Thesis

On

Assessment of Impact of Business Process Integration on Organizational Performance in a Manufacturing Industry -A Case Study

Submitted in partial fulfillment of the requirement for the award of the degree of

MASTER OF ENGINEERING

IN

PRODUCTION & INDUSTRIAL ENGINEERING

Submitted By:

NAVDEEP SINGH

Roll No. 801182015

Under the Guidance of:

Mr. SUPREET BHULLAR

Associate Professor

DEPARTMENT OF MECHANICAL ENGINEERING

THAPAR UNIVERSITY

PATIALA-147004, INDIA

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DECLARATION

I **Navdeep singh** hereby declare that the thesis entitled "**Assessment of Impact of Business Process Integration on Organizational Performance in a Manufacturing Industry- A Case Study**" is an authentic record of my study carried out as requirements for the award of the degree of **Master of Engineering** in **Production and Industrial Engineering** at **Thapar University, Patiala**, under the guidance of **Mr. Supreet Bhullar**, Associate Professor, Department of Mechanical Engineering, Thapar University, Patiala during July 2012 to July 2013. The matter embodied in this report has not been submitted in part or full to any other university or institute for award of any degree.

(Navdeep singh)

Date: 15-07-2013

It is certified that the above statement made by the student is correct to best of my knowledge and belief.

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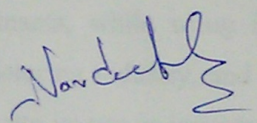

(NAVDEEP SINGH)

ABSTRACT

In the present scenario the lack of business process integration is considered as the nemesis to effective performance and progressive growth. Most industries lack mutual responsiveness in their intra-organizational activities. This primarily germinates from the fact that the business processes within the organization are not aligned and that they are not balanced. Another glaring lacuna is the lack of cohesiveness amongst those involved in team activity. This merits an investigation into the determinants of process integration so as to arrive at an optimal mix of the determinants influencing process performance. The main objective of this study is to assess the impact of Business Process Integration on organizational performance in a manufacturing industry by using three determinants (Cohesion, Alignment and Balance) of BPI (Business Process Integration). The study has validated the merits in the requirement of these determinants among processes to increased organizational effectiveness. The study has also validated the optimal mix of these determinants, while using in combination. This case study has been conducted in a manufacturing industry, and a conceptual model has been proposed and validated to authenticate its use in industry. This work has opened new frontiers of research in other areas like service sector, banking sector, etc.

ABBREVIATIONS

AM	Agile Manufacturing
API	Application Programming Interface
BPI	Business Process Integration
BPO	Business Process Outsourcing
BPR	Business Process Reengineering
CNO	Collaborative Networking Organizations
CSFs	Critical Success Factors
EAI	Enterprise Application Integration
EDI	Electronic Data Interchange
EI	Enterprise Integration
EIP	Enterprise Information Portals
EMI	Enterprise Modelling and Integration
ERP	Enterprise Resource Planning
GSS	Group Support System
HRM	Human Resource Management
IS	Information System
IT	Information Technology
KMS	Knowledge Management Systems
SCI	Supply Chain Integration
SCM	Supply Chain Management
SPMS	Strategic Performance Measurement Systems
VE	Virtual Enterprise

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CHAPTER- 1

INTRODUCTION

1.1 BUSINESS PROCESS INTEGRATION (BPI)

Corporations grow, and as they grow the need for integration across the enterprise increases. Integration is really a business need, and the technology mechanism does not help without the proper organizational structure, goals and incentives. Both organizational and technological integration is necessary. The competitive pressure to satisfy customer expectations has been growing at an ever increasing pace. As a result, concepts and techniques such as Business Process Integration (BPI), Enterprise Integration (EI) have begun to be discussed in the literature. Business Process Integration is concerned with integration of business processes, process data and knowledge, software applications s information systems, within an enterprise, in order to achieve marked advancements in organizational performance. The BPI's main focus is to run the enterprise using information about its processes. Through BPI, the right information at the right time and at the right place is made available thereby enabling communication between people, machines, and computers and their efficient cooperation and coordination. The term "business processes" or "organizational processes" refers to a group of activities that people engage in within the organization. Business process integration is concerned with the overall coordination of business processes and activities in the industrial environment. This involves effective division of tasks across departments and consequent coordination to execute the task within the organization (Van de ven et al., 1976). BPI encompasses defining, enabling and managing the exchange of business information within the organization and beyond organizational boundaries. Business process integration, in its wider definition, refers to the coordination of internal operation processes between departments and the negotiation of external supply chain operations (Sun, Zhao, Nunamaker, & Sheng, 2006). Business process integration aims to eliminate redundancies and inconsistencies among the multiple processes that an organization uses to conduct its day-to-day work. Business process integration also seeks to recognize and effectively manage interdependencies between processes. Process integration centers around interrelated steps and stages of process performance across technical and organizational borders in order to enable new services based on an overarching monitoring and

control of process flow. In today's enterprise, where processes are often driven by data and software applications as much as by personnel, effective business process integration requires the right technology. Business process integration is concerned with the provision for better business coordination, control and monitoring, and possibly, product and process simulation. Process integration can be both internal and external to the firm (Rosenzweig et al., 2003; Flynn et al., 2010).

1.2 TYPES OF PROCESS INTEGRATION

There are two principal types of Enterprise Integration which are commonly described in most Enterprise Modelling and Integration literature. The two main are **inter-enterprise** and **intra-enterprise** integration.

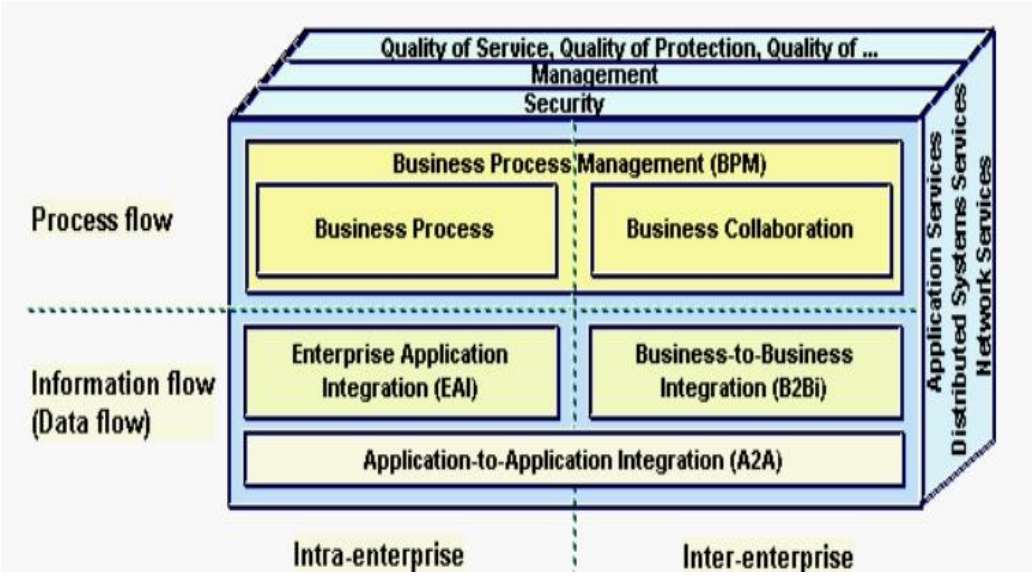

Fig. 1 (Jenz & Partner Business Performance Architecture (BPA) model)

1.2.1 Intra-organizational integration / Internal Integration

Intra-enterprise integration is chiefly concerned with the integration of in-house, business units within an organization. Most processes are composed of a set of sub-processes. Interaction between diverse constituent sub-processes is necessary to effectively execute tasks (Aron and Singh, 2005). Often, these constituent tasks may require coordination between multiple teams

and functions (Haynes and Thies, 1991). Internal process integration is often accomplished via an intranet that provides a common platform; it facilitates the synchronization of departments that are working on different products or services, such as the cross-functional teams often present in new product development projects (Olson et al., 2001). Achieving internal integration is a first step toward achieving overall process integration (Handfield and Nichols, 1999; Swink et al., 2002).

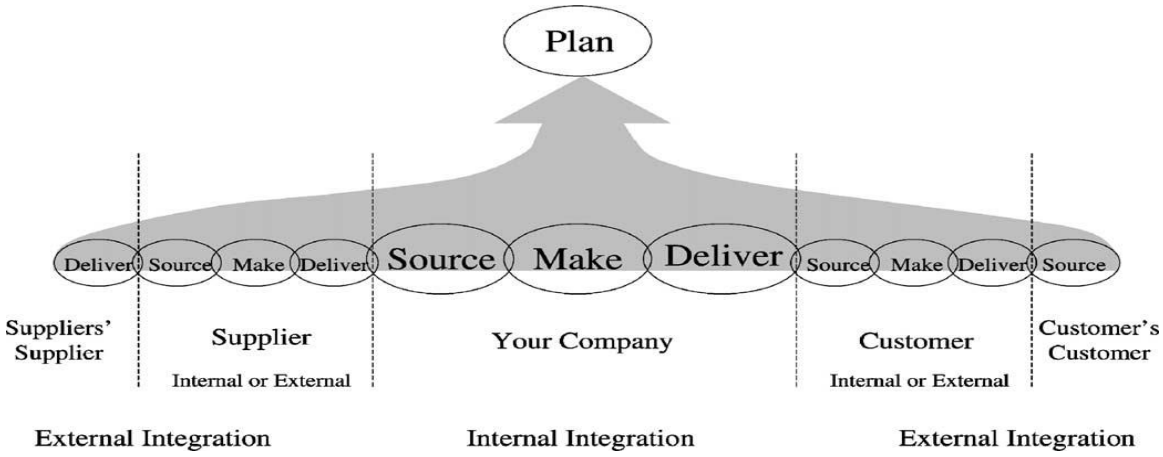

Fig. 1.2 Types of integration

1.2.2 Inter-organizational integration / External integration

Inter-enterprise integration on the other hand, involves the integration of customers, sub-contractors, suppliers and geographically distributed business units. As the terms imply, the former defines a domain of interest internal to the enterprise whilst the latter addresses issues pertaining to integration with parties external to the enterprise. Albeit, achieving both intra and inter-enterprise integration would be the most beneficial to many organizations, the majority would usually commence with the former before moving towards the latter. This is a logical move as it ensures that the enterprises can exercise control over its external partners instead of the other way around. External process integration refers to the degree of interdependence between the processes of the service provider and the client (Ettlie and Reza, 1992). External integration mechanisms include collaborative B2B e-commerce systems like supply chain management, which enable the c-commerce system to perform more efficiently (Lee et al., 2003).

1.3 OBJECTIVES OF BUSINESS PROCESS INTEGRATION

Organizational integration is desired for following reasons:

- Departments often depend on each other for inputs (sequential or reciprocal dependence (Thompson, 1967)
- Departments often need to cooperate to execute distinct parts of the process
- Efficient sharing of resources and the development of organizational standards
- To develop balance among process workflows
- To align workflows
- Support functional integration because the functional or departmental managers are better able to coordinate their decisions with respect to process execution.

1.4 TOOLS OF BUSINESS PROCESS INTEGRATION

The advancements and focus placed on the importance of processes triggered the development of process management and integration tools. These process tools were developed for the purpose of managing processes which include IT as well as human elements (Smith, 2002). Process tools are combination of Enterprise Application Integration (EAI) and Business-to-Business integration based on web technology standard (Silver, 2003).

1.4.1 Workflow

A workflow engine sequences the different steps and activities between individuals in a process and provides the tools necessary to complete each step (Butler Group, 2002). A workflow system typically assigns a case or a document to a specific person, wait for the person to make a decision and once the task is completed, the system passes the case or document on to the next person. Workflow may be adaptable to changes in work pattern, but are less able to support changes in an application environment. The workflow is a system which "embeds a fixed model of one type of process, namely a workflow process" (Smith, 2002). Workflow has provided useful innovations and artefacts in the way processes are managed (Silver, 2003). Workflow however lacks the ability to integrate functions due to its tightly coupled integration style. Integration is provided by the low-level Application Programming Interface (API) between different systems that are required to complete assigned tasks (Silver, 2003).

1.4.2 Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) packages are software applications that connect and manage information flows within and across organizations (Davenport et al, 2004). It is often made up of different modules that support specific functional areas within an organization (Turban et al, 2002). ERP systems (also sometimes referred to as Enterprise Systems) originally were mainly used to integrate transaction intensive "back-office" functions (Davenport et al, 2004). Implementation of ERP systems is however not seen as finite, one-off activity. Most organizations continue to expand the functionality of their ERP system by adding more and more modules to their existing implementation (Davenport et al, 2004). The key drivers for an ERP system can only be realized once companies "make the processes their own" by combining the components in the unique way that the company needs it to operate. Such kind of in-house development of systems has business process integration as a prerequisite. (Davenport et al., 2004) identified the three key value drivers- integrate, optimize and informate, that provide the most return on investment.

1.5 COHESION

Cohesion is the extent to which a group will remain intact. This is an important note to ponder because a team may have a very low level of cohesion, thus be more prone to group disintegration. This helps to illustrate the distinction between the definition of cohesion "the extent to which individuals / processes will remain intact" and the influence of varying degrees of cohesion on the operational effectiveness of groups in situations under stress (Shills & Janowitz, 1948). Cohesion exerted a very strong influence on relevant organizational outcomes such as task performance (Zaccaro & Lowe, 1998; Zaccaro & McCoy, 1988) and the extent to which team members interacted with one another to plan out task strategies (Zaccaro & McCoy, 1998). Cohesion also positively influenced the wellbeing of group members (Bliese & Halveson, 1996). Extremely high levels of cohesion have also been documented as having the effect of keeping teams intact and working under physically threatening situations (Shils & Janowitz, 1948). (Festinger et al., 1950) cleared the distinction between types of cohesion by theorizing two secondary factors influencing the numerous forces which resulted in cohesion: the extent to which the group was attractive to the members of the group and the extent to which the group provided a means for satisfying goal for group members. This important distinction illustrated that there can be numerous factors influencing cohesion and suggested, as the multidimensional view of cohesion holds, that there were numerous specific types of cohesion.

1.5.1 Team cohesion

Team cohesion goes hand in hand with team bonding. In fact, team cohesion is what keeps any group or team together after the team bonding exercise is over. In this regard then, team cohesion is about maintaining the team bonding effect and preventing group fragmentation. Team cohesion is not possible without trust, and trust is a trait that must be present among team members, between team members and their manager, and between the team and company leadership. Building trust takes a combination of personal characteristics such as integrity and authenticity and work performance attributes such as experience and industry knowledge. Members who have pride in their team are typically more cohesive than those ambivalent or neutral toward their group.

1.5.2 Task based cohesion

Task based cohesion can be defined as the extent to which group members identify with the task to be performed by the group (Zaccaro & McCoy, 1998) or the extent to which group membership mediates the attainment of personal goals (Festinger et al., 1950).

1.5.3 Interpersonal cohesion

Interpersonal cohesion can be defined as the extent to which group members are attracted to the group because of interpersonal relations between the group members (Festinger et al., 1950). By designing tasks with specific group performance requirements have shown that task cohesion and interpersonal cohesion are two distinct constructs (Zaccaro & McCoy, 1988; Zaccaro & Lowe, 2001).

1.5.4 Horizontal cohesion

Horizontal cohesion can be defined as the extent to which bonding and mutual affinity exists within a group (Bliese & Halveson, 1996). While cohesion is most commonly regarded as a group level variable, given the influence of an individual's perspective, this type of cohesion has been studied from both a group and individual level and has been noted to positively influence well being (Bliese & Halveson, 1996).

1.6 PREDICTORS OF COHESION

Employee recognition is the acknowledgement of an individual or team's behavior, effort and accomplishments that support the organization's goals and values. Employee recognition needs

to be a common practice in the organization. Abundant literature proposes leadership as a pivotal factor in the quest to become a learning organization because leaders challenge status quo assumptions regarding the environment and guide followers in creating shared interpretations that become the basis for effective action (Altman and Iles, 1998; Appelbaum and Goransson, 1997; Bartunek, 1984; Fiol, 1994; French and Bazalgette, 1996; Garvin, 1993; Naot et al., 2004; Nystrom and Starbuck, 1984; Smircich and Stubbart, 1985; Vera and Crossan, 2004; Williams, 2001). However, company leadership must also set a strong teamwork benchmark in order for cohesion to take root in other departments. Lack of communication in the workplace can occur on a large scale, such as between management and employees, as well as on a smaller scale between individual employees. Failure to communicate effectively often leads to conflict, which can harm an organization. Without regular communication, a team can lose its drive thereby hampering organizational performance. Planning staff meetings to occur periodically throughout the year may assist in keeping the team focused on the service vision and implementing long term goals. Performance appraisal has different objectives for management and for the employees. Employees are interested in having an assessment of their work from the viewpoint of personal development, work satisfaction and involvement in the organization. Management assesses the performance of employees to maintain organizational control and disburse rewards and penalties to further organizational goals. Thus, a spirit of mutuality is essential in an effective performance appraisal system. Teams should be properly configured and managed for the type of organizational output that they are intended to produce. It means knowing how each person thinks and how to best utilize their competencies at all times. Team cohesion is not possible without trust, and trust is a trait that must be present among team members, between team members and their manager, and between the team and company leadership.

1.7 ALIGNMENT

To stay competitive in today's economy, companies need to align their business processes with business strategy and other business processes in the organization, and leverage information technology's potential. Thus leveraging processes for strategic advantage is an imperative (Garvin, 1985). It is then vital for companies to deliver the right product to the right customer at the right time. The right product refers to a product/item with a high quality that fits the customer's needs. In addition, companies must reduce their time-to-market in order to remain competitive. Due to those high conflicting requirements, many companies and especially

manufacturing companies have started considering various new product designs, manufacturing and management strategies (Vernadat, 2002).

1.7.1 Predictors of Alignment

Planning for the unpredictable may seem an impossible irony, but many firms appear to recognize that in a period of turbulence, an organization's ability to flex and respond is critical for sustaining growth. The root of the problem lays in the distinct departments of the organization that, alignment of organizational strategy with business processes and the gaps that exist across the critical functions of strategy, analysis and execution. Isolated efforts related to defining enterprise strategy and architecture, analyzing and optimizing business processes and executing on day-to-day operations will fall short of success if the three areas do not align. Nowadays, the evolution of information technology applications makes it an absolute obligation on behalf of the decision makers to continuously make the best decisions in the shortest possible time. Decision Support System (DSS) is a technology and application that assists managerial decision makers utilizing data and models to solve semi-structured and unstructured problems (Qian et al., 2004). One of the critical linkages in the process of turning strategy into results is the need to understand whether the production plans are producing the right behaviours and outcomes. On top of good information design, improving understanding requires that management has the right information at the right time so they can take action to modify the strategy or the plans accordingly. A collateral organization, in contrast, encourages members and line managers from the operational design to develop creative yet feasible solutions in a more relaxed, fluid, collateral design and then enables them to return to the operational design and implement their solution from a formal position of authority in the organization. Whenever you put a group of individuals together there is the potential for conflict. These interpersonal conflicts tend to arise due to personal differences between individuals. This conflict is damaging to the team and their environment. Conflicts, especially interpersonal conflicts, need to be dealt with as soon as they are discovered, in an appropriate manner, so that the team can get back to work and effectively meet its goals.

1.8 BALANCE

The balance can be defined as the management of the expenditures of the resources like capital investment, manpower, plant facilities, training facilities, etc. While the processes are modeled it

should be necessary to consider each and every aspect involved in processes, if it is not done then the complete system architecture is required to be changed. The explicit definition of processes and knowledge sharing should decrease the problems of confusion and complexity. The balance of tasks should be also there, the employees should face and solve and problem individually rather than leaving it for another, this concept is called improvisation. Strategies were made before the actual practice starts, it should be necessary to make a balance between design processes and their actual performance in the form of practice. The industry should also adapt to changes required with respect to the changed scenarios. Business process integration defines the architecture of an organization. Architecture primarily deals with-what are the different elements, how are they linked and how these related elements function together. To ensure coupling and efficient functioning of these elements a balance between elements is necessary in terms of resources, responsibility, accountability and authority among personnel.

1.8.1 Predictors of Balance

Responsibility is the obligation to perform assigned activities. People who accept responsibility commit themselves to completing an assignment to the best of their ability. Of course, doing a good job is easier when you have the authority to control the necessary resources, including personnel. Thus, accountability is a way of encouraging people to fulfil their responsibilities. Many organizations implement technology or new business processes but do not consider their current cultural norms for accountability. Accountability is at the foundation of business success. Equal opportunities and ensuring a diverse workforce is important for all employers. The mission of the "An Equal opportunity" is to promote the principle of equal opportunity in working, managing, processing, and planning to encourage the best practices in terms of equal opportunity among its members. With better integration of behavioural and structural factors, management can increase the probability that high-quality decisions are made (Gibson et al, 1994). The quality of decisions not only increases the probability of good decisions, but it also establishes the starting point of effective decisions.

CHAPTER- 2

LITERATURE REVIEW

2.1 INTRODUCTION

Ko (2009) found that people tended to understand better the processes through models. Models and processes made people understand the problem or identify them, increased knowledge of the organization's processes, understand the areas of potential improvement and defined the roles and responsibilities in the organization. BPI technology started in 1980's and developed significantly, providing enterprises with a series of advantages. Organizations and governments had paid greater attention to business processes to make a full description, automation and management of them (Verner, 2004).

In this chapter extensive literature survey has been presented to determine the constraints to proper functioning of organization, departments, teams and individual employees. There are some key areas which have to be taken care of. These include individual's contribution, willingness to contribute, information technology, leadership aspects, etc.

Wolfe and Box (1987) researched that, cohesion was positively related to a team's economic performance. There were numerous relationships between student team cohesion and its effects on simulated company performance. The study hypothesized and tested those relationships within a fairly complex business game. 162 Students from four sections of a senior- level Business Policy course were randomly assigned to four or five-member teams that played 10 decision rounds in a moderately-complex business game for 40.0% grade credit, an optimal amount of credit in that simulation from the perspectives of total learning and interest, and time and fair rewards. A total of 36 teams competed in six separate industries. The study concluded by accepting all the proposed hypothesizes on the basis of Pearson's Pair-wise correlation test; Cohesion was both directly and indirectly related to a team's economic effectiveness.

Henderson and Venkatraman (1990) identified that, there was a glaring lack of systematic frameworks to conceptualize the logic, scope and patterns of organizational transformation enabled by information technology (IT). The study proposed a model of organizational strategic

alignment based on four key domains of strategic choice; business strategy, organizational infrastructure and processes; IT strategy; and IT infrastructure and processes. The model was based on the need to achieve alignment across internal and external domains as well as functional integration across business and IT areas. The study concluded that, strategic alignment was a central element of organizational transformation.

Lim et al. (1997) studied the seven key aspects of enterprise modelling and integration. The study provided a concise description on the assortment of topics associated with 'Enterprise Modelling and Integration' (EMI). The topics included aspects namely Drivers, Goals, Domains, Types, Modelling, Scale and Issues. From the study it was evident that Enterprise Modelling and Integration were highly complex and mainly revolved around organizational modelling from which the analysis, design, implementation and integration of the organization management, business processes, software applications and physical computer systems within an enterprise were supported. The study presented a taxonomy aimed at reducing the complexity by partitioning the various topics into groups consisting of common interests thereby making it more comprehensible.

Lockamy and Smith (1997) found that, the increased global competition had forced the firms to change their approach to providing products and services to their customers. Many companies had implemented Business Process Re-engineering (BPR) programs for that purpose, but 60-80% of those programs had failed. So, an approach was needed during that time to increase the probability of success for re-engineering programs. This study presented a conceptual framework and key principles of business process integration. The key principles were strategic alignment, performance measurement, information technology and re-engineering methodology. The principles were derived from a case study of successful implementation of BPR Program at Cummins Engine Company, and a strategic alignment framework which had examined the congruence between a firm's strategy, business processes, and customer requirements. The study made the following three conclusions. First, for successful implementation and adoption of BPR program, a firm needed to provide alignment between the organization's strategy, processes and customer demands in its target market. Second, a performance measurement system was required to provide the information necessary for assessing: (a) the measurement of effectiveness of organizational strategy relative to customer demands and (b) effectiveness of business processes relative to organizational goal. Finally, the application of information technology was needed to

facilitate process management, strategy-process-customer alignment adjustments, and communication with internal and external customers.

Teo and Ang (1999) identified the issue of lack of alignment of Information System (IS) plans with business plans in organizations. The study was conducted for identification of the critical success factors (CSFs) related to aligning IS plans with business plans. A questionnaire survey was used to collect data for this study. Items in the questionnaire were derived from a review of past research literature on IS planning. Respondents were asked to indicate the extent of the importance of each item in influencing the alignment of IS plans with business plans. The questions were based on 18 CSFs related to the issue. The study made the conclusion that, coordination of IS plans and priorities with business plans and priorities was the main difficulty in IS planning. Furthermore the study could also be conducted in any industry interested in identifying the weak-links in the implementation of their Information system.

Brown and Duguid (2000) provided an argument and a practical approach for achieving a balance between business process optimization and the use of human-centered business practices. Process and practice were compared and contrasted prior to the development of a model for their co-existence and interaction. One way through which managers attempted to resolve the tension between process and practice was by compartmentalizing. During study, everything possible was tried to foster inventions and creativity among highly paid, elite workers. At the same time the study tried to make everyone else's work completely predictable. The identification of company's best practice was not easy, for a couple of reasons. First, a large gap was there between what a task looked like in a process manually and what it looked in reality. Second gap was there between what people thought they did and what people actually did. The study concluded that, the managers who wanted to create a balance must bridge both of these gaps between process and practice. The study also provided a practical framework and approach for balancing business process and business practice, that could be practically applied by the practitioners.

Huang et al. (2002) found that, the virtual teams became more and more common in organizations. The study identified the need of group support system (GSS) to support the virtual team-building by enhancing the goal-congruence. The study was conducted on the teams with

goal setting structure and the teams without goal setting structure. The survey based methodology was used. The study concluded that, teams that used the goal-setting structure reported a significant stronger extent of shared team goals than teams that did not used the goal-setting structure.

Kobayashi et al. (2002) researched that, in the domain of Supply Chain Management (SCM), various software packages had been developed for planning business strategies. To solve the problems of system productivity in applied planning packages, the study proposed a solution concept Business Process Integration (BPI), which fused workflow and Enterprise Application Integration (EAI) technology. Two characteristic policies were included in BPI. The first was to design the minimum set of business processes for real-time information sharing with planning packages without changing other processes. The second was to integrate several systems with EAI technology and to manage their execution with a workflow tool. Based on these policies, the study proposed various design templates and integration adapters. Evaluation of study showed that using BPI, a target system could be developed with less manpower, in less time, and with higher quality than previous methods.

Auld (2002) found that it was a difficult task for the process designer to wrap-up the mass of organizational activities up into the business processes and also saw how they were interrelated to determine the process architecture of the organization. A partitioning of processes was required to completely align the business processes within the organization. The study described the approach to solve that problem by using the RIVA business process management method. RIVA was designed to provide the process designer with a rich set of real world analogues. RIVA also provided the process designer with a simple heuristic approach to hypothesizing the process architecture for an organization. The architecture thus produced was solely based on the business the organization.

Zhang and Cao (2002) researched that the flexibility to adapt to changing market needs and develop innovative cross-functional processes was quintessential to success in global and competitive environment. To succeed in Business Process Re-engineering (BPR), the firm must change the organizational structure from a hierarchical to a flat form; management goals must change from being functional to sub-optimized for global-optimization; process-oriented measurement and employees' work must change from being fragmented to team-oriented. The

study concluded that, it was important for a firm to combine its core business processes and re-think its business from an integrated, systematic, and value chain point of view to beat competition with flexibility and innovation.

Aubert et al. (2003) reviewed integration from different perspectives and integrated to isolate the four fundamental properties of information: accessibility, transparency, granularity, and timeliness. An illustration of the process in the aerospace industry was used to apply the four properties. Their definition provided a balanced way for organizations to assess the potential of technology to integrate processes. An additional issue identified issue was the boundary of a given process. While measuring the level of integration of a process, one had to define its limits. However, many processes were linked because the information was exchanged in more than one direction. Activities within a process might be producing information used by another process in the organization. By integrating one process, and minimizing its cost, the organization might hamper optimization efforts in another process

Reijers (2003) researched that in a business organization there was a need for the identification of weakly cohesive activities. The study introduced a Cohesion Metric that could be used for the identification of weakly cohesive activities in a workflow design. Workflow processes were in some sense similar to computer programs. The study proposed a heuristic based on the cohesion metric to decide between various workflow design alternatives. Both a theoretical and an empirical evaluation gave a positive support to its soundness. The inspiration for the introduced notion was derived from cohesion metrics in software engineering.

Rosenzweig et al. (2003) established that supply chain integration led to increase in competitive capabilities and improved business performance. Empirical findings of the study suggested that consumer products manufacturers also achieved performance benefits from supply chain integration efforts. Results showed that consumer products manufacturers with high integration intensity achieved superior product quality, delivery reliability, process flexibility, and cost leadership. When embedded within the organization's operating processes, these capabilities were inherently difficult to imitate and thus provided a competitive advantage over less highly integrated firms in the industry. High integration intensity not only built capabilities, but also reduced the net costs of conducting business by interlocking supply chain elements, essentially provided manufacturers with more leverage in the increasingly volatile marketplace.

Seven (2003) found that business process was a combination of a set of activities within an enterprise with a structure describing their logical order and interdependence. The primary concern of this study was to describe the main process modelling techniques. A framework for classifying business process-modelling techniques according to their purpose was proposed and discussed. After studying the extensive literature on business process modelling it was identified that business process models were mainly used either to learn about the process, to make decisions on the process or to develop business process software. The idea was to provide users with a framework that could help them decide, which among the explained techniques, the one they should apply for a specific case.

Cao and Dowlatshahi (2005) identified that manufacturing companies were facing rapid and unanticipated changes in the business environment. Agile manufacturing (AM) was a manufacturing paradigm that focused on smaller scale, modular production facilities, and agile operations capability to deal with turbulent and changed environments. From several enablers of AM, virtual enterprise (VE) and information technology (IT) were chosen. The study explored the impact of the alignment between VE and IT on business performance in an (Agile Manufacturing) AM setting. It was also established that the alignment between VE and IT had a positive impact on business performance. Further, it was shown that the impact of the alignment between VE and IT on business performance was more significant than the impact of VE and IT on business performance individually. This showed that synergy and interaction effect among the enablers of AM could be more of a determining factor for success of AM than the individual enablers.

Worley et al. (2005) noticed that, implementation of enterprise resource planning (ERP) systems was a key issue for companies. This study focused on the integration of the human resource characteristics in business processes, which was a key issue for the ERP adoption and optimization phases. In that purpose, it was suggested to better adapt business processes to human actors by explicitly taking into account concepts like the role, competence and knowledge of human resources. Optimizing the adoption of an ERP system by its users was a difficult challenge, which required the opinion to make evolve both the system (through interface adaptation, etc.) and the people (by clearly defined the role within consistent and optimized processes). The study resulted in much more efficient implementation and use of the ERP system.

Brockmans et al. (2006) identified that, to facilitate the inter-connectivity of business processes and reduction of communication efforts, with the rapid growth of electronic markets' activities were demanding flexibility and automation of the involved systems. The study presented a method for semantically aligning business processes. The study described an approach of aligning Web Ontology Language (OWL) serializations of Petri nets by (semi-) automatically finding mutual relationships. The semantic alignment was improved by Unified Modeling Language (UML) Profile allowing to visually model it. The combination of Petri nets with OWL provided a base for further research work. The study concluded that, to interconnect disjoint business process industry need to define a suitable connection point for coupling several business processes.

Themistocleous et al. (2006) suggested that, the continuous change in the nature of the business arena had led organizations to seek ways to improve their performance and profits. The purpose of the study was to figure out the main presented research question, "was business process integration feasible through Enterprise Application Integration (EAI) technology"? The study employed a single case study strategy to answer the aforementioned research question. The results obtained after conducting a study concluded that (EAI) technology could integrate business processes, the study also concluded that EAI could easily integrate the business processes when combined with Enterprise Resource Planning (ERP) systems.

Wang et al. (2006) studied that Enterprise Resource Planning systems presented unique difficulties in implementation. These systems typically involved changes to the entire organization and were a novel application for the organization. These characteristics added to the importance of making groups more cohesive in their goals, commitment, and ability to work toward completion of the new system project. Such cohesiveness was built partly through the willingness of the team members to participate and commitment to learn the new system. To determine if these relationships held, a survey of users and managers was conducted in Taiwan to test a model derived from social capital theory. The data supported the positive relationships between group cohesion and both willingness to participate and commitment to learning. Group cohesion was likewise positively related to meeting management goals. Cohesive groups were able to better achieve goals because they knew the members of the group better and were motivated to complete the task successfully. Willingness to participate and commitment towards

learning had significant effects on the outcome of group cohesion in implementing organizational innovations.

Bennour and Crestani (2007) found that performance estimation of enterprise processes generally involved models focused on a particular viewpoint (temporal, financial, etc.). This estimate rarely took the impact of the human factor into account. The study suggested that, it was important to include this factor while modelling and analyzing enterprise processes. In this study a conceptual approach to human resource modelling was proposed on the basis of an analysis of human integration in enterprise process models. The human entity was described through individual and collective competencies, which were needed to implement a process activity and assess its performance. The proposed formally built model provided a new approach to correlate some qualitative and quantitative aspects of the human influence on industrial performance. This model formalized and generalized the performance estimation by linking human capacities and process performance. This study concluded that it would be necessary to integrate other important socio-emotional parameters such as motivation, personal ambition, etc., in the individual competencies.

Lam (2007) examined that large number of information systems were required to be integrated in order to support enterprise wide business initiatives such as e-business, supply chain management and customer relationship management. Organizations had largely tended to address information systems (IS) integration in an ad-hoc manner. However, some organizations realized the value of adopting a more strategic and systematic approach to IS integration, and were therefore turned to the Enterprise Application Integration (EAI) tools being marketed by a number of integration vendors. EAI initiatives, however, not only involved technical challenges, but also significant business and organizational challenges. The study was adapted from a real-life case, described the EAI initiative at a Europe based financial services provider. The study had identified several important lessons in relation to EAI adoption including the business justification for IS integration, EAI vendor selection and evaluation, business process co-ordination and EAI customization.

Lepmets et al. (2007) explored the impact of process assessment on process improvement. In particular, the study explained the alignment of an organization's process goals to its business goals; and the contribution of process assessment to the goal alignment. The study focused on

how well an organization's business goals were identified, communicated and aligned to the process goals and if process assessment contributed to the goal alignment. The study illustrated the data gathered through an industry survey reflecting the lack of focus on alignment of organization's business goals throughout process improvement. The results were validated by using correlation analysis. The results indicated that there was little knowledge and experience in industry in aligning the process goals and organization's business goals. This, in turn could explain the unsuccessful process improvement efforts or perhaps even the scepticism towards process improvement in general.

Markic (2007) identified that; sustainable organizational performance could not be achieved without continuous organization development as well as the continuous development of the employees. The study was of the opinion that in a company or any organization, creating the conditions for knowledge development was of utmost importance. The main part of the study focused on researching team cohesion and obtaining information on interpersonal relationships as a starting-point for new knowledge to emerge. The study established that interpersonal relationships, and the possibilities for acquiring new knowledge, were better in smaller working groups. However, in bigger working group interpersonal relationships and group processes were weaker and tended to be informal, as group members did not know each other well or not well enough to be encouraged to cooperate. Cohesion index, showed attractiveness of the group for its group members, was higher in smaller than in bigger working groups.

Gravier et al. (2008) studied the concept of 'Alliance Cohesion' and observed the positive relationship between increased levels of knowledge interchange, alliance cohesion, and alliance performance. The study proposed that the data sharing, implementing and generating knowledge, as well as inter-firm knowledge management strategies should positively contribute to alliance performance. Meta-analysis was employed as the driving methodology in the study. The meta-analysis approach permitted the literature on inter-firm knowledge management to be reviewed and synthesized such that the role of knowledge in the alliance, environmental risk, and alliance performance could be thoroughly and validly investigated. The study concluded that active inter-firm management appeared to contribute more to alliance performance than environmental factors. The proposed hypothesis was especially true within industries that were inherently more dependent on vertical suppliers or buyer relationships; such as manufacturing and services.

Panetto and Molina (2008) identified that, the recent advancements in information and communication technologies had allowed manufacturing enterprise to move from highly data-driven environments to a more cooperative information/knowledge-driven environment. Enterprise knowledge sharing (know-how), common best practices used, and open source/web based applications were enabled to achieve the concept of integrated enterprise and hence the implementation and interoperability of networked enterprises. The study proposed that Enterprise integration and interoperability in manufacturing systems were key concepts to face the challenges of these new environments. The study described challenges, trends and issues that must be addressed in order to support the generation of new technological solutions.

Emery (2009) studied the concept of "sustained" integration. The purpose of the study was to identify prerequisites for sustaining effective cross-functional integration as well as their temporal inter-relationships. A case research approach was used to explore the relationships between various prerequisites of integration and to understand "how" or "why" their presence might have influenced the success of sustaining integration. The study was conducted in 13 US aerospace defence industries which were in the process of implementing TQM programs. Organizations which successfully attained "sustained" integration indicated that the reward/performance system based on cross-functional objectives was the major driver behind: forcing employees to understand the organization's processes; providing dedicated time for employees to reflect on process improvement; ensuring employees were rewarded for process improvements; and increasing accountability for integration. The study concluded that, the success of cross-functional integration was ultimately dependent on employee motivation.

Matos et al. (2009) identified that, collaboration was a key issue to rapidly answer market demands in a manufacturing company, through sharing competencies and resources. The collaborative networking organizations (CNO) area focused on this type of organizational models that used information and communication technology (ICT) for supporting the development of collaborative business opportunities. The study described the key concepts related to CNOs, provided a high level classification of collaborative networks, and presented some application cases in the manufacturing industry. Finally a holistic research initiative addressing key challenges in that area was presented.

Morrison et al. (2009) found that, process integration aimed to investigate relationships across a

business compendium to produce classifications and merge similar activities into a standardized system. Integration was the process of merging elements from two similar antecedent processes to create a single process that can be used to replace the original processes. The study proposed a practical method for process integration and provided a theoretical framework and metrics for business process integration assessment.

Hung et al. (2010) studied that, although there was much emphasis on the importance of process alignment, organizational learning culture, and dynamic capability; little attention had been paid to their interactions and joint effects on performance. While the concept of dynamic capability had received increasing attention and numerous conceptual frameworks and propositions had been suggested. This empirical study utilized a survey data from a Taiwan high-tech industry to test an integrative model of dynamic capability. The results of the study demonstrated that although organizational learning culture significantly affected performance, its influence was mediated by dynamic capability. Furthermore, the study provided supporting evidence for the hypothesis that process alignment influence performance directly and indirectly through dynamic capabilities.

Kang et al. (2010) observed that, strategy was the key factor for success of enterprises. To survive in a competitive business environment, enterprises had to build strategies which were appropriate to the business environment. But, just to build only business strategies was worthless. Proper business processes were needed to be executed flexibly and proper enterprise resources were required to support the business processes systematically. In addition, members of enterprises needed to recognize relationships among business strategies, business processes and enterprise resources explicitly. To fulfil the requirements, strategy alignment based on the Business Enterprise Architecture was suggested in the study. The Business Enterprise Architecture was composed of Business Architecture and resource architectures which were loosely-coupled to each other. Detailed architecture modeling was conducted with an enterprise meta-model as fact-based ontology's. Enterprise models were verbalized as facts based on the meta-model. Strategy alignments were visualized through a matrix-shaped alignment tables under the Business Enterprise Architecture.

Chang and Wang (2011) identified that, Enterprise Information Portals (EIPs) had been widely adopted as platforms for the integration of knowledge management and information technology

(IT). This study was conducted from the knowledge management perspective to examine the influence of EIPs on collaborative commerce in the automobile industry. The study explored the integration of internal and external business processes and the coordination of collaborative design teams. An initial qualitative investigation explored the practical applications of an EIP in an automobile company. A research model was then formulated and tested using a questionnaire survey of the R&D department of a motor company in Taiwan. The results of the data analysis revealed that the presence of EIPs could help a company realize the benefits of c-commerce. EIPs also improved collaborative commerce performance by promoting the degree of integration of the enterprise process and by strengthening the process innovation and communication of collaborative design teams. The results suggested that managers should reinforce important factors, including knowledge management tools, process integration, and the quality of design teams, to achieve success in collaborative commerce.

Narayanan et al. (2011) examined the role of integration in BPO (business process outsourcing) and its effect on BPO firm performance by using information processing theory. BPO Integration was concerned with the overall coordination of business processes and activities across different units within the outsourced environment. It involved both internal process integration – effective integration of task execution within the BPO and external process integration – effective integration between the BPO and their clients. The study included the gathering of survey data from 205 Indian BPO service providers, analyzing the antecedents of process integration and its impact on BPO performance. The antecedents examined were task complexity, task security, and end customer orientation of the client and IT capability of the BPO. Among other results, it was found that both internal and external process integration partially mediated the impact of the antecedents on performance.

Rosh et al. (2012) researched the concepts of team intimacy and team cohesion, and argued that the two have often been confused, merged, and used interchangeably in recent theoretical, empirical, and applied work on team effectiveness. The study proposed distinct definitions to clarify and distinguish between team intimacy and team cohesion, and suggested areas that will aid research and application. The examination provided a framework for understanding the inconsistent findings in team effectiveness and team building research and thus helps to improve Human Resource Management (HRM) interventions.

Millet (2013) proposed a model-driven ERP project approach, focused on alignment and taking into account models of a company's requirements and models of the capabilities of existing applications and technologies. The company's needs were analyzed as dependent on existing applications. Information System (IS) re-engineering then became a process of alignment between models of needs, solutions and contexts of organizations. The study's engineering project approach supported the idea of alignment as a process of consistency build up between partial models and characterizing all of the dependencies between their constructs. The study characterized the different situations of alignment between business and technology, for different models set in its modeling framework, taken into account standard business knowledge and applications.

2.2 GAPS IN LITERATURE SURVEY

The review of past literature indicated sufficient gap for the conduct of the proposed research work.

i. The most of the research has been done with single key enabler of process integration (example: cohesion, alignment, balance). Research with more than one key-enabler has not been found.

ii. The research in the field of process integration has been done by taking limited factors into the account. Thus the findings were usually skewed.

iii. The remedies or suggestions to improve the weak points were suggested in a piecemeal approach, often conflicting with other factors contributing to BPI.

iv. Very few studies related to BPI have been carried out in manufacturing sector.

v. Most studies related to BPI have centred around IT implementation with little emphasis on process design, process structure and process architecture.

2.3 RESEARCH HYPOTHESIS

Prior studies related to business process integration have identified lack of cohesion, lack of alignment and lack of balance as the main key enablers of business process integration (Wolfe and Box, 1987; Hinterhuber, 1995; Powel & Mikalef, 1997; Zairi, 1997; Lee & Dale, 1998; Wheeler, 2002; Markic, 2007; Lepmets et al, 2007; Gravier et al, 2008; Emery, 2009). While some of these studies have produced inconsistent findings, others have shown inconsistencies

that render additional research necessary. So the parameters of these key enablers are taken as input parameters and the data sharing and data consistency across the organization through IT, the consensus among intra-organizational activities and team performance outputs are taken as three outcomes of business process integration. As a result, the following hypotheses are proposed so far as to increase the business process integration and also to identify the reasons for lack of process integration in a manufacturing industry.

Table 2.1 Research Hypothesis

RESEARCH HYPOTHESIS	
HYPOTHESIS 1	**There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Research Output Parameters'**
H1a	There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Data Sharing and data consistency across the organization through IT'
H1b	There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Consensus among intra-organizational activities' parameters
H1c	There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Team performance output' parameters
HYPOTHESIS 2	**There is a negative relationship between 'Lack Of Alignment' among business processes and 'Research Output Parameters'**
H2a	There is a negative relationship between 'Lack Of Alignment' among business processes 'Data sharing and data consistency across the organization through IT'
H2b	There is a negative relationship between 'Lack Of Alignment' among business processes and 'Consensus among intra-organizational activities' parameters
H2c	There is a negative relationship between 'Lack Of Alignment' among business processes and 'Team performance output parameters
HYPOTHESIS 3	**There is a negative relationship between 'Lack Of Balance' among business processes and 'Research Output Parameters'**
H3a	There is a negative relationship between 'Lack Of Balance' among business processes 'Data sharing and data consistency across the

	organization through IT'
H3b	There is a negative relationship between 'Lack Of Balance' among business processes and 'Consensus among intra-organizational activities' parameters
H3c	There is a negative relationship between 'Lack Of Balance' among business processes and 'Team performance output parameters

2.4 CONCEPTUAL MODEL

On the basis of examination of the extensive literature and scope of the present research, a conceptual model have prepared and presented in figure 2.1. The issues which have come into picture from the literature survey are broadly classified into three areas, which include, 'Lack of Cohesion', 'Lack of Alignment' and 'Lack of Balance'. These three areas have taken as key enablers of business process integration in industry. The proposed model would check the impact of these three key enablers on the process output performance. The three outcomes of BPI which have taken into consideration were, 'Data sharing and Data consistency across organization through IT', 'Team output performance consistent with organization' and 'Consensus among Intra-organizational activities'.

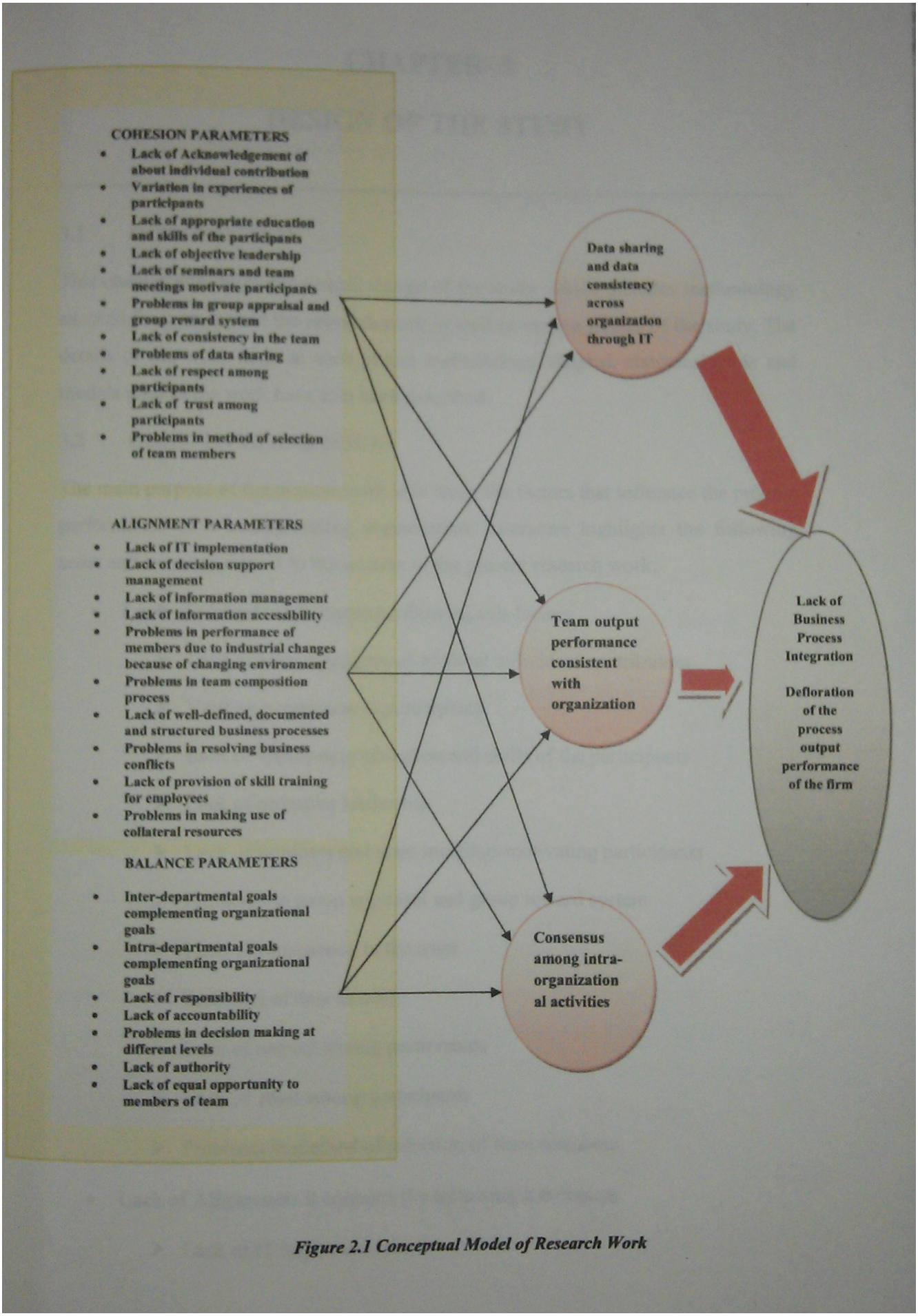

Figure 2.1 Conceptual Model of Research Work

CHAPTER- 3

DESIGN OF THE STUDY

3.1 INTRODUCTION

This chapter introduces the overall design of the study, which includes methodology adopted for carrying out the research work as well as various phases of the study. The details of the work done in each phase; methodology adopted, statistical tools and models used in the work have also been described.

3.2 OBJECTIVES AND ISSUES

The main purpose of the present work is to study the factors that influence the process performance of a manufacturing organization. Literature highlights the following areas and issues as critical to the success of the present research work:

- **Lack of Cohesion:** It contains following sub-factors
  - Lack of acknowledgement of about individual contribution
  - Varying experience of participants
  - Lack of appropriate education and skills of the participants
  - Lack of objective leadership
  - Lack of seminars and team meetings motivating participants
  - Problems in group appraisal and group reward system
  - Lack of consistency in the team
  - Problems of data sharing
  - Lack of respect among participants
  - Lack of trust among participants
  - Problems in method of selection of team members
- **Lack of Alignment:** It contains the following sub-factors
  - Lack of IT implementation

- Lack of decision support management
- Lack of information management
- Lack of information accessibility
- Problems in performance of members due to industrial changes because of changing environment
- Problems in team composition process
- Lack of well-defined, documented and structured business processes
- Problems in resolving business conflicts
- Lack of provision of skill training for employees
- Problems in making use of collateral resources

- **Lack of balance:** It contains following sub-factors
  - Inter-departmental goals complementing organizational goals
  - Intra-departmental goals complementing organizational goals
  - Lack of responsibility
  - Lack of accountability
  - Problems in decision making at different levels
  - Lack of authority
  - Lack of equal opportunity to members of team

3.3 PHASES OF RESEARCH

The present study has employed quantitative research approach. The quantitative approach utilizes a series of statistical techniques. The results obtained from quantitative study and literature review have been synthesized to develop a systematic plan by using qualitative research methods. The research work has been carried out in three phases.

Phase 1: Clarifying the context

Phase 2: Understanding and assessing the situation

Phase 3: Evolving a management process

3.3.1 Clarifying the context

This phase involves extensive literature review of factors contributing to the business process integration in an organization with regards to lack of cohesion, lack of alignment and lack of balance. The key factors in terms of which research output can be expressed have also been identified in this phase. Literature review regarding 'Lack of data sharing and data consistency across the organization through IT', 'Team output performance consistent with organizational objectives' and 'The consensus among intra-organizational activities' has been carried out.

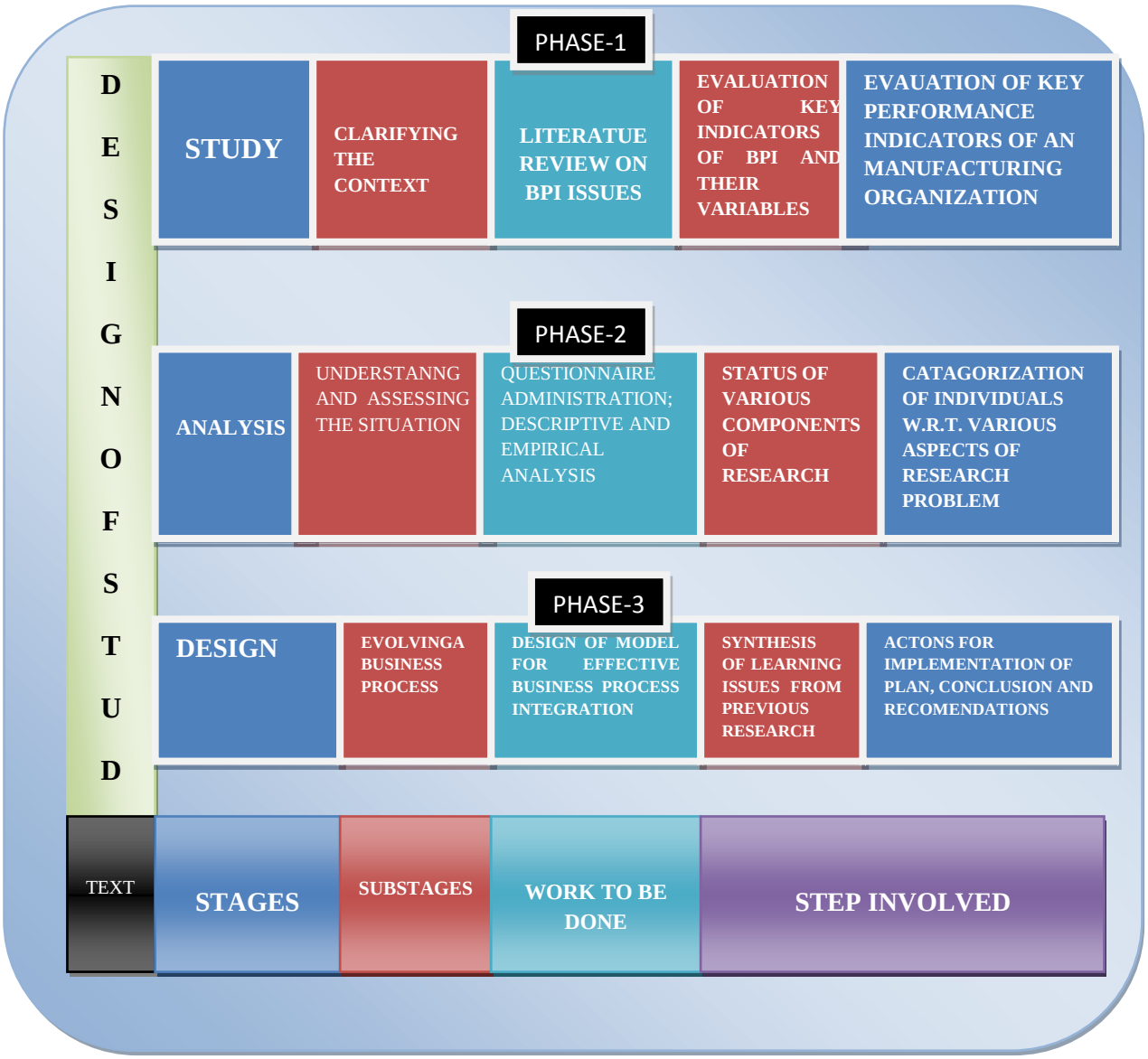

Figure 3.1 Phases of research

3.3.2 Understanding and assessing the situation

The study has been carried out in a leading manufacturing industry in Mandi-Gobindgarh (Punjab) region. A sample of employees from different levels (upper management, middle management and lower management) from all departments was selected. In this research work a questionnaire was sent to the manufacturing organization in Mandi-Gobindgarh region, and 51 fully filled and usable questionnaires were received and have been taken for analysis. The more explicit details of organization are given in Annexure one.

3.3.3 Evolving a management process

The questionnaire has been designed by studying extensive literature survey. The questionnaire has been sent to the industry for collecting sampling data for the verification and validation of the questionnaire. The Cronbach's alpha value of the sample data has been calculated and the questionnaire was revised on the bases of industry's processes. The questionnaire was finalised and then again sent to the industry for the purpose of data collection. Again the Cronbach's alpha value (0.953) has been calculated, and the data has been consolidated and analyzed with the help of SPSS software package. The conclusions have been suggested to refine the organizational architecture, by reducing inadequacies in the processes.

3.4 RESEARCH APPROACH

The goal of the research process is to produce new knowledge or deepen the understanding of a topic or issue. There are two major types of research design approaches; qualitative research and quantitative research. Researchers choose qualitative or quantitative methods according to the nature of the research topic they want to investigate and the research question they aim to answer.

3.4.1 Qualitative research

Quantitative research is the understanding of human behavior and the reasons that govern such behavior. Asking a broad question and collecting data in the form of words, images, video etc that is analyzed searching for themes. This type of research aims to investigate a question without attempting to quantifiably measure variables or look to potential relationships between variables. It is viewed as more restrictive in testing hypotheses because it can be expensive and time consuming, and typically limited to a single set of research subjects. Qualitative research is often used as a

method of exploratory research as a basis for later quantitative research hypotheses. Qualitative research is linked with the philosophical and theoretical stance of social constructionism.

3.4.2 Quantitative research

Quantitative research is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect. It is used in a wide variety of natural and social sciences, including physics, biology, psychology, sociology and geology. In addition, according to Cohen (1980), quantitative research is defined as social research that employs empirical methods and empirical statements. (Cohen, 1980) states that, an empirical statement is defined as a descriptive statement about what "is" the case in the "real world" rather than what "ought" to be the case. Typically, empirical statements are expressed in numerical terms; another factor in quantitative research is that empirical evaluations are applied. Empirical evaluations are defined as a form that seek to determine the degree to which a specific program or policy empirically fulfills or does not fulfill a particular standard or norm. (Creswell, 1994) has given a very concise definition of quantitative research as a type of research that is explaining phenomena by collecting numerical data that are analyzed using mathematical methods. Let's study this definition step by step. The first element is the explaining phenomena. This is a key element of all research, be it quantitative or qualitative. When we set out to do some research, we are always looking to explain something. The specificity of quantitative research lies in the next part of the definition. In quantitative research we collect numerical data. This is closely connected to the final part of the definition: an analysis using mathematics-based methods. In order to be able to use mathematically based methods our data have to be in numerical form. This is not the case for qualitative research. Qualitative data are not necessarily or usually numerical, and therefore cannot be analyzed using statistics. The last part of the definition refers to the use of mathematically based methods, in particular statistics, to analyze the data. This is what people usually think about when they think of quantitative research, and is often seen as the most important part of quantitative studies. This is a bit of a misconception. While it is important to use the right data analysis tools, it is even more important to use the right research design and data collection instruments. Quantitative research is also useful to quantify opinions, attitudes and behaviors and

find out how the whole population feels about a certain issue While quantitative research is based on numerical data analyzed statistically, Qualitative research uses non-numerical data. Qualitative research is actually an umbrella term encompassing a wide range of methods, such as interviews, case studies, ethnographic research and discourse analysis, to name just a few. Qualitative methods are more suited to looking at the meaning of particular events or circumstances.

3.4.2.1 Different Types of Quantitative Research

There are several types of quantitative research. For instance, it can be classified as 1) survey research, 2) correlation research, 3) experimental research and 4) causal-comparative research. Each type has its own typical characteristics.

3.4.3 Survey Research

Statistical surveys are undertaken with a view towards making statistical inferences about the population being studied, and this strongly depends on the survey questions used. Polls about public opinion, public health surveys, market research surveys, government surveys and censuses are all examples of quantitative research that use contemporary survey methodology to answer questions about a population. Survey research uses scientific sampling and questionnaire design to measure characteristics of the population with statistical precision. Survey research enables management to make comparisons between groups. It provides estimates from a sample that can be related to the entire population with a degree of certainty. Survey research requires that respondents are "randomly" sampled - that means each person in the population has a known probability of being sampled. Surveys provide important information for all kinds of public information and research fields, e.g., marketing research, psychology, health professionals and sociology.

3.4.4 Types of Surveys

- ***In-person Interviews:*** An in-person interview consists of an interviewer asking the respondent questions in a face-to-face situation. The interview may take place in the respondent's workplace or at the office.
- ***Telephone Interviews:*** Telephone Interviews involve the presentation of the questionnaire by telephone. Computer-assisted Telephone Interview systems program a survey questionnaire directly into a computer. Then the telephone

interviewer reads the questions from a television-type screen and records the answer directly on the terminal keyboard or directly onto the screen with a light pen.

- ***Self-Administered Questionnaires:*** Respondents fill self-administered questionnaires themselves. Self-administered questionnaires are generally distributed through e-mail. Upon receipt of the questionnaire, the respondent fills it and returns it via mail to the researcher.

3.5 UNITS AND VARIABLES

While conducting quantitative research, a researcher should have a clear understanding about the concepts of 'research units and variables'. When the data is collected for quantitative research, it has to be collected from someone or something. The people or things from which the data is collected are known as research units, units or cases. If the data is needed to be drawn from the samples of the population, the samples are called sampling units. Variables are any characteristic of the unit we are interested in and want to collect.

3.6 HYPOTHESIS

A hypothesis is a tentative explanation that accounts for asset of facts and can be tested by further investigation. Quantitative researchers will design studies that allow us to test these hypotheses. The researchers can collect the relevant data and use statistical techniques to decide whether or not to reject or provisionally accept the hypothesis. Accepting a hypothesis is always provisional since new data may cause it to be rejected later on. Researchers can have one or more hypotheses. In order to find answers to these questions, the researchers can also have various instruments and materials and a clearly defined plan of action.

3.7 RELIABILITY AND VALIDITY

The quality of the survey research is established by examining the reliability and validity of the survey (Litwin, 1995).

3.7.1 Reliability of questionnaire

Reliability is defined as the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials. In short, it is the stability or consistency of scores over time or across raters. There are three aspects of

reliability, namely: equivalence, stability and internal consistency (homogeneity). The first aspect, equivalence, refers to the amount of agreement between two or more instruments that are administered at nearly the same point in time. The higher the degree of correlation between the two forms, the more equivalent they are. The second aspect of reliability is stability, stability is said to occur when the same or similar scores are obtained by repeated testing with the same group of respondents. The third and last aspect of reliability is internal consistency or homogeneity. Internal consistency concerns the extent to which items on the test or instrument are measuring the same thing. Reliability indicates the accuracy or precision of the measurement (Norland, 1990).

3.7.2 Validity of questionnaire

Validity is defined as the extent to which the questionnaire measures what it purports to measure. There are many different types of validity, including: content validity, face validity, criterion-related validity or predictive validity and construct validity. Content validity pertains to the degree to which the instrument fully assesses or measures the construct of interest. Face validity is a component of content validity and is established when an individual reviewing the instrument concludes that it measures the characteristic or trait of interest. Criterion-related validity is assessed when one is interested in determining the relationship of scores on a test to a specific criterion. Construct validity is the degree to which an instrument measures the trait or theoretical construct that it is intended to measure.

Following are the objectives for checking validity of a questionnaire.

- Is the questionnaire valid? In other words, is the questionnaire measuring what it intended to measure?
- Does it represent the content?
- Is it appropriate for the sample/population?
- Is the questionnaire comprehensive enough to collect all the information needed to address the purpose and goals of the study?

3.8 STATISTICAL TOOLS

A multitude of different statistical tools is available, some of them are simple and some are complicated and often very specific for certain purposes. In analytical work,

the most important common operation is the comparison of data, or sets of data, to quantify the accuracy (bias) and precision. Fortunately, with a few simple convenient statistical tools most of the information needed in regular work can be obtained: the "*t*-test, the "*F*-test"

3.8.1 Coefficient alpha index

Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test. Internal consistency should be determined before a test can be employed for research or examination purposes to ensure validity. Alpha coefficient ranges in value from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous (that is, questions with two possible answers) and/or multi-point formatted questionnaires or scales (i.e., rating scale: 1 = poor, 5 = excellent). The higher the score, the more reliable the generated scale is. (Nunnaly, 1978) has indicated 0.7 to be an acceptable reliability coefficient.

$$a = N/(N - 1)[1 - \text{Sum Var}(Yi)/\text{Var}(X)]$$

Where N = Number of Items

Sum Var (Yi) = Sum of Item Variances

Var(X) = Composite Variance (Allen & Yen, 1979)

3.8.2 Correlations

Pearson product-moment correlation coefficient, also known as r, R, or Pearson's r, is a measure of the strength and direction of the linear relationship between two variables that is defined as the (sample) covariance of the variables divided by the product of their (sample) standard deviations. Intra-class correlation is a descriptive statistic that can be used when quantitative measurements are made on units that are organized into groups; describes how strongly units in the same group resemble each other. The correlation coefficient tells how accurately it can predict one variable from another, and it ranges from -1.00 to 0.00 to 1.00. A correlation coefficient of 0.00 means that, one variable can-not be predicted from other. When the value is 1.00 (or -1.00) then one variable can predict from another with perfect accuracy. Whether the

value is positive or negative refers to the nature of the relationship. Negative correlation coefficients are obtained when as one variable increases the other decreases. Positive correlation coefficients are obtained when as one variable increase the other also increases. When using correlation to measure test reliability you expect a positive correlation because each variable is expected to change in the same manner. The results of correlation test are shown in table 4.1.

3.8.3 Regression analysis

In statistics, regression analysis is a statistical technique for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps to understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed. In regression analysis, it is also of interest to characterize the variation of the dependent variable around the regression function, which can be described by a probability distribution. Regression analysis is used to understand which among the independent variables relate to the dependent variable, and to explore the forms of these relationships. In restricted circumstances, regression analysis can be used to infer causal relationships between the independent and dependent variables. It is also widely used for prediction and forecasting.

Regression models involve the following variables:

- The unknown parameters, denoted as β, which may represent a scalar or a vector.
- The independent variables X.
- The dependent variable, Y.

In various fields of application, different terminologies are used in place of dependent and independent variables.

A regression model relates Y to a function of X and β.

$$Y \approx f(\mathbf{X}, \boldsymbol{\beta})$$

3.9 SPSS SOFTWARE

SPSS Statistics (originally, Statistical Package for the Social Sciences, later modified to read Statistical Product and Service Solutions) is a software package used for statistical analysis. It is used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations and others. The SPSS software has been used to analyze and validate the data. The various regression equations and correlations have been solved in SPSS software.

3.10 CONCLUDING REMARKS

The methodology adopted for the study along with the step-by-step approach employed in the research has been elaborated in this chapter. Empirical studies have been used to yield rich data for statistical analysis. The learning issues from the literature review and results of a questionnaire based survey have been synthesized to assess the impact of business process integration on organizational performance.

CHAPTER- 1

INTRODUCTION

1.1 BUSINESS PROCESS INTEGRATION (BPI)

Corporations grow, and as they grow the need for integration across the enterprise increases. Integration is really a business need, and the technology mechanism does not help without the proper organizational structure, goals and incentives. Both organizational and technological integration is necessary. The competitive pressure to satisfy customer expectations has been growing at an ever increasing pace. As a result, concepts and techniques such as Business Process Integration (BPI), Enterprise Integration (EI) have begun to be discussed in the literature. Business Process Integration is concerned with integration of business processes, process data and knowledge, software applications s information systems, within an enterprise, in order to achieve marked advancements in organizational performance. The BPI's main focus is to run the enterprise using information about its processes. Through BPI, the right information at the right time and at the right place is made available thereby enabling communication between people, machines, and computers and their efficient cooperation and coordination. The term "business processes" or "organizational processes" refers to a group of activities that people engage in within the organization. Business process integration is concerned with the overall coordination of business processes and activities in the industrial environment. This involves effective division of tasks across departments and consequent coordination to execute the task within the organization (Van de ven et al., 1976). BPI encompasses defining, enabling and managing the exchange of business information within the organization and beyond organizational boundaries. Business process integration, in its wider definition, refers to the coordination of internal operation processes between departments and the negotiation of external supply chain operations (Sun, Zhao, Nunamaker, & Sheng, 2006). Business process integration aims to eliminate redundancies and inconsistencies among the multiple processes that an organization uses to conduct its day-to-day work. Business process integration also seeks to recognize and effectively manage interdependencies between processes. Process integration centers around interrelated steps and stages of process performance across technical and organizational borders in order to enable new services based on an overarching

monitoring and control of process flow. In today's enterprise, where processes are often driven by data and software applications as much as by personnel, effective business process integration requires the right technology. Business process integration is concerned with the provision for better business coordination, control and monitoring, and possibly, product and process simulation. Process integration can be both internal and external to the firm (Rosenzweig et al., 2003; Flynn et al., 2010).

1.2 TYPES OF PROCESS INTEGRATION

There are two principal types of Enterprise Integration which are commonly described in most Enterprise Modelling and Integration literature. The two main are **inter-enterprise** and **intra-enterprise** integration.

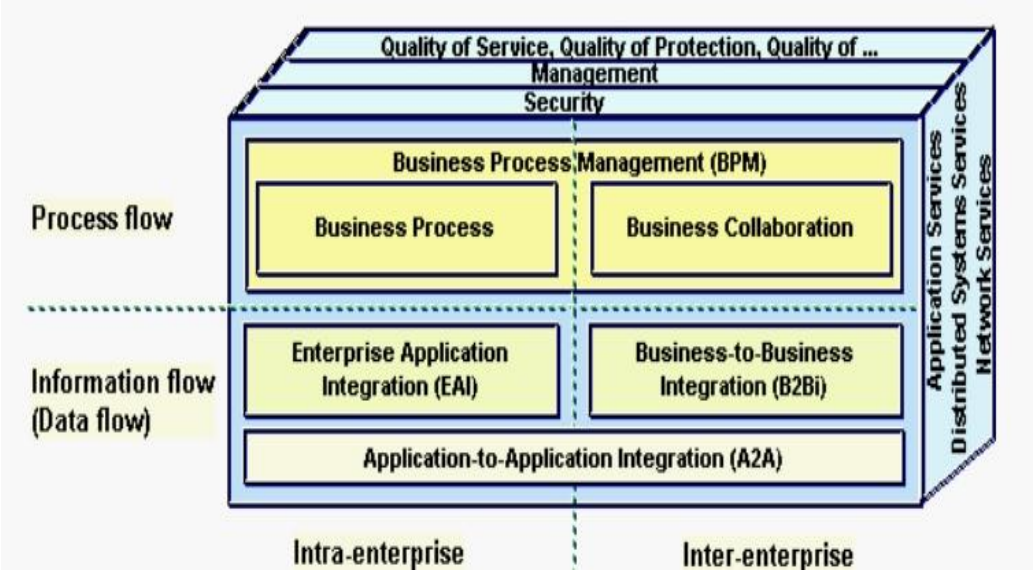

Fig. 1 (Jenz & Partner Business Performance Architecture (BPA) model)

1.2.1 Intra-organizational integration / Internal Integration

Intra-enterprise integration is chiefly concerned with the integration of in-house, business units within an organization. Most processes are composed of a set of sub-processes. Interaction between diverse constituent sub-processes is necessary to effectively execute tasks (Aron and Singh, 2005). Often, these constituent tasks may require coordination between multiple teams and functions (Haynes and Thies, 1991). Internal process integration is often accomplished via an intranet that provides a common platform; it facilitates the synchronization of departments that are working

on different products or services, such as the cross-functional teams often present in new product development projects (Olson et al., 2001). Achieving internal integration is a first step toward achieving overall process integration (Handfield and Nichols, 1999; Swink et al., 2002).

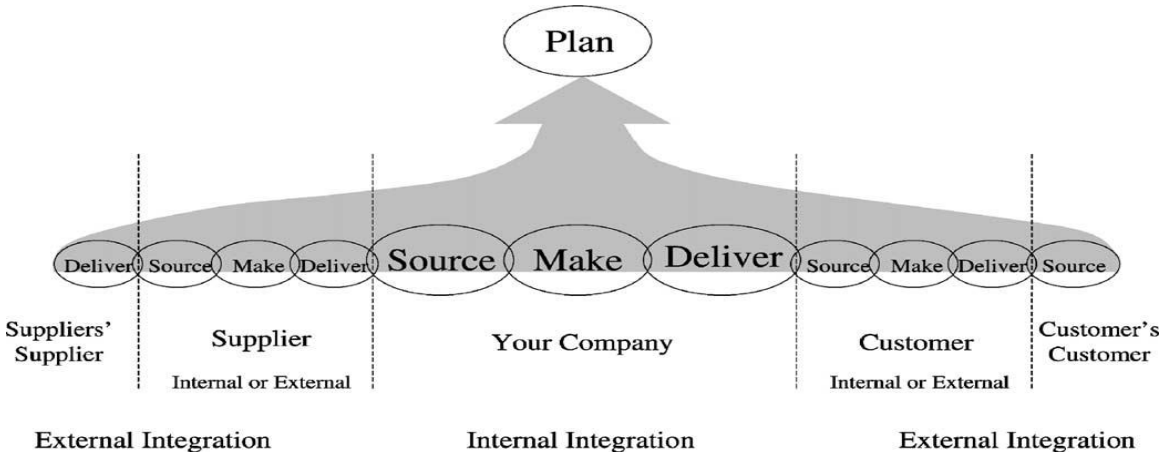

Fig. 1.2 Types of integration

1.2.2 Inter-organizational integration / External integration

Inter-enterprise integration on the other hand, involves the integration of customers, sub-contractors, suppliers and geographically distributed business units. As the terms imply, the former defines a domain of interest internal to the enterprise whilst the latter addresses issues pertaining to integration with parties external to the enterprise. Albeit, achieving both intra and inter-enterprise integration would be the most beneficial to many organizations, the majority would usually commence with the former before moving towards the latter. This is a logical move as it ensures that the enterprises can exercise control over its external partners instead of the other way around. External process integration refers to the degree of interdependence between the processes of the service provider and the client (Ettlie and Reza, 1992). External integration mechanisms include collaborative B2B e-commerce systems like supply chain management, which enable the c-commerce system to perform more efficiently (Lee et al., 2003).

1.3 OBJECTIVES OF BUSINESS PROCESS INTEGRATION

Organizational integration is desired for following reasons:

- Departments often depend on each other for inputs (sequential or reciprocal dependence (Thompson, 1967)

- Departments often need to cooperate to execute distinct parts of the process
- Efficient sharing of resources and the development of organizational standards
- To develop balance among process workflows
- To align workflows
- Support functional integration because the functional or departmental managers are better able to coordinate their decisions with respect to process execution.

1.4 TOOLS OF BUSINESS PROCESS INTEGRATION

The advancements and focus placed on the importance of processes triggered the development of process management and integration tools. These process tools were developed for the purpose of managing processes which include IT as well as human elements (Smith, 2002). Process tools are combination of Enterprise Application Integration (EAI) and Business-to-Business integration based on web technology standard (Silver, 2003).

1.4.1 Workflow

A workflow engine sequences the different steps and activities between individuals in a process and provides the tools necessary to complete each step (Butler Group, 2002). A workflow system typically assigns a case or a document to a specific person, wait for the person to make a decision and once the task is completed, the system passes the case or document on to the next person. Workflow may be adaptable to changes in work pattern, but are less able to support changes in an application environment. The workflow is a system which "embeds a fixed model of one type of process, namely a workflow process" (Smith, 2002). Workflow has provided useful innovations and artefacts in the way processes are managed (Silver, 2003). Workflow however lacks the ability to integrate functions due to its tightly coupled integration style. Integration is provided by the low-level Application Programming Interface (API) between different systems that are required to complete assigned tasks (Silver, 2003).

1.4.2 Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) packages are software applications that connect and manage information flows within and across organizations (Davenport et al,

2004). It is often made up of different modules that support specific functional areas within an organization (Turban et al, 2002). ERP systems (also sometimes referred to as Enterprise Systems) originally were mainly used to integrate transaction intensive "back-office" functions (Davenport et al, 2004). Implementation of ERP systems is however not seen as finite, one-off activity. Most organizations continue to expand the functionality of their ERP system by adding more and more modules to their existing implementation (Davenport et al, 2004). The key drivers for an ERP system can only be realized once companies "make the processes their own" by combining the components in the unique way that the company needs it to operate. Such kind of in-house development of systems has business process integration as a prerequisite. (Davenport et al., 2004) identified the three key value drivers- integrate, optimize and informate, that provide the most return on investment.

1.5 COHESION

Cohesion is the extent to which a group will remain intact. This is an important note to ponder because a team may have a very low level of cohesion, thus be more prone to group disintegration. This helps to illustrate the distinction between the definition of cohesion "the extent to which individuals / processes will remain intact" and the influence of varying degrees of cohesion on the operational effectiveness of groups in situations under stress (Shills & Janowitz, 1948). Cohesion exerted a very strong influence on relevant organizational outcomes such as task performance (Zaccaro & Lowe, 1998; Zaccaro & McCoy, 1988) and the extent to which team members interacted with one another to plan out task strategies (Zaccaro & McCoy, 1998). Cohesion also positively influenced the wellbeing of group members (Bliese & Halveson, 1996). Extremely high levels of cohesion have also been documented as having the effect of keeping teams intact and working under physically threatening situations (Shils & Janowitz, 1948). (Festinger et al., 1950) cleared the distinction between types of cohesion by theorizing two secondary factors influencing the numerous forces which resulted in cohesion: the extent to which the group was attractive to the members of the group and the extent to which the group provided a means for satisfying goal for group members. This important distinction illustrated that there can be numerous factors influencing cohesion and suggested, as the multidimensional view of cohesion holds, that there were numerous specific types of cohesion.

1.5.1 Team cohesion

Team cohesion goes hand in hand with team bonding. In fact, team cohesion is what keeps any group or team together after the team bonding exercise is over. In this regard then, team cohesion is about maintaining the team bonding effect and preventing group fragmentation. Team cohesion is not possible without trust, and trust is a trait that must be present among team members, between team members and their manager, and between the team and company leadership. Building trust takes a combination of personal characteristics such as integrity and authenticity and work performance attributes such as experience and industry knowledge. Members who have pride in their team are typically more cohesive than those ambivalent or neutral toward their group.

1.5.2 Task based cohesion

Task based cohesion can be defined as the extent to which group members identify with the task to be performed by the group (Zaccaro & McCoy, 1998) or the extent to which group membership mediates the attainment of personal goals (Festinger et al., 1950).

1.5.3 Interpersonal cohesion

Interpersonal cohesion can be defined as the extent to which group members are attracted to the group because of interpersonal relations between the group members (Festinger et al., 1950). By designing tasks with specific group performance requirements have shown that task cohesion and interpersonal cohesion are two distinct constructs (Zaccaro & McCoy, 1988; Zaccaro & Lowe, 2001).

1.5.4 Horizontal cohesion

Horizontal cohesion can be defined as the extent to which bonding and mutual affinity exists within a group (Bliese & Halveson, 1996). While cohesion is most commonly regarded as a group level variable, given the influence of an individual's perspective, this type of cohesion has been studied from both a group and individual level and has been noted to positively influence well being (Bliese & Halveson, 1996).

1.6 PREDICTORS OF COHESION

Employee recognition is the acknowledgement of an individual or team's behavior, effort and accomplishments that support the organization's goals and values.

Employee recognition needs to be a common practice in the organization. Abundant literature proposes leadership as a pivotal factor in the quest to become a learning organization because leaders challenge status quo assumptions regarding the environment and guide followers in creating shared interpretations that become the basis for effective action (Altman and Iles, 1998; Appelbaum and Goransson, 1997; Bartunek, 1984; Fiol, 1994; French and Bazalgette, 1996; Garvin, 1993; Naot et al., 2004; Nystrom and Starbuck, 1984; Smircich and Stubbart, 1985; Vera and Crossan, 2004; Williams, 2001). However, company leadership must also set a strong teamwork benchmark in order for cohesion to take root in other departments. Lack of communication in the workplace can occur on a large scale, such as between management and employees, as well as on a smaller scale between individual employees. Failure to communicate effectively often leads to conflict, which can harm an organization. Without regular communication, a team can lose its drive thereby hampering organizational performance. Planning staff meetings to occur periodically throughout the year may assist in keeping the team focused on the service vision and implementing long term goals. Performance appraisal has different objectives for management and for the employees. Employees are interested in having an assessment of their work from the viewpoint of personal development, work satisfaction and involvement in the organization. Management assesses the performance of employees to maintain organizational control and disburse rewards and penalties to further organizational goals. Thus, a spirit of mutuality is essential in an effective performance appraisal system. Teams should be properly configured and managed for the type of organizational output that they are intended to produce. It means knowing how each person thinks and how to best utilize their competencies at all times. Team cohesion is not possible without trust, and trust is a trait that must be present among team members, between team members and their manager, and between the team and company leadership.

1.7 ALIGNMENT

To stay competitive in today’s economy, companies need to align their business processes with business strategy and other business processes in the organization, and leverage information technology's potential. Thus leveraging processes for strategic advantage is an imperative (Garvin, 1985). It is then vital for companies to deliver the right product to the right customer at the right time. The right product refers to a

product/item with a high quality that fits the customer's needs. In addition, companies must reduce their time-to-market in order to remain competitive. Due to those high conflicting requirements, many companies and especially manufacturing companies have started considering various new product designs, manufacturing and management strategies (Vernadat, 2002).

1.7.1 Predictors of Alignment

Planning for the unpredictable may seem an impossible irony, but many firms appear to recognize that in a period of turbulence, an organization's ability to flex and respond is critical for sustaining growth. The root of the problem lays in the distinct departments of the organization that, alignment of organizational strategy with business processes and the gaps that exist across the critical functions of strategy, analysis and execution. Isolated efforts related to defining enterprise strategy and architecture, analyzing and optimizing business processes and executing on day-to-day operations will fall short of success if the three areas do not align. Nowadays, the evolution of information technology applications makes it an absolute obligation on behalf of the decision makers to continuously make the best decisions in the shortest possible time. Decision Support System (DSS) is a technology and application that assists managerial decision makers utilizing data and models to solve semi-structured and unstructured problems (Qian et al., 2004). One of the critical linkages in the process of turning strategy into results is the need to understand whether the production plans are producing the right behaviours and outcomes. On top of good information design, improving understanding requires that management has the right information at the right time so they can take action to modify the strategy or the plans accordingly. A collateral organization, in contrast, encourages members and line managers from the operational design to develop creative yet feasible solutions in a more relaxed, fluid, collateral design and then enables them to return to the operational design and implement their solution from a formal position of authority in the organization. Whenever you put a group of individuals together there is the potential for conflict. These interpersonal conflicts tend to arise due to personal differences between individuals. This conflict is damaging to the team and their environment. Conflicts, especially interpersonal conflicts, need to be dealt with as soon as they are discovered, in an appropriate manner, so that the team can get back to work and effectively meet its goals.

1.8 BALANCE

The balance can be defined as the management of the expenditures of the resources like capital investment, manpower, plant facilities, training facilities, etc. While the processes are modeled it should be necessary to consider each and every aspect involved in processes, if it is not done then the complete system architecture is required to be changed. The explicit definition of processes and knowledge sharing should decrease the problems of confusion and complexity. The balance of tasks should be also there, the employees should face and solve and problem individually rather than leaving it for another, this concept is called improvisation. Strategies were made before the actual practice starts, it should be necessary to make a balance between design processes and their actual performance in the form of practice. The industry should also adapt to changes required with respect to the changed scenarios. Business process integration defines the architecture of an organization. Architecture primarily deals with-what are the different elements, how are they linked and how these related elements function together. To ensure coupling and efficient functioning of these elements a balance between elements is necessary in terms of resources, responsibility, accountability and authority among personnel.

1.8.1 Predictors of Balance

Responsibility is the obligation to perform assigned activities. People who accept responsibility commit themselves to completing an assignment to the best of their ability. Of course, doing a good job is easier when you have the authority to control the necessary resources, including personnel. Thus, accountability is a way of encouraging people to fulfil their responsibilities. Many organizations implement technology or new business processes but do not consider their current cultural norms for accountability. Accountability is at the foundation of business success. Equal opportunities and ensuring a diverse workforce is important for all employers. The mission of the "An Equal opportunity" is to promote the principle of equal opportunity in working, managing, processing, and planning to encourage the best practices in terms of equal opportunity among its members. With better integration of behavioural and structural factors, management can increase the probability that high-quality decisions are made (Gibson et al, 1994). The quality of decisions not only increases the probability of good decisions, but it also establishes the starting point of effective decisions.

CHAPTER- 2

LITERATURE REVIEW

2.1 INTRODUCTION

Ko (2009) found that people tended to understand better the processes through models. Models and processes made people understand the problem or identify them, increased knowledge of the organization's processes, understand the areas of potential improvement and defined the roles and responsibilities in the organization. BPI technology started in 1980's and developed significantly, providing enterprises with a series of advantages. Organizations and governments had paid greater attention to business processes to make a full description, automation and management of them (Verner, 2004).

In this chapter extensive literature survey has been presented to determine the constraints to proper functioning of organization, departments, teams and individual employees. There are some key areas which have to be taken care of. These include individual's contribution, willingness to contribute, information technology, leadership aspects, etc.

Wolfe and Box (1987) researched that, cohesion was positively related to a team's economic performance. There were numerous relationships between student team cohesion and its effects on simulated company performance. The study hypothesized and tested those relationships within a fairly complex business game. 162 Students from four sections of a senior- level Business Policy course were randomly assigned to four or five-member teams that played 10 decision rounds in a moderately-complex business game for 40.0% grade credit, an optimal amount of credit in that simulation from the perspectives of total learning and interest, and time and fair rewards. A total of 36 teams competed in six separate industries. The study concluded by accepting all the proposed hypothesizes on the basis of Pearson's Pair-wise correlation test; Cohesion was both directly and indirectly related to a team's economic effectiveness.

Henderson and Venkatraman (1990) identified that, there was a glaring lack of systematic frameworks to conceptualize the logic, scope and patterns of organizational transformation enabled by information technology (IT). The study

proposed a model of organizational strategic alignment based on four key domains of strategic choice; business strategy, organizational infrastructure and processes; IT strategy; and IT infrastructure and processes. The model was based on the need to achieve alignment across internal and external domains as well as functional integration across business and IT areas. The study concluded that, strategic alignment was a central element of organizational transformation.

Lim et al. (1997) studied the seven key aspects of enterprise modelling and integration. The study provided a concise description on the assortment of topics associated with 'Enterprise Modelling and Integration' (EMI). The topics included aspects namely Drivers, Goals, Domains, Types, Modelling, Scale and Issues. From the study it was evident that Enterprise Modelling and Integration were highly complex and mainly revolved around organizational modelling from which the analysis, design, implementation and integration of the organization management, business processes, software applications and physical computer systems within an enterprise were supported. The study presented a taxonomy aimed at reducing the complexity by partitioning the various topics into groups consisting of common interests thereby making it more comprehensible.

Lockamy and Smith (1997) found that, the increased global competition had forced the firms to change their approach to providing products and services to their customers. Many companies had implemented Business Process Re-engineering (BPR) programs for that purpose, but 60-80% of those programs had failed. So, an approach was needed during that time to increase the probability of success for re-engineering programs. This study presented a conceptual framework and key principles of business process integration. The key principles were strategic alignment, performance measurement, information technology and re-engineering methodology. The principles were derived from a case study of successful implementation of BPR Program at Cummins Engine Company, and a strategic alignment framework which had examined the congruence between a firm's strategy, business processes, and customer requirements. The study made the following three conclusions. First, for successful implementation and adoption of BPR program, a firm needed to provide alignment between the organization's strategy, processes and customer demands in its target market. Second, a performance measurement system was required to provide the information necessary for assessing: (a) the measurement

of effectiveness of organizational strategy relative to customer demands and (b) effectiveness of business processes relative to organizational goal. Finally, the application of information technology was needed to facilitate process management, strategy-process-customer alignment adjustments, and communication with internal and external customers.

Teo and Ang (1999) identified the issue of lack of alignment of Information System (IS) plans with business plans in organizations. The study was conducted for identification of the critical success factors (CSFs) related to aligning IS plans with business plans. A questionnaire survey was used to collect data for this study. Items in the questionnaire were derived from a review of past research literature on IS planning. Respondents were asked to indicate the extent of the importance of each item in influencing the alignment of IS plans with business plans. The questions were based on 18 CSFs related to the issue. The study made the conclusion that, coordination of IS plans and priorities with business plans and priorities was the main difficulty in IS planning. Furthermore the study could also be conducted in any industry interested in identifying the weak-links in the implementation of their Information system.

Brown and Duguid (2000) provided an argument and a practical approach for achieving a balance between business process optimization and the use of human-centered business practices. Process and practice were compared and contrasted prior to the development of a model for their co-existence and interaction. One way through which managers attempted to resolve the tension between process and practice was by compartmentalizing. During study, everything possible was tried to foster inventions and creativity among highly paid, elite workers. At the same time the study tried to make everyone else's work completely predictable. The identification of company's best practice was not easy, for a couple of reasons. First, a large gap was there between what a task looked like in a process manually and what it looked in reality. Second gap was there between what people thought they did and what people actually did. The study concluded that, the managers who wanted to create a balance must bridge both of these gaps between process and practice. The study also provided a practical framework and approach for balancing business process and business practice, that could be practically applied by the practitioners.

Huang et al. (2002) found that, the virtual teams became more and more common in organizations. The study identified the need of group support system (GSS) to support the virtual team-building by enhancing the goal-congruence. The study was conducted on the teams with goal setting structure and the teams without goal setting structure. The survey based methodology was used. The study concluded that, teams that used the goal-setting structure reported a significant stronger extent of shared team goals than teams that did not used the goal-setting structure.

Kobayashi et al. (2002) researched that, in the domain of Supply Chain Management (SCM), various software packages had been developed for planning business strategies. To solve the problems of system productivity in applied planning packages, the study proposed a solution concept Business Process Integration (BPI), which fused workflow and Enterprise Application Integration (EAI) technology. Two characteristic policies were included in BPI. The first was to design the minimum set of business processes for real-time information sharing with planning packages without changing other processes. The second was to integrate several systems with EAI technology and to manage their execution with a workflow tool. Based on these policies, the study proposed various design templates and integration adapters. Evaluation of study showed that using BPI, a target system could be developed with less manpower, in less time, and with higher quality than previous methods.

Auld (2002) found that it was a difficult task for the process designer to wrap-up the mass of organizational activities up into the business processes and also saw how they were interrelated to determine the process architecture of the organization. A partitioning of processes was required to completely align the business processes within the organization. The study described the approach to solve that problem by using the RIVA business process management method. RIVA was designed to provide the process designer with a rich set of real world analogues. RIVA also provided the process designer with a simple heuristic approach to hypothesizing the process architecture for an organization. The architecture thus produced was solely based on the business the organization.

Zhang and Cao (2002) researched that the flexibility to adapt to changing market needs and develop innovative cross-functional processes was quintessential to success in global and competitive environment. To succeed in Business Process Re-engineering (BPR), the firm must change the organizational structure from a

hierarchical to a flat form; management goals must change from being functional to sub-optimized for global-optimization; process-oriented measurement and employees' work must change from being fragmented to team-oriented. The study concluded that, it was important for a firm to combine its core business processes and re-think its business from an integrated, systematic, and value chain point of view to beat competition with flexibility and innovation.

Aubert et al. (2003) reviewed integration from different perspectives and integrated to isolate the four fundamental properties of information: accessibility, transparency, granularity, and timeliness. An illustration of the process in the aerospace industry was used to apply the four properties. Their definition provided a balanced way for organizations to assess the potential of technology to integrate processes. An additional issue identified issue was the boundary of a given process. While measuring the level of integration of a process, one had to define its limits. However, many processes were linked because the information was exchanged in more than one direction. Activities within a process might be producing information used by another process in the organization. By integrating one process, and minimizing its cost, the organization might hamper optimization efforts in another process

Reijers (2003) researched that in a business organization there was a need for the identification of weakly cohesive activities. The study introduced a Cohesion Metric that could be used for the identification of weakly cohesive activities in a workflow design. Workflow processes were in some sense similar to computer programs. The study proposed a heuristic based on the cohesion metric to decide between various workflow design alternatives. Both a theoretical and an empirical evaluation gave a positive support to its soundness. The inspiration for the introduced notion was derived from cohesion metrics in software engineering.

Rosenzweig et al. (2003) established that supply chain integration led to increase in competitive capabilities and improved business performance. Empirical findings of the study suggested that consumer products manufacturers also achieved performance benefits from supply chain integration efforts. Results showed that consumer products manufacturers with high integration intensity achieved superior product quality, delivery reliability, process flexibility, and cost leadership. When embedded within the organization's operating processes, these capabilities were inherently difficult to imitate and thus provided a competitive advantage over less highly integrated firms in

the industry. High integration intensity not only built capabilities, but also reduced the net costs of conducting business by interlocking supply chain elements, essentially provided manufacturers with more leverage in the increasingly volatile marketplace.

Seven (2003) found that business process was a combination of a set of activities within an enterprise with a structure describing their logical order and interdependence. The primary concern of this study was to describe the main process modelling techniques. A framework for classifying business process-modelling techniques according to their purpose was proposed and discussed. After studying the extensive literature on business process modelling it was identified that business process models were mainly used either to learn about the process, to make decisions on the process or to develop business process software. The idea was to provide users with a framework that could help them decide, which among the explained techniques, the one they should apply for a specific case.

Cao and Dowlatshahi (2005) identified that manufacturing companies were facing rapid and unanticipated changes in the business environment. Agile manufacturing (AM) was a manufacturing paradigm that focused on smaller scale, modular production facilities, and agile operations capability to deal with turbulent and changed environments. From several enablers of AM, virtual enterprise (VE) and information technology (IT) were chosen. The study explored the impact of the alignment between VE and IT on business performance in an (Agile Manufacturing) AM setting. It was also established that the alignment between VE and IT had a positive impact on business performance. Further, it was shown that the impact of the alignment between VE and IT on business performance was more significant than the impact of VE and IT on business performance individually. This showed that synergy and interaction effect among the enablers of AM could be more of a determining factor for success of AM than the individual enablers.

Worley et al. (2005) noticed that, implementation of enterprise resource planning (ERP) systems was a key issue for companies. This study focused on the integration of the human resource characteristics in business processes, which was a key issue for the ERP adoption and optimization phases. In that purpose, it was suggested to better adapt business processes to human actors by explicitly taking into account concepts like the role, competence and knowledge of human resources. Optimizing the adoption of an ERP system by its users was a difficult challenge, which required the

opinion to make evolve both the system (through interface adaptation, etc.) and the people (by clearly defined the role within consistent and optimized processes). The study resulted in much more efficient implementation and use of the ERP system.

Brockmans et al. (2006) identified that, to facilitate the inter-connectivity of business processes and reduction of communication efforts, with the rapid growth of electronic markets' activities were demanding flexibility and automation of the involved systems. The study presented a method for semantically aligning business processes. The study described an approach of aligning Web Ontology Language (OWL) serializations of Petri nets by (semi-) automatically finding mutual relationships. The semantic alignment was improved by Unified Modeling Language (UML) Profile allowing to visually model it. The combination of Petri nets with OWL provided a base for further research work. The study concluded that, to interconnect disjoint business process industry need to define a suitable connection point for coupling several business processes.

Themistocleous et al. (2006) suggested that, the continuous change in the nature of the business arena had led organizations to seek ways to improve their performance and profits. The purpose of the study was to figure out the main presented research question, "was business process integration feasible through Enterprise Application Integration (EAI) technology"? The study employed a single case study strategy to answer the aforementioned research question. The results obtained after conducting a study concluded that (EAI) technology could integrate business processes, the study also concluded that EAI could easily integrate the business processes when combined with Enterprise Resource Planning (ERP) systems.

Wang et al. (2006) studied that Enterprise Resource Planning systems presented unique difficulties in implementation. These systems typically involved changes to the entire organization and were a novel application for the organization. These characteristics added to the importance of making groups more cohesive in their goals, commitment, and ability to work toward completion of the new system project. Such cohesiveness was built partly through the willingness of the team members to participate and commitment to learn the new system. To determine if these relationships held, a survey of users and managers was conducted in Taiwan to test a model derived from social capital theory. The data supported the positive relationships between group cohesion and both willingness to participate and

commitment to learning. Group cohesion was likewise positively related to meeting management goals. Cohesive groups were able to better achieve goals because they knew the members of the group better and were motivated to complete the task successfully. Willingness to participate and commitment towards learning had significant effects on the outcome of group cohesion in implementing organizational innovations.

Bennour and Crestani (2007) found that performance estimation of enterprise processes generally involved models focused on a particular viewpoint (temporal, financial, etc.). This estimate rarely took the impact of the human factor into account. The study suggested that, it was important to include this factor while modelling and analyzing enterprise processes. In this study a conceptual approach to human resource modelling was proposed on the basis of an analysis of human integration in enterprise process models. The human entity was described through individual and collective competencies, which were needed to implement a process activity and assess its performance. The proposed formally built model provided a new approach to correlate some qualitative and quantitative aspects of the human influence on industrial performance. This model formalized and generalized the performance estimation by linking human capacities and process performance. This study concluded that it would be necessary to integrate other important socio-emotional parameters such as motivation, personal ambition, etc., in the individual competencies.

Lam (2007) examined that large number of information systems were required to be integrated in order to support enterprise wide business initiatives such as e-business, supply chain management and customer relationship management. Organizations had largely tended to address information systems (IS) integration in an ad-hoc manner. However, some organizations realized the value of adopting a more strategic and systematic approach to IS integration, and were therefore turned to the Enterprise Application Integration (EAI) tools being marketed by a number of integration vendors. EAI initiatives, however, not only involved technical challenges, but also significant business and organizational challenges. The study was adapted from a real-life case, described the EAI initiative at a Europe based financial services provider. The study had identified several important lessons in relation to EAI adoption including the business justification for IS integration, EAI vendor selection and

evaluation, business process co-ordination and EAI customization.

Lepmets et al. (2007) explored the impact of process assessment on process improvement. In particular, the study explained the alignment of an organization's process goals to its business goals; and the contribution of process assessment to the goal alignment. The study focused on how well an organization's business goals were identified, communicated and aligned to the process goals and if process assessment contributed to the goal alignment. The study illustrated the data gathered through an industry survey reflecting the lack of focus on alignment of organization's business goals throughout process improvement. The results were validated by using correlation analysis. The results indicated that there was little knowledge and experience in industry in aligning the process goals and organization's business goals. This, in turn could explain the unsuccessful process improvement efforts or perhaps even the scepticism towards process improvement in general.

Markic (2007) identified that; sustainable organizational performance could not be achieved without continuous organization development as well as the continuous development of the employees. The study was of the opinion that in a company or any organization, creating the conditions for knowledge development was of utmost importance. The main part of the study focused on researching team cohesion and obtaining information on interpersonal relationships as a starting-point for new knowledge to emerge. The study established that interpersonal relationships, and the possibilities for acquiring new knowledge, were better in smaller working groups. However, in bigger working group interpersonal relationships and group processes were weaker and tended to be informal, as group members did not know each other well or not well enough to be encouraged to cooperate. Cohesion index, showed attractiveness of the group for its group members, was higher in smaller than in bigger working groups.

Gravier et al. (2008) studied the concept of 'Alliance Cohesion' and observed the positive relationship between increased levels of knowledge interchange, alliance cohesion, and alliance performance. The study proposed that the data sharing, implementing and generating knowledge, as well as inter-firm knowledge management strategies should positively contribute to alliance performance. Meta-analysis was employed as the driving methodology in the study. The meta-analysis approach permitted the literature on inter-firm knowledge management to be reviewed

and synthesized such that the role of knowledge in the alliance, environmental risk, and alliance performance could be thoroughly and validly investigated. The study concluded that active inter-firm management appeared to contribute more to alliance performance than environmental factors. The proposed hypothesis was especially true within industries that were inherently more dependent on vertical suppliers or buyer relationships; such as manufacturing and services.

Panetto and Molina (2008) identified that, the recent advancements in information and communication technologies had allowed manufacturing enterprise to move from highly data-driven environments to a more cooperative information/knowledge-driven environment. Enterprise knowledge sharing (know-how), common best practices used, and open source/web based applications were enabled to achieve the concept of integrated enterprise and hence the implementation and interoperability of networked enterprises. The study proposed that Enterprise integration and interoperability in manufacturing systems were key concepts to face the challenges of these new environments. The study described challenges, trends and issues that must be addressed in order to support the generation of new technological solutions.

Emery (2009) studied the concept of "sustained" integration. The purpose of the study was to identify prerequisites for sustaining effective cross-functional integration as well as their temporal inter-relationships. A case research approach was used to explore the relationships between various prerequisites of integration and to understand "how" or "why" their presence might have influenced the success of sustaining integration. The study was conducted in 13 US aerospace defence industries which were in the process of implementing TQM programs. Organizations which successfully attained "sustained" integration indicated that the reward/performance system based on cross-functional objectives was the major driver behind: forcing employees to understand the organization's processes; providing dedicated time for employees to reflect on process improvement; ensuring employees were rewarded for process improvements; and increasing accountability for integration. The study concluded that, the success of cross-functional integration was ultimately dependent on employee motivation.

Matos et al. (2009) identified that, collaboration was a key issue to rapidly answer market demands in a manufacturing company, through sharing competencies and resources. The collaborative networking organizations (CNO) area focused on this

type of organizational models that used information and communication technology (ICT) for supporting the development of collaborative business opportunities. The study described the key concepts related to CNOs, provided a high level classification of collaborative networks, and presented some application cases in the manufacturing industry. Finally a holistic research initiative addressing key challenges in that area was presented.

Morrison et al. (2009) found that, process integration aimed to investigate relationships across a business compendium to produce classifications and merge similar activities into a standardized system. Integration was the process of merging elements from two similar antecedent processes to create a single process that can be used to replace the original processes. The study proposed a practical method for process integration and provided a theoretical framework and metrics for business process integration assessment.

Hung et al. (2010) studied that, although there was much emphasis on the importance of process alignment, organizational learning culture, and dynamic capability; little attention had been paid to their interactions and joint effects on performance. While the concept of dynamic capability had received increasing attention and numerous conceptual frameworks and propositions had been suggested. This empirical study utilized a survey data from a Taiwan high-tech industry to test an integrative model of dynamic capability. The results of the study demonstrated that although organizational learning culture significantly affected performance, its influence was mediated by dynamic capability. Furthermore, the study provided supporting evidence for the hypothesis that process alignment influence performance directly and indirectly through dynamic capabilities.

Kang et al. (2010) observed that, strategy was the key factor for success of enterprises. To survive in a competitive business environment, enterprises had to build strategies which were appropriate to the business environment. But, just to build only business strategies was worthless. Proper business processes were needed to be executed flexibly and proper enterprise resources were required to support the business processes systematically. In addition, members of enterprises needed to recognize relationships among business strategies, business processes and enterprise resources explicitly. To fulfil the requirements, strategy alignment based on the Business Enterprise Architecture was suggested in the study. The Business Enterprise

Architecture was composed of Business Architecture and resource architectures which were loosely-coupled to each other. Detailed architecture modeling was conducted with an enterprise meta-model as fact-based ontology's. Enterprise models were verbalized as facts based on the meta-model. Strategy alignments were visualized through a matrix-shaped alignment tables under the Business Enterprise Architecture.

Chang and Wang (2011) identified that, Enterprise Information Portals (EIPs) had been widely adopted as platforms for the integration of knowledge management and information technology (IT). This study was conducted from the knowledge management perspective to examine the influence of EIPs on collaborative commerce in the automobile industry. The study explored the integration of internal and external business processes and the coordination of collaborative design teams. An initial qualitative investigation explored the practical applications of an EIP in an automobile company. A research model was then formulated and tested using a questionnaire survey of the R&D department of a motor company in Taiwan. The results of the data analysis revealed that the presence of EIPs could help a company realize the benefits of c-commerce. EIPs also improved collaborative commerce performance by promoting the degree of integration of the enterprise process and by strengthening the process innovation and communication of collaborative design teams. The results suggested that managers should reinforce important factors, including knowledge management tools, process integration, and the quality of design teams, to achieve success in collaborative commerce.

Narayanan et al. (2011) examined the role of integration in BPO (business process outsourcing) and its effect on BPO firm performance by using information processing theory. BPO Integration was concerned with the overall coordination of business processes and activities across different units within the outsourced environment. It involved both internal process integration – effective integration of task execution within the BPO and external process integration – effective integration between the BPO and their clients. The study included the gathering of survey data from 205 Indian BPO service providers, analyzing the antecedents of process integration and its impact on BPO performance. The antecedents examined were task complexity, task security, and end customer orientation of the client and IT capability of the BPO. Among other results, it was found that both internal and external process integration

partially mediated the impact of the antecedents on performance.

Rosh et al. (2012) researched the concepts of team intimacy and team cohesion, and argued that the two have often been confused, merged, and used interchangeably in recent theoretical, empirical, and applied work on team effectiveness. The study proposed distinct definitions to clarify and distinguish between team intimacy and team cohesion, and suggested areas that will aid research and application. The examination provided a framework for understanding the inconsistent findings in team effectiveness and team building research and thus helps to improve Human Resource Management (HRM) interventions.

Millet (2013) proposed a model-driven ERP project approach, focused on alignment and taking into account models of a company's requirements and models of the capabilities of existing applications and technologies. The company's needs were analyzed as dependent on existing applications. Information System (IS) re-engineering then became a process of alignment between models of needs, solutions and contexts of organizations. The study's engineering project approach supported the idea of alignment as a process of consistency build up between partial models and characterizing all of the dependencies between their constructs. The study characterized the different situations of alignment between business and technology, for different models set in its modeling framework, taken into account standard business knowledge and applications.

2.2 GAPS IN LITERATURE SURVEY

The review of past literature indicated sufficient gap for the conduct of the proposed research work.

i. The most of the research has been done with single key enabler of process integration (example: cohesion, alignment, balance). Research with more than one key-enabler has not been found.

ii. The research in the field of process integration has been done by taking limited factors into the account. Thus the findings were usually skewed.

iii. The remedies or suggestions to improve the weak points were suggested in a piecemeal approach, often conflicting with other factors contributing to BPI.

iv. Very few studies related to BPI have been carried out in manufacturing sector.

v. Most studies related to BPI have centred around IT implementation with little emphasis on process design, process structure and process architecture.

2.3 RESEARCH HYPOTHESIS

Prior studies related to business process integration have identified lack of cohesion, lack of alignment and lack of balance as the main key enablers of business process integration (Wolfe and Box, 1987; Hinterhuber, 1995; Powel & Mikalef, 1997; Zairi, 1997; Lee & Dale, 1998; Wheeler, 2002; Markic, 2007; Lepmets et al, 2007; Gravier et al, 2008; Emery, 2009). While some of these studies have produced inconsistent findings, others have shown inconsistencies that render additional research necessary. So the parameters of these key enablers are taken as input parameters and the data sharing and data consistency across the organization through IT, the consensus among intra-organizational activities and team performance outputs are taken as three outcomes of business process integration. As a result, the following hypotheses are proposed so far as to increase the business process integration and also to identify the reasons for lack of process integration in a manufacturing industry.

Table 2.1 Research Hypothesis

RESEARCH HYPOTHESIS	
HYPOTHESIS 1	**There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Research Output Parameters'**
H1a	There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Data Sharing and data consistency across the organization through IT'
H1b	There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Consensus among intra-organizational activities' parameters
H1c	There is a negative relationship between 'Lack Of Cohesion' among business processes and 'Team performance output' parameters
HYPOTHESIS 2	**There is a negative relationship between 'Lack Of Alignment' among business processes and 'Research Output Parameters'**
H2a	There is a negative relationship between 'Lack Of Alignment' among business processes 'Data sharing and data consistency across the organization through IT'
H2b	There is a negative relationship between 'Lack Of Alignment' among business processes and 'Consensus among intra-organizational activities' parameters
H2c	There is a negative relationship between 'Lack Of Alignment' among business processes and 'Team performance output parameters
HYPOTHESIS 3	**There is a negative relationship between 'Lack Of Balance' among business processes and 'Research Output Parameters'**
H3a	There is a negative relationship between 'Lack Of Balance' among business processes 'Data sharing and data consistency across the organization through IT'
H3b	There is a negative relationship between 'Lack Of Balance' among business processes and 'Consensus among intra-organizational activities' parameters
H3c	There is a negative relationship between 'Lack Of Balance' among business processes and 'Team performance output parameters

2.4 CONCEPTUAL MODEL

On the basis of examination of the extensive literature and scope of the present research, a conceptual model have prepared and presented in figure 2.1. The issues which have come into picture from the literature survey are broadly classified into three areas, which include, 'Lack of Cohesion', 'Lack of Alignment' and 'Lack of Balance'. These three areas have taken as key enablers of business process integration in industry. The proposed model would check the impact of these three key enablers on the process output performance. The three outcomes of BPI which have taken into consideration were, 'Data sharing and Data consistency across organization through IT', 'Team output performance consistent with organization' and 'Consensus among Intra-organizational activities'.

CHAPTER- 3

DESIGN OF THE STUDY

3.1 INTRODUCTION

This chapter introduces the overall design of the study, which includes methodology adopted for carrying out the research work as well as various phases of the study. The details of the work done in each phase; methodology adopted, statistical tools and models used in the work have also been described.

3.2 OBJECTIVES AND ISSUES

The main purpose of the present work is to study the factors that influence the process performance of a manufacturing organization. Literature highlights the following areas and issues as critical to the success of the present research work:

- **Lack of Cohesion:** It contains following sub-factors
  - Lack of acknowledgement of about individual contribution
  - Varying experience of participants
  - Lack of appropriate education and skills of the participants
  - Lack of objective leadership
  - Lack of seminars and team meetings motivating participants
  - Problems in group appraisal and group reward system
  - Lack of consistency in the team
  - Problems of data sharing
  - Lack of respect among participants
  - Lack of trust among participants
  - Problems in method of selection of team members
- **Lack of Alignment:** It contains the following sub-factors
  - Lack of IT implementation

- Lack of decision support management
- Lack of information management
- Lack of information accessibility
- Problems in performance of members due to industrial changes because of changing environment
- Problems in team composition process
- Lack of well-defined, documented and structured business processes
- Problems in resolving business conflicts
- Lack of provision of skill training for employees
- Problems in making use of collateral resources

- **Lack of balance:** It contains following sub-factors
  - Inter-departmental goals complementing organizational goals
  - Intra-departmental goals complementing organizational goals
  - Lack of responsibility
  - Lack of accountability
  - Problems in decision making at different levels
  - Lack of authority
  - Lack of equal opportunity to members of team

3.3 PHASES OF RESEARCH

The present study has employed quantitative research approach. The quantitative approach utilizes a series of statistical techniques. The results obtained from quantitative study and literature review have been synthesized to develop a systematic plan by using qualitative research methods. The research work has been carried out in three phases.

Phase 1: Clarifying the context

Phase 2: Understanding and assessing the situation

Phase 3: Evolving a management process

3.3.1 Clarifying the context

This phase involves extensive literature review of factors contributing to the business process integration in an organization with regards to lack of cohesion, lack of alignment and lack of balance. The key factors in terms of which research output can be expressed have also been identified in this phase. Literature review regarding 'Lack of data sharing and data consistency across the organization through IT', 'Team output performance consistent with organizational objectives' and 'The consensus among intra-organizational activities' has been carried out.

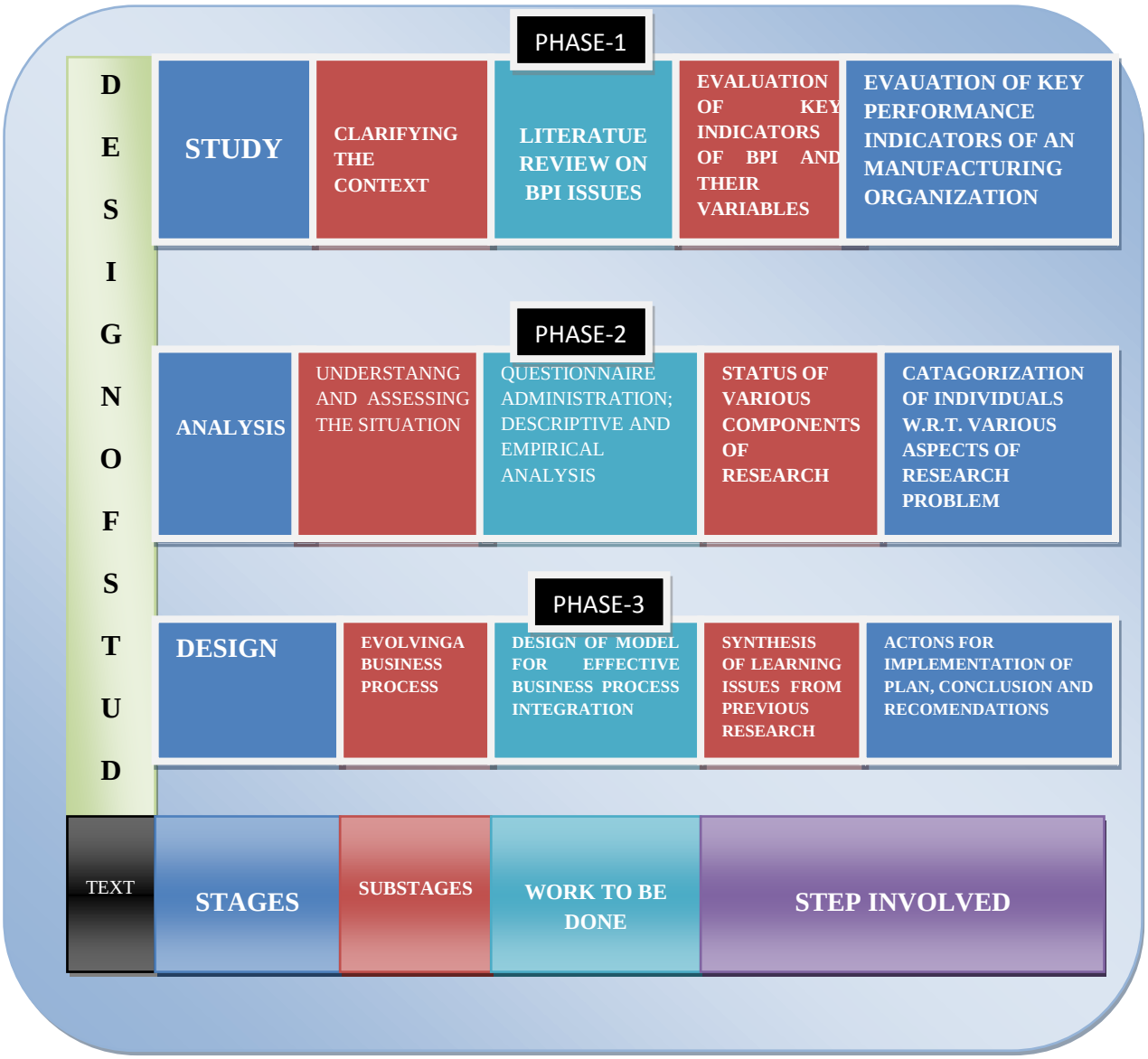

Figure 3.1 Phases of research

3.3.2 Understanding and assessing the situation

The study has been carried out in a leading manufacturing industry in Mandi-Gobindgarh (Punjab) region. A sample of employees from different levels (upper management, middle management and lower management) from all departments was selected. In this research work a questionnaire was sent to the manufacturing organization in Mandi-Gobindgarh region, and 51 fully filled and usable questionnaires were received and have been taken for analysis. The more explicit details of organization are given in Annexure one.

3.3.3 Evolving a management process

The questionnaire has been designed by studying extensive literature survey. The questionnaire has been sent to the industry for collecting sampling data for the verification and validation of the questionnaire. The Cronbach's alpha value of the sample data has been calculated and the questionnaire was revised on the bases of industry's processes. The questionnaire was finalised and then again sent to the industry for the purpose of data collection. Again the Cronbach's alpha value (0.953) has been calculated, and the data has been consolidated and analyzed with the help of SPSS software package. The conclusions have been suggested to refine the organizational architecture, by reducing inadequacies in the processes.

3.4 RESEARCH APPROACH

The goal of the research process is to produce new knowledge or deepen the understanding of a topic or issue. There are two major types of research design approaches; qualitative research and quantitative research. Researchers choose qualitative or quantitative methods according to the nature of the research topic they want to investigate and the research question they aim to answer.

3.4.1 Qualitative research

Quantitative research is the understanding of human behavior and the reasons that govern such behavior. Asking a broad question and collecting data in the form of words, images, video etc that is analyzed searching for themes. This type of research aims to investigate a question without attempting to quantifiably measure variables or look to potential relationships between variables. It is viewed as more restrictive in testing hypotheses because it can be expensive and time consuming, and typically limited to a single set of research subjects. Qualitative research is often used as a

method of exploratory research as a basis for later quantitative research hypotheses. Qualitative research is linked with the philosophical and theoretical stance of social constructionism.

3.4.2 Quantitative research

Quantitative research is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect. It is used in a wide variety of natural and social sciences, including physics, biology, psychology, sociology and geology. In addition, according to Cohen (1980), quantitative research is defined as social research that employs empirical methods and empirical statements. (Cohen, 1980) states that, an empirical statement is defined as a descriptive statement about what "is" the case in the "real world" rather than what "ought" to be the case. Typically, empirical statements are expressed in numerical terms; another factor in quantitative research is that empirical evaluations are applied. Empirical evaluations are defined as a form that seek to determine the degree to which a specific program or policy empirically fulfills or does not fulfill a particular standard or norm. (Creswell, 1994) has given a very concise definition of quantitative research as a type of research that is explaining phenomena by collecting numerical data that are analyzed using mathematical methods. Let's study this definition step by step. The first element is the explaining phenomena. This is a key element of all research, be it quantitative or qualitative. When we set out to do some research, we are always looking to explain something. The specificity of quantitative research lies in the next part of the definition. In quantitative research we collect numerical data. This is closely connected to the final part of the definition: an analysis using mathematics-based methods. In order to be able to use mathematically based methods our data have to be in numerical form. This is not the case for qualitative research. Qualitative data are not necessarily or usually numerical, and therefore cannot be analyzed using statistics. The last part of the definition refers to the use of mathematically based methods, in particular statistics, to analyze the data. This is what people usually think about when they think of quantitative research, and is often seen as the most important part of quantitative studies. This is a bit of a misconception. While it is important to use the right data analysis tools, it is even more important to use the right research design and data collection instruments. Quantitative research is also useful to quantify opinions, attitudes and behaviors and

find out how the whole population feels about a certain issue While quantitative research is based on numerical data analyzed statistically, Qualitative research uses non-numerical data. Qualitative research is actually an umbrella term encompassing a wide range of methods, such as interviews, case studies, ethnographic research and discourse analysis, to name just a few. Qualitative methods are more suited to looking at the meaning of particular events or circumstances.

3.4.2.1 Different Types of Quantitative Research

There are several types of quantitative research. For instance, it can be classified as 1) survey research, 2) correlation research, 3) experimental research and 4) causal-comparative research. Each type has its own typical characteristics.

3.4.3 Survey Research

Statistical surveys are undertaken with a view towards making statistical inferences about the population being studied, and this strongly depends on the survey questions used. Polls about public opinion, public health surveys, market research surveys, government surveys and censuses are all examples of quantitative research that use contemporary survey methodology to answer questions about a population. Survey research uses scientific sampling and questionnaire design to measure characteristics of the population with statistical precision. Survey research enables management to make comparisons between groups. It provides estimates from a sample that can be related to the entire population with a degree of certainty. Survey research requires that respondents are "randomly" sampled - that means each person in the population has a known probability of being sampled. Surveys provide important information for all kinds of public information and research fields, e.g., marketing research, psychology, health professionals and sociology.

3.4.4 Types of Surveys

- ***In-person Interviews:*** An in-person interview consists of an interviewer asking the respondent questions in a face-to-face situation. The interview may take place in the respondent's workplace or at the office.
- ***Telephone Interviews:*** Telephone Interviews involve the presentation of the questionnaire by telephone. Computer-assisted Telephone Interview systems program a survey questionnaire directly into a computer. Then the telephone

interviewer reads the questions from a television-type screen and records the answer directly on the terminal keyboard or directly onto the screen with a light pen.

- ***Self-Administered Questionnaires:*** Respondents fill self-administered questionnaires themselves. Self-administered questionnaires are generally distributed through e-mail. Upon receipt of the questionnaire, the respondent fills it and returns it via mail to the researcher.

3.5 UNITS AND VARIABLES

While conducting quantitative research, a researcher should have a clear understanding about the concepts of 'research units and variables'. When the data is collected for quantitative research, it has to be collected from someone or something. The people or things from which the data is collected are known as research units, units or cases. If the data is needed to be drawn from the samples of the population, the samples are called sampling units. Variables are any characteristic of the unit we are interested in and want to collect.

3.6 HYPOTHESIS

A hypothesis is a tentative explanation that accounts for asset of facts and can be tested by further investigation. Quantitative researchers will design studies that allow us to test these hypotheses. The researchers can collect the relevant data and use statistical techniques to decide whether or not to reject or provisionally accept the hypothesis. Accepting a hypothesis is always provisional since new data may cause it to be rejected later on. Researchers can have one or more hypotheses. In order to find answers to these questions, the researchers can also have various instruments and materials and a clearly defined plan of action.

3.7 RELIABILITY AND VALIDITY

The quality of the survey research is established by examining the reliability and validity of the survey (Litwin, 1995).

3.7.1 Reliability of questionnaire

Reliability is defined as the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials. In short, it is the stability or consistency of scores over time or across raters. There are three aspects of

reliability, namely: equivalence, stability and internal consistency (homogeneity). The first aspect, equivalence, refers to the amount of agreement between two or more instruments that are administered at nearly the same point in time. The higher the degree of correlation between the two forms, the more equivalent they are. The second aspect of reliability is stability, stability is said to occur when the same or similar scores are obtained by repeated testing with the same group of respondents. The third and last aspect of reliability is internal consistency or homogeneity. Internal consistency concerns the extent to which items on the test or instrument are measuring the same thing. Reliability indicates the accuracy or precision of the measurement (Norland, 1990).

3.7.2 Validity of questionnaire

Validity is defined as the extent to which the questionnaire measures what it purports to measure. There are many different types of validity, including: content validity, face validity, criterion-related validity or predictive validity and construct validity. Content validity pertains to the degree to which the instrument fully assesses or measures the construct of interest. Face validity is a component of content validity and is established when an individual reviewing the instrument concludes that it measures the characteristic or trait of interest. Criterion-related validity is assessed when one is interested in determining the relationship of scores on a test to a specific criterion. Construct validity is the degree to which an instrument measures the trait or theoretical construct that it is intended to measure.

Following are the objectives for checking validity of a questionnaire.

- Is the questionnaire valid? In other words, is the questionnaire measuring what it intended to measure?
- Does it represent the content?
- Is it appropriate for the sample/population?
- Is the questionnaire comprehensive enough to collect all the information needed to address the purpose and goals of the study?

3.8 STATISTICAL TOOLS

A multitude of different statistical tools is available, some of them are simple and some are complicated and often very specific for certain purposes. In analytical work,

the most important common operation is the comparison of data, or sets of data, to quantify the accuracy (bias) and precision. Fortunately, with a few simple convenient statistical tools most of the information needed in regular work can be obtained: the "*t*-test, the "*F*-test"

3.8.1 Coefficient alpha index

Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test. Internal consistency should be determined before a test can be employed for research or examination purposes to ensure validity. Alpha coefficient ranges in value from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous (that is, questions with two possible answers) and/or multi-point formatted questionnaires or scales (i.e., rating scale: 1 = poor, 5 = excellent). The higher the score, the more reliable the generated scale is. (Nunnaly, 1978) has indicated 0.7 to be an acceptable reliability coefficient.

$$a = N/(N - 1)[1 - \text{Sum Var}(Yi)/\text{Var}(X)]$$

Where N = Number of Items

Sum Var (Yi) = Sum of Item Variances

Var(X) = Composite Variance (Allen & Yen, 1979)

3.8.2 Correlations

Pearson product-moment correlation coefficient, also known as r, R, or Pearson's r, is a measure of the strength and direction of the linear relationship between two variables that is defined as the (sample) covariance of the variables divided by the product of their (sample) standard deviations. Intra-class correlation is a descriptive statistic that can be used when quantitative measurements are made on units that are organized into groups; describes how strongly units in the same group resemble each other. The correlation coefficient tells how accurately it can predict one variable from another, and it ranges from -1.00 to 0.00 to 1.00. A correlation coefficient of 0.00 means that, one variable can-not be predicted from other. When the value is 1.00 (or -1.00) then one variable can predict from another with perfect accuracy. Whether the

value is positive or negative refers to the nature of the relationship. Negative correlation coefficients are obtained when as one variable increases the other decreases. Positive correlation coefficients are obtained when as one variable increase the other also increases. When using correlation to measure test reliability you expect a positive correlation because each variable is expected to change in the same manner. The results of correlation test are shown in table 4.1.

3.8.3 Regression analysis

In statistics, regression analysis is a statistical technique for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps to understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed. In regression analysis, it is also of interest to characterize the variation of the dependent variable around the regression function, which can be described by a probability distribution. Regression analysis is used to understand which among the independent variables relate to the dependent variable, and to explore the forms of these relationships. In restricted circumstances, regression analysis can be used to infer causal relationships between the independent and dependent variables. It is also widely used for prediction and forecasting.

Regression models involve the following variables:

- The unknown parameters, denoted as β, which may represent a scalar or a vector.
- The independent variables X.
- The dependent variable, Y.

In various fields of application, different terminologies are used in place of dependent and independent variables.

A regression model relates Y to a function of X and β.

$$Y \approx f(\mathbf{X}, \boldsymbol{\beta})$$

3.9 SPSS SOFTWARE

SPSS Statistics (originally, Statistical Package for the Social Sciences, later modified to read Statistical Product and Service Solutions) is a software package used for statistical analysis. It is used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations and others. The SPSS software has been used to analyze and validate the data. The various regression equations and correlations have been solved in SPSS software.

3.10 CONCLUDING REMARKS

The methodology adopted for the study along with the step-by-step approach employed in the research has been elaborated in this chapter. Empirical studies have been used to yield rich data for statistical analysis. The learning issues from the literature review and results of a questionnaire based survey have been synthesized to assess the impact of business process integration on organizational performance.

CHAPTER- 4

ANALYSIS OF SURVEY

4.1 GENERAL

The chapter presents the analysis and major findings of survey based research data. The survey reveals the major weak-links in implementation of business process integration in a manufacturing industry. The main factors affecting the organization's process performance output have been evaluated. The analysis also establishes the relationship of various problems as input factors with performance output parameters of business processes.

4.2 RESULTS OF CORRELATION TEST

The correlations measure the degree to which the variables are inter-related. Correlations range in value from zero to one. The higher the value of R, the greater the level of correlation. The values can be positive or negative, signifying positive or negative correlation. From the results obtained from correlation test, it can be concluded that there is positive relationship among research input parameters (Cohesion, Alignment, Balance) and the process performance output parameters (Consensus among intra organizational activities, Data sharing & data consistency across the organization through IT and Team output performance). Thus hypotheses **H1**, **H2** and **H3** are rejected on the bases of positive relation shown by Pearson's test for correlations.

4.2.1 Correlations between cohesion parameters and process performance output

Table 4.1 shows the results of Pearson's correlation test. The results of correlation analysis shows that cohesion parameter 'Lack of Acknowledgement of about individual contribution' (C1) has a significant positive correlation with 'Team Output Performance Consistent with organization' (DV1) (r = .728) respectively with 'Data Sharing and Data Consistency across Organization through IT' (DV2) (r = .419) and 'Consensus among Intra-organizational activities' (DV3) (r = .436). The parameter 'C2' has a significant positive correlation with 'DV1' (r = .400) respectively with 'DV2' (r = .401) and 'DV3' (r = .265). The parameter 'C3' has a significant-

Table 4.1 Results of correlation analysis

DEPENDENT VARIABLES → / INDEPENDENT VARIABLES ↓			Team Output Performance Consistent with organization	Data Sharing and Data Consistency Across Organization Through IT	Consensus among Intra-organizational activities
			DV1	DV2	DV3
COHESION	C1	Lack of Acknowledgement of about individual contribution	.728**	.419**	.436**
	C2	Varying experience and education of participants	.400**	.401**	.265**
	C3	Lack of appropriate education and skills of the participants	.774**	.409**	.596**
	C4	Lack of objective leadership	.728**	.618**	.597**
	C5	Lack of seminars and team meetings motivate participants	.714**	.466**	.703**
	C6	Problems in group appraisal system	.552**	.358**	.542**
	C7	Lack of consistency in the team	.535**	.646**	.548**
	C8	Problems of data sharing	.484**	.653**	.487**
	C9	Lack of respect among participants	.386**	.376**	.507**
	C10	Lack of trust among participants	.587**	.378**	.680**
	C11	Problems in method of selection of team members	.606**	.387**	.551**
ALIGNMENT	A1	Lack of IT implementation	.531**	.588**	.595**
	A2	Lack of decision support	.590**	.547**	.603**
	A3	Lack of information management	.463**	.583**	.529**
	A4	Lack of information accessibility	.551**	.620**	.615**
	A5	Problems in performance of members due to industrial changes because of changing environment	.550**	.339**	.578**
	A6	Problems in team composition process	.631**	.500**	.555**
	A7	Lack of well-defined, documented and structured business processes	.452**	.455**	.615**
	A8	Problems in resolving business conflicts	.519**	.439**	.717**

	A9	Lack of provision of skill training to employees	.530**	.427**	.478**
	A10	Problems in making use of collateral resources	.686**	.436**	.580**
B A L A N C E	B1	Inter-departmental goals complementing organizational goals	.603**	.376**	.365**
	B2	Intra-departmental goals complementing organizational goals	.671**	.555**	.613**
	B3	Lack of responsibility	.376**	.431**	.386**
	B4	Lack of accountability	.552**	.249**	.515**
	B5	Problems in decision making at different levels	.562**	.272**	.467**
	B6	Lack of authority	.654**	.254**	.432**
	B7	Lack of equal opportunity to members of team	.547**	.309**	.532**
***** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed)***					

Positive correlation with 'DV1' (r = .774) respectively with 'DV2' (r = .409) and 'DV3' (r = .596). The parameter 'C4' has a significant positive correlation with 'DV1' (r = .728) respectively with 'DV2' (r = .618) and 'DV3' (r = .597). The parameter 'C5' has a significant positive correlation with 'DV1' (r = .714) respectively with 'DV2' (r = .466) and 'DV3' (r = .703). The parameter 'C6' has a significant positive correlation with 'DV1' (r = .552) respectively with 'DV2' (r = .358) and 'DV3' (r = .542). The parameter 'C7' has a significant positive correlation with 'DV1' (r = .535) respectively with 'DV2' (r = .646) and 'DV3' (r = .548). The parameter 'C8' has a significant positive correlation with 'DV1' (r = .484) respectively with 'DV2' (r = .653) and 'DV3' (r = .487). The parameter 'C9' has a significant positive correlation with 'DV1' (r = .386) respectively with 'DV2' (r = .376) and 'DV3' (r = .507). The parameter 'C10' has a significant positive correlation with 'DV1' (r = .587) respectively with 'DV2' (r = .378) and 'DV3' (r = .680). The parameter 'C11' has a significant positive correlation with 'DV1' (r = .606) respectively with 'DV2' (r = .387) and 'DV3' (r = .551).

4.2.2 Correlations between alignment parameters and process performance output

Table 4.1 shows the results of Pearson's correlation test. The results of correlation analysis shows that Alignment parameter 'A1' has a significant positive correlation with 'Team Output Performance Consistent with organization' (r = .531) respectively with 'Data Sharing and Data Consistency across Organization through IT' (r = .588) and 'Consensus among Intra-organizational activities' (r = .595). The parameter 'A2' has a significant positive correlation with 'DV1' (r = .590) respectively with 'DV2' (r = .547) and 'DV3' (r = .603). The parameter 'A3' has a significant positive correlation with 'DV1' (r = .463) respectively with 'DV2' (r = .583) and 'DV3' (r = .529). The parameter 'A4' has a significant positive correlation with 'DV1' (r = .551) respectively with 'DV2' (r = .620) and 'DV3' (r = .615). The parameter 'A5' has a significant positive correlation with 'DV1' (r = .550) respectively with 'DV2' (r = .339) and 'DV3' (r = .578). The parameter 'A6' has a significant positive correlation with 'DV1' (r = .631) respectively with 'DV2' (r = .500) and 'DV3' (r = .555). The parameter 'A7' has a significant positive correlation with 'DV1' (r = .452) respectively with 'DV2' (r = .455) and 'DV3' (r = .615). The parameter 'A8' has a significant positive correlation with 'DV1' (r = .519) respectively with 'DV2' (r = .439) and 'DV3' (r = .717). The parameter 'A9' has a significant positive correlation with 'DV1' (r = .530) respectively with 'DV2' (r = .427) and 'DV3' (r = .478). The parameter 'A10' has a significant positive correlation with 'DV1' (r = .686) respectively with 'DV2' (r = .436) and 'DV3' (r = .580).

4.2.3 Correlations between balance parameters and process performance output

Table 4.1 shows the results of Pearson's correlation test. The results of correlation analysis shows that cohesion parameter 'B1' has a significant positive correlation with 'Team Output Performance Consistent with organization' (r = .603) respectively with 'Data Sharing and Data Consistency across Organization through IT' (r = .376) and 'Consensus among Intra-organizational activities' (r = .365). The parameter 'B2' has a significant positive correlation with 'DV1' (r = .671) respectively with 'DV2' (r = .555) and 'DV3' (r = .613). The parameter 'B3' has a significant positive correlation with 'DV1' (r = .376) respectively with 'DV2' (r = .431) and 'DV3' (r = .386). The parameter 'B4' has a significant positive correlation with 'DV1' (r = .552) respectively with 'DV2' (r = .249) and 'DV3' (r = .515). The parameter 'B5' has a significant positive correlation with 'DV1' (r = .562) respectively with 'DV2' (r =

.272) and ‘DV3’ (r = .467). The parameter ‘B6’ has a significant positive correlation with ‘DV1’ (r = .654) respectively with ‘DV2’ (r = .254) and ‘DV3’ (r = .432). The parameter ‘B7’ has a significant positive correlation with ‘DV1’ (r = .547) respectively with ‘DV2’ (r = .309) and ‘DV3’ (r = .532).

4.3 RESULTS OF REGRESSION ANALYSIS

The Table 4.2 shows multiple regression analysis with the dependent variable as ‘Consensus among intra-organizational activities’ and eleven cohesion parameters as independent variables. The results indicate that cohesion parameters can predict 74% of the variance in building consensus among intra-organizational activities. The value of F statistic is 10.094 and it is significant with P (0.000). Thus the hypothesis H1b is rejected, because there is positive relationship between parameters of cohesion and ‘Consensus among intra-organizational activities’.

Table 4.2 Results of regression analysis to test H1b hypotheses

Dependent Variable		**R**	**R Square**	**Adjusted R Square**	**F**	**Sig.**
Consensus among intra-organizational activities		0.860	0.740	0.667	10.094	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Lack of acknowledgement of about individual contribution	-0.108	0.099	-0.127	-1.091	0.282
2	Variation in experiences of participants	0.026	0.078	0.031	0.326	0.746
3	Lack of appropriate education and skills of the participants	0.076	0.119	0.087	0.634	0.530
4	Lack of objective leadership	0.088	0.101	0.107	0.866	0.392
5	Lack of seminars and team meetings to motivate participants	0.231	0.089	0.320	2.593	0.013
6	Problems in group appraisal system	-0.031	0.112	-0.033	-0.277	0.783
7	Lack of consistency in the team	0.142	0.095	0.182	1.495	0.143
8	Problems of data sharing	0.023	0.073	0.031	0.312	0.757
9	Lack of respect among participants	0.119	0.118	0.114	1.006	0.320
10	Lack of trust among participants	0.294	0.095	0.375	3.104	0.004
11	Problems in method of selection of team members	0.054	0.103	0.067	0.522	0.604

The value of (-0.108) shows that, for every unit increase in individual contribution the 'Consensus among intra-organizational activities' will decrease by (0.108) points. For every unit increase in experience, education and leadership will increase the 'Consensus among intra-organizational activities' by (0.026), (0.076) points and (0.088) points. The un-standardized slope of (0.231) tells us that, 'Consensus among intra-organizational activities' increases by (0.231) points for every additional point on the team meetings. The value of (-0.031) means that, for every unit increase in group appraisal system the 'Consensus among intra-organizational activities' will decrease by (0.031) points. For every unit increase in team-composition, Data-sharing, respect and method of selection will increase 'Consensus among intra-organizational activities' by (0.142), (0.023), (0.119) and (0.054) points. The un-standardized slope of (0.294) tells us that, 'Consensus among intra-organizational activities' increases by about (0.294) points for every additional point to the trust.

The t-value and (Sig.) are the t-statistics and their associated 2-tailed p-values used in testing whether a given coefficient is significantly different from zero by using an alpha of 0.05. The coefficient for individual-contribution (-0.108) is not significantly different from 0 because its p-value is (0.282), which is larger than 0.05. The coefficient for experience (0.026) is not significantly different from 0 because its p-value is (0.746), which is larger than 0.05. The coefficient for education (0.076) is not significantly different from 0 because its p-value is (.530), which is larger than 0.05. The coefficient for leadership **(**0.088) is not statistically significant because its p-value of (0.392) is larger than .05. The coefficient for team-meeting (0.231) is significantly different from 0 because its p-value is (0.013), which is less than 0.05. The coefficient for group-appraisal and reward (-0.031) is not significantly different from 0 because its p-value is (0.783), which is larger than 0.05. The coefficient for team-composition (0.142) is not significantly different from 0 because its p-value is (0.143), which is larger than 0.05. The coefficient for data-sharing (0.023) is not significantly different from 0 because its p-value is (0.757), which is larger than 0.05. The coefficient for respect for colleagues (0.119) is not significantly different from 0 because its p-value is (0.320), which is larger than 0.05. The coefficient for trust (0.294) is significantly different from 0 because its p-value is (0.004), which is less than 0.05. The coefficient for method of selection (0.054) is not significantly different from 0 because its p-value is (0.604), which is larger than 0.05. From the

values of beta-coefficients it can be concluded that, the experience, education, objective leadership, seminars & team meetings, respect, data-sharing, consistency of team members, method of selection and trust contributes in building consensus among intra-organizational activities. On the other hand, individual's contribution and group appraisal and reward system have not contributed in building consensus among intra-organizational activities. The t-values obtained from table indicate that, team-meetings (2.593) and trust (3.104) have statistically positive significance in building consensus among intra-organizational activities.

Table 4.3 Results of regression analysis to test H1a hypotheses

Dependent Variable		**R**	**R Square**	**Adjusted R Square**	**F**	**Sig.**
Data Sharing and data consistency across the organization through IT		0.843	0.711	0.630	8.725	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Lack of acknowledgement of about individual contribution	-0.005	0.108	-0.006	-0.050	0.960
2	Variation in experiences of participants	0.179	0.086	0.207	2.081	0.044
3	Lack of appropriate education and skills of the participants	-0.137	0.131	-0.152	-1.049	0.300
4	Lack of objective leadership	0.241	0.111	0.282	2.169	0.036
5	Lack of seminars and team meetings to motivate participants	0.102	0.098	0.136	1.048	0.301
6	Problems in group appraisal system	-0.168	0.123	-0.170	-1.364	0.180
7	Lack of consistency in the team	0.311	0.104	0.383	2.992	0.005
8	Problems of data sharing	0.314	0.080	0.412	3.905	0.000
9	Lack of respect among participants	0.058	0.130	0.053	0.445	0.659
10	Lack of trust among participants	0.027	0.104	0.033	0.263	0.794
11	Problems in method of selection of team members	-0.074	0.113	-0.088	-0.653	0.518

Table 4.3 shows multiple regression analysis with the dependent variable as 'Data sharing and data consistency across the organization through IT' and eleven cohesion parameters as independent variables. The results indicate that, the cohesion parameters can predict 71.1% of the variance in 'Data Sharing and data consistency across the organization through IT'. The value of F statistic is 8.725 and it is significant with P (0.000). Thus the hypothesis H1a is rejected, because there is positive relationship between parameters of cohesion and 'Data Sharing and data consistency across the organization through IT'.

The value -0.005 shows that, for every unit increase in individual-contribution will decrease 'Data Sharing and data consistency across the organization through IT' by (0.005) points. For every unit increase in experience, leadership and team-meetings will increase the 'Data Sharing and data consistency across the organization through IT' by (0.179), (0.241) and (0.102) points. The un-standardized slope of (-0.137) tells us that 'Data Sharing and data consistency across the organization through IT' will decrease by about (0.137) points for every additional point on the education. The value of (-0.168) means that, for every unit increase in group appraisal system the 'Data Sharing and data consistency across the organization through IT' will decrease by (0.168) points. For every unit increase in team-composition, data-sharing, respect and trust will increase 'Data Sharing and data consistency across the organization through IT' by (0.311), (0.314), (0.058) and (0.027) points. The un-standardized slope of (-0.074) tells us that 'Data Sharing and data consistency across the organization through IT' will decrease by about (0.074) points for every additional point to the method-of-selection. The coefficient for individual-contribution (-0.005) is not significantly different from 0 because its p-value is (0.960), which is larger than 0.05. The coefficient for experience (0.179) is significantly different from 0 because its p-value is (0.044), which is less than 0.05. The coefficient for education (-0.137) is not statistically significantly different from 0 because its p-value is (0.300), which is larger than 0.05. The coefficient for leadership (0.241) is statistically significant because its p-value of (0.036) is less than 0.05. The coefficient for team-meeting (0.102) is not significantly different from 0 because its p-value is (0.301), which is larger than 0.05. The coefficient for group-appraisal and reward (-0.168) is not significantly different from 0 because its p-value is (0.180), which is larger than 0.05. The coefficient for team-composition (0.311) is significantly different from 0

because its p-value is (0.005), which is less than 0.05. The coefficient for data-sharing (0.314) is significantly different from 0 because its p-value is (0.000), which is less than 0.05. The coefficient for respect for colleagues (0.058) is not significantly different from 0 because its p-value is (0.659), which is larger than 0.05. The coefficient for trust (0.027) is not significantly different from 0 because its p-value is (0.794), which is larger than 0.05. The coefficient for method of selection (-0.074) is not significantly different from 0 because its p-value is (0.794), which is larger than 0.05. From the values of beta-coefficients it can be concluded that, the experience, objective leadership, seminars & team meetings, data-sharing, respect and trust for colleagues contributes in 'Data Sharing and data consistency across the organization through IT'. On the contrary, individual's contribution, education & skills, group appraisal & reward system and method of selection of participants have not contributed in 'Data Sharing and data consistency across the organization through IT'. The t-values obtained from table indicate that, experiences of participants (2.081), objective-leadership (2.169), consistency of team members (2.992), team-meetings (2.593) and data-sharing issues (3.905) have statistically positive significance in maintaining 'Data Sharing and data consistency across the organization through IT'.

Table 4.4 Results of regression analysis to test H1c hypotheses

Dependent Variable		**R**	**R Square**	**Adjusted R Square**	**F**	**Sig.**
Team performance output parameters		0.928	0.862	0.823	22.146	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Lack of acknowledgement of about individual contribution	0.228	0.073	0.264	3.122	0.003
2	Variation in experiences of participants	0.113	0.058	0.134	1.951	0.058
3	Lack of appropriate education and skills of the participants	0.184	0.088	0.208	2.082	0.044
4	Lack of objective leadership	0.225	0.075	0.270	3.003	0.005
5	Lack of seminars and team meetings to motivate participants	0.217	0.066	0.295	3.288	0.002

6	Problems in group appraisal system	0.006	0.083	0.007	0.078	0.938
7	Lack of consistency in the team	-0.024	0.070	-0.031	-0.345	0.732
8	Problems of data sharing	-0.027	0.054	-0.036	-0.498	0.621
9	Lack of respect among participants	-0.014	0.088	-0.014	-0.164	0.871
10	Lack of trust among participants	0.061	0.070	0.076	0.869	0.390
11	Problems in method of selection of team members	0.052	0.076	0.063	0.679	0.501

Table 4.4 shows multiple regression analysis with the dependent variable as 'Team performance output' and eleven cohesion parameters as independent variables. The results indicate that, the cohesion parameters can predict 86.2% of the variance in 'Team performance output'. The value of F statistic is 22.146 and it is significant with P (0.000). Thus the hypothesis H1c is rejected, because there is positive relationship between parameters of cohesion and 'Team performance output'.

The value of (0.228) depicts that, for every unit increase in individual contribution the will increase 'Team performance output' by (0.228) points. For every unit increase in experience, education and leadership will increase the level of 'Team performance output' by (0.113), (0.184) points and (0.225) points. The un-standardized slopes of (0.217) and (0.006) tells us that 'Team performance output' increases by about (0.217) and (0.006) points for every additional point on the team-meeting group-appraisal-system. The value of (-0.024) means that, for every unit increase in team-composition system the 'Team performance output' will decrease by (0.024) points. For every unit increase in Data-sharing and respect will decrease 'Team performance output' by (-0.027) and (-0.014) points. The un-standardized slopes of (0.061) and (0.052) tells us that 'Team performance output' increases by about (0.061) and (0.052) points for every additional point to the trust and method-of-selection. The coefficient for individual-contribution (0.228) is significantly different from 0 because its p-value is (0.003), which is larger than 0.05. The coefficient for experience (0.113) is not significantly different from 0 because its p-value is (0.058), which is larger than 0.05. The coefficient for education (0.184) is significantly different from 0 because its p-value is (0.044), which is less than 0.05. The coefficient for leadership is **(**0.225) is statistically significant because its p-value of (0.005) is less than 0.05. The

coefficient for team-meetings (0.217) is significantly different from 0 because its p-value is (0.002), which is less than 0.05. The coefficient for group-appraisal and reward (0.006) is not significantly different from 0 because its p-value is (0.938), which is larger than 0.05. The coefficient for team-composition (-0.024) is not significantly different from 0 because its p-value is (0.732), which is larger than 0.05. The coefficient for data-sharing (-0.027) is not significantly different from 0 because its p-value is (0.732), which is larger than 0.05. The coefficient for respect for colleagues (-0.014) is not significantly different from 0 because its p-value is (0.871), which is larger than 0.05. The coefficient for trust (0.061) is not significantly different from 0 because its p-value is (0.390), which is larger than 0.05. The coefficient for method of selection (0.052) is not significantly different from 0 because its p-value is (0.501), which is larger than 0.05. The t-values in the coefficients table indicate the variable's statistical significance.

From the values of beta-coefficients it can be concluded that, the acknowledgement of individual's efforts, experience of participants, seminars & team meetings, education & skill, objective leadership, group appraisal & reward system, method of selection of participants and trust for colleagues contributes in 'Team performance output'. On the contrary, consistency of team members in a team, data sharing and respect among participants have not contributed in 'Team performance output'. The t-values obtained from table indicate that, acknowledgement of individual's contribution (2.081), objective-leadership (3.003), team-meetings (3.288) and education & skill of the participants (2.082) have statistically positive significance in 'Team performance output'.

Table 4.5 Results of regression analysis to test H2b hypotheses

Dependent Variable		**R**	**R Square**	**Adjusted R Square**	**F**	**Sig.**
Consensus among intra-organizational activities		0.885	0.783	0.729	14.452	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Lack of IT implementation	0.143	0.070	0.188	2.038	0.048
2	Lack of decision support	0.223	0.091	0.235	2.466	0.018

3	Lack of information management	-0.006	0.097	-0.007	-0.063	0.950
4	Lack of information accessibility	-0.038	0.079	-0.050	-0.485	0.630
5	Problems in performance of members due to industrial changes because of changing environment	0.037	0.080	0.048	0.459	0.648
6	Problems in team composition process	-0.019	0.083	-0.025	-0.229	0.820
7	Lack of well-defined, documented and structured business processes	0.291	0.087	0.348	3.330	0.002
8	Problems in resolving business conflicts	0.302	0.085	0.383	3.568	0.001
9	Provision of skill training to employees	-0.213	0.105	-0.229	-2.023	0.050
10	Problems in making use of collateral resources	0.226	0.093	0.288	2.439	0.019

The Table 4.5 shows multiple regression analysis with the dependent variable as 'Consensus among intra-organizational activities' and ten alignment parameters as independent variables. The results indicate that alignment parameters can predict 78.3% of the variance in building consensus among intra-organizational activities. The value of F statistic is 14.452 and it is significant with P (0.000). Thus the hypothesis H2b is rejected, because there is positive relationship between parameters of alignment and 'Consensus among intra-organizational activities'.

The value of (0.143) shows that, for every unit increase in information technology will increase 'Consensus among intra-organizational activities' by (0.143) points. For every unit increase in information-access and data-management will decrease the level of 'Consensus among intra-organizational activities' by (-0.006), (-0.038) points. For every unit increase in decision-support and industrial-changes will increase the level of 'Consensus among intra-organizational activities' by (0.0223) and (0.037) points. For every unit increase in team-composition and training will decrease the 'Consensus among intra-organizational activities' by (0.019) and (0.213) points. For every unit increase in procedure-methodology, conflict-resolution and collateral-assistance of resources will increase the 'Consensus among intra-organizational activities' by (0.291), (0.302) and (0.019) points. The coefficients

for information-technology (0.143) and decision-support (0.223) are significantly different from 0 because their p-values are (0.048) and (0.018) which are less than 0.05. The coefficients for information-accessibility (-0.006) and data-management (-0.038) are not significantly different from 0 because their p-values are (0.950) and (0.630), which are larger than 0.05. The coefficients for industrial-changes (0.037), team-composition (-0.019) and training (-0.213) are not significantly different from 0 because their p-values are (0.648), (0.820) and (0.050), which is larger than 0.05. The coefficients for procedure-methodology (0.291), team-composition (0.302) and collateral-assistance-in-resource-utilization (-0.213) are significantly different from 0 because their p-value are (0.002), (0.001) and (0.019), which are larger than 0.05. The computed for information-technology (2.038), decision-support (2.466), procedure-methodology (3.330), conflict-resolution (3.568) and collateral-assistance (2.439) more than 2, showing the statistical positive significance of these five factors on 'Consensus among intra-organizational activities'. From the values of beta-coefficients it can be concluded that, implementation of information and communication technology, provision of decision support system, proper documentation of processes, making use of resources collaterally, time to resolve departmental conflicts and effect of changing scenarios on individual's performance contributes in building consensus among intra-organizational activities. On the other hand, problems in team composition, provision of skill training to employees, information management and information accessibility have not contributed in building consensus among intra-organizational activities. The t-values obtained from table indicate that implementation of information technology (2.038), support for decisions (2.466), well defined and structured processes (3.330), time to resolve intra-organizational conflicts (3.568) and making use of resources collaterally (2.439) have statistically positive significance in building consensus among intra-organizational activities.

Table 4.6 Results of regression analysis to test H2a hypotheses

Dependent Variable		R	R Square	Adjusted R Square	F	Sig.
Data Sharing and data consistency across the organization through IT		0.800	0.640	0.550	7.101	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Lack of IT implementation	0.216	0.094	0.274	2.303	0.027
2	Lack of decision support	0.313	0.121	0.317	2.580	0.014
3	Lack of information management	0.278	0.130	0.324	2.149	0.038
4	Lack of information accessibility	0.197	0.106	0.247	1.866	0.069
5	Problems in performance of members due to industrial changes because of changing environment	-0.186	0.108	-0.234	-1.725	0.092
6	Problems in team composition process	0.101	0.111	0.129	0.912	0.367
7	Lack of well-defined, documented and structured business processes	-0.010	0.117	-0.011	-0.084	0.934
8	Problems in resolving business conflicts	-0.085	0.114	-0.103	-0.747	0.460
9	Provision of skill training to employees	0.111	0.141	0.115	0.786	0.437
10	Problems in making use of collateral resources	-0.043	0.124	-0.053	-0.346	0.731

The Table 4.6 shows multiple regression analysis with the dependent variable as ‘Data Sharing and data consistency across the organization through IT’ and ten alignment parameters as independent variables. The results indicate that alignment parameters can predict 64% of the variance in ‘Data Sharing and data consistency across the organization through IT’. The value of F statistic is 7.101 and it is significant with P (0.000). Thus the hypothesis H2a is rejected, because there is positive relationship between parameters of alignment and ‘Consensus among intra-organizational activities’. The value of (0.216) shows that, for every unit increase in information-technology will increase ‘Data Sharing and data consistency across the

organization through IT' by (0.216) points. For every unit increase in decision-support, data-access and data-management will increase the level of 'Data Sharing and data consistency across the organization through IT' by (0.313), (0.278) and (0.197) points. The un-standardized slope of (-0.186) tells us that 'Data Sharing and data consistency across the organization through IT' will decrease by about (0.186) points for every additional point on the industrial-changes. The value of (0.101) means that, for every unit increase in team-composition the 'Data Sharing and data consistency across the organization through IT' will increase by (0.101) points. For every unit increase in procedure-methodology, conflict-resolution and collateral-assistance in resource utilization will decrease 'Data Sharing and data consistency across the organization through IT' by (-0.010), (-0.085) and (-0.043) points. The un-standardized slope of (0.111) tells us that 'Data Sharing and data consistency across the organization through IT' will increase by about (0.111) points for every additional point to the training. The coefficient for information-technology (0.216) is significantly different from 0 because its p-value is (0.027), which is less than 0.05. The coefficient for decision-support (0.313) is significantly different from 0 because its p-value is (0.014), which is less than 0.05. The coefficient for data-access (0.278) is statistically significantly different from 0 because its p-value is (0.038), which is less than 0.05. The coefficient for data-management is (0.197) is not statistically significant because its p-value of (0.069) is larger than 0.05. The coefficient for industrial-changes (-0.186) is not significantly different from 0 because its p-value is (0.092), which is larger than 0.05. The coefficient for team-composition (0.101) are not significantly different from 0 because its p-value is (0.367), which is larger than 0.05. The coefficient for procedure-methodology (-0.010) is not significantly different from 0 because its p-value is (0.934), which is larger than 0.05. The coefficient for conflict-resolution (-0.085) is not significantly different from 0 because its p-value is (0.460), which is more than 0.05. The coefficient for respect for the training (0.111) is not significantly different from 0 because its p-value is (0.437), which is larger than 0.05. The coefficient for collateral-assistance (-0.043) is not significantly different from 0 because its p-value is (0.731).), which is larger than 0.05. From the values of beta-coefficients it can be concluded that, implementation of information and communication technology, provision of decision support system, management of information, information accessibility, provision of training for skill improvement and team

composition contributes in 'Data Sharing and data consistency across the organization through IT'. On the contrary, time to resolve departmental conflicts, effect of changing scenarios on individual's performance, making collateral use of resources and documentation of business processes have not contributed in 'Data Sharing and data consistency across the organization through IT'. The t-values obtained from table indicate that, implementation of information technology (2.303), support for decisions (2.580) and management of information have statistically positive significance in 'Data Sharing and data consistency across the organization through IT'.

Table 4.7 Results of regression analysis to test H2c hypotheses

Dependent Variable		**R**	**R Square**	**Adjusted R Square**	**F**	**Sig.**
Team performance output parameters		0.819	0.670	0.588	8.132	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Lack of IT implementation	0.099	0.088	0.128	1.121	0.269
2	Lack of decision support	0.249	0.114	0.257	2.189	0.035
3	Lack of information management	0.096	0.121	0.113	0.788	0.435
4	Lack of information accessibility	-0.057	0.099	-0.073	-0.573	0.570
5	Problems in performance of members due to industrial changes because of changing environment	0.036	0.101	0.046	0.352	0.726
6	Problems in team composition process	0.111	0.104	0.144	1.065	0.293
7	Lack of well-defined, documented and structured business processes	0.116	0.110	0.136	1.054	0.298
8	Problems in resolving business conflicts	-0.008	0.106	-0.010	-0.078	0.938
9	Provision of skill training to employees	-0.034	0.132	-0.036	-0.255	0.800
10	Problems in making use of collateral resources	0.312	0.116	0.391	2.685	0.010

The Table 4.7 shows multiple regression analysis with the dependent variable as 'Data Sharing and data consistency across the organization through IT' and ten alignment parameters as independent variables. The results indicate that alignment parameters can predict 67% of the variance in 'Team performance output parameters'. The value of F statistic is 8.132 and it is significant with P (0.000). Thus the hypothesis H2c is rejected, because there is positive relationship between parameters of alignment and 'Team performance output parameters'.

The value of (0.099) depicts that, for every unit increase in information-technology will increase the 'Team performance output' by (0.099) points. For every unit increase in decision-support, data-access and industrial-changes will increase the level of 'Team performance output' by (0.249), (0.096) points and (0.036) points. The un-standardized slope of (-0.057) tells us that 'Team performance output' decreases by about (0.057) points for every additional point on the data-management factor. The value of (0.111) means that, for every unit increase in team-composition 'Team performance output' will increase by (0.111) points. For every unit increase in procedure-methodology and collateral-assistance in resource utilization will increase 'Team performance output' by (0.116) and (0.312) points. The un-standardized slopes of (-0.008) and (-0.034) tells us that 'Team performance output' decreases by about (0.008) and (0.034) points for every additional point to the conflict-resolution and training. The coefficient for information-technology (0.099) is not significantly different from 0 because its p-value is (0.269), which is larger than 0.05. The coefficient for decision-support (0.249) is significantly different from 0 because its p-value is (0.035), which is less than 0.05. The coefficient for data-access (0.096) is no significantly different from 0 because its p-value is (0.435), which is larger than 0.05. The coefficient for data-management is (-0.057) is not statistically significant because its p-value of (0.570) is larger than 0.05. The coefficient for industrial-changes (0.036) is not significantly different from 0 because its p-value is (0.726), which is larger than 0.05. The coefficient for team-composition (0.111) is not significantly different from 0 because its p-value is (0.293), which is larger than 0.05. The coefficient for procedure-methodology (0.116) is not significantly different from 0 because its p-value is (0.298), which is larger than 0.05. The coefficient for conflict-resolution (-0.008) is not significantly different from 0 because its p-value is (0.938), which is more than 0.05. The coefficient for respect for the training (-

0.034) is not significantly different from 0 because its p-value is (0.800), which is larger than 0.05. From the values of beta-coefficients it can be concluded that, implementation of information and communication technology, provision of decision support system, management of information, effect of changing scenarios on individual's performance, team composition, definition and documentation of processes and collaterally use of resources contributes in 'Team performance output'. On the contrary, time to resolve departmental conflicts, information accessibility and skill trainings for employees have not contributed in 'Team performance output'. The t-values obtained from table indicate that, the support for decisions (2.189) and making use of collateral resources (2.658) have statistically positive significance in 'Team performance output'.

Table 4.8 Results of regression analysis to test H3b hypotheses

Dependent Variable		**R**	**R Square**	**Adjusted R Square**	**F**	**Sig.**
Consensus among intra-organizational activities		0.746	0.557	0.485	7.724	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Inter-departmental goals complementing organizational goals	-0.004	0.130	-0.005	-0.033	0.974
2	Intra-departmental goals complementing organizational goals	0.305	0.115	0.349	2.658	0.011
3	Lack of responsibility	0.073	0.113	0.088	0.651	0.518
4	Lack of accountability	0.220	0.114	0.235	1.926	0.061
5	Problems in decision making at different levels	-0.006	0.117	-0.009	-0.054	0.957
6	Lack of authority	0.029	0.122	0.036	0.236	0.815
7	Lack of equal opportunity to members of team	0.295	0.098	0.336	3.020	0.004

The Table 4.8 shows multiple regression analysis with the dependent variable as 'Consensus among intra-organizational activities' and seven balance parameters as independent variables. The results indicate that parameters of balance can predict 55.7% of the variance in building consensus among intra-organizational activities. The value of F statistic is 7.724 and it is significant with P (0.000). Thus the hypothesis H3b is rejected, because there is positive relationship between parameters of balance and 'Consensus among intra-organizational activities'. The value of (-0.004) shows that, for every unit increase in inter-organizational goals, 'Consensus among intra-organizational activities' will decrease by (0.004) points. For every unit increase in intra-organizational goals will increase the level of 'Consensus among intra-organization activities' by (0.305) points. For every unit increase in responsibility and accountability will increase the level of 'Consensus among intra-organizational activities' by (0.073) and (0.220) points. For every unit increase in decision-making at different levels will decrease the level of 'Consensus among intra-organizational activities' by (0.006) points. For every unit increase in authority and equal-opportunity will increase the level of 'Consensus among intra-organizational activities' by (0.029) and (0.295) points. The coefficients for inter-organizational-goals (-0.004) and responsibility (0.073) are not significantly different from 0 because its p-value is (0.974) and (0.518) which is larger than 0.05. The coefficients for intra-organizational-goals (0.305) and equal-opportunity (0.295) are significantly different from 0 because its p-value is (0.011) and (0.004), which is less than 0.05. The coefficients for accountability (0.220), decision-making at different levels (-0.006) and authority (0.029) are not significantly different from 0 because its p-value is (0.061), (0.957) and (0.815), which is larger than 0.05.

From the values of beta-coefficients it can be concluded that, balancing of intra-organizational goals, providing equal opportunity to share views and empowerment of employees by giving them valid responsibilities, accountabilities and authorities contribute in building consensus among intra-organizational activities. On the other hand, balancing of inter-organizational goals and decision making problems have not contributed in building consensus among intra-organizational activities. The t-values obtained from table indicate that, balancing of intra-organizational goals (2.658) and equal opportunity to share and express views (3.020) have statistically positive significance in building consensus among intra-organizational activities.

Table 4.9 Results of regression analysis to test H3a hypotheses

Dependent Variable		R	R Square	Adjusted R Square	F	Sig.
Data Sharing and data consistency across the organization through IT		0.651	0.424	0.330	4.515	0.001
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Inter-departmental goals complementing organizational goals	0.194	0.154	0.211	1.258	0.215
2	Intra-departmental goals complementing organizational goals	0.419	0.136	0.461	3.077	0.004
3	Lack of responsibility	0.275	0.134	0.318	2.051	0.046
4	Lack of accountability	-0.007	0.136	-0.007	-0.053	0.958
5	Problems in decision making at different levels	-0.231	0.139	-0.309	-1.657	0.105
6	Lack of authority	-0.060	0.145	-0.071	-0.414	0.681
7	Lack of equal opportunity to members of team	0.164	0.116	0.179	1.415	0.164

The Table 4.9 shows multiple regression analysis with the dependent variable as ‘Data Sharing and data consistency across the organization through IT’ and seven parameters of balance as independent variables. The results indicate that parameters of balance can predict 42.4% of the variance in ‘Data Sharing and data consistency across the organization through IT’. The value of F statistic is 4.515 and it is significant with P (0.001). Thus the hypothesis H3a is rejected, because there is positive relationship between parameters of balance and ‘Data Sharing and data consistency across the organization through IT’.

The value of (0.194) shows that, for every unit increase in inter-organizational goals will increase ‘Data Sharing and data consistency across the organization through IT’ by (0.194) points. For every unit increase in intra-organizational goals will increase the level of ‘Data Sharing and data consistency across the organization through IT’ by (0.419) points. For every unit increase in responsibility and equal-opportunity will increase the level of ‘Data Sharing and data consistency across the organization through IT’ by (0.275) and (0.164) points. For every unit increase in accountability, decision-making and authority will decrease the level of ‘Data Sharing and data

consistency across the organization through IT' by (-0.007), (-0.231) and (-0.060) points. The coefficients for inter-organizational-goals (0.194) and accountability (-0.007) are not significantly different from 0 because their p-values are (0.215) and (0.958) which is larger than 0.05. The coefficients for intra-organizational-goals (0.419) and responsibility (0.275) are significantly different from 0 because their p-values are (0.004) and (0.046), which is less than 0.05. The coefficients for accountability (-0.007), decision-making (-0.231) and authority (-0.060) are not significantly different from 0 because their p-values are (0.958), (0.105) and (0.681), which is larger than 0.05. . From the values of beta-coefficients it can be concluded that, balancing of intra-organizational & inter-organizational goals with departmental goals, responsibility and providing equal opportunity to share views contribute in 'Data Sharing and data consistency across the organization through IT'. On the other hand, accountability & authority and problems in decision making at different levels have not contributed in 'Data Sharing and data consistency across the organization through IT'. The t-values obtained from table indicate that, balancing of intra-organizational goals (3.077) and proper range and degree of responsibility (2.051) have statistically positive significance in 'Data Sharing and data consistency across the organization through IT'.

Table 4.10 Results of regression analysis to test H3c hypotheses

Dependent Variable		**R**	**R Square**	**Adjusted R Square**	**F**	**Sig.**
Team performance output parameters		0.850	0.722	0.677	15.989	0.000
Sr. No	**Independent Variable(s) (Lack in)**	**Unstandardized Coefficients**		**Beta**	**t**	**Sig.**
		B	**Std. Error**			
1	Inter-departmental goals complementing organizational goals	0.215	0.105	0.240	2.056	0.046
2	Intra-departmental goals complementing organizational goals	0.261	0.092	0.293	2.819	0.007
3	Lack of responsibility	-0.017	0.091	-0.020	-0.183	0.856
4	Lack of accountability	0.193	0.092	0.202	2.095	0.042
5	Problems in decision making at different levels	-0.030	0.095	-0.041	-0.317	0.753
6	Lack of authority	0.166	0.099	0.201	1.684	0.099
7	Lack of equal opportunity to members of team	0.276	0.079	0.309	3.508	0.001

The Table 4.10 shows multiple regression analysis with the dependent variable as 'Team performance output parameters' and seven parameters of balance as independent variables. The results indicate that parameters of balance can predict 72.2% of the variance in 'Team performance output'. The value of F statistic is 15.989 and it is significant with P (0.000). Thus the hypothesis H3c is rejected, because there is positive relationship between parameters of balance and 'Team performance output parameters'. The value of (0.215) depicts that, for every unit increase in inter-organizational goals will increase the 'Team performance output' by (0.215) points. For every unit increase in intra-organizational goals will increase the 'Team performance output' by (0.261) points. For every unit increase in responsibility and decision-making will decrease the 'Team performance output' by (-0.017) and (-0.030) points. For every unit increase in accountability, authority and equal-opportunity will increase the 'Team performance output' by (0.193), (0.166) and (0.276) points. The coefficients for inter-organizational-goals (0.215) and responsibility-accountability (0.193) is significantly different from 0 because its p-value is (0.046) and (0.042) which is less than 0.05. The coefficient for intra-organizational-goals (0.261) is significantly different from 0 because its p-value is (0.007), which is less than 0.05. The coefficient of responsibility (-0.017) is not significantly different from 0 because its p-value is (0.856), which is larger than 0.05. The coefficients for accountability (0.193) and equal-opportunity (0.276) are significantly different from 0 because their p-value is (0.042) and (0.001), which is less than 0.05. The coefficients of decision-making at different levels (-0.030) and authority (0.166) are not significantly different from 0 because its p-value is (0.753) and (0.099), which is larger than 0.05. From the values of beta-coefficients it can be concluded that, balancing of intra-organizational & inter-organizational goals with departmental goals, accountability, authority and provision of equal opportunity to share views contribute in 'Team performance output'. On the other hand, employee responsibilities and problems in decision making at different levels have not contributed in 'Team performance output'. The t-values obtained from table indicate that, balancing of intra-organizational goals (2.819), inter-organizational goals (2.056), accountability (2.095) and equal opportunity to share and express views (3.508) have statistically positive significance in 'Team performance output'.

CHAPTER- 5

CONCLUSIONS

5.1 INTRODUCTION

This chapter covers the summary of research work, its results, conclusions and the recommendations. The chapter also lists various areas, which can be explored in further research. Based on the results and the findings, conclusions have been drawn and recommendations have been made.

5.2 RESULTS AND MAJOR FINDINGS

On analyzing the data collected, a number of inadequacies in the existing system have been observed. With respect to the inadequacies, extensive literature regarding BPI was revisited to identify and specify the precise measures to address the lacuna in system. The following table presents a list made of inadequacies and their corrective measures. From the table 5.1, it is summarized that, trust is the main factor considered by the organization for building consensus among intra-organizational activities. Employees found good in trusting each other. (Lewis & Weigert, 1985) also viewed trust as a characteristic of the social fabric that facilitates interactions among participants. The data highlights that meetings and seminars have been held by industry on a routine basis to increase the understanding of tasks and also for understanding each other. There are some aspects in which organization is lacking in order to build consensus, these are group appraisal, reward, recognition and method of intake of team members. To be effective, rewards and recognition must be tailored to the individuals as well as groups to enhance the team values and goals (Nelson, 1994; Bowen, 2000; Daniels, 2001; Daniels, 1994). Lack of reward and acknowledgement of an individual's efforts severely degrades the individual's willingness to contribute towards their team and organization. The selection and consistency of members in the team are very important points for building consensus. The team members should be selected on the basis of ability, knowledge, personality and skills. Which finds coherence with (Corso, 1993) the individual performance should be consistent with the performances of colleagues. (Corso, 1993) Indicated that, high level of heterogeneity within a team leads to high level of conflicts, which is counter-

productive. The teams should be of a homogeneous nature. It is recommended that while composing team, the members with same work experience, age, knowledge and skill should be selected. Which finds coherence with (Stehle, 1999) the diverse teams have inherently a higher conflict potential than homogenous teams. It is suggested that the team members need to respect and trust their colleagues for building a good alliance. The data highlighted that, no leadership and motivational source has been found to enhance individual's efforts and interests of working as a group. (Wang et al., 2005) considered leadership as a factor that has a major influence on the performance of organizations, managers and employees. The data highlighted that lack of leadership and motivation has resulted in lack of data & information sharing and communication gaps between employees. Lack of data and information sharing is very severe problem in the industry that affects consensus. It is suggested that the industry should offer educational opportunities & exposure to specialized training programs for employees.

Table 5.1 Results of cohesion variables and consensus among intra-organizational activities

Consensus among intra-organizational activities	
Lack of acknowledgement of about individual contribution	Industry should acknowledge its individuals by doing Sincere and genuine appreciation.
Variation in experiences of participants	Variation can be reduced by composition of them by selecting employees of the same age group, same work experiences, because they can easily build consensus.
Lack of appropriate education and skills of the participants	Industry should offer educational opportunities & exposure to specialized training programs for employees.
Lack of objective leadership	Industry should manage the departments and teams by objectives. The leaders should take the decisions in the participative environments, so that every employee can be aware of the organizational goals and strategies. The industry should also promote the understudy assignments.
Lack of seminars and team meetings to motivate the participants	The industry has given employees the opportunity during meetings to discuss on common issues related to their work, the teams are working as quality circles, no changes required in it.
Problems in group appraisal system	The rewards should be proportionate to the efforts of individuals, so that every member of the group can be recognized.
Lack of consistency in the team	Teams should progress from being a loosely formed collection of individuals to a collective, integrated and tightly couple team, by enhancing individual performances.

Problems of data sharing	Industry should motivate the employees to exchange data as well as knowledge with colleagues to increase the team output.
Lack of respect among participants	Industry should build the work culture that promotes respect for team members and senior employees.
Lack of trust among participants	Trust in the industry is working as social fabric to facilitate interactions among employees; no change is required in it.
Problems in method of selection of team members	Team members should be selected on the basis of ability, personality and skill of individual team members.

Table 5.2 Results of alignment variables and consensus among intra-organizational activities

Consensus among intra-organizational activities	
Lack of IT implementation	The industry's IT system supports task coordination, distributes cognition and capable to handle interactivity, no changes required.
Lack of decision support	The ICT is providing good support for decision to the employees in the industry, it guides and motivate the employees in performing their jobs more responsibly, no changes required.
Lack of information management	Information sources should be explicitly defined, Industry should also define data flows more specifically.
Lack of information accessibility	
Problems in performance of members due to industrial changes because of changing environment	Industry needs to provide exposure to employees through short term courses to enhance their skills and technical know-how. The technical sound and motivated employees can adapt to changes more quickly, and consensus can be easily built. Employees should also need to continue their existing team cohesion during times of change.
Problems in team composition process	The team composition should be done on the basis of homogeneity and compatibility of individuals with others. The selection should be fair and made on merit basis.
Lack of well-defined, documented and structured business processes	The industry is distributing knowledge about the technology / equipment (e.g. Equipment functioning and operating procedures) and one's task (e.g. Task procedures, strategies and component relationships), no changes required.
Problems in resolving business conflicts	Employees are co-ordinating in performing tasks, collaborating together to develop solutions to problems, and resolving interpersonal conflicts, so no changes required.
Provision of skill training to employees	Industry should ensure the support for employees for short term programs, skill development programs to develop productive business processes.
Problems in making use of collateral resources	The industry is sharing goals and visions with other departments within the organization and also creating collegial support in utilization of resources, no changes required.

From the obtained results, it can be concluded that the manufacturing organization has implemented a sound information technology system to integrate their business processes. Data for the functioning of processes is collected from many sources, so in order to tackle with data-related conflicts. It is recommended that the industry should define the data flows and data sources more specifically and explicitly. In order to achieve and maintain a strategic alignment between a firm's strategy, processes and stakeholders, it is necessary to capture the information at each point of contact and make it accessible throughout the enterprise (Lockamy & Smith, 1997). The industry knows that, information is a key asset of all business processes. From the data collected & analyzed it is evident that, the information is properly documented with explanations to minimize the frequency of intra-departmental and inter-departmental conflicts. To achieve a sustainable competitive advantage, manufacturing organization must be able to adapt quickly to changes. It is also recommended that, the Industry needs to provide exposure to the employees through short term courses to enhance their skills and technical know-how. It is suggested that the teams should also need to maintain their existing cohesion during times of change. Team composition should be done on the basis of homogeneity, compatibility and fairly on the basis of merit. From results we can be said as in industry, the goals and visions are shared with all departments to get collateral support during utilization of resources. It is recommended that the organization should provide time, support for professional education and training to the individuals so that, they can hone the values that support team work.

Table 5.3 Results of balance variables and consensus among intra-organizational activities

Consensus among intra-organizational activities	
Inter-departmental goals complementing organizational goals	The industry needs to avoid piecemeal approach and should propagate the system approach to complement the organizational goals by all departments. The industry should make the strategies by knowing the critical success factors at the organizational level. The organizational strategies also need to be linked with departmental objectives.
Intra-departmental goals complementing organizational goals	The inter-departmental organizational goals are achieved by reaching the team goals on time, so no changes required.
Lack of Responsibility	Industry should introduce the time frames and the deliverables of the responsible employees. The persons assigned with responsibilities should know what industry expects from them, and they should also know their range of work
Lack of Accountability	Industry's accountability and feedback systems supporting the team members' developing a collective sense of responsibility for the success of the team, so no changes required.
Problems in decision making at different levels	Industry should provide relevant, current and accurate data to its employees for decision taking. The decisions should not be taken with bounded rationality; all alternatives should also be studied before deciding.
Lack of Authority	The industry should provide co-equal authority to the all team members to build consensus between them.
Equal opportunity for members of team	The organization is providing equal opportunity to its employees to share their views and participate in every important event, so there is no need to change.

From the results it can be concluded that, the inter-departmental goals are not complementing organizational goals. It is suggested that the industry needs to avoid piecemeal approach and should propagate the system approach to complement the organizational goals by all departments. It is recommended that the industry should make the strategies by knowing the critical success factors at the organizational level. The organizational strategies also need to be linked with departmental objectives. From the data it is evident that the intra-departmental goals are complementing organizational goals, because teams are performing well. The industry needs to explain the deliverables of responsible persons, and also the time frame, the range and degree of responsibility should be defined. It is suggested that the Industry should define single accountability of responsible persons for their actions, and also needs to provide co-equal authority to all the team members for building consensus between them. Industry should provide relevant, current and accurate data to its employees for decision taking. It is recommended that the decisions should not be taken with bounded rationality approach; all alternatives should also be studied before taking decisions. It is recommended that every employee in the organization should be encouraged to share their views with managers and leaders and also can suggest the ways and ideas to build consensus among team members.

Table 5.4 Results of cohesion variables and Data sharing and data consistency across the organization

Data Sharing and data consistency across the organization	
Lack of acknowledgement of about individual contribution	The industry should have better systems to identify individual and group contribution.
Variations in experiences of participants	Categorization of team members should be based on traits – such as their functional background and educational level. The Industry should offer educational opportunities & exposure to specialized training programs for employees.
Lack of appropriate education and skills of the participants	
Lack of objective leadership	Leaders are communicating the visions and objectives with the employees to motivate and guide them in achieving departmental and organizational goals, so no changes required.
Lack of seminars and team meetings to motivate the participants	The industry should run joint programs with industry consortia, academia for acquiring know how about the state of the art and learn technological advancements.
Problems in group appraisal system	The rewards should be proportionate to the efforts of individuals, so that every member of the group can be recognized.
Lack of consistency in the team	Teams should progress from being a loosely formed collection of individuals to a collective, integrated and tightly couple team, by enhancing individual performances.
Problems of data sharing	The team members share task-relevant knowledge and information through interacting with one another, so no changes required.
Lack of respect among participants	To provide a sustained increase in team effectiveness, organization needs to build a work culture that promotes respect and trust among team members.
Lack of trust among participants	
Problems in method of selection of team members	The selection of team members should be done fairly and members should be selected on the basis of their consistent performances and their ability to match with the team's objectives.

The members of more cohesive teams demonstrate better individual performance and report more physical and psychological resilience under duress (Kidwell et al., 1997; Podsakoff et al., 1997; Vallacher et al., 1974). Recognition and acknowledgement motivate the employees to contribute their efforts more sincerely and seriously. From table 5.4 it is recommended that, the industry needs to work on both these aspects to increase the morale of their employees. Employee acknowledgement and rewarding on account of their group contribution is one of the most effective ways that organizations have to promote team working (Larson and LaFasto, 1989). It is suggested that the selection of team members should be done fairly done on the bases of merit results, and members should be selected on the basis of their consistent performances and their ability to match with the team's objectives. It is recommended that the industry should run joint programs with industry consortia and academia for acquiring know how about the state of the art and leading technological advancements. The industry also needs to enable respect and trust among team members, to increase the data transferring and sharing capabilities of the employees. Respect for a person requires certain actions or behavioural expressions, which are deserved by the person (Dillon & Gibbard, 1990). To provide a sustained increase in team effectiveness, organization needs to build a work culture that promotes respect and trust among team members. From the data it collected and analyzed it is evident that, the managers and team leaders are focused and determined towards their duties, they are influencing and adopting the principles of concurrency in data sharing and in goal congruence. Which forms coherence with (Avolio et al., 2003) leadership is the ability to influence others towards achieving group goals. It is evident that the leaders are communicating the visions and objectives with the employees to motivate and guide them in achieving departmental and organizational goals.

Table 5.5 Results of alignment variables and Data sharing and data consistency across the organization

Data Sharing and data consistency across the organization	
Lack of IT implementation Lack of decision support	The functionalities that IT support system provides in support for task coordination includes: task scheduling, templates for creating team mission, meeting schedules, roles & responsibilities and specifying communication norms. So no changes required.
Lack of Information management	The information sources and information path flows are specifically defined, no changes required.
Lack of Information accessibility	The industry should have a company-wide single information database. Industry should implement the ERP packages for better functioning of departments. Industry should also define the levels of access of information for their employees.
Problems in performance of members due to industrial changes because of changing environment	Industry should provide exposure to employees through short term courses to enhance their skills and technical knowhow. The technical sound and motivated employees can adapt to changes more quickly, and consensus can be easily built. Employees should also need to continue their existing team cohesion during times of change.
Problems in team composition process	The team composition should be done on the basis of homogeneity and compatibility of individuals with others. The selection should be fair and made on merit basis.
Lack of well-defined, documented and structured business processes	Industry should define a clear sequence of steps in each business process. Industry needs to define explicitly the data and information requirements for functioning of each process. Industry also should define the outputs of business processes.
Problems in resolving business conflicts	Industry should use critical success factors as determinants for resolving business process conflicts.
Provision of skill training to employees	Industry should give more efforts in training skills by providing team members with information skills, application of common tools and by developing a shared perception of the environment in which they work
Problems in making use of collateral resources	Resources are shared in the industry with various departments for performing tasks but the problem occurs when same resources are required for more than one business process. The industry should avoid operating the departments as functional silos to solve this issue.

The results show that, the industry is dealing with problems related to resource utilization and business process conflicts. The conflicts arise due to the lack of sharing of data, information and resources with others. It is suggested that the industry should explicitly define the data requirements for functioning of each process to resolve conflicts. The information should be provided more explicitly, by using tools like: flowcharts, workflow diagrams, etc. It is recommended that the team members should show agreeableness in sharing data and resources, while working in a collaborative environment. Teams should be composed fairly on the basis of merit, homogeneity, compatibility to work in a collaborative environment. Teams that are composed of team members who have more knowledge concerning teamwork perform better than teams that are composed of team members who have less knowledge concerning teamwork (Morgeson and DeRue, 2006; Hirschfeld et al., 2006). The teams that did not have any members who were particularly low in agreeableness or extroversion (personality factors) were found to be high-performing teams (Allen and West, 2005). Interpersonal skill training contributes to increase team performance (Bradley et al., 2003). It is also suggested that the organization needs to provide skill training to enhance the employee's abilities. The skilled employees are more adaptive to new situations and can be assigned to any job when required. Industry should give more efforts in training skills by providing team members with information skills, application of common tools and by developing a shared perception of the environment in which they work. Training teamwork skills and cross training team members resulted in the most adaptive teams (Burke et al., 2006). It is suggested that, the industry needs to implement a company-wide single information database for better transfer and accessibility of information. The industry also needs to implement Enterprise resource planning (ERP) packages to increase the organization's ability to transfer data.

Table 5.6 Results of balance variables and Data sharing and data consistency across the organization

Data Sharing and data consistency across the organization	
Inter-departmental goals complementing organizational goals	The industry needs to avoid piecemeal approach and should propagate the system approach to complement the organizational goals by all departments. The industry should make the strategies by knowing the critical success factors at the organizational level. The organizational strategies also need to be linked with departmental objectives.
Intra-departmental goals complementing organizational goals	The inter-departmental organizational goals are achieved by reaching the team goals on time, so no changes required.
Lack of responsibility	The employees assigned to responsibilities knows the deliverables, range of work and doing their jobs responsibly, so no further changes required.
Lack of accountability	The people with assigned with responsibilities should be accountable for their decisions and actions.
Problems in decision making at different levels	Industry should provide relevant, current and accurate data to its employees for decision taking. The decisions should not be taken with bounded rationality; all alternatives should also be studied before deciding.
Lack of authority	The industry should provide co-equal authority to all the team members to share data and knowledge among participants.
Lack of equal opportunity for members of team	The industry should appreciate diverse views and knowledge. Industry should also avoid lobbying and biased decision making.

From the data studied and analyzed it is evident that, intra-departmental goals are complementing the organizational goals, but inter-departmental goals are not complementing the organizational goals. It is recommended that the industry should avoid the piecemeal approach and should propagate the system approach to complement the organizational goals by all departments. It is also recommended that the industry should make strategies by knowing the critical success factors at organization level. It is evident from results, the employees are responsible and know well what the organization's expectations from them are. It is suggested that the employees should also need to be accountable for their actions, to reduce the miss-use of information. It is also suggested that, the Industry should appreciate the diverse views and knowledge offered by participants. It is recommended that the biased decisions should be avoided. Industry should provide valid, accurate and current data for decision making in order to increase the quality of decisions.

Teams that are more cohesive demonstrate better performance than less cohesive teams (Grice and Katz, 2005). From the table 5.7, it is evident that, the organization is acknowledging their employees for their efforts and contributions by providing rewards, bonuses and by increments. Individual values also make a difference, as teams that consist of members who value being on a team perform better than teams that consist of members who do not value being on a team (Bell, 2007; Salas et al., 2005). Members who do not value being on the team are less likely to be motivated to learn team skills (Salas et al., 2005). It is recommended that, the team members should be selected to create a homogeneous environment in the organization.

Table 5.7 Results of cohesion variables and team performance output

Team performance output	
Lack of acknowledgement of about individual contribution	The industry is acknowledging and recognizing the employees for their efforts by providing rewards, bonuses, and increments. So no changes required.
Variation in experiences of participants	Categorization of team members should be based on traits – such as their functional background and educational level. The Industry should offer educational opportunities & exposure to specialized training programs for employees.
Lack of appropriate education and skills of the participants	
Lack of objective leadership	Leaders are providing supporting direction and motivation for employees to meet their goals, so no changes required.
Lack of seminars and team meetings motivate participants	The industry is holding meetings to discuss task related issues and also to discuss about task uncertainties and goal achievement, so changes are required.
Problems in group appraisal system	The rewards should be proportionate to the efforts of individuals, so that every member of the group can be recognized.
Lack of consistency in the team	The industry should avoid the low levels of exits and entries into the team. Industry should avoid using substitutes, and should mandatory the presence of members in the team.
Problems of data sharing	Industry should use centralized data that should be accessible by every employee. The industry also needs to implement a transparent information system.
Lack of respect among participants	Industry should build the work culture that promotes respect for team members and senior employees. Team members should have a high degree of emotional intelligence in order to represent oneself as a trustworthy in the team relationship
Lack of trust among participants	
Problems in method of selection of team members	The team should be of homogeneous nature, industry should reduce the diversity in team by reducing individual differences within a team in terms of age, gender, nationality and ethnicity. The selection process should be fair.

It is suggested that the team members should be selected to create a homogeneous environment in the organization. One way of selecting for teams is to identify those individuals who are best suited to work as team, ensuring that each individual team member possesses the qualities and skills that lend themselves to optimal teamwork. Many organizations use competency frameworks to select individuals (e.g., IBM, GE, Verizon, Waste Management, Hanover, Shell, 3M, the United States Office of Personnel Management) (Rodriguez et al., 2002). Within these frameworks, a "team-working" competency may be found that measures how an individual supports other team members and share knowledge with them. The industry also needs to recognize the group's performance, because if a group is rewarded for its effort, the participants get motivated to work as an alliance. From the data it is evident that the lack of group recognition is the main cause of lack of data sharing, respect, trust and consistency of performances in teams. It is recommended that the industry should build a work culture that promotes trust and respect of the senior members and colleagues to increase the team output. From the data collected and analyzed it is evident that the industry has given employees the opportunity during meetings to discuss on common issues related to their work and the teams are working as quality circles. From the results, it is evident that the managers are working well with their leadership qualities and initiatives to enhance the team performance. Leadership is proposed as a pivotal factor in the quest to become a learning organization because leaders challenge status quo assumptions regarding the environment and guide followers in creating shared interpretations that become the basis for effective action (Altman and Iles, 1998; Appelbaum and Goransson, 1997; Naot et al., 2004; Vera and Crossan, 2004; Williams, 2001). It is suggested that the industry should use centralized database that should be accessible by every employee. The industry also needs to implement a transparent information system.

Table 5.8 Results of alignment variables and team performance output

Team performance output	
Lack of IT implementation	A functional information system needs to be integrated with all departments through IT. Industry should implement an ERP system for better resource planning and utilization.
Lack of decision support	The ICT is providing good support for decision to the employees in the industry, it guides and motivate the employees in performing their jobs more responsibly, no changes required.
Lack of information management	Industry needs to handle the information more efficiently by improving information planning & controlling, by avoiding information overload and by avoiding inconsistencies in data.
Lack of information accessibility	Industry needs to improve its management of database and models for analyzing data.
Problems in performance of members due to industrial changes because of changing environment	Industry needs to provide exposure to employees through short term courses to enhance their skills and technical knowhow. The technical sound and motivated employees can adapt to changes more quickly, and consensus can be easily built. Employees should also need to continue their existing team cohesion during times of change.
Problems in team composition process	The team composition should be done on the basis of homogeneity and compatibility of individuals with others. The selection should be fair and made on merit basis.
Lack of well-defined, documented and structured business processes	Industry should define a clear sequence of steps in each business process. Industry needs to define explicitly the data and information requirements for functioning of each process. Industry also should define the outputs of business processes.
Problems in resolving business conflicts	Industry should use critical success factors as determinants for resolving business process conflicts.
Provision of skill training to employees	Industry should give more efforts in training skills by providing team members with information skills, application of common tools and by developing a shared perception of the environment in which they work
Problems in making use of collateral resources	The industry is sharing goals and visions with other departments within the organization and also creating collegial support in utilization of resources, no changes required.

It is observed that, the industry need to implement a fully functional information system and it should be integrated with all departments. From the results, it is evident that, the industry also needs to implement an ERP system for better planning and utilization of resources to increase process performance. Organizational support systems impact the effectiveness of teams (Sundstrum, et al., 1990) and provide resources for teams operating in the multi-team environment. From the results it is evident that the industry is providing full support in decision making by giving instructions and guidelines to the employees through ICT. A process can-not be performed without data and information. Industry needs to handle the information more efficiently by improving information planning & controlling, by avoiding information overload and by avoiding inconsistencies in data. The data can be accessible to everyone by proper management of the information database. Planning for the unpredictable may seem an impossible irony, but industry needs to recognize that in a period of turbulence. Industry needs to provide exposure to employees through short term courses to enhance their skills and technical knowhow. The teams should also need to maintain their existing cohesion during times of change. Planning for the unpredictable may seem an impossible irony, but industry needs to recognize that in a period of turbulence. The composition of a team is considered to have a strong influence on team processes and outcomes (Bell, 2007). It is recommended that the teams should be composed fairly on the basis of merit, homogeneity, compatibility to work as a group. Industry should define a clear sequence of steps to perform each business process. It is also recommended that, the Industry needs to define explicitly the data and information requirements by information system analysis for functioning of each process. Industry also should define the outputs of business processes. From the results it is evident that the industry is sharing goals and visions with other departments within the organization and also creating collateral support in utilization of resources. It is suggested that the industry should know the critical success factors (CSFs) at the organizational level, and then need to resolve conflicts by working on CSFs. Industry should give more efforts in improvement of training skills by providing team members with information skills, application of common tools and by developing a shared perception of the environment in which they work. Training individual team skills and training teams together encourages better individual and team performance (Hirschfeld et al., 2006; Paris et al., 2000; Bowers, 2000).

Table 5.9 Results of balance variables and team performance output

Team performance output	
Inter-departmental goals complementing organizational goals	The inter-departmental and intra-departmental goals are synchronized with the organizational goals, so no changes required.
Intra-departmental goals complementing organizational goals	
Lack of responsibility	Industry should introduce the time frames and the deliverables of the responsible employees. The persons assigned with responsibilities should know what industry expects from them, and they should also know their range of work
Lack of accountability	Industry's accountability and feedback systems supporting the team members' developing a collective sense of responsibility for the success of the team, so no changes required.
Problems in decision making at different levels	Industry should provide relevant, current and accurate data to its employees for decision taking. The decisions should not be taken with bounded rationality; all alternatives should also be studied before deciding.
Lack of authority	The industry should provide co-equal authority to the all team members to build consensus between them.
Lack of equal opportunity for members of team	The organization is providing equal opportunity to its employees to share their views and participate in every important event, so there is no need to change.

From results, it is evident that, industry's inter-departmental and intra-departmental goals are synchronized with the organizational goals to increase the organizational performance. The industry needs to explain the deliverables of responsible persons, and also the time frame, the range and degree of responsibility should be defined. It is recommended that, the Industry should define single accountability of responsible persons for their actions. It is also recommended that, the industry needs to provide co-equal authority to all the team members for building consensus between them. It is suggested that, the Industry should provide relevant, current and accurate data to its employees for decision taking. It is also suggested that the decisions should not be

taken with bounded rationality; all alternatives should also be studied before taking decisions. From the data collected and analyzed it is evident that every employee in the organization can share his views with managers and leaders and also can suggest the ways and ideas to increase the team performance.

5.3 SCOPE OF FUTURE WORK

The current study suggests several interesting directions for future research. To further extend this study, it could be interesting to include other input or process factors. Following are some main areas that are related to this study and in future can be explored.

I. Designing methodology of implementation of improve to ensure long term changes.

II. Restructuring of business process integration architecture by embedding the proposed changes without any ripple effect.

III. To extend the BPI architecture into the external supply chain to encompass supplier through Electronic Data Interchange (EDI) and IT, thereby enabling inter-organizational integration.

CHAPTER- 6

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Web references

1 Fig. 1., Jenz & Partner Business Performance Architecture (BPA) model., (http://www.bpiresearch.com/BPI)

2 http://www.lcsc.edu/mcolins/groupcohesion

Annexure-1

Details of organization

Name of the organization	XYZ group, Mandi-Gobindgarh, Punjab
Companies	**XYZ Udyog (P) Ltd. (Mandi-Gobindgarh)** **XYZ Alloys (P) Ltd. (Mandi-Gobindgarh)** **XYZ Alloys (P) Ltd.** (Steel Melting Shop Division) (Amloh)
Business type	Manufacturer / Exporter
Trade and Market	North America South America Eastern Europe South-east Asia
Year of extablishment	1980
Certified by	ISO 9001:2000
Total number of employees	200-250
Annual turnover	INR 500 crores
Production in TRs	1,20,000 metric TRs per year
Brands	ABC
Products	Tempcore tmt bars - 8 mm to 36 mm Angles – 40 mm to 200 mm Channels- 75 mm to 300 mm Beams – 150 mm to 300 mm
Address	Madi Gobindgarh (Punjab), pin code: 147301.