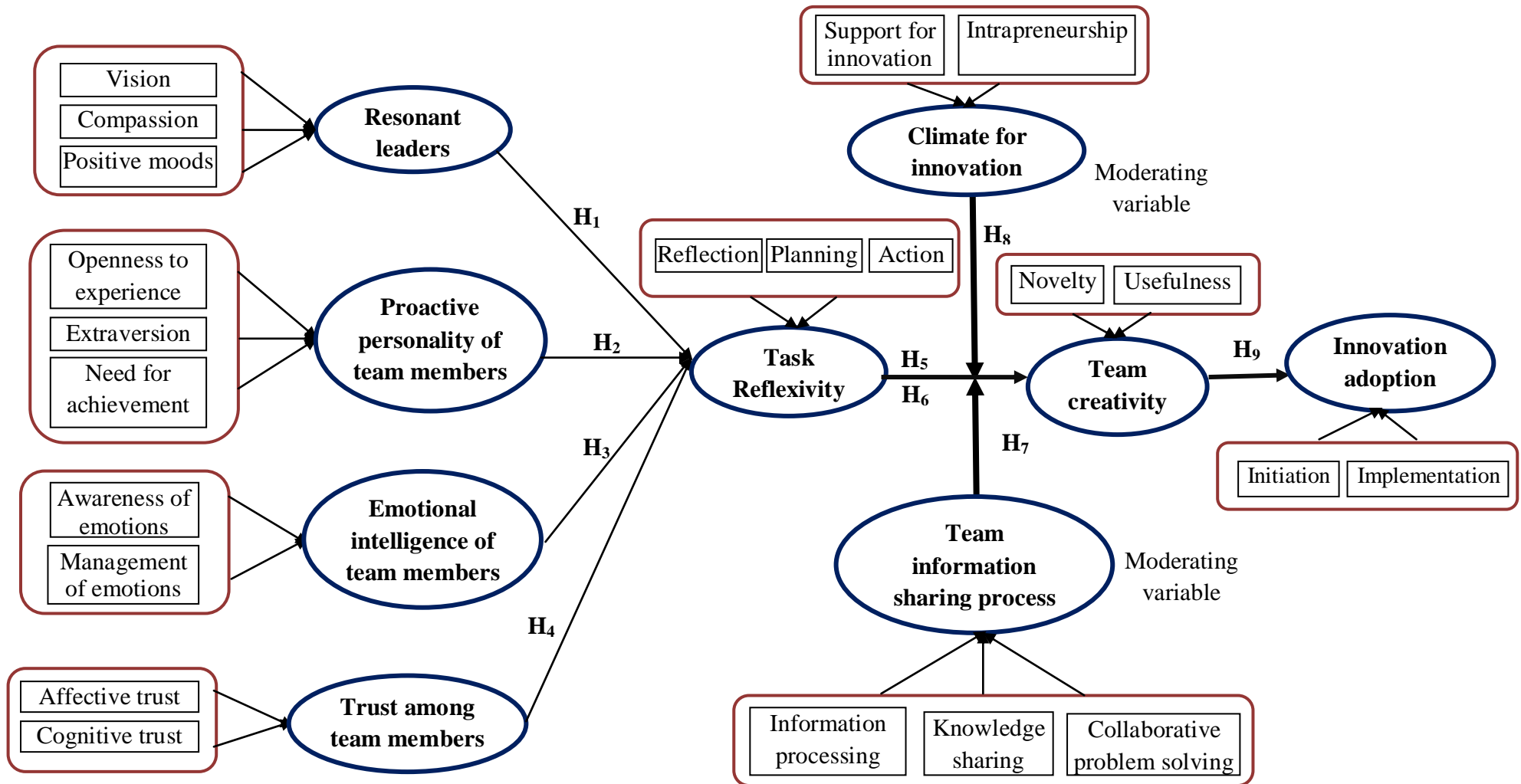
Figure 3.1: Conceptual framework of innovation process with hypothesized relationships.

METHOD

This chapter provides a comprehensive view of the methods to select sample and measures to conduct the present study.

4.1 Sample and procedure

R&D teams located in the small, medium, and large sized pharmaceutical organizations of India, have been considered as unit of analysis in the study. The R&D teams have been purposively selected to study the innovation process in pharmaceutical firms (Malhotra & Dash, 2009). Team members and their leaders working in R&D units of pharmaceutical firms are respondents of the survey. R&D team members have facilitated the smooth conduct of the survey and have ascertained that, the responses have been duly filled. Data were collected over a period of five months from December 2013 to April 2014.

The respondents are scientists, doctors, and clinical executives working in R&D units involved in clinical trials and drug development. The heads of human resource department have been contacted to seek their approval for conducting survey in R&D units of the organization. Team members and leaders were selected at random by human resource head with the consent of researcher. A cover letter briefing the purpose of the survey, details of researcher, and instructions for filling up the questionnaire have been attached along with the questionnaire (Appendix 1). The respondents were assured about confidentiality of information provided by them.

4.1.1 Sample size

Final sample size of the study consists of completely filled responses (Hair, Black, Babin, & Anderson, 2009). Sample size has been decided on the basis of literature, number of variables, and technique used for analysis (Malhotra & Dash, 2009). The cause and effect relationship among 22 variables identified for the study would be established using structural equation modeling (SEM). In SEM, a sample of 10-20 respondents per variable is considered to be ideal (Hair et al., 2009; Stevens, 1986).

Sample size should be adequate enough to determine the reliability of the scale (Nunnally, 1978; Spector, 1992). Although, a larger sample is required to reduce sampling error and increase accuracy of results (Hair et al., 2009). Following these guidelines 450 questionnaires have been finally administered for the survey. A total of 352 duly filled responses were procured resulting in a response rate of 78.22% as shown in Table 4.1.

4.1.2 Demographic detail of respondents

The demographic details of team leaders and members have been collected as part of the questionnaire survey. The salient features of the demographic data obtained in the surveys have been analyzed and summarized in the Table 4.1 as follows:

Data on name, age, gender, years of experience, education, name of the company, type, size of team, and task assigned have been obtained through questionnaire surveys from team member and their leaders.

Table 4.1 *Sample profile of respondents*

Variable	Team Leaders		Team Members	
	M	*SD*	*M*	*SD*
Age (in years)	35.9	8.05	28.5	5.23
Gender				
Male	88%		87%	
Female	12%		13%	
Years of experience (in years)				
Above 5	85%		61%	
Less than 5	12%		18%	
Less than 3	2%		16%	
Less than 1	1%		5%	
Education				
Graduate (BPharm/B. Sc.)	8%		22%	
Post Graduate (MS/M Pharma/M. Sc./ Doctorate)	71%		74%	
Other (Pharmacokinetics/ Pharmacodynamics)	21%		4%	
Task assigned				
Non-routine (Drug interaction, Drug trialability)	41%		24%	
Routine (Quality assurance, Quality Control, Maintaining medical insurance records)	59%		76%	

4.1.2.1 Sample profile of team leaders

Team leaders had an average age of 35.9 years. 88% leaders were males and 12% of them were females. 85 % of them had more than 5 years, 12% had less than 5 years, 2 % had less than 3 years, and only 1% had less than one year of experience respectively. 71% were post graduates and doctorates in pharmacy, drug discovery, biochemistry, and chemical biology. 8% were graduates in biotechnology and pharmacy, and 21% had professional qualification like pharmacokinetics and pharmacodynamics. 59% of leaders were assigned routine task like quality assurance and quality control of medicines, and 41% were deployed in non-routine task like drug trialability, drug hardability, pre-clinical/clinical development, and drug interaction.

4.1.2.2 Sample profile of team members

Team members had an average age of 28.5 years. 87% of them were males and 13% were females. 61% of team members had more than 5 years, 18% had less than 5 years, 16% had less than 3 years, and 5% had less than one year of experience respectively. 74% of these members were postgraduates in pharmacy, biotechnology, biology, and biochemistry, 22% were graduates in biology, chemistry, biotechnology, and pharmacy, and 4% had professional degrees like pharmacokinetics and pharmacodynamics. 76% of members dealt with routine tasks like maintaining medical insurance records as well as prescription and patient information and 24% deployed in non-routine tasks like analyzing chemical structure of drugs and checking the biochemical and physiological consequences of drugs after their clinical trials.

The demographic profile of team leaders and members show that pharmaceutical industry in India lacks gender diversity. Majority of the members and team leaders were post graduates in

biotechnology and medical science. The task assigned to the team members is more routine in nature.

4.2 Measures

A self designed questionnaire has been used to measure the complex process of innovation. The items for the scale have been developed using extant literature in the field and language has been made simple for understanding of team leaders and members. The questionnaire is divided into two parts A and B (Appendix 1) respectively. Questions on certain variables such as vision, compassion, positive mood, information processing, knowledge sharing and collaborative problem solving, support for innovation, and intrapreneurship were responded by team members (Part A) and items measuring variables of openness to experience, extraversion, need for achievement, awareness and management of emotions, cognitive and affective trust, reflection, planning, action, novelty, usefulness, innovation initiation and implementation have been answered by team leaders (Part B). A total of nine constructs have been identified to ascertain the innovation process in R&D units of pharmaceutical companies. These constructs have been tested for their reliability and validity on the current sample. Relevant literature has been critically analyzed to develop the constructs and design the questionnaire (Table 4.2). Respondents were asked to respond on a five-point Likert type scale. The respondents answered the questionnaire in 20-25 minutes.

Table 4.2 *Literature used for developing the constructs*

Construct	Variable	References from literature
Resonant leadership	Vision Compassion Positive mood	Boyatzis, Smith, Oosten, & Woolford, 2013; Goleman, Boyatzis, & McKee, 2002
Proactive personality	Openness Extraversion Need for achievement	Bateman & Crant, 1993; Kichuk & Wiesner, 1997; Lepine, Buckman, Crawford, & Methot, 2011; Mount, Barrick, & Stewart, 1998
Emotional intelligence	Awareness of emotions Management of emotions	Barczak, Lassk, & Mulki, 2010; Jordon & Lawrence, 2009;
Trust	Cognitive trust Affective trust	Chowdhry, 2005; McAllister, 1995; Tsai, Chi, Grandey, & Fung, 2012
Task reflexivity	Reflection Planning Action/Adaptation	De Dreu, 2007; Hirst & Mann, 2004; Pieterse, Knippenberg, & Ginkel, 2011; Schippers, Hartog, & Koopman, 2007
Team information sharing process	Information processing Knowledge sharing Collaborative problem solving	Hirst & Mann, 1999; Huang, 2009; Kankanhalli, 2007
Climate for innovation	Support for innovation Intrapreneurship	Anderson & West, 1998; Antoncic & Hisrich, 2003; Sayeed & Gazdar, 2003; Tajfel & Turner, 1970;
Team creativity	Novelty Usefulness	Amabile, 1996; Nijhoj, Krabbendam, & Looise, 2002; Wang, 2011;
Innovation adoption	Innovation initiation Innovation implementation	Gopalkrishnan & Damanpour, 1994; Gopalkrishnan & Damanpour, 1997; Roger, 1995

Response description against each item of the variable are given on five point Likert type scale with —'Strongly disagree' (= 1), 'Disagree' (= 2), 'Neither agree nor disagree' (= 3), 'Agree' (= 4), and 'Strongly agree' (= 5). Likert scale is more accurate in collecting information from respondents (Anderson & West, 1998; Somech & Drach-zahavy, 2011; Wang, 2011).

4.2.1 Resonant leadership

Resonant leadership style is a process of influencing subordinates through emotional intelligence by invoking emotions such as vision, compassion, and positive mood. Members' responses for vision were attained by asking questions, (a) 'My team leader provides vision for future work', (b) 'My team leader often discusses possible ways for future work'. Responses for compassion were attained through (a) 'My team leader feels trusted by team associates', (b) 'My team leader care about other members of the team'. Lastly, responses for positive mood were attained through (a) 'My team leader spreads a feel good factor in the team' (b) 'My team leader makes us enjoy working for the team'.

4.2.2 Proactive personality of team members

The construct of proactive personality has been measured by variables such as openness to experience, extraversion, and need for achievement. Openness to experience has been measured using items such as (a) 'My colleagues look for new ways to improve their work', (b) 'My colleagues enjoy accepting challenges'. Extraversion has been measured using items such as (a) 'My colleagues excel at identifying opportunities', (b) 'My colleagues always look for better ways to do things'. Need for achievement has been measured using items such as (a) 'My

colleagues try to give concrete shape to their ideas', (b) 'My colleagues convert problems at task into opportunities'.

4.2.3 Emotional intelligence of team members

Emotional intelligence of members helps them in assessing and managing emotions of self and others. The construct of emotional intelligence has been defined by variables such as awareness and management of emotions. Awareness of emotions has been measured through the items such as (a) 'I can explain the emotions I feel towards other colleagues', (b) 'I can discuss the emotions I feel with other colleagues'. Management of emotions has been measured through the items such as (a) 'I can patiently hear my colleagues' ideas', (b) 'I can spread enthusiasm among other colleagues'.

4.2.4 Trust among team members

The construct of trust has been defined by variables such as affective and cognitive trust. Affective trust has been measured through the items such as (a) 'My colleagues share their ideas, feelings, and hopes with each other', (b) 'My colleagues feel a sense of loss if their associates are transferred'. Cognitive trust has been measured through the items such as (a) 'My colleagues approach their job with professionalism and dedication', (b) 'My colleagues are careful in delivering their task and I rely on them'.

4.2.5 Task reflexivity

Task reflexivity has been defined using variables like reflection, planning, and action. Reflection has been measured using items like (a) 'The team often reviews its objectives', (b) 'The team

often discusses the methods for doing jobs'. Planning has been measured using items like (a) 'My team associates regularly discuss whether the team is working effectively', (b) 'My team associates seek feedback on their work methods', (c) 'My team associates ask for feedback from internal and external customers on their results'. Action has been measured using items like (a) 'My team associates have their own interpretation to make changes in the team   objectives as per the market demands', (b) 'My team associates discuss about the magnitude of innovations based on their practical experiences', (c) 'My team associates rarely neglect collective decisions suggested by other   colleagues'.

4.2.6 Team information sharing process

Team information sharing process has been measured using variables like information processing, knowledge sharing, members shared perspectives, and collaborative problem solving. Information processing among members has been measured using items like (a) 'Team members have access to all information required for teamwork', (b) 'Team members are aware of customers and funding agencies' expectations'. Knowledge sharing has been measured using items like, (a) 'We provide manuals, methodologies, and models to other members of the team', (b) 'We always provide information at the request of our colleagues', (c) 'We share our experience/ know-how by working with other colleagues'. Collaborative problem solving has been measured using items like, (a) 'My colleagues examine the viewpoints of their associates' (b) 'My colleagues resolve conflict among each other', (c) 'My colleagues integrate the objectives of others', (d) 'My colleagues agree to the solutions suggested by other team associates'.

4.2.7 Climate for innovation

Climate for innovation has been measured using variables like support for innovation and intrapreneurship. Support for innovation has been measured using items like (a) 'My colleagues search for innovative solutions', (b) 'My colleagues assist in developing new ideas'. Intrapreneurship has been measured using items like (a) 'I am confident to take risk for the teamwork' (b) 'I take calculated risk', (c) I am innovative and analyze things from a different perspective'.

4.2.8 Team creativity

Team creativity is members' effort to produce novel and useful products and services. This construct has been measured using variables such as novelty and usefulness. Novelty has been measured using items like (a) 'My team associates solve problems creatively', (b) 'My team associates develop new products and services'. Usefulness has been measured using items like, (a) 'My team associates put forth novel and feasible solution', (b) 'My team associates have filed number of patent applications'.

4.2.9 Innovation adoption

Innovation adoption has been measured using variables like innovation initiation and implementation. Innovation initiation has been measured using items like (a) 'My team associates perceive new technology to be complicated than the existing ones', (b) 'My team associates perceive innovation to be user friendly and of high quality'. Innovation implementation has been measured using items like (a) 'The efforts of the entire team helps

company to adopt innovation as per market demands', (b) 'The efforts of the entire team helps company to make innovation visible to others'.

4.3 Analysis to measure validity of the measurement scales

The reliability and validity of all the variables are measured using SPSS 20.0 and AMOS 21.0 software packages. Reliability ensures the consistency of scores of measured items. For determining an item to be reliable, a cutoff value of more than 0.7 has been selected (Nunnally, 1978). The convergent and discriminant validity of the constructs have been verified using confirmatory factor analysis (Naglieri, Das, Stevens, & Ledbetter, 1991). We conservatively choose to eliminate item with factor loading less than 0.7 (Hair et al., 2009). The purpose of this stage is to eliminate poor performing items. The descriptive statistics and absolute fit indices of GFI (Goodness-of-fit index), CFI (Comparative fit index), NFI (Normed fit index), and RMSEA (Root-mean-square error of approximation) of all the constructs have been measured (Table 4.5). The acceptable values of all the fit indices of GFI, CFI, and NFI are > 0.90 and for RMSEA < 0.08 (Byrne, 2001; Kline, 2005).

The reliability and validity of the measure have been given in Table 4.3. Further analysis of the hypothesized relationship has been carried out in next chapter five.

Table 4.3: *Scale reliability and validity*

Variables	Original items	Retained items	M	SD	Cronbach α	GFI	CFI	NFI	RMSEA	Loading range
Resonant leadership						0.84	0.86	0.85	0.08	0.61-0.90
(a) Vision	8	8	32.67	5.62	0.92					
(b) Compassion	6	3	11.89	2.14	0.76					
(c) Positive mood	5	3	11.56	2.42	0.80					
Proactive personality						0.88	0.86	0.89	0.07	0.53-0.84
(a) Openness to experience	5	5	20.04	3.58	0.90					
(b) Extraversion	6	4	15.82	2.76	0.76					
(c) Need for achievement	6	6	22.96	4.49	0.85					
Emotional intelligence						0.90	0.88	0.87	0.08	0.68-0.82
(a) Awareness of emotions	7	7	27.68	4.72	0.90					
(b) Management of emotions	7	7	28.00	5.21	0.92					
Trust						0.87	0.90	0.88	0.08	0.48-0.85
(a) Cognitive trust	5	5	19.20	3.76	0.84					
(b) Affective trust	6	6	23.84	4.03	0.89					
Task reflexivity						0.84	0.89	0.87	0.07	0.45-0.86
(a) Reflection	4	4	15.94	2.86	0.87					
(b) Planning	7	7	27.84	4.55	0.91					
(c) Action	3	3	11.68	2.13	0.69					
Team information sharing process						0.89	0.93	0.91	0.08	0.64-0.90
(a) Information processing	5	5	20.03	3.60	0.92					
(b) Knowledge sharing	5	5	20.54	3.23	0.87					
(c) Collaborative problem solving	4	4	16.06	2.87	0.91					
Climate for innovation						0.84	0.90	0.89	0.05	0.66-0.87
(a) Support for innovation	7	7	28.29	4.61	0.92					
(b) Intrapreneurship	7	7	29.03	4.27	0.92					
Team creativity						0.94	0.95	0.94	0.06	0.59-0.89
(a) Novelty	4	4	15.83	2.86	0.91					
(b) Usefulness	4	3	11.81	2.13	0.76					
Innovation adoption						0.84	0.89	0.88	0.07	0.70-0.90
(a) Innovation initiation	6	6	23.82	4.19	0.90					
(b) Innovation implementation	5	5	20.13	3.48	0.91					

RESULTS

R&D teams of pharmaceutical firms were the unit of analysis in the present survey. 352 team members and 352 team leaders were respondents of the survey. Team members responded to questions on certain variables such as resonant leadership style of their leader, team information sharing process, and climate for innovation. Whereas, team leaders responded to questions providing information about their team members' characteristics such as proactive personality, emotional intelligence, and trust, task reflexivity, team creativity, and innovation adoption. Pearson correlation among these variables has been estimated to identify the relationship between the variables. Variables have been designated variable number as well as variable name. Pearson correlation is reported in the Table 5.1, showing the following relationships with respect to the hypotheses proposed.

- Higher the influence of team members' proactive personality, higher is task reflexivity.
- Higher the influence of team members' emotional intelligence, higher is task reflexivity among them.
- Higher the influence of team members' trust, higher is task reflexivity among them.
- Higher the task reflexivity among members, higher is novelty of ideas generated by them.
- Proactive personality, emotional intelligence, and trust among members, helps them to reflect, plan, and act, to develop novel ideas.
- Team information sharing process, facilitates the relationship between task reflexivity and novel ideas generated by team members.

- Support for innovation enhances the relationship between task reflexivity and novel ideas developed by team members.

- Higher the novelty of ideas generated by team members, higher is innovation implementation in organizations.

- However, resonant leadership style of team leader did not influence task reflexivity of team members.

Table 5.1: *Inter-correlation among studied variables*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1.Vision	1																					
2. Compassion	60**	1																				
3. Positive mood	62**	64**	1																			
4. Openness to experience	-5	-9	-3	1																		
5. Extraversion	-3	-2	-0	74**	1																	
6. Need for achievement	-5	-5	-2	60**	62**	1																
7. Awareness of emotions	-5	-1	-3	48**	51**	39**	1															
8. Management of emotions	4	2	5	57**	55	45**	69**	1														
9. Cognitive trust	-2	3	4	59**	57**	63**	55**	54**	1													
10. Affective trust	-2	-1	-0	57**	56**	51**	60**	54**	67**	1												
11. Reflection	-4	-3	-3	56**	55**	46**	64**	76**	52**	58**	1											
12. Planning	-2	-1	-2	59**	60**	52**	60**	65**	56**	62**	80**	1										
13. Adaptation	3	2	-2	50**	49**	40**	48**	54**	47**	53**	62**	73**	1									
14. Information processing	62**	53**	68**	1	1	4	-2	8	6	5	-3	2	6	1								
15. Knowledge sharing	55**	41**	48**	-3	-0	2	-4	6	-2	-2	-5	0	4	66**	1							
16. Collaborative problem solving	57**	42**	50**	2	5	1	0	7	3	2	-2	2	-0	65**	62**	1						
17. Novelty	-4	-6	-6	53**	55**	48**	52**	60**	50**	55**	66**	76	73**	-2	-0	-4	1					
18. Usefulness	-1	5	1	8	8	12	1	6	1	3	12*	13*	17*	1	-3	-0	9	1				
19. Support for innovation	59**	43**	52**	1	1	-3	-1	7	-3	-3	-1	2	-3	62**	59**	82**	-5	-3	1			
20. Intrapreneurship	18	22**	25**	2	7	-4	1	1	-4	0	-1	1	-5	24	28**	37**	-10	-6	40**	1		
21. Innovation initiation	-4	3	0	5	-0	6	4	2	7	8	6	6	8	1	4	-1	6	62**	-3	-10	1	
22. Innovation implementation	-97	-1	-6	9	7	14**	3	6	3	4	8	10	6	-6	-6	-7	11	56**	-9	-6	69**	1

Correlation coefficients are obtained as the number given in the cells divided by 100.

* Significant at $p \leq 0.05$; **Significant at $p \leq 0.01$;   *** Significant at $p \leq 0.001$

5.1 Path analysis to test moderated mediation model

The moderated mediation model was tested using Structural Equation Modeling (SEM). This multivariate data analysis technique is used to develop and test theory (Bagozzi, 1980). The data in social sciences have complex cause and effect relationship caused by independent and dependent variables. The relationship between independent and dependent variables known as endogeneous and exogeneous variables have been tested using SEM (Kline, 1998). The responses to measure these variables have been obtained through survey method. Therefore, statistical relationships among these variables are subject to measurement error. To overcome the measurement error and enhance the reliability and validity of constructs, multi-item scales are preferred in consonance with classical theories and literature. Therefore, latent variable structural equation modeling (LVSEM) was adopted to analyze complex hypothesized relations in a single model (Mackenzie, 2001). It addresses measurement error in statistical model by having multi dimensional construct.

LVSEM describes measurement as well as structural relationship to control random and systematic error. Random errors in the construct have been controlled by enhancing the fit indices using confirmatory factor analysis. Systematic error occurs due to common method bias, response biases like leniency, 'yes saying' and 'no saying' and problem with measurement instruments. These measurement errors have been controlled both statistically and procedurally. Procedural control was done by procuring data partly from team leaders and team members. Data on resonant leadership style, team information sharing process, and climate for innovation were procured from team members. Data on members' proactive personality, emotional intelligence, trust, task reflexivity, team creativity, and innovation adoption were procured from team leaders respectively.

Statistical control was carried out using LVSEM with observed variables loading on latent constructs. Common method bias has been controlled in the measurement model by considering reliable and valid measurement scales. Results have indicated univariate normality of measured variables. Variables have high reliability and validity. The items with skewness and kurtosis less than 0.7, have been discarded from the dataset. Variables are mean centered and are transformed from raw score to a deviated score by subtracting variable mean from each observation. This reduces the problem of multicolinearity. All these statistical assumptions of normality, linearity, and reliability and validity have been met before conducting path analysis to test mediation (Fig. 5.1). AMOS 21.0 software package have been used for testing hypothesized relationship.

5.2 Test of mediation

To test mediation hypotheses (H_1 to H_6) in Fig. 5.1, we used sequential steps (Preacher, Rucker, & Hayes, 2007). Collectively hypotheses H_1 to H_6, suggest an indirect effect model, testing whether the relationship between resonant leader, team members' characteristics of proactive personality, emotional intelligence, and trust is transmitted by task reflexivity. Test of such mediation hypothesis is often guided by a multi step approach suggested by Barron and Kenny (1986). The steps supporting mediation are:

1. Direct effect from independent variables to the outcome variables must be significant.

2. But in complex moderated mediation model, the strength of association from independent variable to dependent variable becomes smaller, because:

i. It is caused by additional variables in the causal chain.

ii. Affected by random factors (Shrout & Bolger, 2002).

A modified version of Baron and Kenny suggested that correlation between independent and outcome variable is no longer necessary, and recommended for elimination of the first step in examining mediation (Kenny, Kashy, & Bolger, 1998; MacKinnon, Krull, & Lockwood, 2000; Shrout & Bolger, 2002). Consequently, mediation can be tested by assessing significance of indirect effect *ab*. Where, *a* is the standardized path from independent variable to mediating variable, *b* is the standardized path from mediating to dependent variable. The relationship between dependent and independent variable is decomposed into direct and indirect effect. The path linking independent variable to dependent variable is called direct effect. The path linking independent variable to dependent variable through another variable is called indirect effect (Sobel, 1990). The indirect effects have been calculated by multiplying standardized path coefficients of the relationships (Bolen, 1989). Significance of indirect effect, *ab* is tested against its standard error ($^2\sigma$).

Magnitude of an indirect effect can be gauged through multiple methods:

(a) Causal step strategy (Baron & Kenny, 1986)

(b) Product of coefficient approach (Sobel's test, 1982)

(c) Distribution of product approach also known as *empirical M-test* (Holbert & Stephenson, 2003)

(d) Resampling or bootstrapping strategies (MacKinnon, 2008; Preacher & Hayes, 2004)

Causal step strategy has low power and does not address hypotheses directly. Product of coefficient approach/Sobel's test assumes indirect effect is normally distributed and is better than step-wise mediation method (Preacher & Hayes, 2004). To overcome the problem of non-normal sampling distribution and power problems, competing tests of *bootstrapping* and *empirical M-*

$^2\sigma:$ Standard error

test are recommended (MacKinnon, Lockwood, & Williams, 2004). These methods have highest power and control *Type I* error. Distribution of product approach or *empirical M-test* involves extensive analytical work and programming (MacKinnon et al., 2004). Evaluating all situations, when sample size is not large, bootstrapping is recommended to test statistical significance in complex model with conditional indirect effect (MacKinnon et al., 2004). This test does not assume normality of the sampling distribution of indirect effect and is used as a supplement to the causal steps approach. Even if the variables constituting indirect effect shows normal distribution, the indirect effect which is product of these variables may not be normal (Edwards & Lambert, 2007). Bootstrapping is implemented in AMOS software and is user friendly (Preacher & Hayes, 2004; Shrout & Bolger, 2002). Therefore, bootstrap method is more appropriate to carry out the analysis. It is used as a valid and powerful method to test mediating variables.

Bootstrapping is empirical representation of sampling indirect effect obtained through resampling technique. An influence is estimated about size of indirect effect to generate a confidence interval (ci %) for *k* values of indirect effect from smallest to largest.

- The lower bound of confidence interval is defined as: value of indirect effect in k $(0.5 - ci/200)^{th}$ position.

- Upper bound $= 1 + k$ $(0.5 + ci/200)^{th}$ position in order

This procedure results in bootstrapping with percentile based confidence interval. The end points are adjusted to get a bias corrected confidence interval.

Confidence intervals for testing indirect effect are considered to be more important than standard hypothesis testing as they provide additional information to the researcher. It helps in assessing whether indirect effect is present/absent in the sample of investigation. It helps in

locating size of indirect effect by giving a range in which the effect may lie. The range assesses accurate confidence limit in a complex model. Performance of mediation is assessed by evaluating t value:

$$t = ab/\ \sigma_{ab} = ab/\sqrt{a^2\ (\sigma_b)^2 + b^2\ (\sigma_a)^2}$$

If 0 is not between lower and upper bounds, then we can claim indirect effect is not 0 with ci% confidence. If the confidence interval from bootstrap method includes 0, then it is complete mediation. If the regression coefficient or β coefficient is non-zero as well as is in the hypothesized direction. Then, the variable is said to partially mediate the relationship. Finally, proactive personality, emotional intelligence, and trust were found to have an indirect effect on team creativity, with task reflexivity as a mediator. The indirect effect of these variables were significant with values ($\beta = 0.038$, $t = 0.599$, $p < 0.001$; $\beta = 0.089$, $t = 1.82$, $p < 0.001$; $\beta = 0.035$, $t = 0.822$, $p < 0.001$) respectively. Bootstrap results with 95% confidence interval around the indirect effect does not contain 0. Bootstrap results with 95% confidence interval for proactive personality (0.036, 0.19), emotional intelligence (0.047, 0.106), and trust (0.025, 0.098). Thus, task reflexivity partially mediates the relationship between the independent variables proactive personality, emotional intelligence, trust and the dependent variable of team creativity, confirming hypothesis H_6.

Overall, we tested all the hypotheses of the proposed moderated mediation model (Fig. 3.1) in two sequential steps. First, we examined mediation of task reflexivity following steps given by Baron and Kennny (1986) to test hypotheses H_1 to H_6. Second, we integrated proposed moderator variables of team information sharing process and climate for innovation (H_7 and H_8) into the moderated mediation model.

Moderated mediation model has both moderation and mediation effects in a single model (Judd, Kenny, & McClelland, 2001). It is also known as conditional indirect effect. The magnitude of an indirect effect is conditional on one or more moderators. A variable mediates the effect of an independent and a dependent variable, and the mediated effect differs with the level of moderator/s. Moderated mediation model explains how and when a given effect occurs. It explains that the strength of an indirect effect depends on level of moderator variable (Edwards & Lambert, 2007).

5.3 Test of moderated mediation

In the complex moderated mediation model, the interaction effect of a variable will be highly correlated with the predictor variables of the model. The colinearity reduces stability of the model and interpretation of regression coefficients. Under such circumstances, measurement and sampling error adversely impacts regression coefficients and standard error. To overcome the problem of bouncing beta weights, interaction term is uncorrelated with the effect variable by mean centering. The resultant interaction term is minimally correlated with the first order variable (Aiken & West, 1991).

Conclusively, we adopted four steps to test moderated mediation model (Preacher, Rucker, & Hayes, 2007). In the step 1 and 2, mediator variable (task reflexivity) is first regressed on independent variables (resonant leaders, proactive personality, emotional intelligence, and trust), intended to be a significant predictor of mediator (task reflexivity). Next, path coefficient predicts dependent variable (team creativity) from mediator (task reflexivity), the moderators (team information sharing process and climate for innovation), independent variable (resonant leaders, proactive personality, emotional intelligence, and trust), and the moderator-mediator

interaction (task reflexivity-team information sharing process; task reflexivity-support for innovation). The interaction effect is tested for its statistical significance.

In the hypothesized model (Fig. 5.1), resonant leadership style of team leader did not influence task reflexivity ($\beta = -0.04$, $p = 0.379$). Therefore, H_1 is refuted in the moderated mediation model, after eliminating the non-significant path (Fig. 5.2). Similarly, variables such as usefulness, intrapreneurship, innovation initiation have nonsignificant relationship and have been eliminated in Fig. 5.2. In the further analysis, team information sharing process and climate for innovation were integrated into the mediation model (Fig. 5.2). Team creativity is measured using variable novelty, climate for innovation is measured using support for innovation, and innovation adoption is measured using innovation implementation respectively in the moderated mediation model (Fig. 5.2). The variable team information sharing process and support for innovation are regressed on team creativity measured with variable novelty before testing for moderation. The path coefficients are statistically significant at $p \leq 0.001$.

To test the moderation hypothesis (H_7 and H_8), it is necessary that strength of indirect effect of task reflexivity is conditional on the value of the moderators called conditional indirect effect/moderated mediation model (Preacher et al., 2007). The hypotheses H_7 and H_8 (Team information sharing process and support for innovation) were integrated to the mediation model to consider statistical significance of indirect effect contingent on the values of proposed moderators. These steps satisfy 3rd and 4th condition of moderated mediation model. It tests the strength of mediation across levels of the moderators (Preacher, Rucker, & Hayes, 2007). Bootstrapping method helps in testing statistical significance of conditional indirect effect at different values of moderators and develops accuracy of estimates of standard errors after repeating estimates a large number of times (Shrout & Bolger, 2002).

We create 1000 bootstrap samples (n=352) by adopting a random sampling with replacement and obtained 1000 estimates of path coefficients. Results from the bootstrap samples confirmed interaction effect of team information sharing process and support for innovation. The interaction effect of team information sharing process was significant at the level of 0.14 to 0.15 $p \leq 0.001$ at 95% confidence interval, confirming hypothesis H_7. The interaction effect of climate for innovation was significant at the level of 0.12 to 0.13 $p \leq 0.001$ at 95% confidence interval, confirming hypothesis H_8. Thus, conditional indirect effect of team information sharing process and support for innovation were significant at $p \leq 0.001$.

The path analysis results of the moderated mediation model have been provided in Table 5.2. Results of the hypothesized model (Fig. 5.1) and moderated mediation model (Fig. 5.2) have been provided in the Table 5.3 respectively.
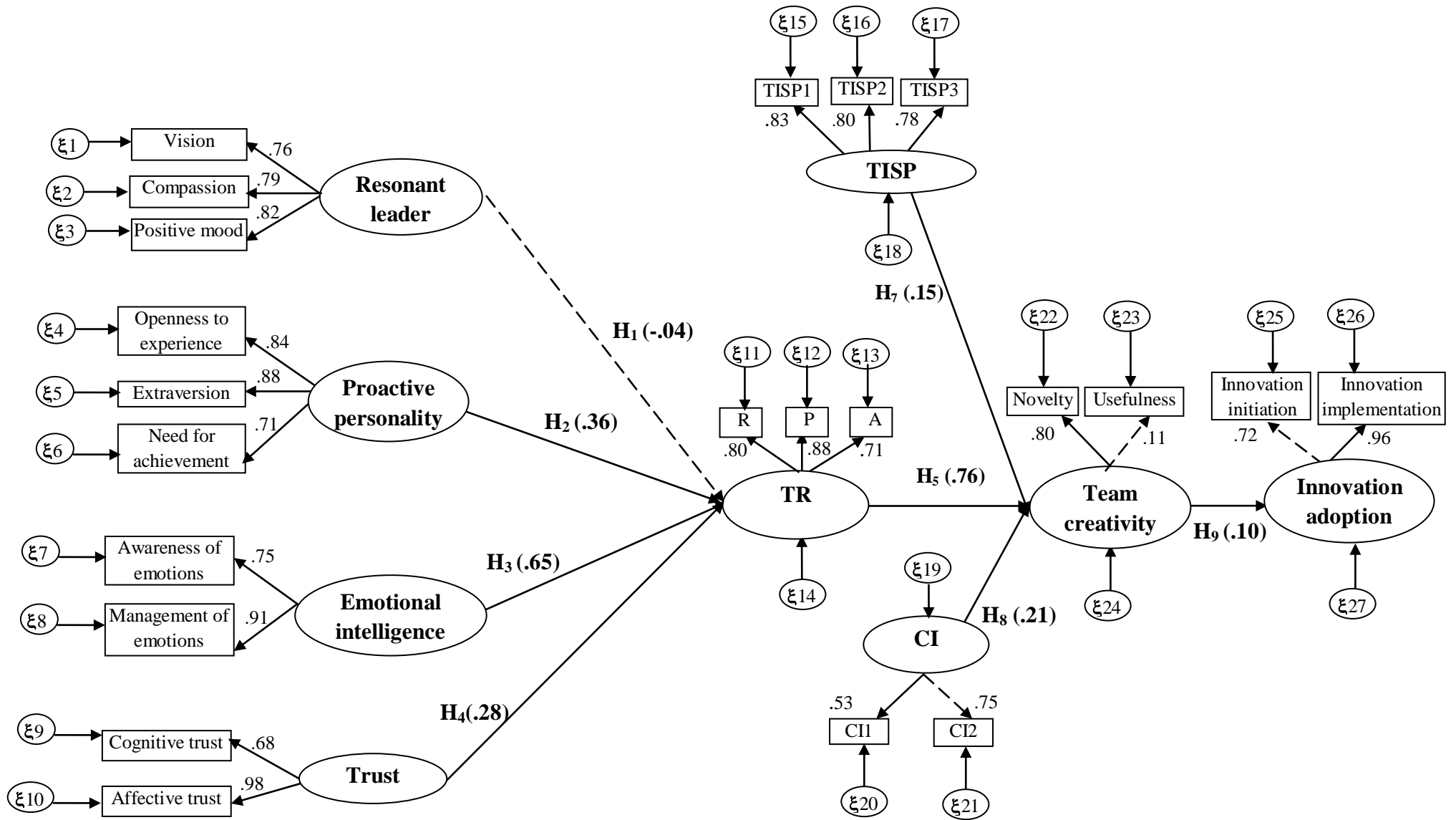
Figure 5.1: Hypothesized model of innovation process with standardized path coefficients.

CI→Climate for innovation; CI1→Support for innovation; CI2→Intrapreneurship; TR→Task reflexivity; R→Reflection; P→Planning; A→Action; TISP→Team information sharing process; TISP1→ Information processing; TISP2 →Knowledge sharing; TISP3→Collaborative problem solving; ξ→error term
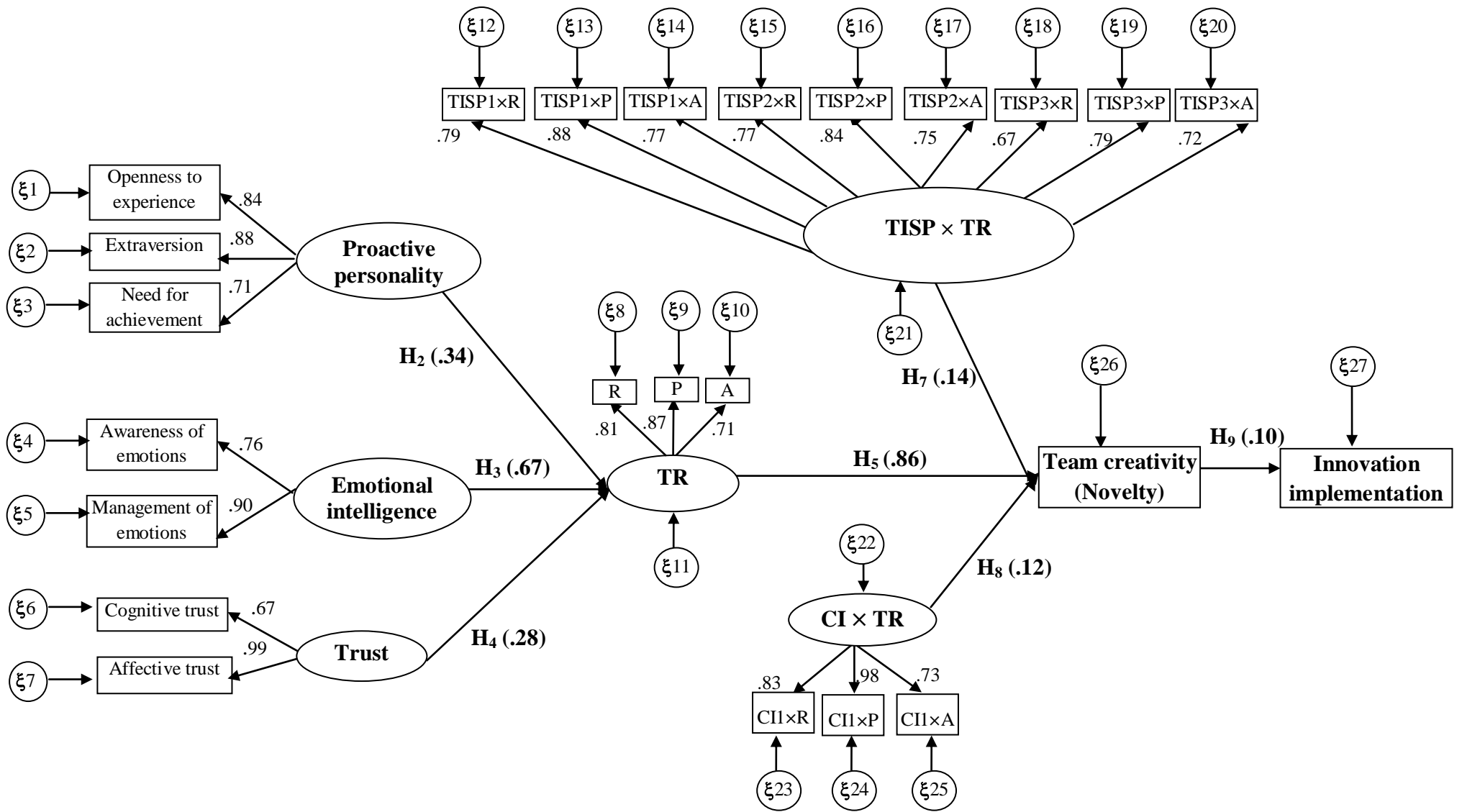
Figure 5.2: Moderated mediation model of innovation process with standardized path coefficients.

CI→Climate for innovation; CI1→Support for innovation; TR→Task reflexivity; R→Reflection; P→Planning; A→Action; TISP→Team information sharing process; TISP1→ Information processing; TISP2 →Knowledge sharing; TISP3→Collaborative problem solving; ξ→error term

The path analysis depicts the relationship among variables, their standardized path, and critical ratio. The values of moderated mediation model have been given in Table 5.2.

Table 5.2: *Path analysis results of moderated mediation model*

Hypotheses	Hypothesized direction	Standardized path coefficients	Critical ratios	Results
H₁	Resonant leadership → task reflexivity	– 0.04	– 0.74	Refuted
H₂	Proactive personality → task reflexivity	0.34	6.92***	Supported
H₃	Emotional intelligence → task reflexivity	0.67	11.01***	Supported
H₄	Trust → task reflexivity	0.28	4.47***	Supported
H₅	Task reflexivity → team creativity	0.86	8.75***	Supported
H₆	Task reflexivity as a mediator between proactive personality, emotional intelligence, trust and team creativity			Supported
H₇	Team information sharing process × task reflexivity → team creativity	0.14	1.80**	Supported
H₈	Support for innovation × task reflexivity → team creativity	0.12	1.80**	Supported
H₉	Team creativity → innovation implementation	0.10	1.85**	Supported

*Significant at $p \leq 0.05$, ** significant at $p \leq 0.01$, *** significant at $p \leq 0.001$

The fit measures of hypothesized and moderated mediation models have been provided in Table 5.3. The chi-square values of the both hypothesized and moderated mediation model were significant at $p < 0.001$. However, non-significant values are expected for similarity between observed model and model implied covariance matrics. Chi-square value is sensitive to sample size. Therefore, relative chi-square values ($\chi2/df$) were estimated. The relative chi-square values of both the models were below the required limit of 3 (Kline, 1998). Other fit indices of both the models were considered. Goodness of fit index (GFI) is similar to square multiple correlations (R^2) in multiple regression. Comparative fit index (CFI) indicates the overall fit of the model with respect to the null model and Normed fit index (NFI) adjusts for the complexity of the model. GFI, CFI, and NFI are absolute fit indices and are closer to 0.90 in both the models. Therefore, both the models are accepted. Root mean square error of approximation (RMSEA) shows that the observed model is approximately closer to the true model and its lower value shows the model is having a better fit. RMSEA value in hypothesized as well as parsimonious model is below the required limit of 0.08. Hence, both models are highly acceptable. Thus, the moderated mediation model has been empirically confirmed.

Table 5.3: *Fit measures of hypothesized and moderated mediation model*

Models	χ2/(df)	GFI	CFI	NFI	AGFI	PGFI	PCFI	PNFI	RMSEA
Hypothesized model	2.8	0.89	0.88	0.90	0.79	0.82	0.79	0.77	0.06
Moderated mediation model	2.9	0.88	0.89	0.90	0.78	0.80	0.76	0.75	0.07

DISCUSSION

The present study has been conducted on 352 team members and 352 team leaders working in R&D teams of 174 small, medium, and large pharmaceutical companies in India. R&D teams were the unit of analysis. The study reveals that members' having proactive personality, their emotional intelligence, and trust with team members have shown collective learning behavior. The team members have discussed team objectives, strategies, and challenges. They have learnt from past mistakes, and experience to find a feasible solution called task reflexivity. Task reflexivity significantly influences team creativity measured using variable novelty. Task reflexivity is mediating the relationship between proactive personality, emotional intelligence, trust, and novelty. Team information sharing process moderates the relationship between task reflexivity and novelty. Support for innovation moderates the relationship between task reflexivity and novelty. Novelty influences innovation implementation. Results of the study have been extensively discussed in subsequent sections.

6.1 Resonant leadership style and task reflexivity

Boyatzis (1982) conceptualized the concept of resonant leaders. Such leaders overcome the limitations of transformational leaders by invoking positive emotions among followers. They inspire their subordinates and transform their behavior (Boyatzis & Yeganeh, 2012). Resonant leader constitutes vision, compassion, and positive mood. Trial and error phase of innovation process de-motivates members working in the R&D teams. Resonant leaders provide a congenial atmosphere to work by empathizing with subordinates. They develop trust and confidence in them. With the support of their leader, members learn to solve complex problems called task

reflexivity. However, our results have shown a non-significant relationship between the resonant leadership style of team leader and task reflexivity.

There is a hierarchical difference between leaders and members. Team leaders inhibit participation of their subordinates in setting team goals. Subordinates are younger and are less experienced than their leaders. Team leaders are professionally qualified scientists and doctors with 10 or more years of experience. These managers have spent longer tenure in the organizations and have more portfolio of tasks. They execute their projects within a specified time duration, meeting the budget and resource constraints. They cannot take risk with the current challenges in the nature of task by inviting suggestions from their subordinates. So they adopt a directive leadership style. Subordinates are hesitant to contribute their ideas due to fear of rejection. Though they suggest improvements in drugs/process improvement, but these suggestions are discarded to avoid huge R&D investment. Innovation process takes a longer time, cost, and valuables resource. Medium and small sized organizations discourage any initiative by subordinates. Most of the R&D works are done in special laboratory settings by people at managerial level which cannot afford intervention of less experienced executives. Moreover, competitive challenge from other firms pressurizes team leaders to focus on productivity rather than empathizing with subordinates. Therefore, in the present study resonant leadership style has not supported task reflexivity of team members.

6.2 Team members' proactive personality and task reflexivity

In the present study proactive personality is measured through openness to experience, extraversion, and need for achievement. Members are curious and open to learn from their colleagues. They take proactive measures to launch incremental innovations of drugs in market.

They identify nature of drug and continuously improve its quality, supply chain to minimize overall cost. Team members socialize with colleagues to discuss clinical trials of drugs and discuss measures to address shorter shelf life of drugs. They also address problems arising out of sudden outbreak of seasonal diseases like flu, cough, and fever. The respondents of the study were clinical executives, quality control, and maintenance executives in the cadre of first line of managers. They are young, dynamic, ambitious, optimistic, and innovation seekers. With their proactive personalities they foresee new challenges and generate alternative solutions. They act like devil's advocate, invoke alternative interpretations, and encourage critical thinking to facilitate team creativity. Such an intimate setting encourages team members to adopt creativity as team norms. Members take initiative to overcome interpersonal issues and motivate their colleagues to adapt to change. The findings have confirmed that member's proactive personality influences task reflexivity.

6.3 Team members' emotional intelligence and task reflexivity

In present study, the construct of emotional intelligence is measured using variables awareness and management of emotions. Awareness of emotions is assessed as emotional self awareness, empathy, and organizational awareness. Management of emotions is self management and relationship management. Self-management assesses achievement orientation, adaptability, emotional self control, and positive outlook of members. Relationship management is how members influence, inspire, work with colleagues in team, and coach and mentor them. Managing emotions of self and others have helped the team members in pharmaceutical firms to encourage idea sharing, better information exchange, decision-making, and conflict resolution to enhance task reflexivity. They assess need of Indian customers and develop drugs at affordable

rates. Pharmaceutical firms confront challenges of supply chain performance, high production cost, quality maintenance, product reachability to the masses, and support for R&D initiatives.

Team leaders have informed that most of the members are professionally trained in pharmacoinformatics, pharmacokinetics, and pharmacodynamics having knowledge of compositions used in drug manufacturing. Those who have spent more than 5 years in the organizations are able to sense competitive challenges faced by the industry and the firm and suggest measures to overcome them. They are sociable, value teamwork, share their ideas, and generate new ideas. They behave professionally, control their anger, stress, and emotions to avoid interpersonal conflict in task. Enthusiastic and achievement oriented team members emphasize on task performance. They passionately participate in training sessions. Members with lower emotional intelligence are unable to handle work stress. A survey of 304 American undergraduate students with higher emotional intelligence have also been found to be better decision makers (Lam & Kirby, 2002). Another survey on 817 Australian employees has also confirmed the role of emotional intelligence on better team decision-making (Jordan & Lawrence, 2009). Therefore, these studies have also corroborated our findings stating that emotional intelligence of team members influences task reflexivity.

6.4 Trust among team members and task reflexivity

Members trust each other because of professional expertise of their colleagues as well as their healthy interpersonal relationship. Cognitive trust is developed on the basis of knowledge, competence, and expertise of the member's. 75% of members were involved in routine type of task which have developed their expertise in task execution. They exhibit their professional competence by performing task on time, meticulously verifying samples, and assessing quality of

drugs. Organizations recognize their competence and seek suggestions from them to improve their decision accuracy. The recognition motivates members to utilize their skills for adding value to the firm. They develop a sense of emotional attachment with the organization and participate in decision-making. Their competence, knowledge, and sense of belongingness, are reasons enough for employers to trust them. They adapt to organizational dynamism and extend support to develop affective trust. In a congenial and cooperative environment members are willing to take initiative, share information, and participate in decision making (Barczak et al., 2010). Previous research conducted on 164 management students in 31 teams, indicated that both affective and cognitive trust have lead to information sharing and decision-making (Chowdhry, 2005). Our results have corroborated these findings to support that team members' trust positively support task reflexivity.

6.5 Task reflexivity and team creativity

The construct of task reflexivity has been assessed through variables like reflection, planning, and action/adaptation. Members' having professional qualification like pharmacokinetics, pharmacodynamics, bachelor/masters degree in pharmacy, chemical biology, and biochemistry, and have worked as trainees and apprentices in pharmaceutical firms. Their experience helps them recall past instances to cope with the present challenges. With the first hand experience in the laboratory setup they take precautionary measures to avoid mishaps. They review their task performance and seek suggestions and feedback to improve their work methods and processes such as adopting safety measures, using caps, gloves, and special boots to develop drugs in a safe working environment. Proactive measures taken by them remove ambiguity and confusion. Their interaction with colleagues provides a platform for information exchange and equips them to

plan their activities. More reflexive members are likely to be aware of their colleagues' strengths and weaknesses and judiciously allocate tasks. A study conducted on 368 supervisors in 46 Dutch project teams indicated that members continuously reflect on their ideas, strategies and plan accordingly (De Dreu, 2007). Supporting previous findings, our results also found a positive link between task reflexivity and team creativity.

6.6 Task reflexivity as a mediator between proactive personality, emotional intelligence, trust, and team creativity

Task reflexivity helps members to learn from each other about the task. Leaders and members enrich each other with their past experiences and contribute ideas to meet organizational challenges. Simply putting forth novel ideas would not result in creativity. Rather it is evaluated prior to execution. This process would avoid wastage of time, resources, and human competence. Team members share their thoughts and experience in an environment free from criticism and fear. The conducive climate for expression of thoughts is possible in firms with the support of empathetic colleagues who trust their fellow colleague's ability and knowledge. Team members express their creative ideas freely because they are young, enthusiastic, and competitive. They intend to contribute solutions to the existing problems with an intension to be recognized by organization and are ambitious to rise the career ladder faster. The more the exchange of ideas among team members the more is the learning. Therefore, our findings have supported that task reflexivity mediates the relationship between members' proactive personality, emotional intelligence, trust, and team creativity.

6.7 Team information sharing process moderates the relationship between task reflexivity and team creativity

Team information sharing process consists of information processing, knowledge sharing, and collaborative problem solving. Pharmaceutical companies included in the survey are involved in both contract manufacturing and drug discovery. Information processing is an important step in all these firms. In the preliminary stage, they design molecules and process it further to R&D unit, which in turn measures its suitability for consumption. Formulation and development unit takes decision on final form of the drug as capsule, tablet, or syrup.

They follow guidelines of regulatory authorities to develop drugs by deploying specific technology. They are not free to make changes in the prescribed compound for drug development. If they do so the machine stops further processing. Thus, companies follow systematic information processing to meet work and time pressure which may arise due to sudden rise in demands of medicines caused by outbreak of seasonal diseases like dengue, swine flu, conjunctivitis, and chicken guinea. They seek systematic information rather than procuring new information. If they miss the target they have to pay penalties. To avoid loss they follow the predefined rules and guidelines. However, few indigenous R&D units of companies like Ranbaxy are involved in drug generation and development through continuous trials. Procedure of discovering new drug is more flexible, exceeds time lines, and forgoes adoption of routine technology.

Their tasks are distributed based on their competency and expertise to enhance collaborative problem solving. Continuous interaction minimizes interpersonal conflicts and enhances creativity. 12 managers and 315 engineers working in 12 project teams of Canadian organizations have also stated that integrative problem solving results in identifying a solution

good for all (Barker et al., 1988). Therefore, it is necessary for contemporary organizations to resolve conflict in order to enhance information processing, cognitive functioning of members, and learning to encourage team creativity. Results of Korean study, conducted on 166 employees revealed that task conflict help members to obtain divergent views to enhance performance (Cho, Sanghee, & Kim, 2009). Another study conducted on 150 Chinese firms involving employees of work teams have stated that mutually agreed goals helps members to solve problem collectively (Tjosvold et al., 2003). Therefore, team information sharing process enhances task reflexivity.

6.8 Climate for innovation moderates relationship between task reflexivity and team creativity

Communicating expectations and providing continuous support to members can motivate them to generate new ideas and products (Singhal & Misra, 1994). The influence of climate for innovation has been assessed through support for innovation and intrapreneurship. Support for innovation is a complementary asset, without which reflexive decisions may not be converted to team creativity. Members are young, dynamic, and sense the essence of improvising supply chain and drug development process. However, most of the respondents are freshers are very impatient. They want to achieve more gains in short span of time. They frequently switch jobs in search of better opportunities. R&D initiatives are sensitive issues and performed only in controlled laboratory settings. Organizations are hesitant to give them responsibility. Executives with domain specific expertise in pharmacy, biochemistry, and biotechnology with experience, and research ability are allowed to work in laboratories. Though the members have post graduation in pharmacy, pharmacoinformatics, and pharmakinetics, but lack experience in research capability due to which they are restricted to work in controlled laboratory settings.

These organizations maintain secrecy during new drug formulation and development. They can trust on those who have spent long tenure in organization or have exemplary research abilities like scientists and doctors with specialized knowledge. They are given freedom and flexibility to experiment. They cannot give autonomy to newly joined executives to carry experiments. Experiments by inexperienced people can cause loss to the company and its valuable resources. Inexperienced employees flunk to abide by pre-requisites of a laboratory setup like warnings and adopting safety measures and guidelines. R&D initiatives can be successful with patience, involvement, experience, knowledge, and dedication of employees.

Organizations can risk investing in R&D initiatives with government support for clinical trials with experienced and trustworthy employees. Small or medium sized organizations involved in contract manufacturing and drug development rarely initiate drug discovery because there are procedural rigmaroles in seeking government permission. R&D initiatives involve risk and patience during repeated trials leading to frustration of members. To avoid time and cost overrun, top management of pharmaceutical industry often discourages intrapreneurship among new joinees. Therefore, the support for intrapreneurship was weak in the model and has been eliminated in the final model.

However, climate for innovation is provided to employees having more than 10 years of experience. Employees have been given autonomy to innovate. These employees are enthusiastic, committed, and interact more with their team members to brainstorm creative ideas. Therefore, support for innovation enhances the relationship between task reflexivity and team creativity.

6.9 Team creativity and innovation adoption

Team creativity is generation of innovative solutions procuring divergent views of members. Its emphasis is solely on the novelty of products to generate a competitive advantage. Innovative ideas are fostered by interaction of members in the work group. Companies bring in innovative products to fascinate customers like pain relieving spray, fitness pills, and performance enhancing drugs. Innovation in drugs are a quick fix formula to increase its sales. Amway sales calcium tablets and health drinks to niche customers. Thus, novelty of the product enhances innovation in organizations.

Innovation adoption consists of initiation and implementation. Due to short shelf life of products and rising market competition, some pharmaceutical companies emphasize on quick implementation ignoring clinical trials. Components of the medicines are altered seeking suggestions from doctors and practitioners. The procedure helps organization to escape the systematic and long clinical trials and avoid time and cost overrun. They do preliminary test to verify its consumption suitability in the R&D units. Companies like Ranbaxy, Wockhardt, Strides, and Arcob Ltd. have failed to comply with standard manufacturing practices and have been advised to follow a well defined structure to export drugs (Das, 2014). In lieu of clinical trial these companies offer incentives of free health checkups, medicines, toys for kids. Intas Pharmaceutical Ltd., Indian Pharmaceutical Combine Association Laboratories , Lupin Ltd. and few other pharmaceutical companies conduct clinical trials at R&D units, send samples for survey, and finally launch the drug in market. They follow drug development process and launch them in the market. 288 employees working in R&D teams of Korean companies have found that R&D team creativity help organizations to have a competitive advantage (Shin & Zhou, 2007). Another Californian study on 323 university students has examined the impact of creativity on

innovation using regression (Cropley, Kaufman, & Cropley, 2011). Our study reaffirms that, team creativity influences innovation adoption.

Overall, the study highlights that creativity and innovation arises as an interaction between certain individual, social, and contextual factors. The individuals' attributes, their learning behavior, personal characteristics of proactive personality, emotional intelligence, trust, and information processing strategies have facilitated creativity within a supportive climate for innovation. Theory of intrinsic motivation supports the above conceptual framework as team members garner support of their colleagues to take up challenging assignment and optimally utilize organizational resources (Amabile, 1996). Similarly, theory of team interaction have also supported participative safety, support for innovation, challenging task, and members' concern for creativity as factors of social climate facilitating creativity (West & Anderson, 1996). Theory of psychological processes reaffirms that creativity promulgates when there is trust, openness, and collaborative problem solving (Ekvall, 1996).

The innovation model depicting the hypothesized relations are synchronous with Ansoff's strategy stating that organizations develop managerial capabilities to adapt to environmental complexities (Ansoff, 1987a; 1987b). The managerial capabilities derive innovation for an organization to be competitive. These capabilities are members' proactive personality, knowledge acquisition and dissemination, collaborative problem solving, and information sharing. However, variables like strategic cognition that equips a manager to foresee new challenges in the market have been ignored in the present study. Strategic cognition of a leader is required to facilitate risk taking, leveraging on organizational current resources, and search for new opportunities in an organization.

EPILOGUE

This chapter summarizes findings of the present study to develop a theoretical framework and state its contributions, scope for future research, along with its limitations.

7.1 Summary of findings

The present study discusses that an organization can overcome challenges in an aggressive market by developing managerial competencies to generate a perennial source of competitive advantage. Organizations can have high performance with emphasis on capability building and liasoning with partners to create and innovate. Creativity is not transpired by an individual alone, but is a consorted effort of organizational members, departmental units, and partner firms.

The present research has investigated the innovation process in Indian pharmaceutical industry. Innovation has been perceived from two broad perspectives: (a) structuralist and (b) process. Structuralist perspective perceives innovation is acquired implementing new technology and methods. However, a new technology or a method can be successfully incorporated in an organization, with the approval of top management and commitment of employees, and multiple stakeholders. Process perspective views innovation as an outcome of decision making process, with participation of multiple stakeholders in a social context. It is an interaction of socio-cognitive processes in an organization to develop, communicate, transfer, and implement an idea. Conclusively, the present study has found that, the innovation process includes both structuralist and process views, justifying innovation is generation and implementation of ideas. Both generation and implementation of innovation needs approval of top management, commitment of employees, and involves decision making process.

Overall, innovation is an integration of several social processes and business units, creating, sharing, and managing knowledge and expertise of members. Knowledge is transferred through collective understanding and collaborative problem solving. Continuous creation and recreation of knowledge is possible, when group members shared a common frame of reference. Members' proactive personality, emotional intelligence, trust, task reflexivity, team information sharing process, and climate for innovation have facilitated innovation process in the present study. However, resonant leadership style of team leader has not been supported in the present study. To withstand competitive challenges in the dynamic environment strategic leaders would be more suitable than the resonant leaders.

Moreover, innovation process encourages sharing of information and knowledge by building employee capability. Unit of analysis in this study is a R&D unit within the organization. However, innovation is also promoted beyond organizational boundaries through information exchange with other departments/organizations/partner firms. Multinational American drug maker *Gilead Sciences* has recently decided to tie up with five Indian pharmaceutical firms such as *Cadila*, *Hetero*, *Strides Arcolab*, *Mylan*, and *Cipla* to manufacture and sell cheaper versions of *Hepatitis C* medicines憫 *sofosbuvir* and *ledipasvir* in 90 countries (Dey, 2014). This strategic initiative by Gilead would help save its patent rights and also enrich domestic companies to earn revenues. The strategic initiatives taken by *Gilead Sciences* have been possible with the intervention of a strategic leader. Therefore, in future studies, it is required to find out the impact of strategic leader in innovation process.

Table 7.1: *Hypotheses along with summary of findings*

Hypotheses	Results
H$_1$: Higher resonant leadership style of team leaders, higher would be task reflexivity of team members.	Resonant leadership style of team leader did not influence task reflexivity among team members
H$_2$: Higher team members' proactive personality, higher would be task reflexivity.	Higher the influence of team members' proactive personality, higher is task reflexivity.
H$_3$: Higher team members' emotional intelligence, higher would be task reflexivity.	Higher the influence of team members' emotional intelligence, higher is task reflexivity among them.
H$_4$: Higher the trust among team members', higher would be task reflexivity	Higher the influence of team members' trust, higher is task reflexivity among them.
H$_5$: Higher the members' task reflexivity, higher would be team creativity.	Higher the task reflexivity among members, higher is novelty of ideas among team members.
H$_6$: Task reflexivity is mediating the relationship between resonant leadership style, proactive personality, emotional intelligence, trust, and team creativity.	Proactive personality, emotional intelligence, and trust among members, helps them to reflect, plan, and act, to develop novel ideas.
H$_7$: Team information sharing process acts as a moderator between task reflexivity and team creativity.	Team information sharing process, facilitates the relationship between task reflexivity and novel ideas among team members
H$_8$: Climate for innovation moderates the relationship of task reflexivity and team creativity.	Support for innovation enhances the relationship between task reflexivity and novel ideas among team members
H$_9$: Higher the team creativity of members, higher would be innovation adoption.	Higher the novelty of ideas among team members, higher is innovation implementation in organizations.

7.2 Theoretical framework and contributions

Creativity generates new ideas, and innovation translates them into useful products. The entire process of creativity and innovation arises as an interaction between the employees and their contingencies in a social environment (Amabile, 1996). This study has conceptualized the innovation process as an interplay of attributes of creative people, their proactive personality, emotional intelligence, and trust with each other to facilitate information processing, knowledge sharing to provide a novel solution to maintain organizations continuity and order. The proactive personality of members imbibes responsibility and discipline among members to follow organizational norms. Team members' emotional intelligence helps them to rationally judge organizational priorities. They learn to develop new products/services/ideas to serve market needs. Learning through colleagues help them to plan and execute novice ideas. The theoretical framework discusses that creativity is promulgated when information is disseminated among members in a supportive climate for innovation.

Growing and innovating organizations are essence of developing economies like India. They leverage on their core competence to create and innovate by adopting a continuous learning culture. National culture of a country also reflects in an organizational culture. India has a collectivistic culture with power distance, risk aversiveness, and preference for feministic values of relationship, mutual respect, and trust (Triandis et al., 1986). Trust building in the workplace reduces interpersonal conflicts and maximizes cooperation among members to solve problems.

Overall the theoretical framework enriches existing body of knowledge on innovation process by developing a holistic model. This complex model would guide academicians to unearth several individual, team, and contextual factors facilitating innovation. Organizations can improve the innovation process by supporting and developing as a learning organization. The

continuous learning approaches would help in retaining and developing talents of generation Y who have dominant needs of self actualization. Organizations also emphasize on building managerial competencies of employees by supporting innovation, processing information, and collaboratively solving problems.

7.3 Agenda for future research

1. The moderated mediation model of innovation process can be tested in software firms, hospitality, banking, insurance, and pure R&D organizations.

2. Education diversity of team members, cognitive thinking, intrinsic motivation, social reflexivity, creative thinking can be included as antecedents of team creativity. Future studies can also see impact of team's creative efficacy as a mediating variable and leadership style of a leader as a moderating variable.

3. Impact of workload on task reflexivity, cognitive intelligence, can also be included as antecedent variable for improving performance of R&D teams. Level of task conflict on team creativity has not been assessed in the present study.

4. Talent retention and development in pharmaceutical industry is a major concern. Therefore, measures to retain and develop talent in pharmaceutical industry need to be taken care of to further promulgate innovation process.

5. Organizational value system measured as a result of individual's experience and attitude, have not been studied.

6. Impact of new business venture on team creativity can be studied in future.

7.4 Limitations of study

1. Survey has been conducted in R&D units of pharmaceutical industry only. However new product development units have been ignored in the survey.

2. In the pharmaceutical industry senior managers were not part of the survey. Respondents of the survey were middle level managers, so we could not assess the strategic leadership style of team leaders, rather assessed their resonant leadership style.

3. Few individual level variables like personality, emotional intelligence, and trust have been included in the survey ignoring certain other variables like cognitive diversity.

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LIST OF PUBLICATIONS FROM PRESENT RESEARCH

RESEARCH PUBLICATIONS IN INTERNATIONAL JOURNAL

1. Lenka, U., Gupta, M., & Sahoo, D. K. (2016). Research and development teams as a perennial source of competitive advantage in the innovation adoption process. *Global Business Review* (*Sage*), *17* (3), (Forthcoming).

RESEARCH PAPERS COMMUNICATED IN INTERNATIONAL JOURNAL

1. An empirical investigation of innovation process in Indian pharmaceutical companies. European Journal of Innovation Management (Emerald).

PAPERS PRESENTED IN INTERNATIONAL CONFERENCES

1. Presented a research paper on "*Developing R&D teams through Talent management for sustainable businesses*" in International conference on Trade, Markets and Sustainability held at Symbiosis Institute of International Business, Pune, from 22-23 February, 2013.
2. Presented a research paper on "*Problems of Indian IT Offshore Industry*" in Tenth AIMS International conference on Management held at IIM Bangalore, from 6-9 January, 2013.
3. Presented a research paper on "*Effective Change Initiatives*" in International Conference on Business & Technology held at FRI University, Dehradun from 4-5 November, 2011.

PAPERS PRESENTED IN NATIONAL CONFERENCES

1. Presented a research paper on "*Importance of R&D teams in Creativity and Innovation*" in National conference on Emerging Challenges for Business in a Borderless World held at University of Pune, from 22-24 February, 2013.

APPENDIX 1

Department of Management Studies Indian Institute of Technology Roorkee, Roorkee Tele: 01332-285014, 285617 Fax: 01332-285565

Letter from Supervisor,

<u>To whomsoever it may concern</u>

This is to certify that Ms. Minisha Gupta, a registered scholar of the Department of Management Studies, IIT Roorkee is conducting a survey on **A Study of Innovation Process in Indian Pharmaceutical companies**. Therefore, she needs to interact with team leaders and members working in Research and Development teams. This study is part of her PhD thesis and the responses would be kept confidential. Kindly cooperate with her for the smooth conduct of the process.

Dr. Usha Lenka,
Assistant Professor
Department of Management Studies
Indian Institute of Technology Roorkee, Roorkee

Part A
To be filled by team members
Section I

Kindly fill the following details and √ appropriate responses in both section I and II

1. Name:_____ Age: _____ Gender: _____

2. Years of experience in years: ☐ Less than 1 ☐ Less than 3 ☐ Less than 5 ☐ Above 5

3. Education: ☐ BSc/BPharma ☐ MSc/Mpharma ☐ PhD ☐ Any other

   Please specify: _____

4. Name of the company : _____

5. Type of team: ☐ Cross- functional ☐ Project ☐ Research & Development ☐ New product development

   If any other then please specify: _____

6. Task assigned: ☐ Routine Task ☐ Non-routine/Complex Task

7. Nature of team: ☐ Autonomous ☐ Semi-autonomous

8. Size of team: ☐ Less than5 ☐ Less than10 ☐ Less than15 ☐ Above 15

Section II

Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I. My team leader:					
1 Provides vision for future work.	1	2	3	4	5
2 Often discusses possible ways for future work.	1	2	3	4	5
3 Clarifies that our future in this organization is brighter than our past.	1	2	3	4	5
4 Inspires us by his vision and mission.	1	2	3	4	5
5 Encourages us to build on our strengths.	1	2	3	4	5
6 Ensures that our work coincides with organization's vision or mission.	1	2	3	4	5
7 Ensures that we are clear with our team goals.	1	2	3	4	5
8 Emphasizes on developing on our current strengths.	1	2	3	4	5
9 Does not feel trusted by team associates.	1	2	3	4	5
10 Feels trusted by team members.	1	2	3	4	5
11 Cares about other members of the team.	1	2	3	4	5
12 Does not trust his team members.	1	2	3	4	5
13 Does not care about his colleagues at work.	1	2	3	4	5
14 Trusts his teammates.	1	2	3	4	5
15 Ensures that we enjoy team work.	1	2	3	4	5

	Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
16	Makes us enjoy working for the team.	1	2	3	4	5
17	Does not make us feel team climate comfortable.	1	2	3	4	5
18	At times irritates, compelling us to work somewhere else.	1	2	3	4	5
19	Spreads a feel good factor in the team.	1	2	3	4	5

II. Team members:

20	Communicate project objectives to all associates.	1	2	3	4	5
21	Have access to all information required for effective teamwork.	1	2	3	4	5
22	Receive feedback concerning quality and performance of the project.	1	2	3	4	5
23	Are aware of customers' and funding agencies' expectations.	1	2	3	4	5
24	Have a clear understanding of the project objectives.	1	2	3	4	5
25	We share our work reports and official documents with our teammates.	1	2	3	4	5
26	We provide manuals, methodologies and models to other members of the team.	1	2	3	4	5
27	We share our experience/ know-how by working with other colleagues.	1	2	3	4	5
28	We always provide information at the request of our colleagues.	1	2	3	4	5
29	We share our experience from education or training with other colleagues.	1	2	3	4	5

III. My colleagues

30	Examine the viewpoints of their associates.	1	2	3	4	5
31	Resolve conflict among each other.	1	2	3	4	5
32	Integrate the objectives of others.	1	2	3	4	5
33	Agree to the solutions suggested by other team associates.	1	2	3	4	5
34	Search for innovative solutions.	1	2	3	4	5
35	Assist in developing new ideas.	1	2	3	4	5
36	Are open and responsive to change.	1	2	3	4	5
37	Always search for new ideas for looking at problems.	1	2	3	4	5

	Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
38	Take time to develop new ideas.	1	2	3	4	5
39	Cooperate in application of new ideas.	1	2	3	4	5
40	Provide resources and support for application of new ideas.	1	2	3	4	
41	I am confident to take risk for the teamwork.	1	2	3	4	5
42	I like to create original ideas.	1	2	3	4	5
43	I tend to work until something meaningful emerges..	1	2	3	4	5
44	I take calculated risk.	1	2	3	4	5
45	I respond to every situation confidently.	1	2	3	4	5
46	I am innovative and analyze things from a different perspective	1	2	3	4	5
47	I am good at conceptualizing the ideas.	1	2	3	4	5

Part B
To be filled by team leader
Section I

Kindly fill the following details and √ appropriate responses in both section I and II

1. Name:_____ Age: _____ Gender: _____

2. Years of experience in years: ☐ Less than 1 ☐ Less than 3 ☐ Less than 5 ☐ Above 5

3. Education: ☐ BSc/Bpharma ☐ MSc/Mpharma ☐ PhD ☐ Any other

   Please specify: _____

4. Name of the company : _____

5. Type of team: ☐ Cross- functional ☐ Project ☐ Research & Development ☐ New product development

   If any other then please specify: _____

6. Task assigned: ☐ Routine Task ☐ Non-routine/Complex Task

7. Nature of team: ☐ Autonomous ☐ Semi-autonomous

8. Size of team: ☐ Less than5 ☐ Less than10 ☐ Less than15 ☐ Above 15

Section II

Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I. My colleagues					
1 Look for new ways to improve work.	1	2	3	4	5
2 Feel driven to mark a difference in their work.	1	2	3	4	5
3 Often motivate others to start new projects.	1	2	3	4	5
4 Take initiative to introduce constructive change.	1	2	3	4	5
5 Enjoy accepting challenges.	1	2	3	4	5
6 Feel excited seeing their ideas turn into reality.	1	2	3	4	5
7 Avoid task they do not like.	1	2	3	4	5
8 Make things happen, inspite of obstacles in their way.	1	2	3	4	5
9 Love to be an idea champion, even against others oppose it.	1	2	3	4	5
10 Excel at identifying opportunities.	1	2	3	4	5
11 Always look for better ways to do things.	1	2	3	4	5
12 Try to give concrete shape to their ideas.	1	2	3	4	5
13 Love to accept challenge.	1	2	3	4	5
14 Try to tackle problems during task execution.	1	2	3	4	5
15 Convert problems at task into opportunities.	1	2	3	4	5

	Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
16	Spot opportunity before others can foresee.	1	2	3	4	5
17	Enjoy extending help to others.	1	2	3	4	5
18	Share their ideas, feelings, and hopes with each other.	1	2	3	4	5
19	Can talk freely to others about difficulties at work expecting that others would listen.	1	2	3	4	5
20	Feel a sense of loss if their associates are transferred.	1	2	3	4	5
21	Share problems with others knowing that they would respond with care.	1	2	3	4	5
22	Have made considerable emotional investments in his relationship with other colleagues.	1	2	3	4	5
23	Approaches their job with professionalism and dedication.	1	2	3	4	5
24	Exhibit their competence through past performance that also reaffirms my confidence in them.	1	2	3	4	5
25	Are careful in delivering their task and I rely on them.	1	2	3	4	5
26	Are trustworthy and therefore earns respect from other co-workers.	1	2	3	4	5
27	Are considered to be trustworthy by other team associates.	1	2	3	4	
28	Are familiar with other associates and they are more concerned for his performance.	1	2	3	4	5
29	I can explain the emotions I feel towards other colleagues.	1	2	3	4	5
30	I can discuss the emotions I feel with other colleagues.	1	2	3	4	5
31	I can tell my colleagues what I feel better, at times of stress.	1	2	3	4	5
32	I can freely talk to other members of the team about my emotions.	1	2	3	4	5
33	I can read fellow colleagues' feelings, even if they try to hide.	1	2	3	4	5
34	I can understand my associates' feelings.	1	2	3	4	5
35	I can gauge my colleagues' feelings from their body language.	1	2	3	4	5
36	I can respect the opinion of my colleagues.	1	2	3	4	5

Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
37 I can overcome my frustration.	1	2	3	4	5
38 I can try to judiciously see all sides of disagreement while resolving conflict.	1	2	3	4	5
39 I can patiently hear my colleagues' ideas.	1	2	3	4	5
40 I can spread enthusiasm among other colleagues.	1	2	3	4	5
41 I can motivate my colleagues when they are emotionally low.	1	2	3	4	5
42 I can motivate fellow colleagues to show their interest in the project work.	1	2	3	4	5

II. The team

43 Reviews daily routines to assess whether appropriate methods have been used.	1	2	3	4	5
44 Often reviews its objectives.	1	2	3	4	5
45 Often discusses the methods for doing jobs.	1	2	3	4	5
46 Regularly reviews whether work performed meet project requirements.	1	2	3	4	5

III. My team associates

47 Regularly discuss whether the team is working effectively.	1	2	3	4	5
48 Seek feedback on their work methods.	1	2	3	4	5
49 Work out how well they are performing as compare to other teams.	1	2	3	4	5
50 Ask for feedback from internal and external customers on their results.	1	2	3	4	5
51 Seek feedback during task execution to develop subsequent plans.	1	2	3	4	5
52 Check how well they perform as a team.	1	2	3	4	5
53 Plan goals and ways to achieve them.	1	2	3	4	5

	Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
54	Have their own interpretation to make changes in the team objectives as per the market demands.	1	2	3	4	5
55	Discuss about the magnitude of innovations based on their practical experiences.	1	2	3	4	5
56	Rarely neglect collective decisions suggested by other colleagues.	1	2	3	4	5
57	Come up with creative ideas.	1	2	3	4	5
58	Solve problems creatively.	1	2	3	4	5
59	Develop new products and services.	1	2	3	4	5
60	Adopt new ways to complete the task.	1	2	3	4	5
61	Utilize their knowledge and expertise in their specialty field.	1	2	3	4	5
62	Put forth novel and feasible solutions.	1	2	3	4	5
63	Put forward different ideas.	1	2	3	4	5
64	Have filed number of patent applications.	1	2	3	4	5
65	Are aware of possible innovation.	1	2	3	4	5
66	Perceive innovation to be difficult to understand and use.	1	2	3	4	5
67	Perceive new technology to be complicated than the existing ones.	1	2	3	4	5
68	Perceive innovation to be better than the original idea.	1	2	3	4	5
69	Perceive innovation to be user friendly and of high quality.	1	2	3	4	5
70	Perceive innovation to be appropriate for the need of potential adopters.	1	2	3	4	5

IV.   The efforts of the entire team helps company to

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
71	Adopt innovation as per market demands.	1	2	3	4	5
72	Adopt experimentation on a limited basis.	1	2	3	4	5
73	Modify innovation frequently.	1	2	3	4	5
74	Integrate innovation as a routine practice.	1	2	3	4	5
75	Make innovation visible to others.	1	2	3	4	5