T.C.
MARMARA UNIVERSITY
INSTITUTE FOR GRADUATE STUDIES IN
PURE AND APPLIED SCIENCES

BUSINESS PROCESS REENGINEERING AND ITS APPLICATION IN A MULTINATIONAL COMPANY

Beliz ÖZSOY

(Business Administration)

THESIS

FOR THE DEGREE OF MASTER OF SCIENCE

IN

ENGINEERING MANAGEMENT PROGRAMME

SUPERVISOR
Prof. Dr. Arif GÜLLÜOĞLU

İSTANBUL 2007

T.C.
MARMARA UNIVERSITY
INSTITUTE FOR GRADUATE STUDIES IN
PURE AND APPLIED SCIENCES

BUSINESS PROCESS REENGINEERING AND ITS APPLICATION IN A MULTINATIONAL COMPANY

Beliz ÖZSOY

(Business Administration)

141102420040387

THESIS
FOR THE DEGREE OF MASTER OF SCIENCE
IN
ENGINEERING MANAGEMENT PROGRAMME

SUPERVISOR
Prof. Dr. Arif GÜLLÜOĞLU

İSTANBUL 2007

ACKNOWLEDGEMENT

Hereby I would like to convey my sincere gratitude to my supervisor Prof Dr. Arif Güllüoğlu who led my study with his valuable comments and recommendations.

I would like to thank Doç Dr. Özalp Vayvay and Yrd. Doç. Bahar Sennaroğlu for supporting and assisting me with resources and also with their knowledge and experience.

I also would like to express my sincere appreciation to the group manager of Quality and Environmental Systems of A&D business unit of the company Ahmet Yılmaz, A&D Production Planning Specialist Kaya Ergin, PTD-M Purchasing Specialist Kerem Gürsoy, SAP Consultant Ali Koyuncu and A&D Quality Specialist Hilal Topçu and my colleague Dila Hacer Çankaya for their support, patience and also for aiding me with useful data and resources

June 2007, **Beliz Özsoy**

CONTENTS

PAGE NO

ABSTRACT

BUSINESS PROCESS REENGINEERING AND ITS APPLICATION IN A MULTINATIONAL COMPANY

Increased competition and globalization compels most organizations to become innovative and adopt approaches based on change. Business Process Reengineering is one of these most popular change management approaches which has attracted great attention in this world of change recently.

Even though there have been successful and unsuccessful cases stated in the literature, BPR has been touted as a vital management tool in order to achieve dramatic improvements and organizational competitiveness by business circles if it is implemented properly and carefully.

In this context; with this thesis, analyzing Business Process Reengineering as today's prominent management trend, examining the reengineering projects that have been undertaken in a multinational electronics and electrical equipment company, making suggestions for the areas that can be improved, and finally figuring out the company employees` point of view regarding these projects is intended.

Within this framework, in order to grasp the topic completely, BPR's emergence as a management concept was looked over initially and several definitions of BPR in literature along with its principles and factors which make reengineering projects successful and factors which lead to failure were also alluded.

In the next chapter, different BPR methodologies from the literature as well as enablers of BPR which make change feasible and act as vehicles for processes to change were studied.

After that, some companies like Ford Motor, IBM Credit ,Kodak etc which have fruitfully put reengineering into practice were analyzed; their experiences on reengineering were discussed and the analysis was focused on a specific multinational company

The scope of the analysis encompasses the examination of reengineering projects related with production, procurement and logistics in this multinational company and suggestions for improvement on these projects.

In addition, a survey was conducted with the employees working in departments related with production, procurement and logistics of this company with the aim of finding out their perceptions on reengineering initiatives that have been implemented in the company, how they appraise the success of these reengineering implementations and their satisfaction with them.

Survey results revealed that employees perceptions towards reengineering applications executed in the company were that top management commitment and support was ensured for these applications, as a consequence of these implementations employee productivity, morale, motivation were increased, aimed targets were attained, and information sharing and customer satisfaction were heightened. In contrast to the expected consequences of BPR, employee empowerment was not increased and processes did not become simpler from the employees point of view. However, survey results indicated that experienced employees have a positive perception concerning the increase in employee empowerment and process simplification as a result of reengineering applications, compared to inexperienced employees who have been working for the company for a short period of time. Additionally, the findings of the research revealed that most of the employees were satisfied with reengineering and found reengineering initiatives carried out in the company successful. Managers' perceptions towards reengineering and the results of reengineering were found out to be more positive compared to the perceptions of non manager employees.

Lastly, business process reengineering methodologies which are cited in the literature were examined and a research methodology was proposed by combining the information which was obtained from the research conducted in the multinational company and the literature. This proposed methodology is supposed to aid companies that strive to redesign their processes in order to accomplish dramatic performance improvements.

June, 2007 **Beliz Özsoy**

ÖZET

İŞLETMELERDE YENİDEN YAPILANMA VE ÇOK ULUSLU BİR ŞİRKETTE UYGULANMASI

Küreselleşme ve artan rekabet pek çok organizasyonu yaratıcı ve yenilikçi olmaya ve değişime dayalı yaklaşımlar benimsemeye zorlamaktadır. Süreçlerin Yeniden Yapılanması veya diğer adıyla Değişim Mühendisliği, bu değişim dünyasında son zamanlarda oldukça dikkat çeken en popular değişim yönetimi yaklaşımlarından birisidir.

Literatürde başarılı ve başarısız örnekleri görülse de; değişim mühendisliği iş çevrelerince doğru ve dikkatli uygulandığında dramatik gelişme ve organizasyonel rekabet avantajı elde etmeyi sağlayan önemli bir yönetim aracı olarak görülmektedir.

Bu bağlamda, bu tez çalışması ile günümüzün bu gözde yönetim trendi ile ilgili bilgi vermek ve çok uluslu bir şirkette gerçekleştirilen yeniden yapılanma projelerini inceleyerek iyileştirilebilinecek noktalarda öneriler getirmek ve şirkette gerçekleştirilen projelere çalışanların bakış açısını ortaya çıkarmak amaçlanmıştır. Bu çerçevede, konuyu iyice kavrayabilmek için öncelikle Yeniden Yapılanmanın bir yönetim kavramı olarak ortaya çıkışı incelenmiş ve literatürde yer alan Yeniden Yapılanma tanımları ile birlikte; Yeniden Yapılanma prensipleri, Yeniden Yapılanma projelerini başarıya ulaştıran başarı faktörleri ve bu projeleri başarısızlığa uğratan faktörlere değinilmiştir.

Diğer bölümde, literatürdeki farklı Yeniden Yapılanma metodolojileri ve süreçlerde değişim aracı görevi gören ve değişimi mümkün Yeniden Yapılanma katalizatörleri irdelenmiştir.

Ford Motor, IBM Credit, Kodak gibi süreçlerin yeniden yapılanması uygulamasını başarıyla gerçekleştirmiş şirketler analiz edilmiş; süreçlerin yeniden yapılanması ile ilgili deneyimleri tartışılmış ve analiz spesifik bir çok uluslu şirkette odaklanmıştır.

Analizin kapsamını bu çok uluslu şirketteki üretim, satın alma ve lojistik ile ilgili süreçlerin yeniden yapılanması alanında gerçekleştirilmiş projelerin analizi ve bu projeler ile ilgili iyileştirme önerileri oluşturmaktadır.

Buna ek olarak firmanın üretim, satın alma ve lojistik bölümlerinde çalışanların şirkette gerçekleştirilen süreçlerin yeniden yapılanmasına ilişkin uygulamalar konusundaki görüş ve algılamalarını, bu uygulamaları başarılı bulup bulmadıklarını ve bu uygulamalardan tatmin olup olmadıklarını ortaya çıkarmak için firma çalışanlarına bir anket uygulanmıştır.

Anket sonuçları çalışanların süreçlerin yeniden yapılanması uygulamalarına ilişkin görüşlerinin; şirkette üst yönetimin desteğinin sağlandığı, yeniden yapılanma uygulamaları sonucunda çalışanların verimliliğinin, moral ve motivasyonunun arttığı, amaçlanan hedeflere ulaşıldığı, bilgi paylaşımının ve müşteri memnuniyetinin arttığı yönünde olduğunu ortaya koymuştur. Süreçlerin yeniden yapılanması uygulamalarından beklenen sonuçların aksine, anket sonuçları çalışanların çoğunun yeniden yapılanma uygulamaları sonrasında karar verme yetkilerinde herhangi bir artış sağlanmadığını ve süreçlerin basitleşmediğini düşündüklerini ortaya çıkarmıştır. Bununla birlikte anket sonuçları, deneyimli çalışanların süreçlerin yeniden yapılanması sonrası karar verme yetkilerindeki artış ve süreçlerin basitleşmesi konusundaki görüşlerinin şirkette daha kısa süreden beri çalışan, deneyimsiz çalışanlara göre çok daha olumlu olduğunu göstermiştir. Anket sonuçları ayrıca çalışanların çoğunun süreçlerin yeniden yapılanması uygulamalarını başarılı bulduklarını ve bu uygulamalardan tatmin olduklarını göstermiştir. Yönetici pozisyonunda çalışanların yeniden yapılanma uygulamalarına ilişkin tutumlarının yönetici pozisyonunda olmayan çalışanlara kıyasla daha pozitif olduğu gözlemlenmiştir.

Son olarak, literatürdeki süreçlerin yeniden yapılanmasına ilişkin metodolojiler incelenmiş, literatürden ve çok uluslu şirkette yapılan araştırmadan elde edilen bilgiler birleştirilerek bir yeniden yapılanma metodolojisi önerilmiştir. Önerilen metodolojinin süreçlerini performansta büyük gelişmeler sağlamak için yeniden dizayn etmeye çalışan şirketlere yardım etmesi beklenmektedir.

Haziran 2007, **Beliz Özsoy**

LIST OF SYMBOLS

df	:	Degree of Freedom
F	:	F value
M	:	Mean
M1	:	Mean for Group 1 (Manager)
M2	:	Mean for Group 2 (Non-Manager)
p	:	Significance Level
t	:	T value
r	:	Correlation Coefficient

ABBREVIATIONS

ABC	: Activity-Based Costing
A&D	: Automation and Drives
A&D AS	: A&D Industrial Automation Systems
A&D CD	: A&D Control and Distribution
A&D EA	: A&D Electronics Assembly Systems
A&D ET	: A&D Enstalation Installation Technique
A&D LD	: A&D Large Drives
A&D MC	: A&D Motion Control Systems
A&D MD	: A&D Mechanical Drives
A&D SC	: A&D Sensors and Communication
A&D SD	: A&D Standard Drives
A&D SE	: A&D Systems Engineering
ASM	: Asset Management Coordinator
AVIS	: Loading Advice
BPR	: Business Process Reengineering
CAD	: Computer-Aided Design
CAM	: Computer-Aided Manufacturing
CC	: Corporate Communications
CFS	: Corporate Financial Services
CHR	: Corporate Human Resources
CIS	: Common Independent States
CNI	: Contribution to Net Income
CPI	: Continuous Process Improvement
CSC	: Corporate Strategies and Consulting
DTC	: Deutsche Transportation Companies
ECC	: Export Control and Customs
EDI	: Electronic Data Interchange

EM : Enviromental Management

IA : Internal Auditing

IBS : Integrated Building Services

IK : Information Knowledge

IS : Information Systems

I&S : Industrial Solutions

ISO /DPPC : Information Security Officer/Data Privacy Protection Coordinator

IT : Information Technology

JIT : Just in Time

K- Minus : Kitchenless Restaurant

LD : Legal Department

MBL : Mutual Benefit Life

MED : Medical Solutions

MIR : Material Info Record

ORG-ID : Organization ID

PC : Personal Computer

PEM : Production Equipment Manufacturing

PG : Power Generation

P&L : Procurement and Logistics

POL : Purchase Order Letter

PSA : Production Storage Areas

PSA& MS : Production Storage Areas and Material Supply

PSE : : Program and System Engineering

PTD : Power Transmission and Distribution

PTD-EA : PTD Energy Automation

PTD-E : PTD Engineering

PTD- H : PTD High Voltage

PTD-SE : PTD Service

PTD- M : PTD Medium Voltage

QM : Quality Management

RCO : Regional Compliance Officer

R&D : Research and Development

RM : Risk Management

SAP	: Systems, Applications and Products in Data Processing
SBS	: SMS Business Services
SBT	: SMS Building Technologies
SMS AG	: SMS Germany
SPON	: Supplier Purchase Order No
SRE	: SMS Real Estate
TOP	: Transportation Order Process
TQM	: Total Quality Management
T-SAS	: Transportation Service Purchase Order Letter
TS	: Transportation Systems

LIST OF FIGURES

PAGE NO

LIST OF TABLES

PART I.

INTRODUCTION

I.1. OBJECTIVES AND SCOPE OF THE THESIS

In today's highly competitive and constantly changing market place, in order to thrive and operate successfully; it is inevitable for companies to give up obsolete ways of doing business and adjust to change. In recent years, we have been witnessing a management concept called "Business Process Reengineering" which has become commonplace among companies which seek for adapting rapid external changes and changes in the marketplace.

Business process reengineering, which is a proven management technique, has allowed many failing and even successful organizations to re-invent themselves to achieve performance improvements within this continually changing business world and marketplace.

Business process reengineering involves reinventing processes by abolishing the old ones and finding imaginative ways of accomplishing work while designing completely and radically new processes.

The fact that this above mentioned and today's widely-used management concept has arisen as a solution for companies to improve their performances ; elevate their efficiencies and gain a competitive advantage in this everlastingly developing and changing world , makes this concept worthwhile to investigate.

In this context, one of the objectives of this thesis is enhancing the knowledge on BPR and getting an overall view of it. Therefore, first of all BPR's emergence as a management concept will be looked over and several definitions of BPR , different BPR methodologies stated in literature, enablers of BPR which make change possible along with the principles and factors that make reengineering projects successful as well as factors which lead to failure will be also touched upon.

Another objective of this thesis is to examine some companies that have implemented BPR and learn on which conditions and for which reasons it can be resorted to , how these companies have implemented reengineering to attain striking improvements in performance and see whether they have succeeded or not.

After discussing these companies' experiences on reengineering, the analysis will be focused on a specific multinational company with the aim of figuring out why and how reengineering implementations have been carried out in this company, what has been done to make process change feasible , how the processes changed and identifying the ramifications of these reengineering implementations so that other companies which are contemplating on redesigning their processes can benefit from these experiences and can gain insights.

A survey will be conducted with the company employees so as to figure out their perceptions, knowledge, and satisfaction about reengineering implementations which have been carried out in this company so far.

Finally, different reengineering methodologies mentioned in the literature will be analyzed and a reengineering methodology which is applicable to companies that are considering improving their efficiency and performance and which is supposed to be a guide for these companies will be put forward.

PART II.

THE BUSINESS PROCESS REENGINEERING CONCEPT

In today's ever-changing world, the business environment throughout the world is also going through a continuous and rapid change. In this challenging world increasingly driven by customers, change and competition, companies are now vigorously looking for new ways to make their businesses more efficient and competitive. They are analyzing their current systems, processes and are trying to find new solutions to their business problems. Recently, we witness that some of the most successful companies in the world, seem to have come up with an amazing solution to their business problems: Business Process Reengineering (BPR).

During the past years, as a management concept, business process reengineering has gained considerable attention in the world of change management but how this concept has emerged? When we question the emergence of today's highly known management concept, we comprehend that it has a long history.

Reengineering traces its origins back to Frederick Taylor, the guru of Scientific Management, who is recognized as the first person analyzing the "Management Concept" as a scientific research field. In the literature, his views and opinions are called "Scientific Management Theory or Taylorizm". Taylorizm suggests engineers and specialists formulate technical and work standards in an organization. At this point, workers task is to execute the work they are given and follow the technical standards and work standards that are set.

The criticism that has been directed to Taylorizm mostly intensifies here. As it can be understood from the above point of view, Taylor has been criticized for treating and considering humans as machines but although this practice of improving efficiency in manufacturing often raised the concern of dehumanization of the work place, Taylor's view on this point should be assessed by taking into account the lack of knowledgeable workers and existing conditions at the time. [1]

The Scientific Management method gave birth to Total Quality Management (TQM) in Japan after World War 2 , which eliminated many of the discrepancies that the previous method of improving the business structure. William Deming and Dr. Joseph Juran helped Japan become a super economic power by taking over market share from North American businesses with quality goods and services. Some researchers and practitioners even allege that Business Process Reengineering has been put forward as a philosophy by Western Countries in order to survive against the process- oriented approaches such as JIT (Just- in Time)and TQM of Far East Countries after the 1980's .[2]

Business Process Reengineering has been practiced as a formal discipline since the early 1920's. Then it was known as "Methods and Procedures Analysis" always searching for new ways of restructuring work flows or improving business organization. [3]

Due to the global changes in economy, markets are globalized, customer requirements are changed, competition is intensified and new approaches had to be developed to cope with environmental dynamics and the flexible organizational change. In the 1990's Michael Hammer and James Champy introduced their book "Reengineering the Corporation" emphasizing the need for organizational change and gave birth to the term : Business Process Reengineering. [4]

Since then, the concept has been widely spread and applied. In this increasingly challenging business world companies, nowadays undertake reengineering projects to achieve dramatic performance improvements in their key processes so as to gain tremendous competitive advantage over their rivals.

This short history indicates that past periods of time includes very valuable data about the fundamental principles and emergence of "Reengineering".

II.1. THE ESSENCE OF BUSINESS PROCESS REENGINEERING

II.1.1. Definitions of BPR from Literature

Although BPR is a relatively new management concept, there are numerous definitions made by different academic scholars and practitioners in the literature. Here are some of these definitions from the literature:

- Business process reengineering is radically changing how people work-changing business policies and controls , systems and technology , organizational relationships and business practices , and reward programs. [5]

- Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed. [6]

- BPR is an improvement philosophy. It aims to achieve step improvements in performance by redesigning the processes through which an organization operates, maximizing their value-added content and minimizing everything else. This approach can be applied at an individual process level or to the whole organization.[7]

- Reengineering is about changing anything which provides a block to improving today's business performance , even if it means going back to the drawing board.[5]

- Business process reengineering although a close relative of JIT and TQM, seeks radical rather than merely continuous improvement. It escalates the efforts of JIT and TQM to make process orientation a strategic tool and a core competence of the organization. BPR concentrates on core businesses , and used the specific techniques within JIT and TQM 'toolboxes' as enablers , while broadcasting the process vision.[5]

- Reengineering is only part of what is necessary in the radical change of processes; it refers specifically to the design of the new process. The term process innovation encompasses the envisioning of new work strategies , the actual process design ,activity and the implementation of the change in all its complex technological , human , and organizational dimensions.[8]

- A methodological process that uses information technology to radically overhaul business process and thereby attain major goals.

- The fundamental analysis and radical redesign of business processes to achieve dramatic improvements in critical measures of performance.[9]

- According to Petrozzo and Stepper (1994) BPR involves the concurrent redesign of processes, organizations, and their supporting information systems to achieve radical improvements in time, cost, quality, and customers' regard for the company's products and services.

- Lowenthal describes the fundamental rethinking and redesign of operating processes and organizational structure, the focus is on the organization's core competencies, to achieve dramatic improvements in organizational performance as BPR's essential components.[10]

Within all the above definitions, especially within the definition of Michael Hammer and James Champy, the pioneers of BPR, we grasp four key concepts: fundamental, radical, and dramatic and processes.

*** Fundamental**

Reengineering begins with no assumptions, and the most fundamental questions about the companies, and how they operate, need to be asked. So it can be said that, by fundamental, authors mean that businesspeople must ask themselves the basic questions about the way their company do business such as: why do we do what we do? And why we do it the way we do?

For instance, the current practice of having separate departments performing their respective functions is the traditional way of operating a health care facility. Can this compartmentalization be reduced? [11]

By asking these fundamental questions, companies can judge the way they operate and this consequently leads to rules turning out to be obsolete, erroneous and unsuitable.

As a result, companies undertake reengineering initiatives to change the obsolete way of conducting business and start from scratch**.** [6]

*** Radical**

Radical redesign of business process means getting the root of things , not improving existing processes or procedures, not making superficial changes. According to Hammer, radical redesign means disregarding all existing structures and procedures and inventing completely new ways of accomplishing work**.** [4]

*** Dramatic**

Reengineering is not about making small step improvements but accomplishing giant increases in performance.

For example , if a company's customer service speed falls % 10 behind it's competitors or if a company's products or services need % 10 improvement in quality and etc. this company doesn't need to be reengineered. Reengineering should only bring in when a need exists for large demolishing. Making dramatic improvements require demolishing the old ways of doing business and displace with something which is entirely new.[6] According to Hammer and Champy there are three possible situations that a company needs reengineering. Firstly, the company may be in a desperate situation. It needs dramatic improvement to survive. Secondly, the company may be doing quite well, but management may anticipate and expect some serious and threatening problems and competition in the near future. Finally, the company may be doing well but the ambitious and challenging management may want to do better and make it more difficult for others to enter into the competition.[12]

*** Processes**

Process orientation is considered as being the most important aspect of business process reengineering. We can define a process as a set of linked activities that take an input and transform it to create an output. Ideally, the transformation that occurs in the process should add value to the input and create an output that is more useful and effective to the recipient either upstream or downstream.

Reengineering must focus on redesigning fundamental business processes and not on departments or other organizational units. A core business process "creates" value by the capabilities it gives the company for competitiveness. Core business processes are valued by the customer, the shareholder and are critical to get right. [13]

BPR involves reengineering processes to achieve radical improvements in cost, time, responsiveness, performance, quality, etc. and these reengineered processes should provide the company with dramatic improvements in cost, response time, and performance, as well as reflecting the company's overall strategy.[14]

II.1.2. Companies in need for Business Process Reengineering

According to Hammer and Champy there are three possible situations that a company takes on reengineering:

- Firstly, the company may be in a desperate situation. For instance, the company's costs may be higher than the competitors or than the business model will allow. The customer service it provides may not be good enough and may not appeal to the customers in the market. The products the company offers may have a product failure rate higher than the competition's. In other words, if the company needs dramatic improvement to survive, it needs reengineering. [10]
- Secondly, the company may be doing quite well, but management may anticipate and expect some serious and threatening problems and competition in the near future.
- Finally , the company may be doing well and being in a peak condition but the ambitious and challenging management may want to do better and make it more difficult for others to enter into the competition.[12]

II.1.3. Principles of Business Process Reengineering

*** Organize around processes and outcomes, not tasks**

Reengineering the system enables assigning the responsibility of an entire process to a single person and designing that person's job around an objective or outcome, such as a complete process, instead of one of the tasks necessary to complete the process.

In the past, when salespersons at IBM Credit Corporation called with a request for financing, they reached one of fourteen employees who recorded the request. The request was forwarded through five different individuals who checked the customer's credit, determined interest rate and handled other procedures. It took six days to two weeks to complete all five steps. When a request was walked through the five steps, the company discovered that the actual work took only an hour and a half.

IBM Credit reengineered the process and eliminated the five steps .Most applications are straightforward and one individual, called a deal structurer, uses a computer system to process an application from beginning to end. When complexities arise, the deal structurer can call on a small group of specialists. IBM Credit increased the number of applications it processes by 100- fold while reducing its head count slightly.[15] The company achieved a dramatic performance breakthrough by making a radical change to the process as a whole.[6]

*** Treat geographically dispersed resources as though they were centralized**

Centralization of operations allows companies to achieve economies of scale while decentralization of operations gives companies the chance to be more responsive and speedy to their target market and provide better service and products. Today with the advances in current technology, companies can take the advantage of both approaches: Corporate – wide databases centralizes data and telecommunications technology disperses it.

*** Capture data once and at its source**

Most companies have many different information systems such as an accounting system, a management information system, a marketing system, a production system, a finance system etc. which retrieves, collects, enters and processes some of the same information. This is not only in efficient and expensive but also poses redundancy in data which often contains inconsistencies.

Today in this age of technological advances, it is possible to capture data once at its source, enter and store it in databases and make the data available to all who need it. For instance, bar coding and Electronic Data Interchange (EDI) make it easy to collect, store and transmit information.

*** Subsume information - processing work into the real work that produces the information**

This principle suggests that people who produce the information should also process it. Doing as this principle states, will allow companies reduce their time delays, errors and help them work more effectively and efficiently.

In the past, we could see examples of companies which set up departments that are separate from other departments and just process information that are produced by other departments. One of the examples of such companies is Ford Motor. Ford prepared multi copy purchase orders and receiving reports. Fourteen data items on these documents had to be matched to a vendor's invoice before a payment could be made. Accounts payable had more than 500 people who spent most of their time trying to reconcile all the mismatches. The process was time consuming and frustrating, and vendors were unhappy because payments were delayed.

Ford's system was reengineered so that people who produce the information also process it. In the new system, vendors do send invoices. Purchasing agents enter purchase orders directly into the company data base. The part number, supplier code and unit of measure are entered by the receiving clerk when goods are arrived.

The computer matches these data items with the purchase order data. If they do not match, the goods are returned. If they do match, the goods are accepted; the computer prepares and sends the check to the vendor.[15]

Taken into account the example of Ford, it can be said that will be able to both create and process information via reengineering.

*** Have those who use the output of the process perform the process**

Organizations are composed of discrete departments each operates specific processes. Each department performs its specific type of work and transmits its finished work to another department. This way of doing business works but it is a slow and bureaucratic process. This principle states that people who use information from the system should be those who perform the process that produces that information. Before reengineering, Phoenix Designs Inc. had its salesperson call on customers to determine what they desired in the way of furniture. The salesmen submitted the ideas to a team that produced a design that the salesperson took back to customer. Customer made changes and the salesperson took the changes back to the designers. When the salesman took the new design back to the customers, they would again evaluate the design and request more changes. It took up to six weeks to fulfill customers and submit them with a final design.

Phoenix replaced the old system with one in which salesperson, using a PC and a special software package, designed the furniture themselves in less than a week. This system was later improved so that a salesperson could use a portable computer to design the furniture right in the customer's office. The system, which cost Phoenix $1 million, has increased dealer sales by up to 1,000 percent and has boosted after-tax income by 27 percent.[15]

To conclude, it can be said that by implementing this principle, the need for communications between departments, bureaucratic procedures and control mechanisms which monitor both people who perform the process and those who use the output of the process are likely to reduce.

*** Put the decision point where the work is performed and build control into the process**

Most organizations have a hierarchical structure with one or more levels of management which supervises, directs and controls those below them. In those kinds of organizations, people who perform the work are set apart from people who make the decisions and control the work performed.

In this hierarchical management structure employees who perform the work don't take part in making decisions and controlling. This principle states that employees who perform the work should also take role in decision making and control mechanisms associated with the work and therefore organizations should be flattened.

Nowadays , increasing number of organizations have realized that empowering employees and assigning them decision making responsibilities leads to higher quality product and service, faster responses to problems , and fewer levels of management. Expert systems and other newly developed information technology helps workers make correct decisions and avoid mistakes by providing them knowledge.

*** Link parallel activities instead of integrating their results**

This principle claims that instead of integrating tasks after they are finished, connections should be formed between parallel functions, teams and coordination should be established while their tasks are being done.

For example, when Chrysler designed a new car, they had different teams designing the body the interior, the engine, the transmission and other elements. When they began assembling the cars, they often found out that the components did nit fit together properly and had to be redesigned.

The product development process was reengineered, and Chrysler organized its teams differently. A new team was created for each new car and people from each design area were placed on the team. In the end, Chrysler not only reduced the number of costly redesigns but was also able to reduce its product development time significantly.[15]

II.1.4. Critical Success Factors for BPR

*** Drive from Top**

Top management should be committed to the Business Process Reengineering Project and should be willing to express that commitment across the enterprise. Especially if a significant portion of the enterprise is to be reengineered then this commitment must come from the very top.

The support, energy and drive of top management must also be sustained over a long period to ensure things actually done.

*** Communication**

In condition of a reengineering process the necessity and gaining's of such an improvement and change should be communicated clearly to the employees and across the organization even if job losses are likely to happen.

*** Treat people fairly and with respect**

Management, in particular must set a clear example that manners, common courtesy and respect should not be left at home but should brought into work as well**.** [7]

*** Ensure that right sponsor is chosen**

Choosing the right sponsor for the reengineering initiative is one of the momentous factors for the success of BPR. A good sponsor can not succeed alone but a poor sponsor can kill BPR single handed very quickly. Best leaders recognize their own failings and recruit others to complement and challenge their skills and abilities.

*** Be clear about the purpose of the redesign**

The vision set should be clear and reengineering initiative & purpose should be consistent with this vision. Customer requirements, patterns of demand, constraints and efficiency targets should all be analyzed and understood with the process re-engineering initiative targeted firmly on delivering performance improvements in performance to these.[7]

*** Match the scale and scope of the project to the ambitions of the initiative**

One of the guidelines for the success of BPR is the consistency between the expectations of the BPR project and its scale and scope. If a single department in a company is to be reengineered, this will have an effect on the performance of that department and the departments it deals with but can not have the same effect as a company wide initiative. That’s why, if management looks for company-wide improvements which will effect company’s overall performance, it should focus on core processes which the company conducts its main business.

*** Set aggressive re-engineering performance targets**

Establishing performance standards and targets and conducting the reengineering efforts to achieve these targets is key to accomplishing radical & dramatic performance improvements. Taken this into account, particular care must be taken in constructing a performance measurement system.

*** Understand the context of the process being redesigned**

BPR, like other philosophies, must be undertaken within the context of the particular firm.

*** Treat BPR as a holistic philosophy**

Organizations are composed of interdependent elements. Changing one in isolation is unlikely to produce the required results and may have adverse effects on other elements. That's why successful BPR requires action on a broad front.

*** Aim for some quick hits**

Early demonstrable successes will help overcome resistance, build momentum and a 'can do' attitude and make people confident in their abilities. These 'quick hits' , however , should be recognized for what they are and companies must then go on , often through a lot of pain , to achieve the longer term goals. [7]

*** Ensure that processes match the needs of the markets they are to serve**

The starting point of most reengineering initiatives is markets. Companies direct their reengineering efforts by considering the needs and requirements of the markets they aim at. That's why the importance of a 'match' between the market needs and the processes that are to serve them is paramount.

*** Involve customers and suppliers in the redesign process** as **appropriate**

Customers and suppliers should be involved in the BPR program, especially where the process has direct relevance for them. They can give valuable insights and suggest ways in which the process could be redesigned. This may also prove useful in cultivating a closer relationship and have a positive effect on the volume of business conducted with the customer.

*** Dedicate resources to the project**

Consultants, academics can help, support and encourage the reengineering process. If BPR is important it is worth the investment of these people's talents full time.

*** Recognize that IT provides opportunities for new designs**

Information Technology (IT) can be a key enabler of BRP and that's why organizations must constantly evaluate how both old and new technology can be used.

*** Recognize that BPR may be just the beginning**

In this highly competitive and challenging marketplace, organizations should continually try to renew themselves in order to surpass their competitors. For this reason, we can say that new process design is not an end but another beginning.[7]

II.1.5. Pitfalls to avoid while conducting BPR

As well as some guidelines for success there are also some common pitfalls that should be avoided by companies contemplating on BPR. These pitfalls can be listed as below:

*** Distinguish the re-engineering effort from the main goals of the organization**

One of the common pitfalls which should be avoided while conducting a reengineering initiative is considering the reengineering initiative separate from organizational objectives. Reengineering efforts shouldn't be comprehended separate; on the contrary they should be seen as means of reaching organizational goals. That's why; companies should not take on reengineering projects without reference to their strategic aims.

*** Underestimate the changes required to achieve a process orientation**

Lack of understanding about the tremendous upheaval which can result from implementing BPR is one of the reasons why firms need a second go. Too much attention to the process design phase and not enough on other aspects can result in a stalled initiative.

*** Run before you can walk**

Companies which want to achieve dramatic performance improvements through BPR should prepare themselves for it and proceed with slow and confident steps. In other words, companies must be ready for the change which BPR will bring.

The company's decision to implement BPR maybe be due to a history of TQM, a crisis situation or a visionary leader but whatever the driver there must be a readiness for such a program.

*** Do not expect too much too soon**

Change, in whatever form it takes, is a process that happens in time. For instance, changes such as organizational changes, cultural changes and changes in employees' behaviors and attitudes do not occur instantly.

Not only change but also benefits of change emerge in time. That's why companies should know that the real benefits of BPR may take some time to realize.

*** Be careful about the title**

No matter what is called for the change program, it is the results that count and the important thing is the improvements that the change program brings.[7]

*** Over reliance on Information Technology**

While undertaking BPR projects many managers err in over relying on information technology solutions. They forget to analyze the business process and attempt instead to simply automate the ineffective process.

Although IT is an enabler of business redesign the evidence shows that it is the business itself not the IT department makes the BPR projects successful.[12]

*** Do not pilot the new process**

Running a pilot process before implementing the new one helps identifying problems and bottlenecks related to the process and helps eliminating failures which are likely to happen.

This kind of trial may take time and cost much but in case of the failure of the new process the time and cost in order to amend it would be much greater.[7]

*** Wrong process and objectives**

Defining a change objective wrongly and choosing a wrong process or processes which will not add great value to the organization's overall performance would result in reengineering failure.[12]

PART III.

BPR METHODOLOGIES & TOOLS AND TECHNIQUES

III.1. METHODOLOGY OF DAVENPORT AND SHORT

Davenport and Short place IT at the heart of BPR. They realize the existence of a recursive relationship between IT capabilities and BPR, meaning that IT should be considered in terms of how it supports new or redesigned business processes, and recursively business processes and process improvement should be considered in terms of the capabilities IT can provide.

Believing that BPR should be integrated with approaches like Continuous Process Improvement (CPI) Davenport and Short recommends a five-step approach to BPR. [16]

a) Develop Business Vision and Process Objectives

Developing a business vision and process objectives depends on a clear understanding of organizational strengths , weaknesses , opportunities and threats that exist in the market place , awareness and knowledge about innovative activities attempted by competitors and other organizations. Therefore, we can say that external forces (competition, customer needs, environmental, political and technological factors) and internal factors (organizational capabilities) have a tremendous effect on the determination of business strategy and process objectives. [17]

During this step the business vision and objectives that the process should reach in order to accomplish the vision are determined. A business vision implies specific objectives for process redesign, such as: cost reduction, time reduction, output quality, the quality of work life and the quality of learning.

The objectives are prioritized and stretch targets are set. A redesign effort does not aim at improving processes' performance, so that they contribute to the fulfillment of the vision and the objectives of the organization.

b) Identify Processes to Be Redesigned

Identifying and selecting processes to be redesigned is a crucial step for process change. In this phase, the most critical part is determining core business processes which have a significant impact on the company's overall business performance and bring great value to its customers.

That's why during this step, the most important processes are identified and prioritized according to their redesign potential. Key business processes are identified either by identification and prioritization of all processes or by identification of important processes or processes in conflict with the business vision and process objectives. [16]

After a process has been selected for innovation, the company can begin to contemplate on change tools which will enable it to create quantum improvements in the selected process/es.

c) Understand and Measure Existing Processes

Although it has been criticized by Hammer and Champy as an impeding factor for creativity, it is important to comprehend and get a clear picture of existing business process/es before designing new ones. Recognizing problems in an existing process can help ensure that they are not repeated in the new process.

Understanding existing processes also facilitates communication among participants in the BPR work. Models and documentation of current processes enable those involved in the BPR initiative to develop and share a common understanding of the existing state.[17]

At this stage, the selected processes are analyzed in terms of functionality and their performance are gauged and compared to the reengineering objectives.

Table III.1 Key Activities in Understanding and Improving Existing Processes

(adapted from [8])

• Describe the current process flow
• Measure the process in terms of the new process objectives
• Asses the process in terms of the new process attributes
• Identify problems with or shortcomings of the process
• Identify short- term improvements in the process
• Assess current information technology and organization

Here it is important that designers of the new process think innovatively without being restricted or affected by the analysis of the current situation. [16]

d) Identify Change Levers

IT is a powerful tool which is commonly utilized within companies not only to provide effective support to business processes but also in BPR initiatives in order to redesign processes which limit the competitiveness , effectiveness and efficiency of the organization.

The authors prescribe eight ways to think about IT capabilities and their organizational impacts, which are summarized in Table III.2 [16]

Table III.2 IT Capabilities and Their Organizational Impact (adapted from [16])

Capability	Organizational Impact/Benefit
Integrative	Coordination between tasks and processes
Geographical	IT can transfer information with rapidity and ease across large distances, making processes independent of geography
Automational	IT can replace or reduce human labor in a process
Analytical	IT can bring complex analytical methods to bear on a process
Informational	IT can bring vast amounts or detailed information into a process
Sequential	IT can enable changes in the sequence of tasks in a process, often allowing multiple tasks to be worked on simultaneously
Knowledge management	IT allows the capture and dissemination of knowledge and expertise to improve the process
Tracking	IT allows the detailed tracking of task status, inputs, and outputs
Disintermediation	IT can be used to connect two parties within a process that would otherwise communicate through an intermediary (internal or external)

e) Design and Build a Prototype of the Process

The final step in a redesign effort is the design of the new process .The actual design of the new process should be viewed as a prototype and successive amendments should be expected. [16]

Table III.3 Key Activities in Designing and Prototyping a New Process (adapted from [8])

- Brainstorm design alternatives
- Assess feasibility , risk and benefit of design alternatives and select the preferred process design
- Prototype the new process design
- Develop a migration strategy
- Implement new organizational structures and systems

III.2. METHODOLOGY OF EVANS

Many BPR researches have stated that BPR projects can not be planned meticulously in small precise steps. However, Evans (1993) adopts a bridge metaphor to suggest a broad framework for BPR projects.
Evans proposes a four stage methodology as follows:

Stage 1: To Be

This stage is related with setting the organization's vision, defining where the organization wants to see itself in the future and consequently defining process objectives so as to accomplish this vision.

Stage 2: As Is

This stage is concerned with analyzing, understanding and defining existing business processes.

Stage 3: The Plan

In this stage a plan to migrate from the "As is" stage to "To be" stage is established.

Stage 4: The Crossing

In this final stage the plan set is implemented.

Although this general high- level approach has its advantages, it is also claimed to have some weaknesses. One of the main arguments centralizes on the subject that previously focusing on setting the organization's vision without understanding the current process or processes impedes reaching desired results of the reengineered processes. That's why a process has to be comprehended before attempting to redesign it. On the other hand, the issue of concern is whether concentrating on current processes will limit the imagination of the people involved in the BPR project and to reengineer the process with a completely fresh and open mind, due to the legacy of past practice.

In fact, Evans himself provides an example which demonstrates the vital importance of understanding the context of the existing process: He relates the hypothetical example of an accountant who on analyzing aircraft fuel consumption discovers that 2 percent of the fuel is used during the first 30 seconds of the flight take off. Based on this isolated fact, the accountant might suggest that all aircraft should take –off on half –throttle thus saving millions of dollars on fuel bills.

As a last word it can be said that, reengineering efforts must be grounded in a thorough understanding of the operation of the process along with discontinuous and imaginative thinking necessary for developing the organization’s vision.[18]

III.3. METHODOLOGY OF FITZGERALD & MURPHY

Fitzgerald and Murphy adapt the structured approach to devise their BPR methodology. The methodology is expressed as a series of phases, each of which addresses a basic question and is summarized below:

a) Select the process to be reengineered

In this stage the basic question “Where are we going to start? “is addressed and processes are prioritized in terms of redesign urgency.

b) Establish process team

This addresses the basic question “Who is going to do it? “. In this phase the team which will take on the reengineering effort is formed.

c) Understand the current process

In this stage the existing process/es are analyzed and understood in detail and compared in terms of their contribution to organizational objectives. In this phase the current physical to current logical mapping of the process models are also established and this stage addresses the question “Where do our stakeholders see us now? “

d) Develop a vision of the improved process

Addresses the question “Where do our stakeholders want us to be? “ In this phase, the desired objectives of a process to be reengineered are determined and the new logical model of the process is set.

e) Identify the actions needed to move to the new process

Addresses the question “What do we need to achieve? “ Here, actions required to migrate from the current process to the new process are set and the new physical process model is established.

f) Negotiate / execute a plan to accomplish these actions.

Addresses the question “How will we achieve it?” The methodology is based on an iterative approach. At any stage, going back to a previous stage for further improvement is admitted. In practice, processes that work well during later phases often go through considerable revision and reconsideration in earlier stages.[19]

III.4. A CONSOLİDATED METHODOLOGY FOR BPR

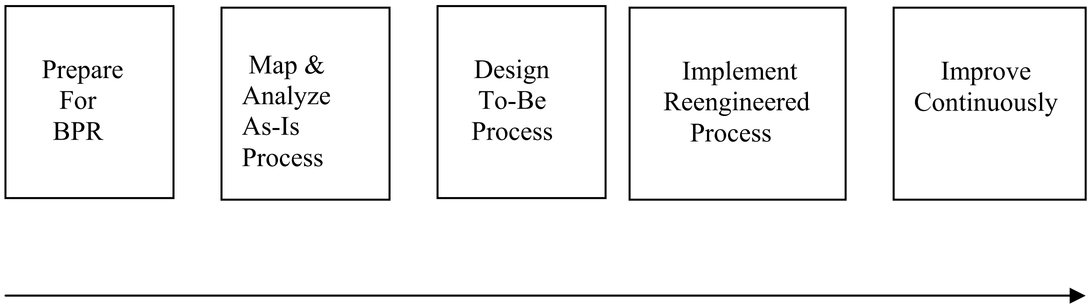


Figure III.1 A Consolidated Methodology for BPR

a) Prepare for Reengineering

“If you fail to plan, you plan to fail”. Planning and preparation are paramount factors for any reengineering project to be successful. The first step of “planning and preparation” is identifying whether a need for reengineering is crucial or not.

Here, the question to be asked is “Is BPR necessary? “ There should be a significant need for the process to be reengineered. Having vindicated this need, preparation activity can be started.

After top management’s commitment and consensus on the necessity of reengineering is established , a cross functional team which will tale on the reengineering effort with a action plan is formed in accordance with the company’s strategy and organizational objectives.

While setting the strategic goals for the reengineering effort it is important to understand the expectations of the customers and analyze whether the current process fulfills these requirements. Having identified the customer driven objectives, the mission or vision statement is formulated.

b) Map and Analyze As- Is Process

In order to successfully redesign the process, reengineering team should first understand and delve into the existing process. Although some organizations attempt a new process design while totally ignoring the existing processes most need to map the existing processes first, analyze and improve on it to design new processes.

Delving into current process/es and figuring out problems and bottlenecks related with them ensure that they are not repeated in the new process.

The main objective of this phase is to identify disconnects (anything that impedes the process from achieving desired results and in particular information transfer between organizations or people) and value –adding processes. This is initiated by first creation and documentation of “Activity and Process Models” making use of the various modeling methods available. Then, the amount of time each activity takes and the cost that each activity requires in terms resources is calculated through simulation and Activity Based Costing (ABC). After finishing all the groundwork, the process or processes that need reengineering are detected.

c) Design To- Be Process

After identifying the processes to be reengineered design alternatives to the existing process/es which aim at accomplishing company’s strategic goals are generated. One of the ways that facilitate setting alternatives is “Benchmarking “.

Benchmarking is the comparing of both the performance of the organization’s processes and the way those processes is conducted with those relevant peer organizations to obtain ideas for improvement.

Having identified the potential improvements to the existing processes, To-Be models are developed. Then simulation and ABC are performed to analyze factors like time and cost involved. The several To-Be models are validated and best possible scenarios are selected among them for implementation.

d) Implement Reengineered Process

When so much time and effort is spent on analyzing the current processes, redesigning them and planning the migration, it would be prudent to run a culture change program simultaneously with all the planning and preparation.

Once this has been done, the next step is to develop a transition plan from As-Is to the redesigned process. This plan must align the organizational structure, information systems, and the business policies and procedures with the redesigned process.

Using prototyping and simulation techniques, the transition plan is validated and its pilot versions are designed and demonstrated. Training programs for the workers are initiated and the plan is executed in full scale.

e) Improve process continuously

Implementing the reengineered process does not assure the success of the reengineered process alone. A key to success for every reengineering effort is to improve the reengineered process permanently by both monitoring the progress of the process and the results.

The progress of action is gauged by seeing how much more informed the people feel, how much more commitment the management shows and how well the change teams are accepted in the broader perspective of the organization. This can be achieved by conducting attitude surveys and discrete fire side chats with those initially not directly involved with the change.

Monitoring the results involve measures such as employee attitudes, customer perceptions, supplier responsiveness etc.[20]

III.5. MANGANELLİ /KLEİN'S METHODOLOGY FOR BPR

Manganelli/Klein argue, to only concentrate on those business processes, that directly support the strategic goals of the company and customer requirements. Product development (a knowledge process) is such a preferred business process. They see organizational impact, time, risk, and cost as obstacles to success. They claim, business reengineering to be more successful than incremental change initiatives, which tend to fail more often.[21]

The Manganelli/Klein business reengineering methodology breaks into five steps as shown in Table III.4 :

Table III.4 The Manganelli/Klein's Business Process Reengineering Methodology
(adapted from [21])

Project Steps	Objectives
1. Preparation	The first step asks all directly involved persons to define goals and to prepare for BPR Project.
2. Identification	This step defines a customer oriented process model of the organization, as well as selects key business processes for redesign.
3. Vision	The third step serves to define at which performance level the processes currently deliver, and which higher level is required for the future.
4. Redesign 4.1 Technical Design 4.2 Social Design	This step breaks into two parallel sub-steps. The technical design deals with information technology design to support the new processes. The Social design step serves to design new work environments for the people , including organizational and personnel development plans.
5. Transformation	The fifth step is meant to implement the redesigned process and work environments within the organization.

III.6. BPR TOOLS AND TECHNIQUES

The various definitions of BPR suggest that the radical improvement of processes is the goal of BPR but when we have a look at the literature we see that they do not refer specifically to the tools and techniques used in reengineering business processes. The result of this void is that some authors and consultants alike have pursued the use of many different tools in the search for the best reengineering application. These tools and techniques can be listed as below:

* *Process visualization.*

While many authors refer to the need to develop an ideal end state" for processes to be re-engineered, Barrett (1994) suggests that the key to successful reengineering lies in the development of a vision of the process.

* *Process mapping and modeling.*

Process flowcharting, IDEF, role activity diagraming etc.

* *Change management*.

Several authors concentrate on the need to take account of the human side of reengineering, in particular the management of organizational change. Some authors suggest that the management of change is the largest task in reengineering. Kennedy (1994) on the other hand, incorporates the human element of reengineering due to the perceived threat it has on work methods and jobs.

* *Benchmarking*.

Several authors suggest that benchmarking forms an integral part of reengineering, since it allows the visualization and development of processes which are known to be in operation in other organizations.

* *Process and customer focus*.

The primary aim of BPR, according to some authors, is to redesign processes with regard to improving performance from the customer's perspective.

* *Problem solving and diagnosis.*

Pareto diagramming, cognitive mapping, etc.

* *Process prototyping and simulation*.

* *Project Management.*

Budgeting , project scheduling , etc.

* *Process measurement.*

Activity-based costing, statistical process control, etc.

It should be noted that few authors refer to any single technique when discussing BPR. Most incorporate and integrate a mixture of tools and techniques for change effectively and for the success of BPR projects. [10]

PART IV.

ENABLERS OF BPR

IV.1. INFORMATION TECHNOLOGY AS AN ENABLER OF BPR

In today's continuously changing and developing world, we witness profound breakthroughs in technology especially in the last couple of decades. One of the areas of technology that we notice a great number of major developments is information technology.

Today, we find a large number of advances in ITs being used in companies. In one way, outstanding improvements in personal computers and communications give employees the chance to work from home and other locations instead of office while still being connected to the office. Multimedia communications systems , which send and receive audio and video data , help us in making decisions by using electronic mail ,file transference , or video conference. Computer aided design/ manufacturing /engineering techniques allow for coordinating product design, manufacturing and engineering activities.[22]

Using new IT allows companies to gain important advantages such as:

1) Cost savings and improving the accuracy of exchanging information;
2) Avoiding human mistakes inherent when complex and repetitive tasks are used
3) Saving money because it reduces errors and the time it takes to accomplish tasks;

4) Integrating and coordinating several functions at once; and

5) Improving the organizational efficiency and effectiveness by eliminating delay, administrative intermediaries, and redundant processing steps and providing better access to information.[22]

IV.1.1. The role of IT in BPR

BPR is a methodology which requires change in existing processes and designation of radically new ones and it is inevitable that some certain factors make this change feasible. These factors are known as enablers and may be defined as elements that act as vehicles for processes to change.[22]

IT can help make the changes promoted by reengineering, and it can be considered as an enabler of BPR. To be an enabler is to make able, to make feasible or effective, and to provide with means, opportunity, power, or authority.[12]

Reengineering must work hand-in-hand with information technology to consider cutting-edge innovations—things never attempted before. In a reengineering project, IT is an "essential enabler." Many processes cannot be reengineered without it. In keeping with reengineering's "ambitious" approach, information technology should be anticipatory; it should answer problems the consumer does not know he has yet.[23]

In today's highly changing environment, increased competition and rapidly changing needs and wants of customers force companies to be more flexible by being able to develop their products and services which will fulfill customers' needs in a fastest and most effective manner. In order to be more flexible and competitive, companies should eliminate processes with many steps and insufficient collaboration. Consequently, this environment obliges business processes for a change to feature reduced mediation and increased collaboration.

Does IT diminish the degree of mediation and increase the degree of collaboration? First, companies must reduce the degree of mediation in processes. Degree of mediation, as Teng et.al states, is the extent of sequential flow of input and output among participating functions.

In other words, companies must transform processes with a great number of intermediate steps into processes that take part directly in the final outcome. The ITs that make this modification easy might be:

1) Shared databases: Different functions are allowed to take part directly by using the information stored databases. Each function can approach , enter or recover information from this database whenever it is needed.
2) Imaging technology: Several people may work at the same time on a digitalized image of documents or graphics.
3) Electronic data exchange and electronic funds transference

Second, companies must increase the degree of collaboration in processes to ensure exchange of information between related functions. The IT that eases the collaboration among different people may be communication technologies. These allow information transfer by using tools such as electronic mail, video conference and file transfer protocol.[22]

IT can be more than a useful tool in business process redesign. We can say that IT and BPR have a recursive relationship. Each is the key to thinking about the other. Thinking about information technology   should be in terms of how it supports new or redesigned business processes, rather than business functions or other organizational entities. And business processes and process improvements should be considered in terms of the capabilities information technology can provide.[24]

When we have a look at the literature we see IT indicated as a powerful tool and fundamental capacitor of BPR too. Gulden and Reck state that IT is fundamental, enabling organizations to break the old rules and conventions that dictated the design of business processes, and to achieve the aggressive improvement targets of reengineering. Venkatraman too, refers to IT as a" fundamental enabler in creating and and maintaining a flexible business network". Wastell, White and Kawalek call IT "the vital ingredient of this restorative "of improving business performance. Hammer and Champy posit IT as playing a crucial role, an essential enabler that permits companies to BPR.

Belmonte and Murray suggest that innovation is difficult to achieve without leveraging the potential of IT and that in many cases a business process can not be restructured without it. Further, they state that to redesign a process without considering the critical role of IT will lead to marginal improvements and that it is nearly impossible to reach stretch goals without effectively using information technologies.[25]

Davenport & Short (1990) argue that BPR requires taking a broader view of both

IT, business activity and of the relationships between them. IT should be viewed as more than an automating or mechanizing force but rather as a way to fundamentally reshape the way business is done. Many researchers and practitioners have increasingly considered factors related to IT infrastructure as a vital component of successful BPR efforts. Effective alignment of IT infrastructure and BPR strategy, building an effective IT infrastructure, adequate IT infrastructure investment decision, adequate measurement of IT infrastructure effectiveness, proper (Information Systems) IS integration, increasing IT function competency, and effective use of software tools are a few of the most important factors that contribute to the success of BPR projects.[26]

There are also some examples of companies that have successfully implemented IT in BPR. Some of these companies are given below:

** **Caterpillar:** Being exposed to losses in the mid 1980's because of Japanese competition, augmenting manufacturing costs and declining market share; Caterpillar decided to reengineer its core processes. Caterpillar spent 1.85 billion on modernizing 17 factories with the aim of increasing flexibility and quality while cutting inventories and cycle time. The return on investment was running at a %20 annual rate and inventories had been reduced by almost % 40.The information systems created a flow of information from suppliers all the way through the process to the delivery of products to customers. Those customers benefited from faster delivery, lower prices and a % 50 reduction in quality problems.

** **Dell Computer Corp:** Dell Computer Corp. invests $ 50 million annually to maintain a customer data base that stores information gathered from 35,000 telephone calls or e-mail messages received each day. All employees in different departments from marketing to product development to customer service could access the database. Marketing uses the data to narrowly focus on market segments targeted for greater penetration. Product developers use the database to guide them in packaging new offerings and purchasing use the database to watch to watch and analyze trends in demand for such components as larger hard drives or monitors. The online customer data base gives Dell a competitive advantage in the direct-sales market.

** **Du Punt Corporation**: Du Pont linked about % 5 of its suppliers electronically, eliminating purchase orders and invoices. The suppliers have direct access to Du Pont's inventory system and initiate orders when Du Pont's inventories fall below minimum levels.[27]

As we can see from the examples one important point that needs to be emphasized is that IT should not be considered independently when redesigning a process.

Although IT investment has increased productivity and customer value, its effect on profitability has been difficult to isolate. In other words , pay-off of IT-enabled process design is affected by other complimentary changes such as organizational structure changes , management of change process an the extent of the effort involved in Business Process Reengineering initiatives. An organization aim at achieving return on investments in IT should strive to assure that process changes are executed. If the way work is carried out does not alter and the role of IT is simply to automate an existing process , economic benefits are likely to be minimal which in the end results in BPR projects failed in accomplishing paramount performance improvements.[28]

IV.2. TOTAL QUALITY MANAGEMENT AND BPR

Quality has been one of the strategic factors for organizations to be successful in the organizational world. Especially in recent years we witness many organizations adopting quality programs so as to ensure customer satisfaction in a highly perfect manner.

With the importance that quality has gained for the last few decades of 20 th century an important management concept called TQM has emerged.

TQM, a Japanese management philosophy can be defined as follows:

Total: The sum of all elements of the business

Quality: The desired state of accuracy, variation, or acceptance of all products and services of the business.

Management: The methods and actions employed to achieve the desired outcome.[29]

Total Quality Management is an enabling ingredient that can contribute to the successful implementation of process reengineering. Essentially, TQM forms the foundations of process reengineering as it embraces open communications, and breaks down the barriers which exist between management and non-management personnel.[30]

When we analyze TQM and BPR we can conclude that in essence TQM has similar underlying principles as process reengineering focus on: customers, cultural change, best practice and an integrated approach to doing work. Nevertheless, although both methods have some characteristics and principles in common, they differ in some ways. The major differences between TQM and BPR can be classified as follows:[30]

- BPR pursues multi-faceted improvement objectives that may include quality, cost, flexibility, speed and accuracy concurrently while the primary objective of TQM philosophy is to improve the quality of the product essentially by improving the quality of the processes that produce the product.[31]

- TQM focuses on existing processes and attempts to implement continuous but incremental change improvements whereas BPR takes a clean –state approach which means obliterating existing processes and creating entirely new processes which will take the place of old ones.[32]

- TQM is a management system that aims at long term continuous and incremental change improvements to achieve customer satisfaction. TQM refers to programs and initiatives that emphasize incremental improvement in work processes and outputs over an open-ended period of time.[33] BPR, on the other hand, is the rapid and radical redesign of strategic processes to optimize the workflow and productivity in an organization. The changes that take place during BPR are fast and drastic.[34] BPR refers to discrete initiatives that are intended to achieve radically redesigned and improved work processes in a bounded time frame.[33]

- BPR is an intensive top down approach that needs continual top management leadership and support. TQM needs overall top management support and, when provided, can continue functioning without any more daily support from management.[32] TQM can also be a bottom-up exercise if most ideas come from the shop floor, it can be implemented in a bottom –up fashion by "reversing the pyramid". However it would be unusual for a shop floor employee or even a middle manager to be TQM's main driver or champion – for more likely the chief executive or the managing director will be the major sponsor of the TQM program.[31]

- External pressures, in particular the market, are seen to play a significant role in explaining why organizations opt for BPR and TQM programs.
  TQM initiatives are seen to be motivated to a significant extent by external (market) pressures. When we look at BPR applications on the other side, we see that BPR applications are not only conducted in order to adapt changes in external environment but also carried out because of internal concerns.[31]

- TQM appears to take moderate amount of risk by working with existing processes whereas BPR assumes a high risk in its efforts, including doing away with the existing methods of operation.[32]

- Both TQM and BPR realize that a cultural change may be necessary in order to execute organizational change successfully. The chosen approach must fit the organizational culture in order for the approach to be embraced by workers. If the current culture is not suitable with the chosen approach, then culture change is required. TQM is customer focused and requires all employees to be similarly focused. A TQM culture would also facilitate the development of human resources but, in this instance the development would focus on customer service skills, technical skills and other skills that would improve service quality. In contrast, BPR is more objective in nature. BPR is about redesigning systems and so requires a culture that will be willing one-off frame-breaking changes.[35]

At this point it is important to underline that although these two approaches are different in some ways they are both based on change but generally TQM falls behind the needs of increasing productivity and quality requirements. To meet these increasing needs, a more pragmatic approach implementing the tools and techniques of TQM to an increased level of sophistication are required. This can be achieved through process reengineering. With this in mind, it can be concluded that organizations with a built-in philosophy of TQM will have a good understanding and be more adaptable to process reengineering than those without.

Consequently, when it is questioned whether TQM is an enabler or not, it can be inevitably said that TQM is an enabling ingredient and stepping stone towards process reengineering. [30]

IV.3. ORGANIZATIONAL ENABLERS OF BPR

While conducting their reengineering efforts organizations can not overlook the other enablers of process redesign such as organizational enablers.

For a BPR effort to succeed, all enablers must be aligned in balance with other key aspects of the organization. For example, if a process is reengineered through the innovative application of IT, this will result in greater worker empowerment and autonomy, and then the organizational culture and organizational structure must be adapted to support these changes. Conversely, if an organization’s culture supports control and maximum efficiency systems to enable process innovation must be consistent with these objectives to succeed.[8]

From the above, it can be concluded that reengineering projects focused on only one element of the organization will probably have unexpected and unpleasant results o the other interdependent elements of the organization.

Organizational enablers are divided into two categories: Structural and Cultural

IV.3.1. Structural Enablers

Among numerous structural changes that can facilitate process reengineering the most effective is the organizing of functional tasks into group-based units or teams. [30]

* Benefits of Teams

Teams perform better as they integrate cross-functional skills in single work units. Furthermore, a broad set of skills and perspectives increases the likelihood that output will meet multifunctional requirements.For instance, new product development teams increasingly include representatives from all the functions involved in the product development process.

One of the benefits of composing teams to aid process reengineering is that working in teams improves the quality of work life. Teams provide opportunities for small talk, development of friendships, social interaction and empathic reactions from other employees.

* Criteria for Team Success

Although personality issues may make some productive workers unsuited for teamwork, in general, employees who perform well as individuals tend to perform well as team members.For the team to be successful, it is important to find workers with good performance, skills, background and experience. If the team members lack the functional background, experience and skills to manage the process change the team is probable to be unsuccessful.[8]

Logistical issues, such as the location of team members can also affect team success. In one computer company that was redesigning several key processes, the owners of each process themselves formed a team. A division in which process owners was collocated, enabling them to meet biweekly, progressed much faster in designing new processes than other divisions in which geographical separation precluded such frequent meetings.

Clarity in mission, process boundaries, decision-making authority and internal and external roles is also one of the momentous success factors for process teams. Clarity is facilitated when teamwork is viewed in process terms; the process orientation supplies a clear purpose and the process performance objectives become the performance objectives of the team.[8]

* Types of Teams

Different team structures can be formed as structural enablers, for example:

a) Self-Managing Work Teams : Self-managing teams have control over their jobs, tasks and work environment and they have no formal leader. The positive impact of peer pressure from within self-managing teams has delivered significant increases in productivity and quality.

b) Cross-Functional Teams: In these kinds of teams, multiple functions are combined into one unit. These teams increase the probability that the output team produces meets multi-functional requirements.

c) General Purpose Problem Solving Teams: Generally this structure consists of between five and ten employees from within a department. The team meets on a regular basis to discuss ways of improving productivity, quality and the working environment.[30]

Although the execution of teams and team building have been underlined as the most important structural enabler of BPR , it should be recognized by the management that forming teams are not always vital to BPR , the work of individuals can also be effective. That's why, in order to figure out the best way of facilitating BPR, the organizational culture and functional diversity should be fully understood and analyzed by the top management before carrying out any structural changes.[30]

Only the organization who is going to reengineer its processes can know whether team work will create a more effective process or not. Teams are a means of building social interaction and a cross functional perspective into a work process. If these objectives can be consummated through some other means, or are for some reason unnecessary, team structures are not required.[8]

IV.3.2. Cultural Enablers

Greater empowerment and participation in decision making are some of the trends in organizational culture that have been recently noticed. These recent shifts have resulted in flatter organizational hierarchies or broader spans of control in organizations and have been widely documented to lead to both higher productivity and greater employee satisfaction. By this way, employees involved in the process become decision makers through greater empowerment and consequently taking responsibility for the functional and operational procedure of the process.[30]

In addition to these, information technology can support either culture-employee performance or empowerment by supplying employees with necessary information that enables them to make their own process decisions or with instructions that dictate exactly how to execute each step of the process.This dual nature of IT, enables individuals or teams to manage information effectively and provides a tool to monitor individual or team performance.[8]

IV.4. HUMAN RESOURCES AS AN ENABLER OF BPR

Hammer and Champy recognize the importance of the human resource when they state “companies are not asset portfolios, but people working together to invent, sell and provide service.” Taken the above into account, it can be said that human factor plays an important role in the daily operations and consequently in the success of organizations. [36]

Human resources is not only effective in the daily operations and success of the organizations but also in organizations’ reengineering efforts.

No reengineering effort will succeed without first reeducating and retraining people who will ultimately work the new process. According to Meg Wheatly , “ if you are going to move information and responsibility down to the low level, then the key question is how can you be sure that people will behave appropriately ? You need to be sure that everyone is playing by the same rulebook.”[36]

Hence, we can conclude that the success of BPR is closely linked to the success of human resources and human resource policies which act as an enabler for business process reengineering.

Essentially, these human resource enablers focus on new process skills, job motivation and human resource policies.

IV.4.1. New process skills

When a new process is being designed the process skill requirements should be assessed, both by management and the employees since the introduction of a new process or processes requires new process skills.

When a new process or processes are launched into an organization, new skills associated with these process/es should be obtained in the context of the new process/ es through training programs.[30]

Since process innovation often involves both greater employee empowerment and a broader set of work tasks, the necessary new skills may involve both greater depth of job knowledge and greater span of task expertise. For instance, a worker expected to be a generalist and participate in an autonomous team must learn about the jobs of other team members, should become familiar with their tasks and if new technologies are to be employed in the process, must acquire skills in applying and using those technologies.

In extreme cases, process innovation may demand not just new skills, but new employees. Many process designs lessen needs for employment, enabling firms to remove all or most workers in the process area. Companies experiencing such a change tend to hire fewer new employees with different skills and backgrounds. Even though the employing of new employees as an enabler of process innovation is a viable option, it is not a particularly desirable option for companies seeking to ensure and pertain employee loyalty and morale. A better alternative is to employ eligible, flexible and competent employees from the beginning and invest to keep their skills current and adjustable to the needs of the new process.[8]

IV.4.2. Motivation

Motivation levels of employees unquestionably influence process performance. Employee motivation stems from combination of factors such as the characteristics of the job, the way job is designed, and some other factors determined by individuals' personalities.

Companies may aim at hiring employees with high motivation levels but can also find ways to bring motivation into the process/es being designed and make the new tasks for the new process or processes rewarding.[30]

The consensus model in studies of work organization suggests that work motivation originates from five key aspects of the job, or process.

- Skill variety – the variety of skills and talents necessary to perform the tasks
- Task identity –the degree to which a job involves completion of an entire activity

- Task significance- the perceived importance and impact of the job
- Autonomy- the extent of the individuals freedom to schedule tasks and determine procedures
- Feedback- the extent to which information about the performance of the job is provided to the worker.[8]

Since employees are highly motivated by task meaningfulness and responsibility, each of the above core dimensions should be addressed by management to ensure motivation, satisfaction and increased performance.[30]

To summarize, well designed process jobs are likely to be highly motivating and high motivation is an important element in terms of process performance.

IV.4.3. Human resource policies

A number of other human resource policies can be considered as process innovation enablers when integrated with technological and organizational changes. These policies and their implications for process innovation are mentioned briefly below:

IV.4.3.1. Compensation

It has been found out by researchers that compensating employees according to their process performance results in increased productivity.

The strong measurement orientation of a process approach requires compensating process workers on the basis of process performance. Obviously doing so would probably be an effective motivational technique for these employees. At the management or process owner level, compensation-oriented enablers might include giving managers a financial share in the performance of the process.

IV.4.3.2. Career paths

A process view of the organization usually implies career paths different from those found in the typical functional, hierarchical organization. Career movement is likely to be more lateral than upward; titles may no longer reflect the importance of role.

Companies that can comprehend how to motivate employees under these new career conditions and make use of these lateral advance opportunities to the advantage of employees will have a long term advantage in process reengineering over those that can not.[8]

IV.4.3.3. Work role rotation

Since processes are typically collections of functions, a process worker should have enough knowledge about other functions and activities so as to effectively integrate across them. One way to ensure broad process knowledge is to rotate workers through various jobs in the process or in related processes.

This, like process oriented career paths, is a long term enabler of process reengineering that should be established throughout a company rather than for a specific process.

IV.4.3.4. Lifetime employment

Companies adopting the life-time employment policy are in the position of taking the advantage in their reengineering efforts over other companies who do not. Employees who feel that they belong to a company and have a job for life tend to be more loyal and are much less worried about designing and performing their jobs out of existence. We have been witnessing copious firms in Japan adopting this policy so as to ensure process flexibility and grass-roots innovativeness of their employees.

These policies described above make process reengineering through other enablers much more likely to happen and the absence of these human resource enablers could be considered as constraints to process innovation.[8]

At this point, it must be emphasized that like the multinational company which has been analyzed as a case study in this thesis, project-oriented companies should also give importance and careful attention to the development of human resource policies.

Project–oriented companies have dynamic boundaries and contexts. The number and sizes of the projects performed are constantly changing and cooperation with clients and suppliers are organized in teams. In this dynamic environment in which human resource configuration is constantly changing, ensuring employee well-being and ethical treatment also play a significant role in the success of BPR efforts.[37]

PART V.

BPR CASE STUDIES FROM LITERATURE

V.1. FORD-MOTOR COMPANY

In the early 1980's, Ford, like many other American corporations was exploring for ways to reduce overhead and administrative costs. One of the places Ford believed it could lower costs was in its accounts payable department, the organization that paid the bills submitted by Ford's suppliers.[6]

At that time, accounts payable in North America alone employed more than 500 people. Ford's management thought that by automating the existing process and by using computers the head-count could be reduced by % 20.

Ford was enthusiastic about its plan to tighten accounts payable until it looked at Mazda. While Ford was aspiring to a 400-person department, Mazda's account payable organization consisted of a total of 5 people. The difference in absolute numbers was astounding and even after adjusting for Mazda's smaller size , Ford figured that its accounts payable organization was five times the size it should be.

Ford managers set up their goal: accounts payable would perform with not just a hundred but many hundreds fewer clerks. It then set out to achieve it. First, managers scrutinized the existing system." Accounts payable "can not be reengineered , because it is not a process but a department. The process that Ford redesigned was not "accounts payable" but "procurement."[38]

Ford's old parts acquisition process was rather conventional. It began with the purchasing sending a purchase order to a vendor, with a copy going to accounts payable. When the goods were arrived at Ford," material control" filled a form describing the goods and sent it to accounts payable. The vendor, meanwhile, sent accounts payable an invoice. At this point, it was accounts payable duty to match the purchase order with the receiving document and the invoice. If these all three documents matched, the department made payment.[6]

If they were any incompatibilities between purchase orders, receiving document and invoice they payment was holded. In case of such discrepancies the department had to spend a big portion of its time to figure out them. In these cases, an accounts payable clerk would investigate the discrepancy, hold up payment, generate documents and all in all gum up the works.

One way to improve things was determined as hindering the discrepancies in the first place. In order to attain this, Ford put " invoiceless processing " in practice. Now, accounts payable clerks do not have to match purchase order with invoice with receiving document, primarily because the new process eliminates the invoice entirely.[38]

Now, in this new process when a buyer in the purchasing department places a purchase order to a vendor, that buyer simultaneously enters the order into an on-line database. Vendors like before send the goods to material control. When they arrive responsible person in the material control checks a computer terminal to see the received shipment matches with an outstanding purchase order in the database. There are two chances: It does or it does not. If it does, the clerk at "material control" accepts the goods and pushes a button on the terminal keyboard that tells the database that the goods have arrived. Receipt of the goods is now saved in the database, and the computer will automatically issue and send a check to the vendor at the suitable time. On the other hand, if the goods arrived do not match with the outstanding purchase order in the database, the clerk at "material control" will refuse shipment and send it back to the vendor.[6]

As it can be seen from the application, Ford made a radical change and attained dramatic improvement. By this way, Ford has achieved a % 75 reduction in head count, not the % 20 it would have gotten with a conventional program. And since there are no incompatibilities between the financial record and the physical record, material control is easier and financial information is more precise and correct.[38]

V.2. IBM CREDIT

IBM Credit is in the business of financing the computers, software, and services that IBM Corporation sells. The IBM Credit’s operation comprises of five steps as follows:

(1) When an IBM field sales representative called in with a request for financing, one of the operators taking the call in the central office wrote down the request on a piece of paper.

(2) The request was then dispatched to the credit department where a specialist checked the potential borrower's creditworthiness by entering information into a computer system wrote the result on the piece of paper and dispatched to the next link in the chain, which was the business practices department.

(3) The business practices department was in charge of modifying the standard loan covenant in response to customer request. When this task was completed, the special terms to the request form were attached to the request if necessary.

(4) Next, the request went to the price department where a pricer determined the appropriate interest rate to charge the customer.

(5) Finally, the administration department turned all this information into a quote letter that could be delivered to the field sales representative by Federal Express.

This entire process was taken six days on average. From the sales representative's point of view, this turnaround was too long that another computer vendor could possibly attract the customer. Furthermore, when the sales representative called to learn the status of the deal no-one could tell where the request was and when it could be done.

To improve this process, IBM Credit tried several fixes. They decided, for instance, to install a control desk, so they could answer the sale representative's question about the status of the request. That is, instead of forwarding the request to the next step in the chain, each department would return the request to the control desk where an administrator logged the completion of each step before sending out the request again. This fix did indeed solve the problem, however, at the expense of adding more time to the turnaround.[39]

Eventually, two senior managers at IBM Credit took a request and walked themselves through all five steps. They figured out that performing the actual work took only ninety minutes in total. Clearly, the problem did not lie in the tasks and the people performing them, but in the structure of the process itself. As a result, the management decided to re-engineer the overall credit issuance process.

In the end, IBM Credit replaced its specialists - the credit checkers, pricers and so on - with generalists. Now, instead of sending an application form office to office a generalist called deal structurer processes the entire request from beginning to end.

How could one generalist replace four specialists? The old process design was, in fact, found on a deeply held assumption: that every bid request was unique and difficult to process, thereby requiring the intervention of four highly trained specialists. In fact, this assumption was false; most requests were simple and straightforward: finding a credit rating in a database, plugging numbers into a standard model, pulling clauses from a file. These tasks fall well within the capability of a single individual when he or she is supported by an easy-to-use computer system. IBM Credit therefore developed a new, sophisticated computer to support the generalists. In most situations, the system provides guidance and data to generalists. In really tough situations, he or she can get help from a small pool of real specialists who are assigned to work in the same team.

The new turnaround becomes four hours instead of six days. The company achieved a dramatic performance breakthrough by making a radical change to the process - i.e. the definition of reengineering.[39]

V.3. TACO-BELL AND HALLMARK

One of the elements which make business process re-engineering inevitable is information technology which has improved incredibly in recent years. The use of technology has been the principles of business process re-engineering to achieve dramatic improvements in organizations.

Taco-Bell and Hallmark are among these organizations which have taken the advantage of this principle and reached success by re-engineering. By make use of information technology Taco Bell eliminated managerial layers within the organization. In stead of being a regional fast food restaurant it succeeded in becoming a national company known ABD wide. [40]

Taco Bell created the K-Minus (Kitchenless restaurant) program based on their belief that they are a retail service company, not a manufacturing company. In the new process, meat, beans, corn shells, lettuce, tomatoes and cheese for their products are prepared outside of the restaurant in central commissaries. At the Taco Bell restaurants, the food ingredients are prepared when ordered for customer consumption. Taco Bell cites the following results: greater quality control, better employee morale, fewer employee accidents and injuries (due to preparation task off-site), big savings and more time to focus on the customer business processes. Currently they are redefining how to deliver their food services, by taking their food service to places where people gather such as dining centers, schools, universities, airport, and stadiums.

Using reengineering, Hallmark, redesigned the process they used to bring new card concepts to market. The growing trend of more and more niche markets convinced Hallmark executives that the product development process needed changing. The company's goal was to get new products to market within one year. Hallmark has always assumed that the product development was comprised mostly of printing and production rework time.

Much to their surprise two-thirds of the time was spent in developing the plan and concept for the card. They also found that from the time a concept was given to the creative staff, numerous hand-offs were completed. The concept spent 90% of the time within the creative staff sitting in someone's in/out slot. In developing a new line of cards in 1991 Hallmark used BPR to create a cross functional team approach to product development and these teams which work together from a card's design to manufacturing bring the new card to market 8 months ahead of schedule.[41]

V.4. KODAK

Another example of re-engineering was executed in the production development process of Kodak in response to a competitive challenge. In 1987 , Kodak has no competitive offering against Fuji's newly announced 35 mm single use camera which the customer purchases loaded with film , uses once , and then returns to the manufacturer , who processes the film and breaks down the camera into parts for re-use.

Kodak's traditional product design process would have taken seventy weeks to produce a rival to Fuji's camera. Such a time delay would have handed Fuji an enormous head start and advantage in a new market. To cut its time –to- market, Kodak decided to re-engineer its product development process.

Kodak's old product development process was partly sequential and partly parallel but entirely slow. At Kodak, the manufacturing engineers could begin their work only after twenty eight weeks the product designers had started. Kodak re-engineered its product development process through the innovative use of a technology called computer aided design/computer aided manufacturing (CAD /CAM). With this technology, managers take the advantage of being able to design at computer workstations instead of drafting tables which have made them more productive in the end.

The technology that has enabled Kodak to reengineer its process is an integrated product design database. Each day, each engineers work is collected by the database and combined into a coherent whole. Each day, design groups and individuals inspect the database to see whether someone else's work yesterday has created a problem for them and for the overall design. If so, the problem is resolved immediately, instead of after weeks or months of wasted work.

Moreover, this technology allows manufacturing engineers to start their tooling design just ten weeks into the development process immediately after some shape has given the first prototype by product designers. Furthermore, because the reengineered process allows tooling designers to participate before the product design is finished, their expertise can be utilized to create a design that is more easily and inexpensively manufactured.[6]

V.5. MUTUAL BENEFIT LIFE

Mutual Benefit Life (MBL) is an insurance company which reengineered its processing of insurance applications. Before reengineering, MBL handled customers applications as its competitors did. The long, multi step process involved credit checking, quoting, rating, underwriting, and so on. An application would have to go through as many as 30 different steps, reaching 5 departments and including 19 people. At the very best , MBL could process an application in 24 hours but since most of the time was spent forwarding information from one department to another it was taking 5 days to 25 days.

Since the MBL's rigid, sequential process led to many applications the president of MBL decided that an improvement in customer was needed and demanded a %60 improvement in productivity. The management team authorized to executing the reengineering effort realized that shared databases and computer networks could make many different kinds of information available to a single person, while expert systems could help people with limited experience make correct decisions.

MBL gave up existing job definitions and departmental boundaries and created a new position called a case manager. Case managers work autonomously and have total liability for an application from the time it is received to the time a policy is issued. Because they are supported by powerful PC (Personal Computer) based workstations that run an expert system they are able to perform all the tasks related with an insurance application.

MBL reaped the benefits of assigning individuals to an entire process and empowering them to process the whole applications. MBL can now consummate an application in as little as four hours and average turnaround takes only two to five days. The company has eliminated 100 field office positions and case managers can handle more than twice the volume of new applications the company previously could process.[38]

PART VI.

A BPR CASE STUDY

In this chapter, the reengineering implementations related with production, logistics and procurement divisions in the Automation and Drives (A&D) and Power Transmission and Distribution (PTD) business units of a multinational company will be analyzed and proposes for further improvements will be tried to put forward. The information given here has been obtained from the interviews conducted with the company personnel and from the company's website. The name of the company will not be denounced and it will be called SMS in the following sections. In order to comprehend the company and the business area the company is operating more fully, initially a brief introduction of the company will be given. The organization chart as well as charts of business units A&D, PTD and sub business units A&D-Control and Distribution (A&D-CD) and PTD-Medium Voltage (PTD-M) can be also found in Appendix A, Appendix A1, Appendix A2, Appendix A3, and Appendix A4.

VI.1. SMS COMPANY

SMS Company is a world leader company in electrical engineering and electronics and ranks second in sales among the world's leading electronics and electrical equipment companies.

The company has been founded in 1847 and since that time it has tended to shape the future with innovations through its vision which is to sustain worldwide leadership in electrical engineering and electronics.

SMS offers comprehensive range of systems, solutions and services and invests between 5-6 billion € annually in global Research and Development (R&D) SMS Company accounts to more than 1 million shareholders and employs over 400,000 people and is a global player with local access in more than 190 countries.

Table VI.1 The Number of Engineering /Production Facilities of SMS Worldwide

Europe	345
America	158
Asia / Pacific	85
Africa , Middle East, CIS	17

VI.2. SMS A.Ş – TURKEY

First SMS activities in Turkey have started in 1856 but the foundation of SMS A.Ş was eventuated in 1958. The company 's former name was S-ko A.Ş at that time but with the transfer of % 25 shares from one of the biggest Turkish groups to SMS AG the name of the company was changed from S-ko A.Ş to SMS A.Ş.

The company's main mission is to strive for growth and increased value for stakeholders by implementing advanced technologies, new products and services to provide excellent solutions to satisfy customers' requirements.

The company offers products, services and solutions in seven main areas.

1- Power & Infrastructure
   * Power Transmission and Distribution
   * Power Generation

2- Information and Communication Systems
   * Communications

3- Automation and Control
   * Low tension Control Systems
   * Electrical Installation Technology
   * Motors and Motor Driving Systems
   * Automation Systems
   * Process Automation

4- Transportation Systems
   * Rail Automation and Electrification

5- Medical Solutions
   * IT Solutions
   * Customer Services
6- Solutions
   * Building Technologies
   * Integrated Building Services
   * Industrial Solutions and Services
   * Real Estate
7- Program and System Engineering

The business areas in which the company operates are explained below concisely:

1- Power Transmission and Distribution

Efficient and safe distribution of power has always been a key point for network operators worldwide. Established to meet such requirements in Turkey and respond to customer requests and requirement arising in this context, Power Transmission and Distribution division provides consultancy, project, turn-key delivery solutions and after-sale services for al levels from 0.4 kV to 400 kV with its high technology products and experienced staff.

2- Power Generation

SMS Turkey Power Generation division has specialized on engineering, manufacturing, installation and commissioning services concerning inner requirement and measuring control systems of thermal and hydroelectric power plants in Turkey. Operation fields concerning power plants covers a wide range from super efficient gas turbines, generators, and computerized command and control system, each representing the most advanced technology in their specific areas.

3- Communication Systems

Communications Systems Division provide services ranging from IT solutions, software development , electronic signatures and security certificates for banks, and call center solutions.

4- Automation and Control

A world leader in the sector, SMS provides its business partners with integrated solution through its product and system solutions, turn-key projects and responses at all levels of automation. Automation and Drives division serves its customers by providing circuit hardware and installation technologies, motor and motor driving systems and process automation techniques.

5- Transportation Systems

SMS Transportation Systems division has a "field of activity" covering design, manufacturing, shipping, installation, commissioning, trial operation and service work of infrastructural hardware such as rail transportation vehicles, electrification, signalization, and telecommunication.

6- Medical Solutions

SMS offers health sector in Turkey and worldwide manufacturing, sale, consultancy and technical service of Siemens-branded medical systems in a great number of fields ranging from radiology, cardiology, nuclear medicine, women's health through oncology and urology.

On the other hand, with increasing efforts in Turkey to catch up with European Community standards for health system, Medical Solutions division provides powerful solutions such as re-structuralization workflow of organizations and enterprises in the health sector, access to health, treatment and examination data of the patients at any point on the established communication networks, consultancy, optimization and implementation concerning hospital information systems and radiology information systems that increase quick diagnosis add correct treatment rates as well as image archiving and electronic distribution systems.

7- Building Technologies

SMS Building Technologies division renders service in the fields of comfort control and building automation systems, fire alarm and electronic security system in international standards and set quality standard in its business area by providing the most suitable system solutions according to the customer requirements.

In Turkey, it deals with sale, commissioning, training, maintenance and modernization for HVAC automation and control systems, room control systems (heating, acclimatization, ventilation, and blind control), lighting and power management.

Interactive and analog address and conventional fire alarm systems, gas detection, FM200, CO_2 and nitrogen gas automatic extinguishing, security, card-entry systems and products as well as closed-circuit television system, turnspikes, x-ray and metal detectors and watch tour control and pneumatic posting systems all are marketed by SMS Building Technologies in Turkey.

8- Integrated Building Services

SMS Integrated Building Services division provides solutions of all electro mechanic contractual works from project stage to commissioning period, including consultancy, engineering and financial services in accordance with requirements of the customers. Extending economic life by maintaining investment value of real estate at the operation stage, achieving savings at operation costs up to 20% are some of the major reasons of for its existence. The Department offers services in the fields of Technical Building Management, Logistic Building Management, Commercial Building Management and Special Solutions. Siemens Integrated Building Services Department gives service with its network of technology, 365day/24 hour uninterrupted and quality service, expert technical staff capable of giving immediate response to requirements, financial power and, most importantly, business perspective based on customer satisfaction.

9- Industrial Solutions and Services

Industrial Solutions and Services division provides high performance solutions and services for industry and infrastructure from planning stage of the facility through assembly, commissioning, modernization, maintenance, operation and, finally, disassembly stage.

10- Real Estate

As being one of the essential factors in the development of products and services, the real estates may deeply affect profitability of an organization with their costs and revenues. SMS Real Estate management manages more than 19 million m2 of office and industrial area at 810 locations throughout the world.

Aiming at managing and developing of the real estates in the portfolio of SMS Turkey on “added-value development” basis and particularly meeting areas and building service requirements of SMS companies, SMS Real Estate Turkey division provides service with its expert and experienced staff in the areas such as real estate development, location concepts, building service management.

11- Program and System Engineering

Program and System Engineering division is an independent research and development unit in SMS. Having more than 5,100 employees in Europe and Asia, the business unit operating in Turkey since December 2000. Powered by its effective staff, it offers services in the fields of computer program, consultancy, integration, application, training, maintenance and support. The division's mission is to provide SMS companies and local customers with the best program service.

VI.3. RE-ENGINEERING IMPLEMENTATIONS IN SMS

VI.3.1. Re-Engineering in A&D CD - Production

Since SMS is a highly renowned company in manufacturing of energy control, energy distribution and consumption oriented electro mechanic products and devices; production management is at the core of SMS's all business activities. So, it is not overwhelming that reengineering efforts in production all focus on improving production.

One of the main areas in which reengineering initiatives have taken place in SMS has been the production division of Automation & Drives business unit.

VI.3.1.1. Before Re-engineering – Historical Perspective

Automation & Drives business unit consists of two main sub business units which execute production: Control and Distribution (CD) and Enstalation Technik-Installation Technique (ET). CD sub unit is specialized in producing contactor, signal lights, mini contactors, motor mechanisms, automatic switch appliances, thermic relays etc.

ET, on the other hand is specialized in producing 05 to 70 ampere B and C type electric fuses that are used in homes and in industry. B type fuses are used in homes with the aim of lightening. C type fuses, however, are used in industry for motors and machines.

The figure below depicts the production process in A&D-CD simply.

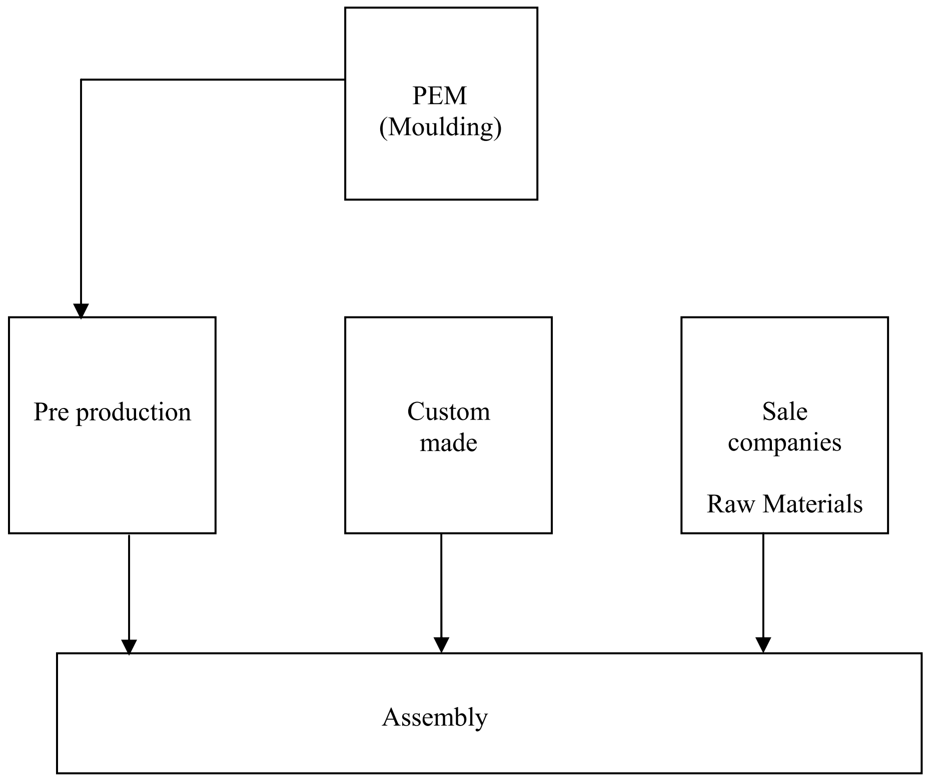


Figure VI.1 Production Process in A&D-CD Simply

Before attempting on re-engineering, answers to some vital questions like "Is there any need to change what is being done? How can the production process be improved and production times can be shortened? How flexibility to production orders could be ensured? "have been sought by the unit. As a result, putting a reengineering project named Production Storage Areas Project (PSA Project) into practice has been decided.

The purpose of the "PSA Project" has been to form production storage rooms in the production site so as to give flexibility to production orders, constitute the necessary infrastructures to supply materials to this storage rooms free from orders and reduce production cycle time.

Before the implementation of "PSA Project", the company was keeping a specified monthly based stock level in raw materials & semi-finished warehouse outside the production area and executing production depending on the yearly sales estimations which are set by the Sales Division.

Demands for every material needed to manufacture a certain product are logged into the SMS SAP R/3 4.6 C system that the company uses currently, on a yearly and monthly basis and these demands are revised in a meeting conducted every fortnight.

As production orders were being received, raw materials & semi-finished goods were being transferred from the warehouses for raw materials & semi-finished goods outside the production area to the storage rooms in the production site. Here it is important to touch on that raw materials and semi finished goods warehouse outside the production area consists of semi-finished goods produced at Pre-production, Custom-made goods of which SMS provides the raw materials while other companies execute the production, and finally Raw Materials that are directly bought from some sale companies.

In addition to that before the implementation of “PSA Project”, in the former system, when a production order came from sales division to the warehouse division through SAP, the needed materials along with the availability of materials needed to produce a device was being checked and identified by the SAP system and if there was not enough material to manufacture a certain product first of all the system was providing a missing materials list and did not let the order/s open. After the system issued the deficient material list, this list was being given to the warehouse division which conveys the list to Pre-Production or Procurement. After the materials in the list were complemented the production order/s were being opened and production was being commenced.

All these circumstances mentioned above resulted in long production phases and not sufficiently fulfilled customer requirements. Consequently, a reengineering Project named “PSA Project “was launched in order to address these problems.

The figure below designates the production process before reengineering:

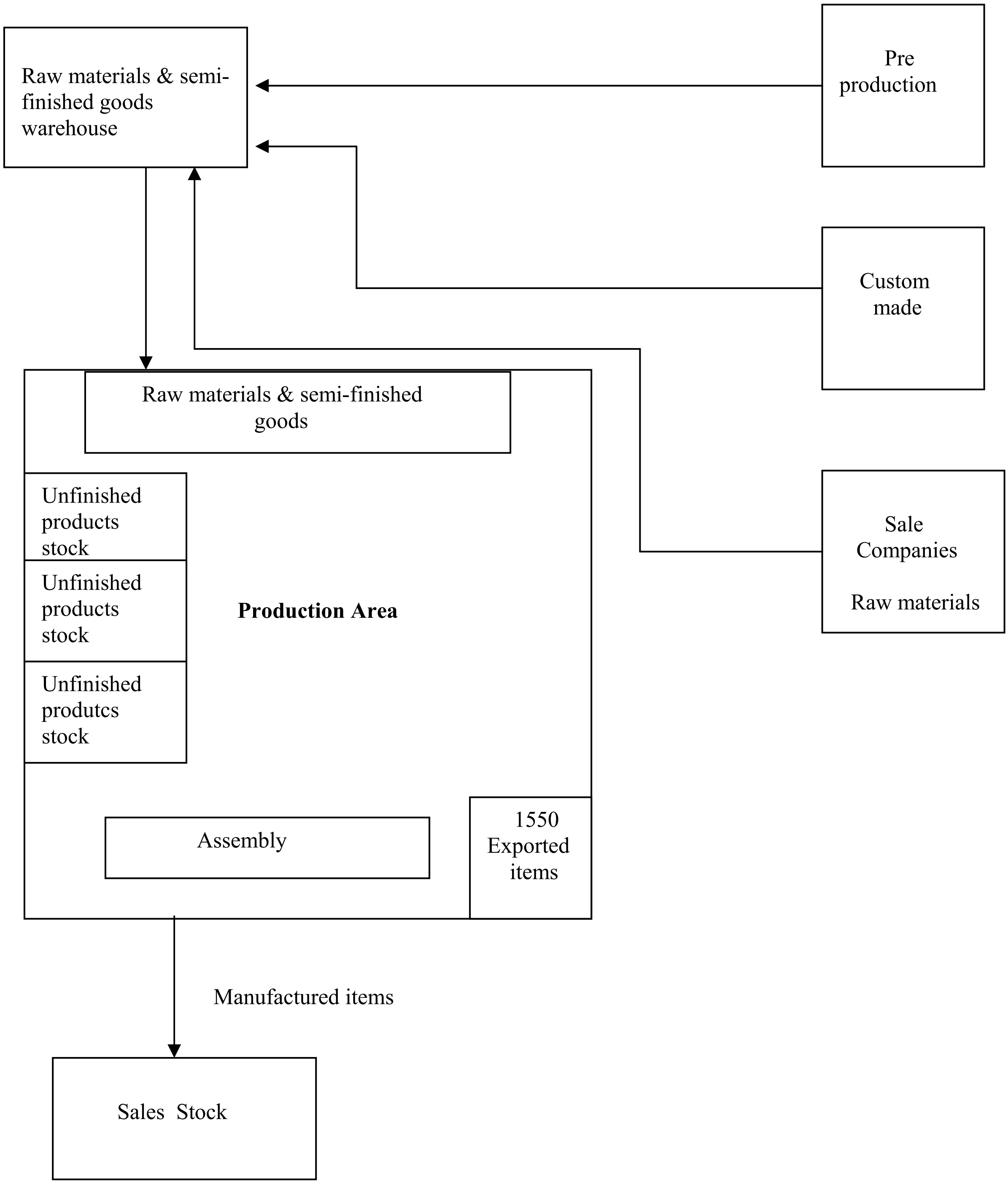


Figure VI.2 The Production Process Before Re-engineering

VI.3.1.2. Implementation of Re-engineering in Production

The re-engineering project in the production department of SMS has 2 main objectives as shortening production times and satisfying customer requirements more efficiently in a short period of time by gaining production flexibility.

In order to accomplish these goals the project named Production Storage Areas and Material Supply Project (PSA & MS Project) has been put into use. Within the framework of the project, production storage areas for raw materials and semi-finished goods needed to manufacture certain items and shelves for each specific item in these production areas have been constituted in the production area.

All raw materials and semi-finished goods needed to manufacture certain products are stored in production storage areas called "PSA "in the production area with a particular code of 1100. Raw materials and semi finished goods needed to produce a certain item are stored at shelves specific for each item in this production storage area with 1100 code. If we are to give a specific example: raw materials and semi-finished goods essential to produce" Contactor" are stored on a different shelve and raw materials and semi-finished goods needed to produce "electric fuses "are stored on a different one.

Each unfinished product required to produce a certain product, on the other hand, is stored in a specific unfinished products storage area with a certain code. The code of unfinished products storage areas changes from device to device. For instance, unfinished products necessary to produce contactor are stored in a warehouse with a 1120 code. The stock quantities of unfinished products storage areas are determined based on yearly sales estimations and stocking is done on a weekly basis but it can vary from product to product. For instance, the stocking of unfinished product "Bobbin" which is necessary in producing "Contactor" is done on a 15 day basis since any problem in Bobbin line may cause a 15 day delay in production.

The figure below briefly depicts the new process:

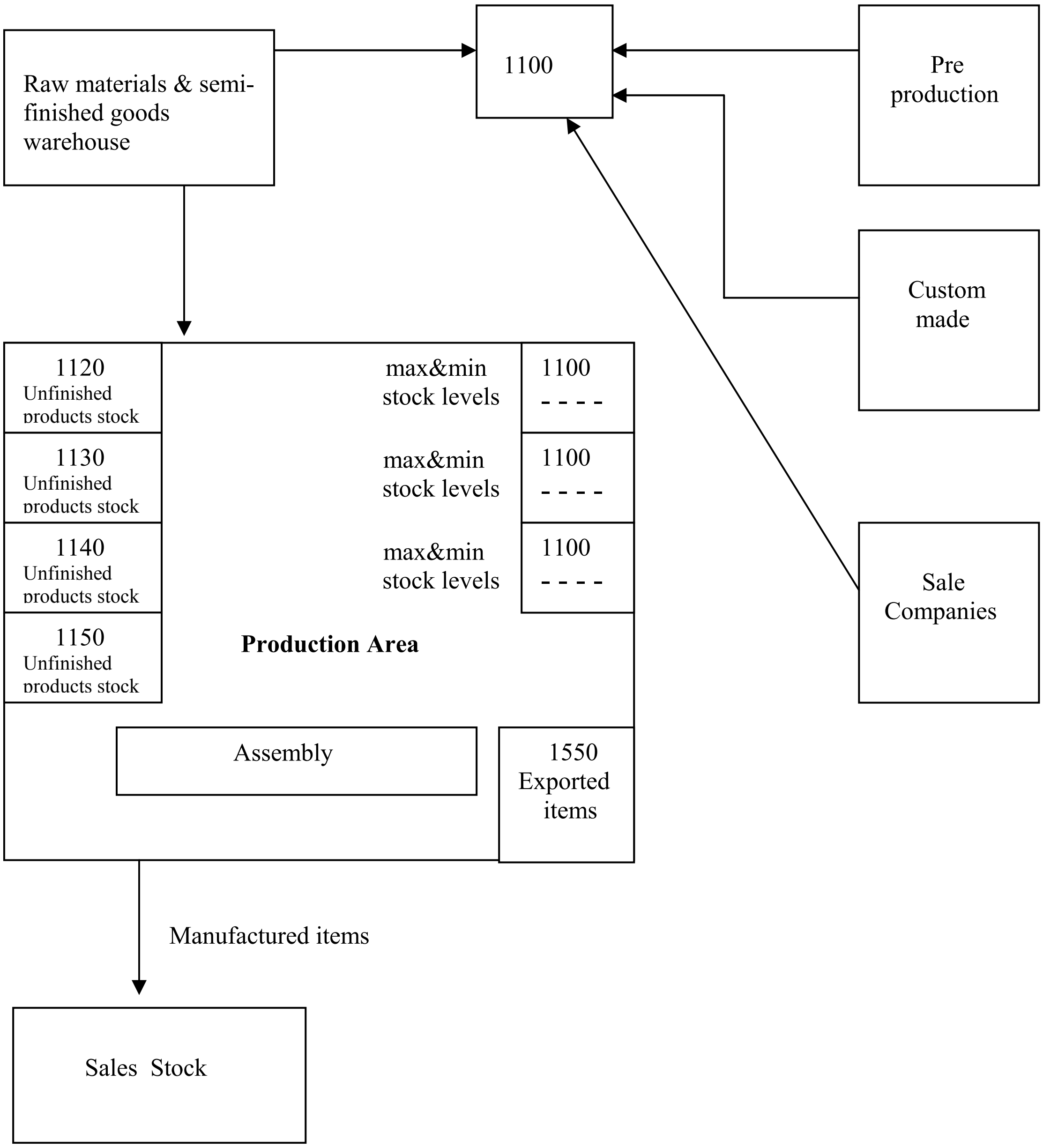


Figure VI.3 The Production Process After Re-engineering

Since the number of materials that are worked on is over 4000 the stock tracking of materials and their supply from raw materials & semi-finished goods warehouse can not be done manually. That's why within the framework of the project a software program, PSA Software-ABAP, independent from human which works under the company's SAP program has been developed by Information Knowledge (IK) department. This system is supposed to provide materials from raw materials & semi-finished goods warehouse automatically.

The addresses where materials in the production area should be stored, packaging styles and the fixed quantity of each material are identified and are logged into the system. With this program maximum and minimum stock levels of PSA areas are identified and dispatch of related materials to these production warehouses without being dependent on order quantities has been ensured. The system enables the shipment of materials as previously determined groups. Every material is stored based on determined quantities and supplied from semi-finished warehouse as they reduce.

When we have a look at the working style of the software program, the program runs every night automatically, groups every material used in production based on their storage place in production and lists needed materials by working according to a stock formula which can be seen below:

PSA Stock – Reserved Quantity < Minimum Stock Level

If PSA Stock minus Reserved Quantity which is the required quantity of materials for % 100 confirmed orders, is less than the determined Min Stock Level of that material the system calculates a quantity of need.

For example:

Contact - PSA stock : 1000

Contact - Reserved Quantity: 500

Contact- Minimum Stock: 600

Contact –Maximum Stock: 1000

The Quantity of Need: [Maximum Stock – (PSA Stock-Reserved Quantity)]

In this example the quantity of need: [1000- (1000-500)] =500

Having determined the quantity of need, the system uses a second formula to calculate the amount of materials that should be transferred from raw materials & semi-finished goods warehouse outside the production area to the PSA in the production area.
This formula could be seen below:

Quantity of Need > ½ Packaging Quantity

According to this formula, if the quantity of need determined for a specific material is larger than half of the packaging quantity of this specific material previously described into the system, amount of materials to be sent to PSA should be the same as the multiples of packaging quantity.
For instance:
Contact – Packaging Quantity: 250
Quantity of Need: 500

500 > ½ 250 = 500 > 125

According to this example, amount of contacts to be transferred to PSA is 250x2=500

These listings of these needed materials are made based on each device, according to device groups separately. For instance the Contactor device involves different Contactor groups such as K1, K2 etc.In addition to that, materials are listed according to their storage place in production. By this way needed deficient materials are taken from the warehouse and sent to production storage places.

The program could also be operated by a warehouse responsible manually in any time enabling the listing of missing materials to be identified. The warehouse responsible conveys the list to the operative warehouse responsible who collects and puts the needed materials from the raw materials & semi-finished goods warehouse so that the fork lift can take and carry them to the PSA.

If there is deficient stock or no stock at all for concerning materials in raw materials & semi finished goods warehouse, a notification mail is sent to the responsible people at production. These features of the new system granted important advantages which can be summarized as below:

* In the former system, for every order a dispatch report which included only one material was prepared and sent to the warehouse but in the new system every dispatch report sent to warehouse now includes at least 5 materials which in the end has ensured the reduction of paper need from 40.000 to 5000.
* In the new system, materials from raw materials & semi-finished goods warehouse are now being demanded as the multiples of packaging quantities which reduced the material count processing by the warehouse staff. For instance, now instead of 6300, 5700 etc. 5000, 10.000 numbers of materials packed are dispatched from raw materials and semi-finished goods warehouse.
* The going and coming number of the fork lift between raw materials and semi-finished goods warehouse outside the production area and PSA in the production area has been reduced since max-min quantities of raw materials and semi-finished goods that are supposed to be in production area have been set with this new system.
* The employee need decreased from 17 to 10.
* Deadline loyalty has been ensured and increased from 24% to 98% and customer requirements have been fulfilled on time efficiently. The time between starting and finishing of a specific order has decreased from 8.9 days to 6 days.

VI.3.1.3. Proposes for Further Improvement

When we have a look at the PSA Project that has been put into use in A&D-CD business unit, it seems to be working efficiently but some recommendations could be made at this point with the purpose of aiding the business unit to operate more efficiently and cost effectively.

The proposal for improvement that can be made for the production process of the sub business unit is to constitute “Consignment Stocks” for some of the raw materials. At this point, it is vital to mention that in SMS SAP system, every material bought from a supplier/sales company is described as “Raw Material” while materials that SMS have them produced to suppliers by providing them with raw materials and demands for labor work are described as “Custom-Made Materials.”

Every supplier/sales company which provides SMS A&D-CD production unit with raw materials should have its own storage place for the products they provide in the production area with a particular storage code. Here, the sales companies or suppliers’ task is to monitor the stock levels of SMS and supply materials as they reduce from their storage place.

In order to accomplish this, a web-based software tool, which will authorize and enable the suppliers to see and track the stock levels of SMS, should be established. As mentioned before, all the information related with raw materials (max-min stock levels, packaging quantities, storage no, supplier no etc.) had already been logged into the SMS SAP system. Based on the max-min stock level information entered to the system, a notification mail can also be sent to the suppliers as stock levels decrease from the identified min stock levels through SAP. At this point, it must be highlighted that since suppliers have the ability to monitor and track SMS stock levels they can adjust themselves and supply needed materials to SMS on time. Here it should be underlined that since "Material Income and Transport" division will not control the materials supplied to the production area by suppliers, the quality of these materials ought to be secured with a "Quality Assurance Agreement" made between SMS and the potential suppliers which will undertake the liability if any problem occurs in the production process of A&D-CD because of low quality materials.

It must also be emphasized that since some of the identified raw materials will be provided directly into the production area by suppliers independent from the PSA Project; some adjustments in SMS SAP system should be made in order to effectuate the proposed system. The proposed system may look like below:

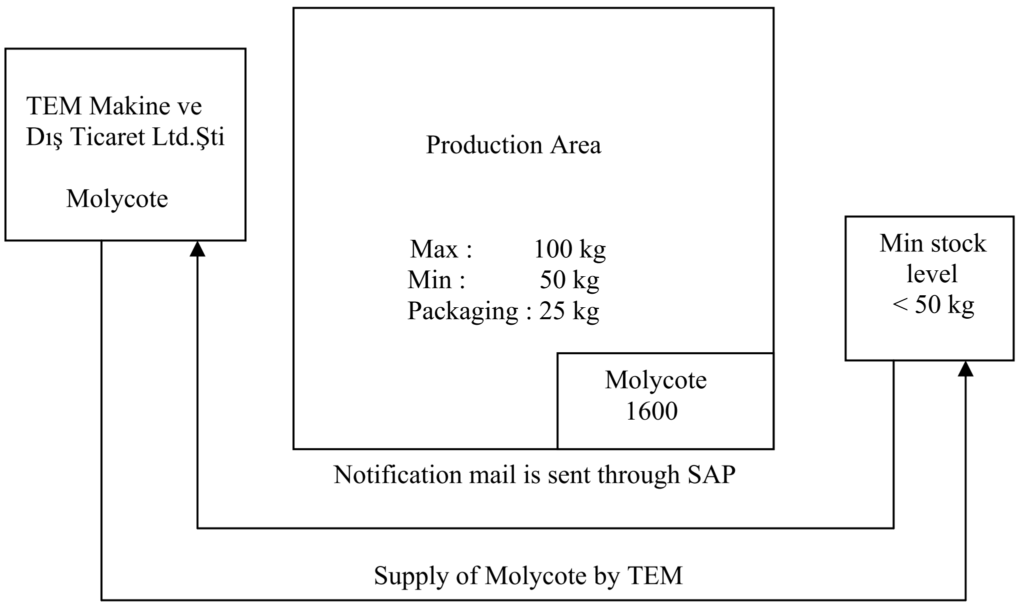


Figure VI.4 The Proposed Consigment Stock System

Here it must be also emphasized that the terms of payment and supply are supposed to be set with an agreement made between SMS, contract manufacturers and sales companies. Since the proposed system is a "Consignment Stock System" the payment terms can be determined based on weekly material usage. If we were to give an example, if 150 kg of Molycote product which TEM Makina ve Dış Ticaret Ltd.Şti provides as an engineering adhesive is used in one week , a notification mail will be sent to TEM Makina ve Dış Ticaret Ltd.Şti and payment will be made on the basis of this 150 kg weekly usage. No payment will be done in advance; TEM will only receive payment as long as Molycote products are used by SMS weekly.

We should also note here that a minimum weekly usage quantity must be also set ahead in the agreement and TEM should receive payment based on this minimum weekly usage quantity even its products are not used within a week.

At this point, it will be useful to mention the estimated costs and savings SMS may have with this proposed system. These estimated costs, savings, and procurement figures which have been obtained from the Purchasing Specialists of A&D-CD are summarized in the below tables:

Table VI.2 Potential Savings related with Printing and Faxing of Purchase Orders (yearly)

Working days (yearly)	300
Printing cost of 1 page (€)	0.09 €
Number of purchase orders (yearly) x 2 pages per order	5.000x2=10.000
Fax cost (€)	0.30 €
Total Saving	**3.900,000 €**

Table VI.3 Potential Savings related with Processing of Purchase Orders (yearly)

The cost of planning ,opening, approving, sending, trailing and ending of a purchase order	30 Euro/hour
The duration of planning ,opening, approving, sending, trailing and ending of a purchase order	50 Minutes
The cost of planning ,opening, approving, sending, trailing and ending of a purchase order	0.50 Euro/minute
The number of purchase orders related with raw materials (yearly)	5.000
Total Saving	**125.000,000 €**

The tables above show the estimated savings SMS will get if the proposed system is implemented. Since the stock levels related with raw materials will be under the control of suppliers, there will be no need to place purchase orders to these companies. So, there will not be any need to print, fax and process these purchase orders by Operative Procurement in A&D-CD.

In addition to the above mentioned savings related with procurement, the business unit will also reap the benefits of reducing its stock levels and will have the chance to reduce its' costs associated with high stock keeping since these stock levels will be monitored and supplied by suppliers. The approximate savings that will be gained through reduction in stock levels can be summarized as below:

* A&D business unit invests approximately 5.000.000 € to its raw materials' stock which means that the amount of raw materials which are at stock in any time is approximately 5.000.000 €. If the business unit opts to provide 50% of these materials through this proposed system, estimated saving will be around **2.500.000 €.** Here, it should be emphasized that the proposed system can not encompass 100% of raw materials since approximately 50% of them are imported from foreign countries.

- Since the business unit will invest half of the money it used to invest to raw materials' stock, the remaining half of the money which is 2.500.000 € could be invested to other risk free investment tools which is announced to bring nearly 16% revenue which means **400.000 €** saving per year.
- The business unit will also take the advantage of decreasing its warehouse costs (area costs, personnel costs, transportation costs etc.) which is declared to be 5% of the money invested in raw materials' stock. This means **125.000 €** saving per year.

According to the above estimated figures the approximate total saving can be calculated as **653.900,00 €.** At this point; as well as estimated savings, the costs that are likely to occur with this proposed system must be also alluded. According to the information obtained from IT and Logistics specialists in A&D, the prospective costs that may occur can be designated as below:

Table VI.4 Potential Costs related with the Proposed Consignment Stock System (yearly)

The cost of the software tool (€)	~ 50.000 €
Supplier training and development costs (€)	~ 3.000 €
The cost of supplier support (€)	~ 1000 €
Storage costs (€)	~ 90.000 €
Total Cost	**~ 144.000,000 €**

The above figures prove that the business unit will have a significant amount of gain which can be stated as approximately **509.900,000** in Euro if this proposed Consignment Stock System is put into use.

VI.3.2. Re-Engineering in Logistics in SMS

VI.3.2.1. Before Re-engineering – Historical Perspective

The important portion of raw materials and buy-sell products such as mobile phones, relays, contactors, insulating switches etc. which SMS A.Ş Company purchases are imported from SMS Germany (SMS AG) and any other different foreign suppliers.

Before the attempt of re-engineering SMS Turkey was giving purchase orders for these kinds of materials to SMS AG via telephone or fax which was fairly time-consuming and costly.

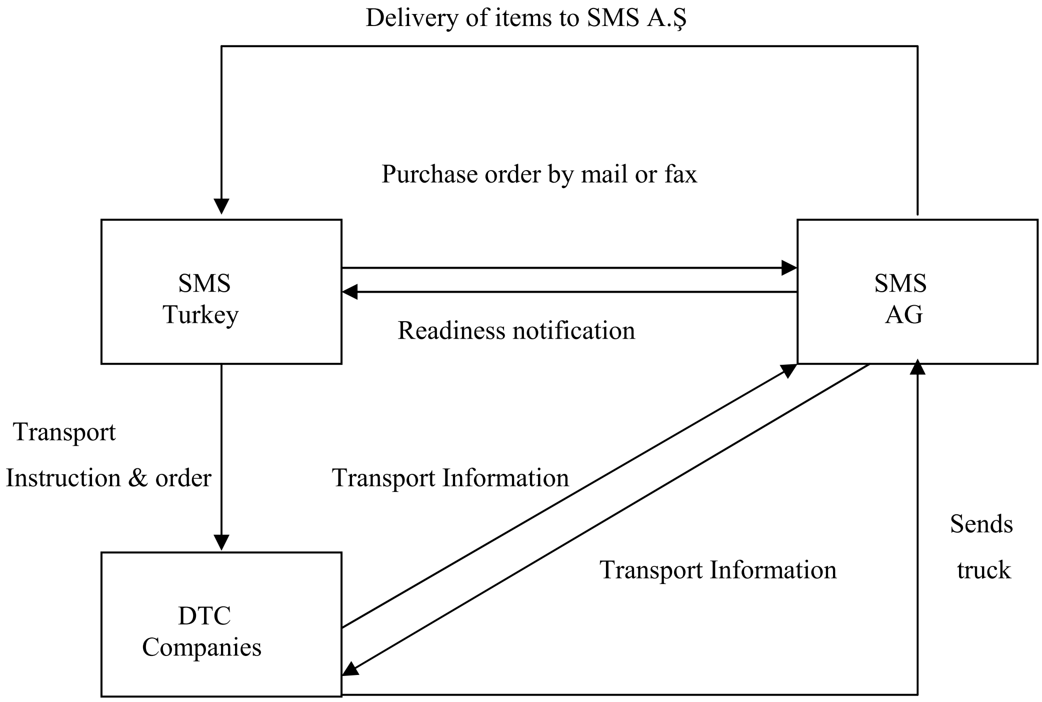


Figure VI.5 Import and Transportation Order Process (TOP) – Historical View

When the order was ready, SMS AG was informing SMS Turkey via same communication channels and after being informed, SMS Turkey was instructing Deutsche Transportation Companies (DTC) to pick-up the orders of different business units. At this point , DTC was calling SMS AG to get information about all the orders (kg , pallet dimensions and quantity etc.) and was sending a truck to pick –up the orders and deliver them to SMS Turkey.

In order to solve the problems associated with costs and time waste, the company put EDI along with the SAP / MM module into practice. In this way, the company reaped the benefits of the application of SAP / EDI between SMS Turkey and SMS AG in the purchase order process.

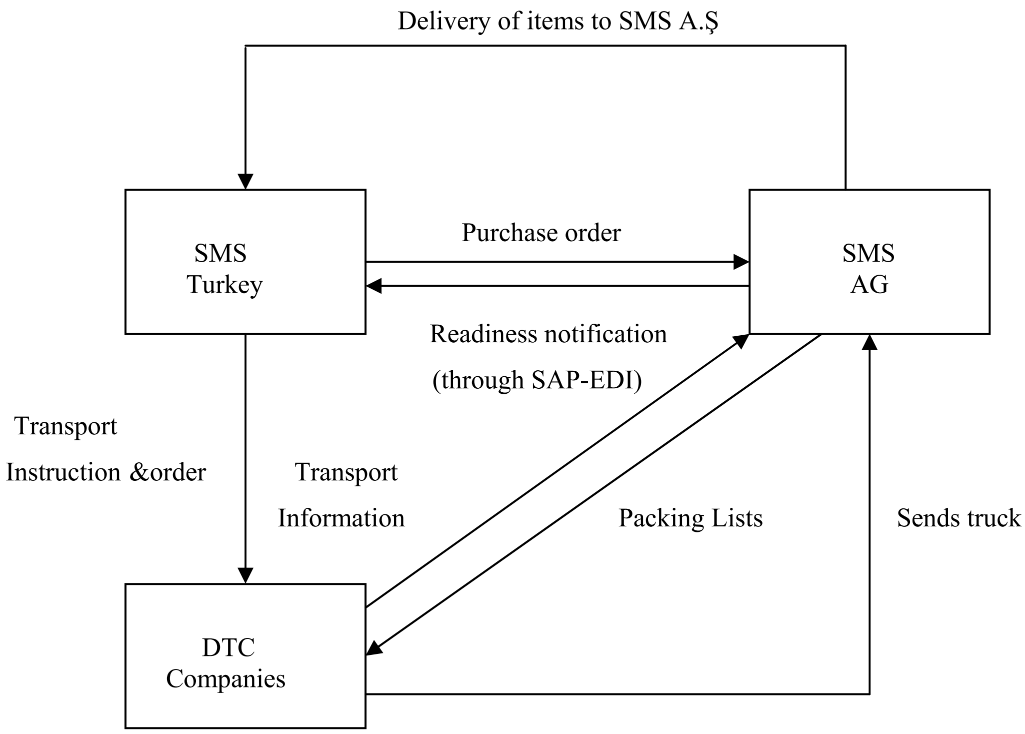


Figure VI.6 Import and Transportation Order Process – Before Reengineering

Purchase orders were now being sent by SMS Turkey - Operative Procurement division via SAP/EDI and were being opened automatically at the moment of sending by SMS AG. SMS Turkey was being informed by SMS AG through SAP/EDI with a notification mail when the orders were ready.

At this point DTC companies were being instructed to pick-up and deliver the orders by SMS Turkey again by mail, telephone or fax and DTC companies were calling SMS AG to receive information about the orders (kg, pallet dimensions and quantity etc.) by packing lists sent and were sending a truck on the specified date to collect and deliver the orders of different business units of SMS Turkey.

The advantages that the company had with the implementation of EDI, which is defined as the electronic exchange of business information—purchase orders, invoices, bills of lading, inventory data and various types of confirmations—between organizations or trading partners in standardized formats ,can be summarized as below:

1- Putting EDI into practice has allowed business transactions to occur in less time and with fewer errors than do traditional, paper-based means.
2- The cost of paper and paper processing has eliminated.
3- When the SMS Turkey wants a copy of a document, instead of calling SMS AG they simply check their mailbox. This results in a great time savings from not having to copy and fax/mail copies of business documents.
4- EDI data is received exactly as transmitted, so you eliminate re-keying errors. As a result, SMS has had fewer product returns, lost orders, and backorders.
5- Better and more accurate information has lead to improved decision making procedures.
6- Information sharing has increased; the cost of carrying inventory and human intervention has reduced.

But even though the implementation of SAP/EDI between SMS Turkey and SMS AG brought some conveniences mainly in efficiency, cost and time there were still difficulties such as inability to arrange the transportation via DTC companies effectively and inability to know, gauge and save the freight charges by purchasing departments and logistics departments of each business unit since there weren't recorded in the company's SAP system.

VI.3.2.2. Implementation of Reengineering in Logistics

The company has still been facing significant complications in the transportation of these items via contract forwarding companies called DTC as well as costing and recording of transportation work into the SMS's SAP system.

In SMS all the partial deliveries which come from Germany have been made by DTC companies. In order to overcome these above mentioned difficulties SMS has also aimed at scrutinizing and reengineering the process related with DTC in the scope of "Import and TOP Project".

Within the context of the project, in order to surmount the problems associated with the arrangement of deliveries, EDI infrastructure has been put into practice in DTC companies.

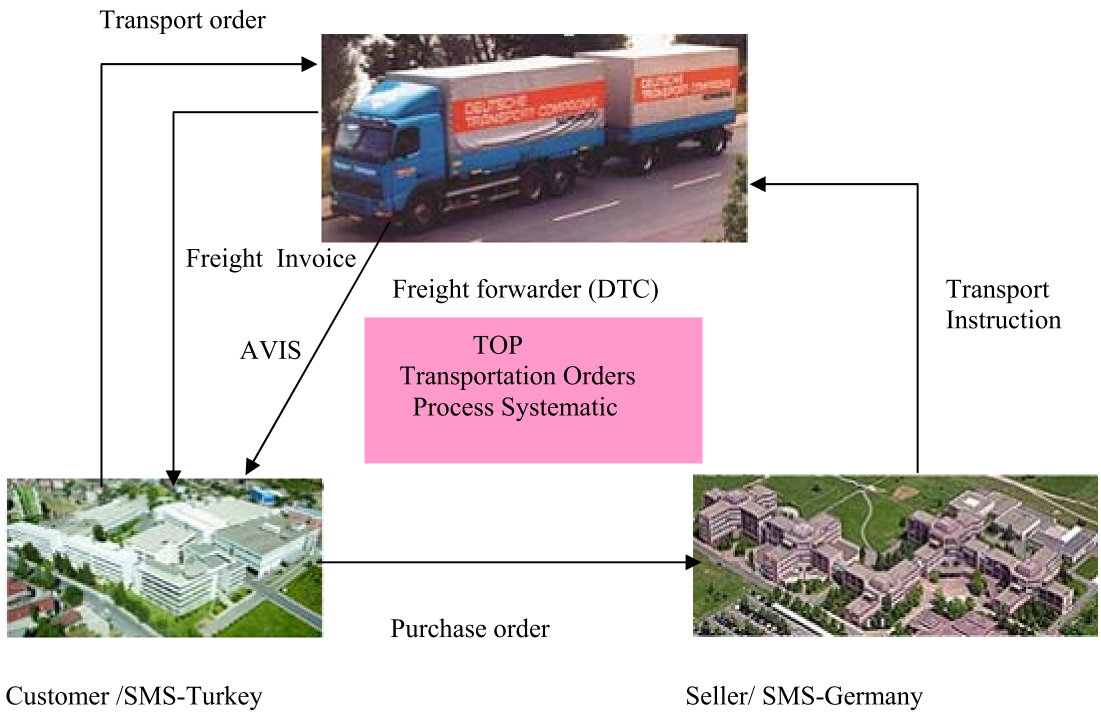


Figure VI.7 Import and Transportation Order Process- After Reengineering

TOP Application Process Steps

1. Purchasing Departments of all business units send their purchase order letters to suppliers on a daily basis.

2. Referring to purchase orders which come from the business units of SMS Turkey, suppliers send transport instruction to forwarding companies (DTC) when the orders are ready.

3. Transport information are collected as AVIS Lists- Csv file by DTC

4. DTC sends 1. AVIS Lists that include supplier purchase order no (SPON) and transport information such as weight and dimensions of the orders, departure places, material purchase order no on ORG-ID basis to SMS A.Ş when the orders are ready. In order to ensure this, data such as every business unit's ORG-ID and supplier no are described to the DTC's current system.

5. Taking into account the AVIS Lists which are sent in an electronic form, transportation service purchase order letters (T-SAS) are opened in SMS A.Ş SAP system automatically on an ORG-ID basis. Here, it is important to mention that every business unit has its own ORG- ID (Organization ID) which is represented by a 4 digit figure. For instance, PTD business unit's ORG-ID is 3000. It must be also underlined that in each business unit one person in Logistics division is assigned this task and T-SAS are opened for the name of this person. Not only people in Logistics departments but the people who placed the order in Operative Procurement divisions of every business unit can see these AVIS Lists and the transportation service purchase order letters are sent electronically in to DTC companies over DTC/EDI infrastructure.

6. At the stage of opening of T-SAS, DTC do not have the transportation cost information. This information is formed at the stage of loading or in other words at the stage of optimization when the orders of all business units are ready for loading. Having formed this information, DTC send 2. AVIS Lists which include transportation costs to SMS A.Ş electronically. An example of AVIS-1 and AVIS-2 lists can be seen in Appendix B.

7. The price information notified in 2.AVIS Lists are ensured to be processed thoroughly to right T-SAS automatically with the help of T-SAS no, SPON no, ORG-ID and bill of shipment information. Here, it should be stressed that initially T-SAS are opened as 1 Euro.

When 2.AVIS are sent transportation costs are processed to these T-SAS automatically. It is also important to point out that every business unit and sub business unit has a profit center and profit number and the cost of all carriage orders placed based on every business unit's ORG- ID is attributed to the " Profit Center" of the first pos. in the T-SAS saved in the SMS SAP system.

8. When the products arrive SMS Turkey, the responsible person in "Material Income and Transport" makes the product entry by entering the purchase order no of each product from the bill of shipment. If product entry has been made, the Operative Procurement tracks this and sees in SAP that products have arrived and then approves the Transportation Order related with these products and alerts "Material Income and Transport" to make the transportation entry of the products via a notification mail. If there is a purchase of service instead of a product, the responsible person in "Material Income and Transport" is informed via e-mail by the responsible person in "Operative Procurement Department ".

9. When the "Commercial Department (Account Department) "enters the purchase order no into the system, the arrival of the related product could be seen from the system since it's entry has been made by "Material Income and Transport". If the product hasn't arrived yet, the payment is not made by the "Commercial Department (Account Department)".

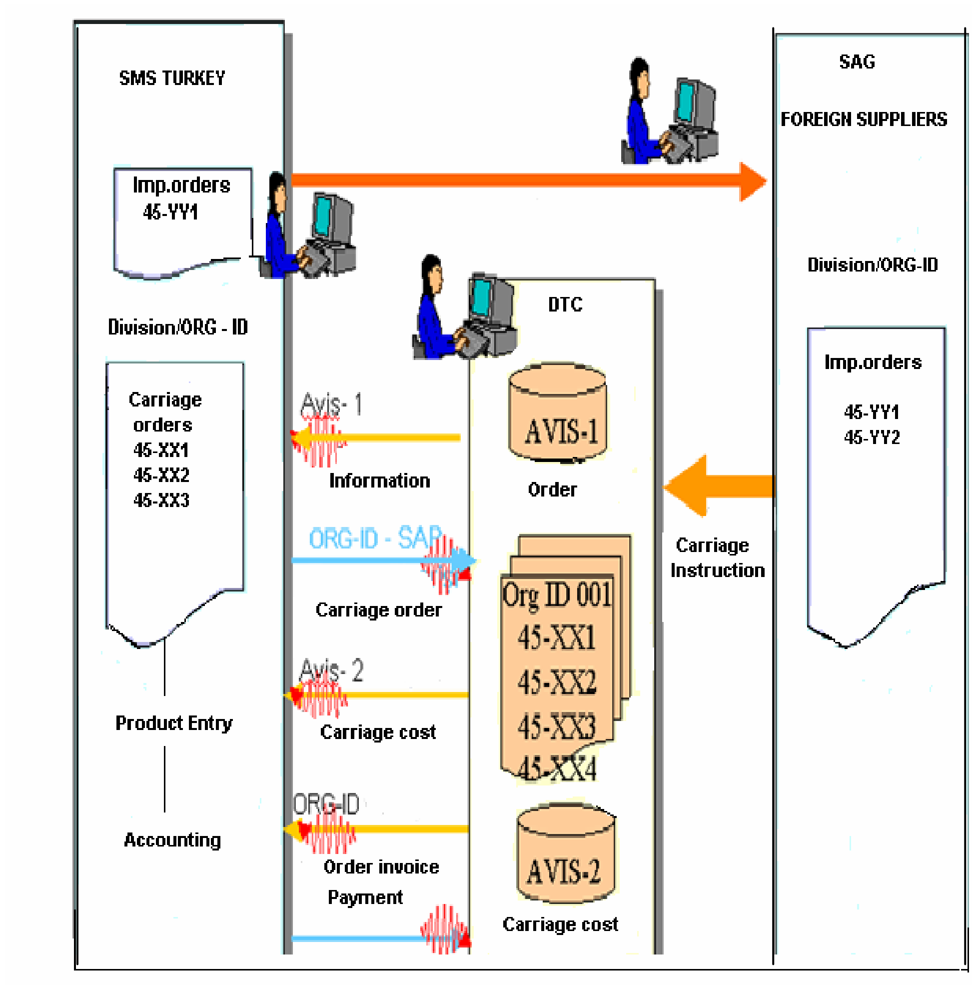


Figure VI.8 The Transportation Order Process

VI.3.2.3. Implementation Results

With this redesigned process the transfer of transportation purchase orders and the arrangement of deliveries via DTC companies is less time consuming, more accurate and cost effective.

In the former system, SMS Turkey (SMS A.Ş) was giving transport instructions and orders to DTC companies via fax or mail and then confirming whether they have been reached or not via telephone. The construction of EDI between SMS Turkey, SMS AG and DTC companies has brought away these needs. The approximate savings that the company has gained related with the placement of transportation purchase orders can be seen in the Table VI.5 and Table VI.6.

Table VI.5 Savings related with Printing and Faxing of Transportation Purchase Orders (yearly)

Working days (yearly)	300
Printing cost of 1 page (€)	0.09 €
Number of transportation purchase orders (yearly) x 1 pages per order	30.000
Fax cost (€)	0.30 €
Number of transportation purchase orders per day	100
Total Saving	**11.700,000 €**

Table VI.6 Savings related with Confirmation of Transportation Purchase Orders (yearly)

Turkey–Germany telephone costs per minute (€)	0.7 Euro
Number of transportation purchase orders (yearly)	30.000
The duration of confirmation of a transportation order via telephone	~ 2 minutes
Number of transportation purchase orders per day	100
Total Saving	**42.000,000 €**

As can be seen above, the approximate savings related with the placement of transportation purchase orders can be calculated as **53.700,000 Euro.**

In SMS raw materials and buy and sell products constitute an important portion of the imported products that's why knowing the freight charges accurately is vital. Before reengineering, Logistics division in SMS was setting a fix cost, such as %10, as a freight cost by taking into account the general yearly freight costs of the company which does not reflect the actual transportation costs.

Since this new process enables the freight charges to be recorded in the company's SAP system, it is now possible to track the freight costs, make the cost analysis and pricing of these products more properly.

In addition to that, in the former system all freight invoices were sent to Logistics division of each related business unit. The person in charge in Logistics was checking the "purchase order no" written on the freight invoice to see which sub unit the materials or products belong to. Having identified the related sub unit, this same responsible person was taking a commercial approval and signature and was sending the invoice to the Account Department for the payment to be made. This kind of operation was sometimes resulting in lost and unpaid invoices, twice paid invoices since T-SAS are not recorded and tracked by Operative Procurement from the SAP system. Here it must be emphasized that since Operative Procurement places and trails purchase orders, instead of Logistics division it is crucial for Operative Procurement to see and approve the freight costs.

Now with this redesigned process, since T-SAS are recorded in the SAP system it is possible to make the transportation entry of the products. After the Operative Procurement approves the T-SAS and freight costs related with the products which have arrived in SMS, Operative Procurement notifies “Material Income and Transport” to make the transportation entry of these products. So, now when “Account Department “enters the material purchase order number into the system , they can see whether the transportation entry has been made by “Material Income and Transport “ or not and make payments of approved T-SAS while do not make the payments of the unapproved ones. This feature enabled by the new system has pulled ahead the problems related with accounting.

VI.3.2.4. Proposes for Further Improvement

Even though the new process ensures the recording of freight charges into the company’s SAP system, there is a deficiency that needs to be improved.

As previously mentioned, the freight information sent via 2. AVIS is automatically processed into “Transportation (Carriage) Orders “called “T-SAS”. However in this new system , the cost of all carriage orders placed , based on every business unit’s ORG-ID is sent to the “ Profit Center“ of the first pos. regardless of which sub business unit the cost actually belongs to.

This situation poses inconsistencies regarding freight charges between sub units which are dependent on each business unit. For instance, if the material in the first pos. belongs to PTD – high tension sub unit (PTD-H) the carriage cost of the whole order of PTD business unit is assigned to profit center of PTD –high tension sub unit. No matter the material in the second or third pos. belongs to PTD –high tension sub unit or not (the other materials in the following pos. may belong to PTD-medium tension sub unit or PTD Energy and Automation sub unit) all the carriage costs which are automatically processed into T-SAS‘s are assigned to PTD –high tension sub unit.

This kind of recording of freight charges into the SAP system doesn’t reflect the real transportation (carriage) costs of sub units and must be altered. At this point we may give two suggestions for the company to improve this. One could be that for every sub-unit an ORD-ID should be identified and described to the system. By this way, it will be possible to assign the freight charges to the related sub-unit.

Another recommendation that may be given is that every T-SAS must be opened on “Profit Center “basis instead of ORG-ID basis in the system. If T-SAS are opened on “Profit Center” basis instead of “ORG-ID “basis, it will be possible to save them in SAP and make the freight cost analysis of each sub-unit more precisely and correctly.

VI.3.3. Re-engineering in PTD M- Procurement

The support process “Procurement “in the SMS describes the strategic procurement process as mandatory within the company. The key objectives of a common procurement process are achieving the highest possible Contribution to Net Income (CNI) for the company, attaining and maintaining competitiveness, increase of procurement competence, continuous optimization of procurement processes and consistent implementation of common procurement methods, programs and tools within the company.

When we have a look at how the procurement process in SMS works we see that there are two divisions associated with it.

1- Strategic Procurement
2- Operative Procurement

In case of need for any new material, first of all Research and Development division announces this need for this new material. If this material is not a standard material without a norm, the division depicts the material and transfers this information to Planning. If it is a standard material, Research and Development division conveys information concerning this needed material to Planning without depicting it.

Having received the information, “Planning” gives a number for the material in need and enters all the information about the material into the system. All these information is sent to Strategic Procurement by e-mail as an Excel List.

After Strategic Procurement division receives this e-mail, it makes the necessary agreements and decides from which company to purchase along with its deadline, price etc. Having decided from which supplier to purchase, all information related with the material (price, supplier, dead line etc.) are entered to the system by creating an 8 digit Material Info Record (MIR) on the Material Info Record Screen under SAP.

When the Operative Procurement Staff receives a “purchase proposal demand” from SAP, a purchase order letter is created and the Operative Procurement Staff is able to see the Material Info Record and also all the information (supplier, deadline, price etc.) related with each material he or she is responsible for.

After this point, Operative Procurement’s task is to place and follow up the order. It is also important to mention that in each business unit each Operative Procurement Staff is liable for placing and tracking the orders concerning products and materials related with these products they are assigned to.

VI.3.3.1. The Definition of the Problem for the Order Approval Process in PTD M - Historical Perspective

In SMS every purchase order placed by Operative Procurement needs to be approved by Strategic Procurement Staff and Commercial Executives at the moment this purchase order letter is created. The orders can not become valid if these two signatures are not taken.

In the order approval process , all purchase order letters (POL) are taken from the company’s SAP system in a pdf format by operative procurement staff and sent to Strategic Procurement and Commercial Executives depending on whether the material is described to the system in terms of Material Info Record or not. For materials which are going to be purchased once or twice no Material Info Record is created by Strategic Procurement.

When need for such materials arises Research and Development division conveys this need to the concerned Operative Procurement Staff and Strategic Procurement Staff via mail. Having decided which supplier to purchase from, the price, the deadline etc. of the material in need; Strategic Procurement Staff informs the Operative Procurement Staff and send this information via mail.

Purchase order letters regarding materials which do not have a Material Info Record in the SAP system needs to approved by Strategic Procurement first and then by Commercial Executives when they are ordered.

Purchase order letters regarding materials with a Material Info Record, on the other hand, do not need to be approved by Strategic Procurement. These purchase order letters directly go to Commercial Executives for approval.

When we have a look at this order approval process in SMS, we see that it brings forth a lot of paper work and files making waited on the desks of Strategic Procurement Staff and Commercial Executives for approval for hours and sometimes days. That’s why; the process has reengineered in order to cut the costs associated with paper work, save time and trail the process more effectively.

VI.3.3.2. Implementation of Reengineering in Order Approval Process in PTD M

The order approval process has been reengineered through transferring it into an electronic medium. This electronic medium is a shared medium on internet which has ensured the approval of the purchase order letters to be done electronically. By this way, the company can track and vision the process more effectively, save time and diminish its costs associated with paper work.

As can be seen from the diagram in Appendix C, the Operative Procurement Staff gives a start to the process. The responsible person downloads the purchase order letters in pdf format from the SAP system to his/her personal computer and enter the shared electronic medium attaching POL pdf. After the Operative Procurement Staff initiates the process by this way , the POL pdf. is directed to Strategic Procurement or Commercial Executives depending on the Material Info Record the material(s) in the POL have. If all the materials in the POL pdf. have a Material Info Record described to the system then these POL pdf. are sent to Commercial Executives electronically for approval. At this point one Commercial Executive undertakes the approval assignment.

The process is finished with the approval of POL pdf. by the Commercial Executive undertaking the assignment. The approved POL pdf. is saved into the system as a Approved POL pdf. folder. In case of disapprove by a commercial executive, POL pdf. is saved into the system again as Disapproved POL pdf.

Here, since Operative Procurement Staff places and trails the orders it is important for her/him to be informed about the status of POL.He/She is informed by a notification mail describing the state .In case of disapproval; the process will again be directed to Operative Procurement to make the necessary amendments.

However, if POL pdf. does not consist of materials with a Material Info Record then these POL.pdf is first sent to Strategic Procurement for approval. In case of disapprove by Strategic Procurement, these POL pdf. is saved into the system as Disapproved POL pdf. folder. At this stage again a notification mail stating that the POL pdf has not been approved by Strategic Procurement is sent to the operative procurement responsible.

In case of approval by Strategic Procurement the POL pdf are directed to Commercial Executives for approval this time. The process is finished with the approval of POL pdf. by the Commercial Executive undertaking the assignment. The approved POL pdf. is saved into the system again as a Approved POL pdf. folder. In case of disapproval by a Commercial Executive, POL pdf. is saved into the system as Disapproved POL pdf. Here, the Operative Procurement Staff is kept informed again by a notification mail about the disapproval of POL so as to make the vital corrections.

The gains that have been achieved through reengineering the "order approval process" in Procurement are:

- Time savings
- Savings related with paper work
- Effective trailing and monitoring the process

The savings related with paper work can be seen in the table below:

Table VI.7 Savings related with Printing and Processing of Purchase Orders for Approval (yearly)

Working days (yearly)	300
Printing cost of 1 page (€)	0.09 €
Number of purchase orders (yearly) x 2 pages per order	12000x2=24000
Processing cost related with approval of purchase orders (€)	4 €
Total Saving	**50.160,000 €**

VI.3.3.3. Operating Model (As-Is Model) and Definition of the Problem for the Procurement Process in SMS

When SMS Turkey's corporate structure is to be analyzed it is seen that the company composes of many business units which have their own purchasing divisions each pursue their procurement activities separately. For instance Power Transmission and Distribution business unit purchases materials they need independently from Medical Solutions or Automation & Drives business unit.

When the materials required by each business unit is examined ; we can also see that most units have common needs for many materials such as cable, transformer, power meter etc but since all business units pursue their procurement processes autonomously they usually resort to different suppliers for shared needs. This type of purchasing makes the purchasing process costly and time-consuming.

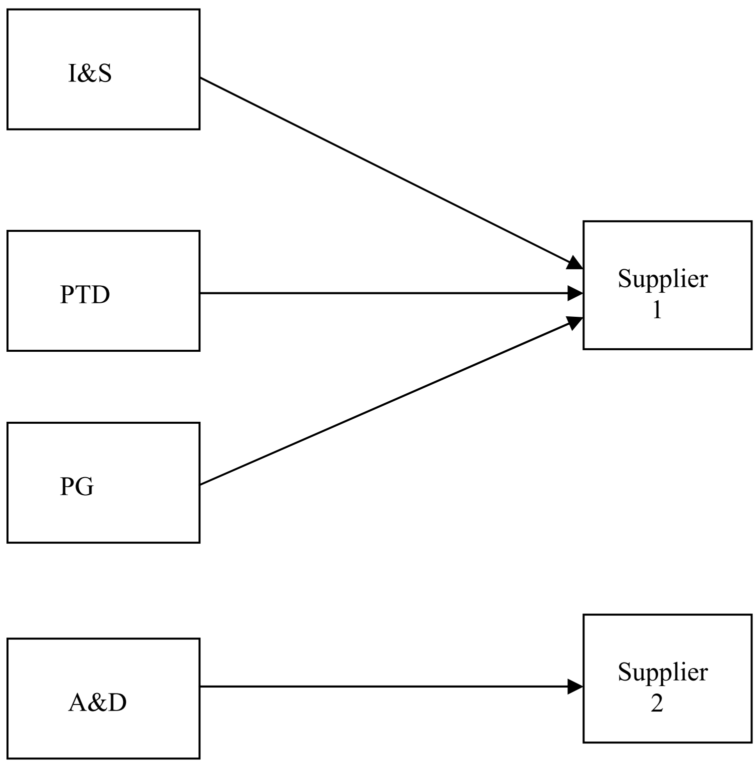


Figure VI.9 The Operating Model (As-Is Model) for Procurement

That's why instead of executing a discrete procurement activity, business units with common needs can follow a collective procurement approach which in the end requires a reengineering effort to be conducted in "procurement" so as to save time and money. Needless to say how much gain the company will have in terms of money if the purchasing volume of the business units for common needs is pooled and each business unit resorts to a same supplier with big quantity of need .Purchasing in big amounts will help the company to reduce its purchasing costs. The company will also save time because for a specific material with shared need there will be only one supplier to purchase from and there will be no need to search for alternative potential suppliers for each business unit any more.

VI.3.3.4. To-Be Business Model

Applying a model based on collaboration between business units' divisions of procurement in SMS Turkey requires the selection of one business unit as "Head Buyer" which will be the face to supplier on behalf of other business units. In order to actualize this, the first course of action to be followed can be enlarging the sphere of authority of the Sales Committee which consists of each business unit's procurement representative and which has the duty to ensure the harmonization concerning general procurement regulations between SMS AG and SMS Turkey.

This committee can be given the authorization to access and identify each business units purchasing data from the company's SAP system. Here it must be stressed that every item is also described to the SAP system on a material group basis to ensure the retrieving of general information such as purchasing data. For instance, material "plastic "is described as F in SAP while sub materials of plastic such as "thermoplastic materials", "thermo set plastic materials" are described to the system as below:

F- Plastic materials
FF- Thermoplastic materials
FG- Thermo set plastic materials

Since there are thousands of materials described into the SAP system, this type of grouping of materials ensures the retrieval and analysis of purchasing data more accurately. As mentioned above, from the SAP system it is possible to get information about purchasing data such as which materials each business unit purchases, at which price they purchase, from which supplier they purchase and their monthly purchasing volume. At this point, it must be underlined that one business unit is not allowed to see the purchasing data of another business unit but the authorized Sales Committee can reach each business unit's purchase volume and any other purchasing information by entering the ORG-ID of each business unit to the system.

Having accessed all the purchasing data of each business unit for a specific period of time, the items that have common needs and the items that constitute the most important portion in the company's procurement process should be identified.

In order to identify the materials that have shared needs and the items that makes up the most important portion in the company's procurement process, a formation of an online –database which purchasing data in SAP can be transferred to and which will be able to report and analyse each business unit's purchasing data on a supplier, material group and business unit basis can be beneficial since it is not possible to report and make this kind of analysis with SAP.

After determining the target materials, a head buyer which will additionally conclude agreements of certain materials for other business units is supposed to be identified based on the highest total purchase volume and specialization by the database. The head buyer can also be selected based on a consensus between all procurement representatives in the Sales Committee and the chosen head buyer may negotiate binding contracts for the consumers but the other business units will handle their orders independently.

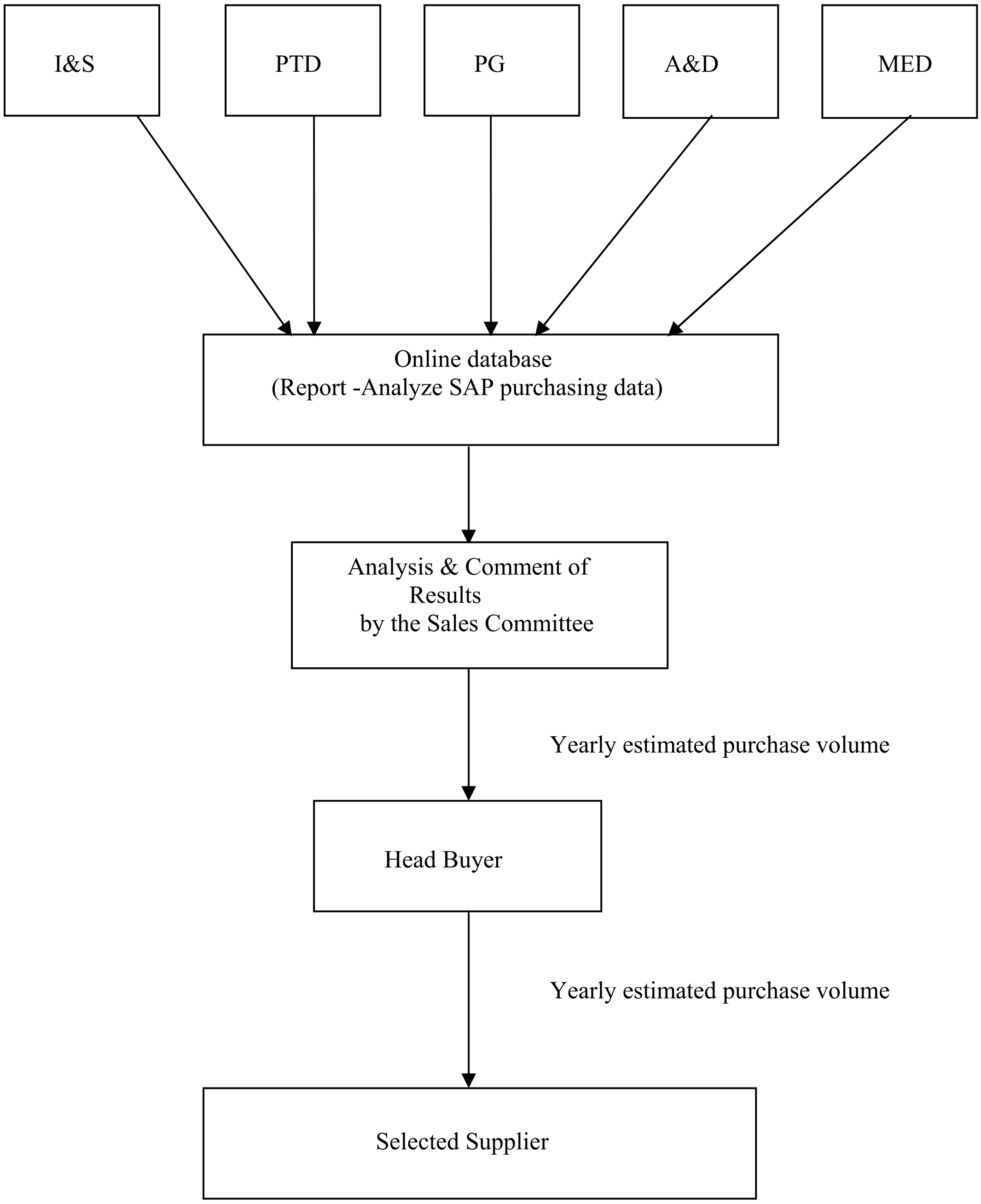


Figure VI.10 To-Be Model for Procurement

Figure VI.11 The Operation of the To-be Model

The selected head buyer may chose to purchase from the supplier the online database and sales committee sets or may chose to analyse the market to identify potential suppliers but before the selected head buyer resorts to any supplier, a yearly estimated purchase volume of all business units should be identified by the Sales Committee.

If the head buyer prefers to analyse the market, having identified the potential suppliers, information about them should be gathered and evaluated. The next step at this point should be the assessment and analysis of offers received from suppliers which are found more acceptable to negotiate by the head buyer. As a result of the assessment, negotiations and contract can be made with the selected supplier. Here, the head buyer must ensure that this contract will be valid for all business units. In order to ensure this, the Strategic Procurement division of the head buyer ‘s business unit can describe the selected supplier concerning each target material to the SAP system so that other business units can not purchase from different suppliers.

There should also be a % tolerance stated in the contract that will be made between the head buyer and selected supplier since there is always a risk of realized yearly purchase volume to fall behind the planned yearly estimated purchase volume or sometimes exceed it.

PART VII.

RESEARCH METHODOLOGY

A survey has been conducted with SMS employees working in departments related with production, procurement and logistics in order to find out the effects of reengineering and ramifications that have come up with it. In addition to that , employees' perceptions towards reengineering, their perceptions towards the success of reengineering initiatives and towards the factors that make reengineering projects successful along with their satisfaction with these projects are also assessed.

The expected results that have come to existence with reengineering are top management's support, increase in employee efficiency, motivation and empowerment; achievement of aimed objectives, process simplification, increased customer satisfaction and information sharing. With this survey, employees' perceptions towards these expected results are tried to be measured.

The research is both exploratory and empirical and it is formed to test the hypotheses concerning employees' perceptions and satisfaction towards reengineering initiatives executed in SMS.

VII.1. PURPOSE

The purpose of this research is to find out and assess employees' perceptions about the results of reengineering projects that have been carried out in SMS in terms of their consequences on both employees and the company; gauge the success of these projects from the employees' point of view and measure the employees' satisfaction with reengineering.

This research is supposed to reveal how reengineering projects and their results are appraised by SMS employees and how employees are affected by reengineering initiatives carried out in SMS.

VII.2. SAMPLE SELECTION

The target population is the employees working in SMS/Turkey. The sample is drawn from this population which consists of 155 employees working as top manager, middle–level manager and non manager employee in production , procurement and logistics departments in A&D and PTD business units and who are related with BPR projects.

TableVII.1 Distribution of SMS Employees Working in A&D and PTD

Business Units	Top Manager	Middle Manager	Non Manager Employee	TOTAL
A&D PTD	8	25	122	155

The survey was targeted toward these employees related with production, procurement and logistics and the questionnaire was distributed to 155 SMS employees who are working in production, procurement and logistics departments in A&D and PTD business units accordingly. By conducting surveys in person 80 responses were received, giving a response rate of 51 %. However, some of the respondents left too many questions unanswered, which dropped the sample size to 75 with a response rate of % 48.

VII.3. QUESTIONNAIRE CREATION

The questionnaire is in English and consists altogether of 20 questions: four of them are open ended questions and remaining ones are close-ended questions with multiple-choice options.

The questions cover the topics such as assessing the BPR implementations' success and satisfaction of employees with these, indicating the importance of critical success factors in BPR implementations and measuring employees' perceptions towards reengineering and the results of reengineering.

Based on the above topics the respondents were asked the questions in order to have their opinions about whether top management commitment and support has ensured or not , whether employee productivity , motivation and empowerment has increased , whether aimed objectives have been accomplished ,whether processes have been simplified and whether information sharing and customer satisfaction has increased. They are also asked to rate the success of the reengineering applications and their satisfaction concerning these applications.

In these questions related with the above topics (q5, q6, q7, q8, q9, q10, q11, q12) respondents are required to indicate their extent of agreement with given statements on a five-point Likert scale (from 1= strongly disagree to 5= strongly agree).

In questions q 13 and q16 how employees rate the success of reengineering applications and their satisfaction with these applications were tried to be gauged by again using a five-point Likert scale (for q 13 : from1 = very unsuccessful to 5 = very successful and for q 16 : from 1 = very unsatisfied to 5 = very satisfied)

In questions q 4 and q 18, employees' perceptions on what reengineering is, were tried to be revealed. In questions q 17 and q 19, on the other hand, respondents were asked to designate their perceptions towards the factors that make reengineering projects successful and finally in q 20 respondents perceptions towards the degree of importance of success factors of reengineering in the reengineering projects that have been implemented in their company were tried to be measured.

The respondents were also asked some questions about demographic characteristics for the analysis. A copy of the survey and coding key used for data processing and analysis can be found in Appendix D and Appendix E.

VII.4. DATA COLLECTION

Data collection method chosen is conducting surveys with SMS employees personally at the place of work. A pilot application of the survey was also made before conducting the survey on all SMS employees related with production, procurement and logistics with the aim of testing the survey for consistency and reliability. A pilot application of the survey was conducted with 9 SMS employees, 2 middle- level manager, 7 non- manager employee at SMS A&D-CD business unit.

After the pilot application it occurred that question 19 had to be changed since almost every respondent showed a tendency to mark more than one option. That's why a remark which states that only one option should be marked was added to question 19.

VII.5. DATA ANALYSIS

The data analysis in the next parts is supposed to find answers to the following research questions:

* Do employees really know the term "Reengineering"?

* What are the perceptions of SMS employees about top management's commitment and support, employee efficiency, motivation and empowerment; achievement of aimed objectives, process simplification, customer satisfaction and information sharing which have assumed to come existence as a result of reengineering implementations ?

* Are there any significant differences between manager and non-manager employee perceptions about the consequences of reengineering implementations?

* How do manager and non-manager employees rate the success of reengineering applications? How much manager and non –manager employees are satisfied with these applications?

* Which factors make reengineering applications successful from employees' point of view? How do employees rate the degree of importance of the mentioned success factors of reengineering in the reengineering projects in SMS?

In order to find answers to the above mentioned questions , sample and data characteristics " Reliability Analysis", "Independent Sample T test ", "Chi-Square Analysis " and "Correlation Analysis" are applied by SPSS 11.5 Software for Windows Release.

VII.6. RELIABILITY ANALYSIS

Reliability is the correlation of an item, scale or instrument with a hypothetical one which truly measures what it is supposed to. Reliability analyses typically measure the internal consistency of multiple-item scales by estimating a true score and comparing the observed score to it. [42]

In this survey, in order to determine the reliability level and internal consistency of the five-point Likert scale which consists of 10 variables the reliability co-efficient is found regarding the whole scale by using the Cronbach Alpha Internal Consistency Co-efficient and Guttman Split-half Co-efficient. At this point it should be noted that a reliability coefficient of 0.70 or higher is considered"acceptable" in most Social Science research situations.

With the use of Cronbach Alpha test technique, the Cronbach Alpha value is estimated as 0.8768.Since 0.8768 is higher than 0.70, it can be said that reliability and internal consistency of the scale is high.

The results can also be seen in the table below:

TableVII.2 Reliability Analysis with Cronbach Alpha Technique

Reliability Analysis –Scale (Alpha)	
Reliability Coefficients	
Number of Cases = 75.0	
Alpha = .8768	Number of Items = 10

With the use of Split-Half test technique, the Guttman Split -half value is estimated as 0.8291

The results can also be seen in the table below:

Table VII.3 Reliability Analysis with Split-half Technique

Reliability Analysis –Scale (Split –half)	
Reliability Coefficients	
Number of Cases = 75.0	
Guttman Split-half = .8291	Number of Items = 10
Alpha for part 1 = 0.7890	Alpha for part 2 = 0.8088

The Cronbach Alpha and Guttman Split-half coeffficent values indicate that the reliability of the data used in this study is high and can be analyzed in this scope.

VII.7. RESULTS OF THE ANALYSIS

The following sections list the findings concerning the perceptions of SMS employees about top management commitment and support, improvement in employee productivity, motivation and empowerment, accomplishment of targeted objectives, process simplification, increase in information sharing and customer satisfaction which are assumed to come up with reengineering applications.

In addition to that, the findings regarding SMS employees' perceptions on reengineering projects' success and their satisfaction with these projects and applications can also be found in the next sections.

VII.7.1 Analysis of Perception towards Top Management Commitment and Support

Question 5 intends to reveal the employees' perceptions about whether top management commitment and support has been ensured or not in reengineering implementations executed in SMS. In order to respond question 5 , an analysis of the variable q5 is needed.

The Table VII.4 shows the outcomes of Frequency Listing Statistics of q 5.

Table VII.4 Frequency Listing of Perception towards Top Management Commitment and Support

	Value	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	1	2	2.7	2.7
Disagree	2	1	1.3	4.0
Neutral	3	8	10.7	14.7
Agree	4	41	54.7	69.3
Strongly Agree	5	23	30.7	100.0
Total		75	100	

Top Management Commitment & Support	Mean : 4.09
	Std. Deviation : 0.841

As can be seen from the table, 2.7% of SMS employees who responded the questionnaire strongly disagree, 1.3% disagrees, 10.7% neither disagree nor agree, 54.7% agree and 30.7% strongly agree that top management commitment and support has been ensured for the implementation of reengineering projects.

Because of the fact that the variable "ensure of top management commitment and support "is presented as an interval scale in the survey, the mean is a good measure of central tendency for this variable.

As a result, it can be deduced that most of the employees think top management commitment and support has been ensured for the implementation of reengineering projects.

VII.7.1.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perception towards top management commitment and support and their positions.

H1: There is a relationship between employees' perception towards top management commitment and support and their positions.

The above hypothesizes are related to two variables. The first one is q005 (Perception towards Top Management Commitment and Support) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis, Chi-Square Test which will allow us to find if there is a statistical association between the two sets of answers; and examines whether there is a relationship between two categorical variables is used initially. [43]

Here it should be noted that for the chi-square test to work correctly the cells that indicate the extent of agreement of the employees are grouped as Disagree-Neutral-Agree in all of the following sections related with Chi-Square Analysis in order to meet the Chi-Square criteria which states that 80% of cells should have more than 5 observations and the expected cell frequency should be greater than 1.[44]

The results of the Chi-Square Analysis can be found in the below tables:

Table VII.5 Crosstab for Top Management Commitment & Support with respect to Position

	Top Management Support			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	1	3	25	29
Ex.Count	1.2	3.1	24.7	29
Non Manager				
Count	2	5	39	46
Ex.Count	1.8	4.9	39.3	46
Total				
Count	3	8	64	75
Ex.Count	3	8	64	75

Table VII.6 Chi-Square Test for Top Management Commitment & Support with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	.045a	2	.978
Likelihood Ratio	.046	2	.977
Linear -by-Linear	.041	1	.840
Association			
N.of Valid Cases	75		

* 4 cells (66.7 %) have expected count less than 5. The minimum expected count is 1.16.

As can be seen from the tables, the Chi-square Statistic with two degree of freedom is (df) = 0.045 and p = 0.978. Since the significance level (p=0.978) is larger than the alpha value which is 0.05 , null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards top management commitment and support and their positions.

At this point it should be highlighted that for the chi-square test to work correctly, 80% of cells should have more than 5 observations and the expected cell frequency should be greater than 1. That's why using the Chi-Square statistic is questionable here because all four cells have expected frequencies less than 5 although the minimum expected frequency is above 1.

Instead of Chi-Square Test, making use of Independent Samples T- Test which compares the mean scores of two groups on a given variable is more appropriate in this case.

Ho: There is no difference in employees' perception towards top management commitment and support dependent on their positions.

H1: There is difference in employees' perception towards top management commitment and support dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q005 (Perception towards Top Management Commitment and Support) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards top management commitment and support.

The results of the T-test can be found in Table VII.7.

TableVII.7 Independent Samples T-test for Top Management Commitment and Support with respect to Position

	Independent Samples T- Test							
Top Management Commitment & Support	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower - upper
Equal Variances Assumed	1.581	.213	.928	73	.357	.19	.200	-.213 .583
Equal Variances Not Assumed			.903	54.496	.370	.19	.205	-.226 .596

Top Management Commitment &Support	**Manager (group1)**	**Non-Manager (group2)**
Means	4.21	4.02

The means of groups can be seen in the second table. From this we can see that M1 = 4.21 and M2 = 4.02 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards top management commitment and support.

In the first table we can see the results of the t-test. At this point, it should be noted that if the significance level for Levene's test is 0.05 or below, the "Equal Variances Not Assumed" test is used. Otherwise, "Equal Variances Assumed" test is used as a rule. [45]

As can be seen above, the significance level for Levene's test is 0.213, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row. In order to decide whether to reject the null hypothesis or not , Sig . (2 tailed) value with alpha value which is 0.05 should be compared.Since Sig .(2 tailed) value of 0.357 is greater than alpha value of 0.05 we can not reject the null hypothesis. (t (73) = 0.928, p = 0.357)

As a result of Independent Samples T- Test, it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards top management commitment and support.

VII.7.2. Analysis of Perception towards Employees' Productivity

Question 6 intends to reveal the employees' perceptions about whether employees' productivity has increased or not after the implementation of reengineering projects in SMS.

In order to respond question 6 , an analysis of the variable q6 is needed.

The Table VII.8 shows the outcomes of Frequency Listing Statistics of q 6.

Table VII.8 Frequency Listing of Perception towards Employee Productivity

	Value	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	1	2	2.7	2.7
Disagree	2	2	2.7	5.3
Neutral	3	12	16	21.3
Agree	4	45	60	81.3
Strongly Agree	5	14	18.7	100.0
Total		75	100	

Employee Productivity	Mean :	3.89
	Std. Deviation :	0.831

As can be seen from the above table, 2.7% of SMS employees who responded the questionnaire strongly disagree, 2.7% disagree, 16% neither disagree nor agree, 60% agree and 18.7% strongly agree that employees' productivity has increased after the implementation of reengineering.

Because of the fact that the variable "employee productivity "is presented as an interval scale in the survey, the mean is a good measure of central tendency for this variable. The mean is 3.89 and it designates that employees' perceptions towards the increase in employees' productivity is positive. As a result, it can be deduced that most of SMS employees think employee productivity has increased after the implementation of reengineering projects.

VII.7.2.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perceptions towards increase in employee productivity and their positions.
H1: There is a relationship between employees' perceptions towards increase in employee productivity and their positions.

The above hypothesizes are related to two variables. The first one is q006 (Perception towards Increase in Employee Productivity) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Chi-Square Test which examines whether there is a relationship between two categorical variables is used initially.
The results of the Chi-Square Analysis can be found in the below tables:

Table VII.9 Crosstab for Employee Productivity with respect to Position

	Employee Productivity			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	1	4	24	29
Ex.Count	1.5	4.6	22.8	29
Non Manager				
Count	3	8	35	46
Ex.Count	2.5	7.4	36.2	46
Total				
Count	4	12	59	75
Ex.Count	4	12	59	75

Table VII.10 Chi-Square Test for Employee Productivity with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	0.560a	2	.756
Likelihood Ratio	0.582	2	.748
Linear -by-Linear	0.551	1	.458
Association			
N.of Valid Cases	75		

* 3 cells (50 %) have expected count less than 5. The minimum 55 expected count is 1.

As can be seen from the above tables, the Chi-square Statistic with four degree of freedom is (df) = 0.560 and p = 0.756.Since the significance level (p=0.756) is larger than the alpha value which is 0.05 , null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards top management commitment & support and their positions.

Using the Chi-Square statistic is questionable here again because although the minimum expected frequency is above 1, all three cells (%50) have expected frequencies less than 5 and

Instead of Chi-Square Test, making use of Independent Samples T- Test is more appropriate in this case too.

Ho: There is no difference in employees' perception towards increase in employee productivity dependent on their positions.

H1: There is difference in employees' perception towards increase in employee productivity dependent on their positions

The above hypothesizes are again related to two variables. The first one is q006(Perception towards Increase in Employee Productivity) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards increase in employee productivity.

The results of the T-test can be found in Table VII.11.

Table VII.11 Independent Samples T-test for Employee Productivity with respect to Position

	Independent Samples T- Test							
Employee Productivity	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower - upper
Equal Variances Assumed	.527	.470	.594	73	.554	.12	.198	-.277 .512
Equal Variances Not Assumed			.598	60.721	.552	.12	.197	-.276 .512

Employee Productivity	Manager (group1)	Non-Manager (group2)
Means	3.97	3.85

The means of groups can be seen in the second table. From this we can see that M1 = 3.97 and M2 = 3.85 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards increase in employee productivity.

In the first table we can see the results of the t-test. At this point, it should be noted that if the significance level for Levene's test is 0.05 or below, the "Equal Variances Not Assumed" test is used. Otherwise, "Equal Variances Assumed" test is used as a rule. [46]

As can be seen above, the significance level for Levene's test is 0.470, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row.

In order to decide whether to reject the null hypothesis or not , Sig . (2 tailed) value with alpha value which is 0.05 should be compared.Since Sig .(2 tailed) value of 0.554 is greater than alpha value of 0.05 we can not reject the null hypothesis. ($t(73) = 0.594$, $p = 0.554$)

As a result of Independent Samples T- Test , it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards increase in employee productivity.

VII.7.3. Analysis of Perception towards Employees' Morale and Motivation

Question 7 intends to reveal the employees' perceptions about whether employees' morale and motivation has increased or not after the implementation of reengineering projects in SMS. In order to respond question 7 , an analysis of the variable q7 is needed.

The table below shows the outcomes of Frequency Listing Statistics of q 7.

Table VII.12 Frequency Listing of Perception towards Employee Morale and Motivation

	Value	**Frequency**	**Valid Percent**	**Cumulative Percent**
Strongly Disagree	1	1	1.3	1.3
Disagree	2	7	9.3	10.7
Neutral	3	24	32	42.7
Agree	4	37	49.3	92
Strongly Agree	5	6	8	100.0
Total		75	100	

Employee Morale & Motivation	Mean : 3.53
	Std. Deviation : 0.827

Because of the fact that the variable "employee morale and motivation "is presented as an interval scale in the survey, the mean is a good measure of central tendency for this variable.

The mean is 3.53 and it designates that employee's perceptions towards the increase in employees' morale and motivation is positive. As a result, it can be deduced that 58% of the employees think employees' morale and motivation has increased after the implementation of reengineering projects.

VII.7.3.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perceptions towards increase in employee morale & motivation and their positions.

H1: There is a relationship between employees' perceptions towards increase in employee morale & motivation and their positions.

The above hypothesizes are related to two variables. The first one is q007 (Perception towards Increase in Employee Morale & Motivation) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Chi-Square Test which examines whether there is a relationship between two categorical variables is used initially.

The results of the Chi-Square Analysis can be found in the below tables:

Table VII.13 Crosstab for Employee Morale and Motivation with respect to Position

	Employee Morale & Motivation			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	4	9	16	29
Ex.Count	3.1	9.3	16.6	29
Non Manager				
Count	4	15	27	46
Ex.Count	4.9	14.7	26.4	46
Total				
Count	8	24	43	75
Ex.Count	8	24	43	75

Table VII.14 Chi-Square Test for Employee Morale & Motivation with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	.486a	2	.784
Likelihood Ratio	.474	2	.789
Linear -by-Linear	.282	1	.595
Association			
N.of Valid Cases	75		

* 2 cells (33.3 %) have expected count less than 5. The minimum expected count is 3.09.

As can be seen from the above tables, the Chi-square Statistic with two degree of freedom is (df) = 0.486 and p = 0.784. Since the significance level (p=0.784) is larger than the alpha value which is 0.05 , null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards increase in employee morale & motivation and their positions.

However, using the Chi-Square statistic is questionable here because although the minimum expected frequency is above 1, all two cells (33.3%) have expected frequencies less than 5.

Instead of Chi-Square Test, making use of Independent Samples T- Test which compares the mean scores of two groups on a given variable is more appropriate in this case.

Ho: There is no difference in employees' perception towards increase in employee morale & motivation dependent on their positions.

H1: There is difference in employees' perception towards increase in employee morale & motivation dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q007 (Perception towards Increase in Employee Morale & Motivation) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards increase in employee morale & motivation

The results of the T-test can be found below:

Table VII.15 Independent Samples T-test for Employee Morale & Motivation with respect to Position

	Independent Samples T- Test							
Employee Morale & Motivation	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower upper
Equal Variances Assumed	2.786	.099	.437	73	.663	.09	.197	-.307 .479
Equal Variances Not Assumed			.415	49.890	.680	.09	.208	-.331 .503

Employee Morale& Motivation	**Manager (group1)**	**Non-Manager (group2)**
Means	3.59	3.50

The means of groups can be seen in the second table. From this we can see that M1 = 3.59 and M2 = 3.50 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards increase in employee morale & motivation.

In the first table we can see the results of the t-test. As can be seen from this table, the significance level for Levene's test is 0.099, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row.

Since Sig .(2 tailed) value of 0.663 is greater than alpha value of 0.05 we can not reject the null hypothesis. (t (73) = 0.437, p = 0.663). As a result of Independent Samples T- Test , it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards increase in employee morale & motivation.

VII.7.4 Analysis of Perception towards Empowerment

Question 8 intends to reveal the employees' perceptions about whether empowerment has increased or not after the implementation of reengineering projects in SMS. In order to respond this question, an analysis of the variable q8 is needed.
The table below shows the outcomes of Frequency Listing Statistics of q 8.

Table VII.16 Frequency Listing of Perception towards Employee Empowerment

	Value	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	1	20	26.7	26.7
Disagree	2	18	24	50.7
Neutral	3	9	12	62.7
Agree	4	23	30.7	93.3
Strongly Agree	5	5	6.7	100
Total		75	100	

Empowerment	Mean : 2.67
	Std. Deviation : 1.339

As can be seen from the above table, 26.7% of SMS employees who responded the questionnaire strongly disagree, 24% disagree, 12% neither disagree nor agree, 30.7% agree and 6.7% strongly agree that empowerment has increased after the implementation of reengineering.

Because of the fact that the variable "empowerment "is presented as an interval scale in the survey, the mean is a good measure of central tendency for this variable .The mean is 2.67 and it designates that employees' perceptions towards the increase in empowerment is negative.

As a result, it can be deduced that 50.7% of the employees think empowerment has not increased after the implementation of reengineering projects.

VII.7.4.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perceptions towards increase in employee empowerment and their positions.

H1: There is a relationship between employees' perceptions towards increase in employee empowerment and their positions.

The above hypothesizes are related to two variables. The first one is q008 (Perception towards Increase in Employee Empowerment) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Chi-Square Test is used initially.

The results of the Chi-Square Analysis can be found in the below tables:

Table VII.17 Crosstab for Employee Empowerment with respect to Position

	Employee Empowerment			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	10	3	16	29
Ex.Count	14.7	3.5	10.8	29
Non Manager				
Count	28	6	12	46
Ex.Count	23.3	5.5	17.2	46
Total				
Count	38	9	28	75
Ex.Count	38	9	28	75

Table VII.18 Chi-Square Test for Employee Empowerment with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	6.583a	2	.037
Likelihood Ratio	6.584	2	.037
Linear -by-Linear	6.263	1	.012
Association			
N.of Valid Cases	75		

* 1 cells (16.7 %) have expected count less than 5. The minimum expected count is 3.48.

As can be seen from the above tables, the Chi-square Statistic with four degree of freedom is (df) = 6.583 and p = 0.037. Since the significance level (p=0.037) is smaller than the alpha value which is 0.05 , null hypothesis is rejected and it can be concluded that there is a statistically significant relationship between the employees' perception towards increase in employee empowerment and their positions.

Since minimum expected frequency is larger than 1 (3.48 > 1) and 83.3% cells have more than 5 observations Chi-Square statistic is applicable in this case.

Ho: There is no difference in employees' perception towards increase in employee empowerment dependent on their positions.

H1: There is difference in employees' perception towards increase in employee empowerment dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q008 (Perception towards Increase in Employee Empowerment) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards increase in employee empowerment.

The results of the T-test can be found in Table VII.19.

Table VII.19 Independent Samples T-Test for Employee Empowerment with respect to Position

	Independent Samples T- Test							
Employee Empowerment	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower upper
Equal Variances Assumed	.150	.700	3.336	73	.001	.99	.298	.400 1.587
Equal Variances Not Assumed			3.370	61.638	.001	.99	.295	.404 1.583

Employee Empowerment	**Manager (group1)**	**Non-Manager (group2)**
Means	3.28	2.28

The means of groups can be seen in the second table. From this we can see that M1 = 3.28 and M2 = 2.28 so we can say that there is a significant difference in the means of Non-manager and Manager level employees' perceptions towards increase in employee empowerment.

In the first table we can see the results of the t-test. As can be seen from this table, the significance level for Levene's test is 0.700, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row.

Since Sig .(2 tailed) value of 0.001 is smaller than alpha value of 0.05 we can reject the null hypothesis. (t (73) = 3.336, p = 0.001). As a result of Independent Samples T- Test , it can be said there is a significant difference between the perceptions of Non Manager-level and Manager-level employees towards increase in employee empowerment.

VII.7.5. Analysis of Perception towards Aimed Objectives

Question 9 intends to reveal the employees' perceptions about whether aimed objectives have been accomplished or not after the implementation of reengineering projects in SMS.

In order to respond this question, an analysis of the variable q9 is needed.

The table below shows the outcomes of Frequency Listing Statistics of q 9.

Table VII.20 Frequency Listing of Perception towards Aimed Objectives

	Value	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	1	1	1.3	1.3
Disagree	2	4	5.3	6.7
Neutral	3	19	25.3	32
Agree	4	43	57.3	89.3
Strongly Agree	5	8	10.7	100.0
Total		75	100	

Aimed Objectives	Mean :	3.71
	Std. Deviation :	0.785

As can be seen from the above table, 1.3% of SMS employees who responded the questionnaire strongly disagree, 5.3% disagree, 25.3% neither disagree nor agree, 57.3% agree and 10.7% strongly agree that aimed objectives have been accomplished after the implementation of reengineering.

The mean is 3.71 and it designates that employees' perceptions towards accomplishment of aimed objectives is positive. As a result, it can be concluded that most of the employees think aimed objectives have been reached out after the implementation of reengineering.

VII.7.5.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perceptions towards achievement of aimed objectives and their positions.

H1: There is a relationship between employees' perceptions towards achievement of aimed objectives and their positions.

The above hypothesizes are related to two variables. The first one is q009 (Perception towards Achievement of Aimed Objectives) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Chi-Square Test is used initially.

The results of the Chi-Square Analysis can be found in the below tables.

Table VII.21 Crosstab for Aimed Objectives with respect to Position

	Aimed Objectives			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	3	4	22	29
Ex.Count	1.9	7.3	19.7	29
Non Manager				
Count	2	15	29	46
Ex.Count	3.1	11.7	31.3	46
Total				
Count	5	19	51	75
Ex.Count	5	19	51	75

Table VII.22 Chi-Square Test for Aimed Objectives with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	3.875a	2	.144
Likelihood Ratio	4.061	2	.131
Linear -by-Linear	.220	1	.639
Association			
N.of Valid Cases	75		

* 2 cells (33.3 %) have expected count less than 5. The minimum expected count is 1.93.

As can be seen from the above tables, the Chi-square Statistic with two degree of freedom is (df) = 3.875 and p = 0.144.Since the significance level (p=0.144) is larger than the alpha value which is 0.05 , null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards achievement of aimed objectives and their positions.

However it should be emphasized that using the Chi-Square statistic is questionable here because all two cells (33.3 %) have expected frequencies less than 5 although the minimum expected frequency is above 1.

Instead of Chi-Square Test, using of Independent Samples T- Test is again more appropriate in this case.

Ho: There is no difference in employees' perception towards achievement of aimed objectives dependent on their positions.

H1: There is a difference in employees' perception towards achievement of aimed objectives dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q009 (Perception towards Achievement of Aimed Objectives) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards achievement of aimed objectives.

The results of the T-test can be found in Table VII.23.

Table VII.23 Independent Samples T-test for Aimed Objectives with respect to Position

	Independent Samples T- Test							
Aimed Objectives	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower upper
Equal Variances Assumed	.134	.715	1.370	73	.175	.25	.185	-.115 .622
Equal Variances Not Assumed			1.308	50.868	.197	.25	.194	-.135 .642

Aimed Objectives	**Manager (group1)**	**Non-Manager (group2)**
Means	3.86	3.61

The means of groups can be seen in the second table. From this we can see that M1 = 3.86 and M2 = 3.61 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards achievement of aimed objectives

In the first table we can see the results of the t-test. As can be seen from this table, the significance level for Levene's test is 0.715, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row.

Since Sig .(2 tailed) value of 0.175 is larger than alpha value of 0.05 we can not reject the null hypothesis. ($t(73) = 1.370$, $p = 0.175$). As a result of Independent Samples T- Test, it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards achievement of aimed objectives.

VII.7.6 Analysis of Perception towards Process Simplification

Question 10 intends to reveal the employees' perceptions about whether processes have been simplified or not after the implementation of reengineering in SMS.
In order to respond this question, an analysis of the variable q10 is needed.
The table below shows the outcomes of Frequency Listing Statistics of q 10.

Table VII.24 Frequency Listing of Perception towards Process Simplification

	Value	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	1	20	26.7	26.7
Disagree	2	18	24	50.7
Neutral	3	5	6.7	57.3
Agree	4	20	26.7	84
Strongly Agree	5	12	16	100
Total		75	100	

Process Simplification	Mean : 2.81
	Std. Deviation : 1.486

As can be seen from the above table, 26.7% of SMS employees who responded the questionnaire strongly disagree, 24% disagree, 6.7% neither disagree nor agree, 26.7% agree and 16% strongly agree that processes have been simplified after the implementation of reengineering.

The mean is 2.81 and it designates that employees' perceptions towards process simplification is negative. As a result, it can be deduced that 50.7% of the employees think processes have not been simplified after the implementation of reengineering projects.

VII.7.6.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perceptions towards process simplification and their positions.

H1: There is a relationship between employees' perceptions towards process simplification and their positions.

The above hypothesizes are related to two variables. The first one is q010 (Perception towards Process Simplification) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).
In order to test the null hypothesis Chi-Square Test is used initially again.
The results of the Chi-Square Analysis can be found in the below tables:

Table VII.25 Crosstab for Process Simplification with respect to Position

	Process Simplification			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	8	1	20	29
Ex.Count	14.7	1.9	12.4	29
Non Manager				
Count	30	4	12	46
Ex.Count	23.3	3.1	19.6	46
Total				
Count	38	5	32	75
Ex.Count	38	5	32	75

Table VII.26 Chi-Square Test for Process Simplification with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	13.370a	2	.001
Likelihood Ratio	13.627	2	.001
Linear -by-Linear	12.272	1	.000
Association			
N.of Valid Cases	75		

* 2 cells (33.3 %) have expected count less than 5. The minimum expected count is 1.93

As can be seen from the above tables, the Chi-square Statistic with two degree of freedom is (df) = 13.370 and p = 0.001.Since the significance level (p=0.001) is smaller than the alpha value which is 0.05 , null hypothesis is rejected and it can be concluded that there is a statistically significant relationship between the employees' perception towards process simplification and their positions.

Although minimum expected frequency is larger than 1 (1.93 > 1) and 66.7 % of cells have more than 5 observations. That's why the Chi-Square statistic is not applicable in this case. Instead of Chi-Square Test, using of Independent Samples T-Test is again more appropriate in this case.

Ho: There is no difference in employees' perception towards process simplification dependent on their positions.

H1: There is difference in employees' perception towards process simplification dependent on their positions.

The hypothesizes again are related to two variables. The first one is q010 (Perception towards Process Simplification) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards process simplification.

The results of the T-test can be found in Table VII.27.

TableVII.27 Independent Samples T-test for Process Simplification with respect to Position

	Independent Samples T- Test							
Process Simplification	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower upper
Equal Variances Assumed	3.407	.069	3.496	73	.001	1 .15	.328	.493 1.802
Equal Variances Not Assumed			3.300	48.846	.002	1 .15	.348	.449 1.847

Process Simplification	**Manager (group1)**	**Non-Manager (group2)**
Means	3.52	2.37

The means of groups can be seen in the second table. From this we can see that M1 = 3.52 and M2 = 2.37 so we can say that there is a significant difference in the means of Non-manager and Manager level employees' perceptions towards process simplification.

In the first table we can see the results of the t-test. As can be seen from this table, the significance level for Levene's test is 0.069, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row.

Since Sig .(2 tailed) value of 0.001 is smaller than alpha value of 0.05 we can reject the null hypothesis. ($t(73) = 3.496$, $p = 0.001$). As a result of Independent Samples T- Test, it can be said there is a significant difference between the perceptions of Non Manager-level and Manager-level employees towards process simplification.

VII.7.7 Analysis of Perception towards Information Sharing

Question 11 intends to reveal the employees' perceptions about whether information sharing has increased or not after the implementation of reengineering in SMS.In order to respond question 11, an analysis of the variable q11 is needed.
The table below shows the outcomes of Frequency Listing Statistics of q 11.

Table VII.28 Frequency Listing of Perception towards Information Sharing

	Value	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	1	3	4	4
Disagree	2	3	4	8
Neutral	3	18	24	32
Agree	4	41	54.7	86.7
Strongly Agree	5	10	13.3	100
Total		75	100	

Information Sharing	Mean : 3.69
	Std. Deviation : 0.900

As can be seen from the above table , 4% of SMS employees who responded the questionnaire strongly disagree , 4% disagree, 24% neither disagree nor agree , 54.7% agree and 13.3% strongly agree that information sharing has increased after the implementation of reengineering.

The mean is 3.69 and it designates that employees' perceptions towards increase in information sharing is positive. As a result, it can be concluded that 68% of the employees think information sharing has increased after the implementation of reengineering.

VII.7.7.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perception towards increase in information sharing and their positions.

H1: There is a relationship between employees' perception towards increase in information sharing and their positions.

The above hypothesizes are related to two variables. The first one is q011 (Perception towards Increase in Information Sharing) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Chi-Square Test which examines whether there is a relationship between two categorical variables is used initially.

The results of the Chi-Square Analysis can be found in the below tables:

Table VII.29 Crosstab for Information Sharing with respect to Position

	Information Sharing			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	2	6	21	29
Ex.Count	2.3	7	19.7	29
Non Manager				
Count	4	12	30	46
Ex.Count	3.7	11	31.3	46
Total				
Count	6	18	51	75
Ex.Count	6	18	51	75

Table VII.30 Chi-Square Test for Information Sharing with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	.423a	2	.809
Likelihood Ratio	.428	2	.807
Linear -by-Linear	.355	1	.551
Association			
N.of Valid Cases	75		

* 2 cells (33.3 %) have expected count less than 5. The minimum expected count is 2.32

As can be seen from the above tables, the Chi-square Statistic with two degree of freedom is (df) = 0.423 and p = 0.809.Since the significance level (p=0.809) is larger than the alpha value which is 0.05 , null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards increase in information sharing and their positions.

Using the Chi-Square statistic is questionable here too because all two cells (33.3 %) have expected frequencies less than 5 although the minimum expected frequency is above 1.

Instead of Chi-Square Test, Independent Samples T- Test is used in this case.

Ho: There is no difference in employees' perception towards increase in information sharing dependent on their positions.

H1: There is difference in employees' perception towards increase in information sharing dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q011 (Perception towards Increase in Information Sharing) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards increase in information sharing.

The results of the T-test can be found in Table VII.31.

Table VII.31 Independent Samples T-test for Information Sharing with respect to Position

	Independent Samples T- Test							
Information Sharing	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower - upper
Equal Variances Assumed	.524	.471	1.295	73	.199	.28	.212	-.148 .699
Equal Variances Not Assumed			1.329	64.613	.189	.28	.207	-.138 .689

Information Sharing	**Manager (group1)**	**Non-Manager (group2)**
Means	3.86	3.59

The means of groups can be seen in the second table. From this we can see that M1 = 3.86 and M2 = 3.59 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards top management commitment and support.

As can be seen above, the significance level for Levene's test is 0.471, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row.

Since Sig .(2 tailed) value of 0.199 is greater than alpha value of 0.05 we can not reject the null hypothesis. (t (73) = 1.295, p = 0.199). As a result of Independent Samples T- Test , it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards towards increase in information sharing.

VII.7.8 Analysis of Perception towards Customer Satisfaction

Question 12 intends to reveal the employees' perceptions about whether customer satisfaction has increased or not after the implementation of reengineering in SMS.
In order to respond question 12, an analysis of the variable q12 is needed.
Table shows the outcomes of Frequency Listing Statistics of q 12.

Table VII.32 Frequency Listing of Perception towards Customer Satisfaction

	Value	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	1	3	4	4
Disagree	2	0	0	4
Neutral	3	23	30.7	34.7
Agree	4	44	58.7	93.3
Strongly Agree	5	5	6.7	100
Total		75	100	

Customer Satisfaction	Mean : 3.64
	Std. Deviation : 0.782

As can be seen from the above table , 4% of SMS employees who responded the questionnaire strongly disagree , 0% disagree, 30.7% neither disagree nor agree , 58.7% agree and 6.7% strongly agree that customer satisfaction has increased after the implementation of reengineering.

The mean is 3.64 and it designates that employees' perceptions towards increase in customer satisfaction is positive. As a result, it can be concluded that 65.4% of the employees think customer satisfaction has increased after the implementation of reengineering.

VII.7.8.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perception towards increase in customer satisfaction and their positions.

H1: There is a relationship between employees' perception towards increase in customer satisfaction and their positions.

The above hypothesizes are related to two variables. The first one is q012 (Perception towards Increase in Customer Satisfaction) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).
In order to test the null hypothesis Chi-Square Test is used initially.
The results of the Chi-Square Analysis can be found in the below tables:

Table VII.33 Crosstab for Customer Satisfaction with respect to Position

	Customer Satisfaction			
Position	**Disagree**	**Neutral**	**Agree**	**Total**
Manager				
Count	1	10	18	29
Ex.Count	1.2	8.9	18.9	29
Non Manager				
Count	2	13	31	46
Ex.Count	1.8	14.1	30.1	46
Total				
Count	3	23	49	75
Ex.Count	3	23	49	75

Table VII.34 Chi-Square Test for Customer Satisfaction with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	.338a	2	.845
Likelihood Ratio	.336	2	.845
Linear -by-Linear	.108	1	.742
Association			
N.of Valid Cases	75		

* 2 cells (33.3 %) have expected count less than 5. The minimum expected count is 1.16.

As can be seen from the above tables, the Chi-square Statistic with two degree of freedom is (df) = 0.338 and p = 0.845.Since the significance level (p=0.845) is larger than the alpha value which is 0.05 , null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards increase in customer satisfaction and their positions.

Using the Chi-Square statistic is questionable here too because all two cells (33.3 %) have expected frequencies less than 5 although the minimum expected frequency is above 1.

Instead of Chi-Square Test, Independent Samples T- Test is used in this case.

Ho: There is no difference in employees' perception towards increase in customer satisfaction dependent on their positions.

H1: There is difference in employees' perception towards increase in customer satisfaction dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q012 (Perception towards Increase in Customer Satisfaction) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards increase in customer satisfaction.

The results of the T-test can be found in Table VII.35.

Table VII.35 Independent Samples T-test for Customer Satisfaction with respect to Position

	Independent Samples T- Test							
Customer Satisfaction	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower upper
Equal Variances Assumed	.604	.439	.434	73	.666	.08	.187	-.291 .453
Equal Variances Not Assumed			.421	53.840	.675	.08	.192	-.304 .466

Customer Satisfaction	**Manager (group1)**	**Non-Manager (group2)**
Means	3.69	3.61

The means of groups can be seen in the second table. From this we can see that M1 = 3.69 and M2 = 3.61 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards increase in customer satisfaction.

As can be seen above, the significance level for Levene's test is 0.439, so "Equal Variances Assumed" test is used in this case by paying attention to the results indicated in the first row.

Since Sig .(2 tailed) value of 0.666 is greater than alpha value of 0.05 we can not reject the null hypothesis. (t (73) = .434, p = 0.666).As a result of Independent Samples T- Test , it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards increase in customer satisfaction.

VII.7.9 Analysis of Reengineering Success

Question 13 which can be seen below intends to reveal the employees' perceptions about whether they find reengineering projects which have been put into practice in SMS successful or not

Question 13: Please designate how successful you find the reengineering initiatives which have been carried out in your company.

(1)	(2)	(3)	(4)	(5)
Very Unsuccessful	**Not Successful**	**Neutral**	**Successful**	**Very Successful**
☐	☐	☐	☐	☐

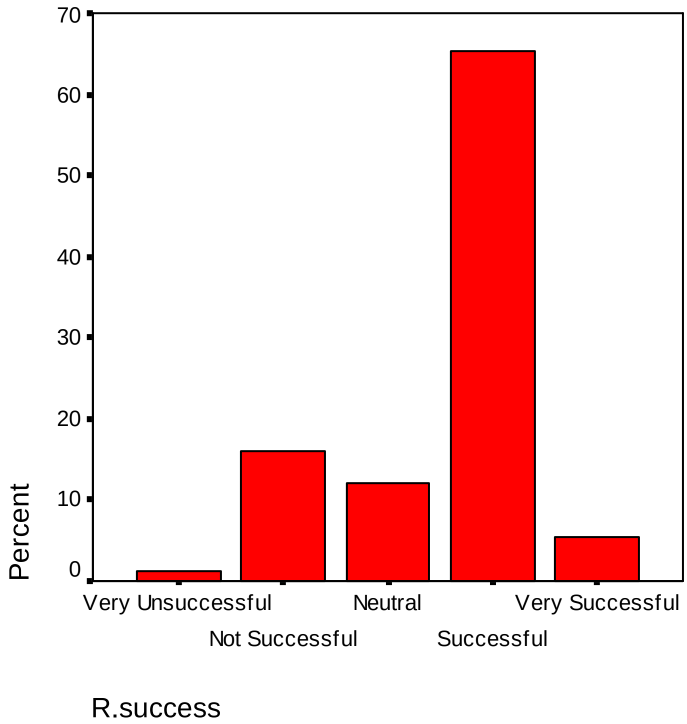


Figure VI.12 The Frequency Analysis Results for Reengineering Success

In order to respond this question, an analysis of the variable q13 is needed.

The table below shows the outcomes of Frequency Listing Statistics of q13.

Table VII.36 Frequency Listing of Perception towards Reengineering Success

	Value	Frequency	Valid Percent	Cumulative Percent
Very Unsuccessful	1	1	1.3	1.3
Unsuccessful	2	12	16	17.3
Neutral	3	9	12	29.3
Successful	4	49	65.3	94.7
Very Successful	5	4	5.3	100
Total		75	100	

Reengineering Success	Mean : 3.57
	Std. Deviation : 0.873

As can be understood from the above table, 1.3% of SMS employees who responded the questionnaire have found reengineering implementations executed in SMS very unsuccessful, 16% unsuccessful, 12% neither unsuccessful nor successful, 65.3% successful and 5.3% very successful.

The mean is 3.57 and it indicates that employees' perceptions towards the success of reengineering initiatives which have been carried out in SMS is positive. As a result, it can be concluded that most of the employees think reengineering implementations executed in SMS is successful.

VII.7.9.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perception towards success of reengineering initiatives and their positions.

H1: There is a relationship between employees' perception towards success of reengineering initiatives and their positions.

The above hypothesizes are related to two variables. The first one is q013 (Perception towards Success of Reengineering Initiatives) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Chi-Square Test is used initially.

The results of the Chi-Square Analysis can be found in the below tables:

Table VII.37 Crosstab for Reengineering Success with respect to Position

	Reengineering Success			
Position	**Unsuccessful**	**Neutral**	**Successful**	**Total**
Manager				
Count	3	4	22	29
Ex.Count	5	3.5	20.5	29
Non Manager				
Count	10	5	31	46
Ex.Count	8	5.5	32.5	46
Total				
Count	13	9	53	75
Ex.Count	13	9	53	75

Table VII.38 Chi-Square Test for Reengineering Success with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	1.640a	2	.441
Likelihood Ratio	1.737	2	.420
Linear -by-Linear	1.163	1	.281
Association			
N.of Valid Cases	75		

* 1 cells (16.7 %) have expected count less than 5. The minimum expected count is 3.48

As can be seen from the above tables, the Chi-square Statistic with two degree of freedom is (df) = 1.640 and p = 0.441.Since the significance level (p=0.441) is larger than the alpha value which is 0.05 , null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards the success of reengineering initiatives and their positions. Since minimum expected frequency is larger than 1 (3.48 > 1) and 83.3% of cells have more than 5 observations the Chi-Square statistic is applicable in this case.

Ho: There is no difference in employees' perception towards success of reengineering initiatives dependent on their positions.

H1: There is difference in employees' perception towards success of reengineering initiatives dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q013 (Perception towards Success of Reengineering Initiatives) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards success of reengineering initiatives

The results of the T-test can be found below:

Table VII.39 Independent Samples T-test for Reengineering Success with respect to Position

	Independent Samples T- Test							
Reengineering Success	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower upper
Equal Variances Assumed	4.036	.048	1.192	73	.237	.25	.206	-.165 .657
Equal Variances Not Assumed			1.253	68.720	.215	.25	.196	-.146 .637

Reengineering Success	**Manager (group1)**	**Non-Manager (group2)**
Means	3.72	3.48

The means of groups can be seen in the second table. From this we can see that M1 = 3.72 and M2 = 3.48 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards success of reengineering initiatives.

As can be seen above, the significance level for Levene's test is 0.048, so "Equal Variances Not Assumed" test is used in this case by paying attention to the results indicated in the second row.

Since Sig .(2 tailed) value of 0.215 greater than alpha value of 0.05 we can not reject the null hypothesis. (t (68.720) = 1.253, p = 0.215).As a result of Independent Samples T- Test , it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards success of reengineering initiatives.

VII.7.10. Analysis of Reengineering Satisfaction

Question 16 which can be seen below intends to reveal whether SMS employees are satisfied or not with reengineering projects which have been put into practice in SMS.

Question 16 : Please indicate how much you are satisfied with the reengineering initiatives which have been put into practice in your company.

1. I am very unsatisfied ☐
2. I am unsatisfied ☐
3. I am neither unsatisfied/nor satisfied ☐
4. I am satisfied ☐
5. I am very satisfied ☐

In order to respond this question, an analysis of the variable q16 is needed.

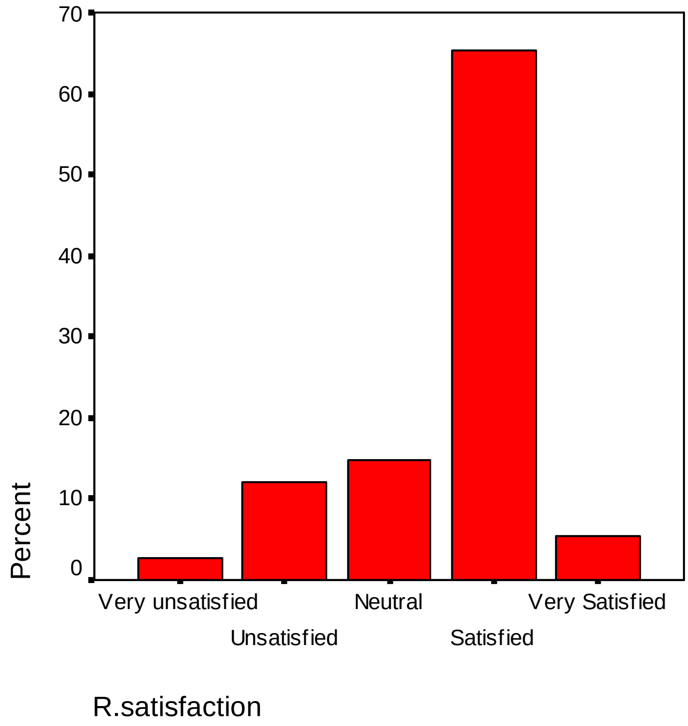


Figure VI.13 The Frequency Analysis Results for Reengineering Satisfaction

The table below shows the outcomes of Frequency Listing Statistics of q16

Table VII.40 Frequency Listing of Perception towards Reengineering Satisfaction

	Value	Frequency	Valid Percent	Cumulative Percent
Very Unsatisfied	1	2	2.7	2.7
Unsatisfied	2	9	12	14.7
Neither unsatisfied Nor satisfied	3	11	14.7	29.3
Satisfied	4	49	65.3	94.7
Very Satisfied	5	4	5.3	100
Total		75	100	

Reengineering Satisfaction	Mean : 3.59
	Std. Deviation : 0.871

As can be understood from the above table , 2.7% of SMS employees who responded the questionnaire are very unsatisfied , 12% unsatisfied, 14.7% neither unsatisfied nor satisfied, 65.3% satisfied and 5.3% very satisfied with reengineering implementations executed in SMS.

The mean is 3.59 and it indicates that employees' satisfaction with reengineering initiatives which have been carried out in SMS is positive. As a result, it can be concluded that most of the employees are satisfied with reengineering implementations executed in SMS.

VII.7.10.1 Analysis related with Position of Employees

Ho: There is no relationship between employees' perception towards satisfaction with reengineering initiatives and their positions.

H1: There is a relationship between employees' perception towards satisfaction with reengineering initiatives and their positions.

The above hypothesizes are related to two variables. The first one is q016 (Perception towards Satisfaction with Reengineering Initiatives) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Chi-Square Test is used initially.

The results of the Chi-Square Analysis can be found in the below tables:

Table VII.41 Crosstab for Reengineering Satisfaction with respect to Position

	Reengineering Satisfaction			
Position	**Unsatisfied**	**Neither unsatisfied, nor satisfied**	**Satisfied**	**Total**
Manager				
Count	2	5	22	29
Ex.Count	4.3	4.3	20.5	29
Non Manager				
Count	9	6	31	46
Ex.Count	6.7	6.7	32.5	46
Total				
Count	11	11	53	75
Ex.Count	11	11	53	75

Table VII.42 Chi-Square Test for Reengineering Satisfaction with respect to Position

	Value	df	Asymp.Sig (2-sided)
Pearson Chi-Square	2.341a	2	.310
Likelihood Ratio	2.558	2	.278
Linear -by-Linear	1.453	1	.228
Association			
N.of Valid Cases	75		

* 2 cells (33.3 %) have expected count less than 5. The minimum expected count is 4.25

As can be seen from the above tables, the Chi-square Statistic with two degree of freedom is (df) = 2.341 and p = 0.310. Since the significance level (p=0.310) is larger than the alpha value which is 0.05, null hypothesis can not be rejected and it can be concluded that there is no statistically significant relationship between the employees' perception towards the satisfaction with reengineering initiatives and their positions. But using the Chi-Square statistic is questionable here too because all two cells have expected frequencies less than 5 although the minimum expected frequency is above 1. Instead of Chi-Square Test, Independent Samples T- Test is used in this case again.

Ho: There is no difference in employees' perception towards satisfaction with reengineering initiatives dependent on their positions.

H1: There is difference in employees' perception towards satisfaction with reengineering initiatives dependent on their positions.

The above hypothesizes are again related to two variables. The first one is q016 (Perception towards Satisfaction with Reengineering Initiatives) and the second one is q002 (Position of Employees: Manager or Non Manager Employee).

In order to test the null hypothesis Independent Samples T-Test is used. This test compares the means of perception of two groups (Manager and Non-Manager Employee) towards satisfaction with reengineering initiatives.

The results of the T-test can be found in Table VII.43.

Table VII.43 Independent Samples T-test for Reengineering Satisfaction with respect to Position

	Independent Samples T- Test							
Reengineering Satisfaction	**Levene's Test for Equality of Variances**		**T-test for Equality of Means**					
	F	Sig	t	df	Sig (2 tailed)	Mean difference	Std.Error difference	%95 Conf.interval of the diffence lower upper
Equal Variances Assumed	6.993	.010	1.086	73	.281	.22	.206	-.187 .635
Equal Variances Not Assumed			1.189	72.806	.238	.22	.189	-.152 .600

Reengineering Satisfaction	**Manager (group1)**	**Non-Manager (group2)**
Means	3.72	3.50

The means of groups can be seen in the second table. From this we can see that M1 = 3.72 and M2 = 3.50 so we can say that there is no significant difference in the means of Non-manager and Manager level employees' perceptions towards satisfaction with reengineering initiatives.

As can be seen above, the significance level for Levene's test is 0.010, so "Equal Variances Not Assumed" test is used in this case by paying attention to the results indicated in the second row.

Since Sig .(2 tailed) value of 0.238 greater than alpha value of 0.05 we can not reject the null hypothesis. (t (72.806) = 1.189, p = 0.238).As a result of Independent Samples T- Test , it can be said there is no significant difference between the perceptions of Non Manager-level and Manager-level employees towards satisfaction with reengineering initiatives.

VII.7.11 Analysis of Knowledge and Agreement on the Term of Reengineering

Question 4 and Question 18 which both can be seen below intends to reveal whether SMS employees know and agree with the definition of reengineering known in the literature.

Question 4 : Do you agree with the below definition of business process reengineering?

Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed.

☐ Yes

☐ No

In order to respond question 4 , an analysis of the variable q4 is needed.
Table shows the outcomes of Frequency Listing Statistics of q4

Table VII.44 Frequency Listing of Agreement on the Reengineering Definition

	Value	Frequency	Valid Percent	Cumulative Percent
Yes	1	70	93.3	93.3
No	2	5	6.7	100
Total		75	100	

As can be understood from the above table, 93.3 % of SMS employees who responded the questionnaire agree with the definition of reengineering given , whereas 6.7 % of them do not agree with it.

Question 18: Which of the below definitions you think is the appropriate definition of reengineering?

☐ Reengineering: Little improvements that are made in business processes.

☐ Reengineering: Little, cost effective improvements that are made in business processes.

☐ Reengineering: Radical redesign of business processes to achieve dramatic improvements in performance measures such as cost, quality , service and speed.

In order to respond question 18, an analysis of the variable q18 is needed

Table shows the outcomes of Frequency Listing Statistics of q18

Table VII.45 Frequency Listing of the Appropriate Definition of Reengineering

	Value	Frequency	Valid Percent	Cumulative Percent
Little Improvements	1	2	2.7	2.7
Little Cost Effective Improvements	2	9	12	14.7
Radical Redesign of business processes	3	64	85.3	100
Total		75	100	

As can be understood from the above table, most of the SMS employees who responded the questionnaire actually knows what reengineering is , whereas approximately 15 % of them do not know what the term means.

Consequently, it can be asserted that most of the SMS employees responded the survey questions by being aware of the meaning of reengineering.

VII.7.12 Analysis of Reasons for Lack of Success in Reengineering Implementations

Question 14, which is an open-ended question, aims to reveal why SMS employees who find reengineering initiatives that have been implemented in SMS unsuccessful, find them unsuccessful. The question 14 was answered by employees who had replied question 13 as unsuccessful or very unsuccessful.

Question 14: Please indicate the reasons why you find the reengineering applications which have been carried out in your company unsuccessful.

In order to respond this question, an analysis of the variable q14 is needed. With the aim of being able to analyze the responses of question 14, every answer given by each employee is given a value, in other words, described to the SPSS 11.5 Software numerically. Table shows the outcomes of Frequency Listing Statistics of q14

Table VII.46 Frequency Listing of Reasons for Reengineering to be Unsuccessful

	Value	**Frequency**	**Valid Percent**	**Cumulative Percent**
Employees are not empowered enough	1	5	38.5	38.5
Employees do not participate in the change process enough	2	2	15.4	53.8
Slow implementation	3	1	7.7	61.5
New program flaws	4	1	7.7	69.2
Insufficient planning	5	1	7.7	76.9
Insufficient IT	6	1	7.7	84.6
Not considering other departments needs	7	1	7.7	92.3
Lack of team working	8	1	7.7	100
Total		13	100	
Missing		62		
Total		62		

As can be understood from the table, among 13 of SMS employees who responded question 14, 38.5 % of them find reengineering implementations in SMS unsuccessful on the grounds that employees are not empowered enough as a result of BPR projects. Other reasons that were put forward by employees as lack of success in reengineering projects are, not adequately involving employees in the change management process, slow implementation, flaws that have come up with new programs or systems, insufficient planning, not sufficiently using IT, not considering the needs of other departments and lack of team working.

Consequently, it can be asserted that among SMS employees who find reengineering implementations in SMS unsuccessful, most of them think that the reason for lack of success in these implementations is the fact that as a result of BPR implementations they are not empowered enough and their role in decision making mechanism is still limited.

VII.7.13 Analysis of Reasons for Success in Reengineering Implementations

Question 15 which is also an open-ended question aims to reveal why SMS employees who find reengineering initiatives which have been implemented in SMS successful, find them successful. The question 15 was answered by employees who had replied question 13 as successful or very successful.

Question 15: Please indicate the reasons why you find the reengineering applications which have been carried out in your company successful.

In order to respond this question, an analysis of the variable q15 is needed. With the aim of being able to analyze the responses of question 15, every answer given by each employee is valued, in other words, described to the SPSS 11.5 Software numerically.

Table shows the outcomes of Frequency Listing Statistics of q15

Table VII.47 Frequency Listing of Reasons for Success in Reengineering

	Value	Frequency	Valid Percent	Cumulative Percent
Communication with Employees	1	5	9.4	9.4
Increase in Efficiency	2	13	24.5	34
Employee Participation	3	6	11.3	45.3
TopManagement support	4	5	9.4	54.7
Information Sharing	5	7	13.2	67.9
Innovation	6	2	3.8	71.7
Results	7	6	11.3	83
Need Analysis	8	2	3.8	86.8
Customer Orientation	9	1	1.9	88.7
Plan,report,control	10	4	7.5	96.2
Change Management	11	2	3.8	100
Total		53	100	
Missing		22		
Total		75		

As can be understood from the above table, among 53 of SMS employees who responded question 15, 24.5% of them find reengineering implementations in SMS successful on the grounds that work efficiency has increased after these implementations. They claim that with efficiency reengineering has provided; workflows have accelerated and eased up, paper work has decreased and process periods have been shortened.

Other reasons for success in reengineering implementations which were broached by employees are need analysis, giving full weight to innovation, customer orientation, plan, report and control accurate change management, top management's support, information sharing and use of IT, communication with employees before and during the reengineering implementation, involving employees into the change management process and good results that have come up with reengineering projects.

Consequently, it can be alleged that among SMS employees who find reengineering implementations in SMS successful, most of them think that the reason for success in these implementations is the increase in work efficiency which is ensured by reengineering.

VII.7.14 Analysis of Success Factors in Reengineering Implementations

Question 17 and Question 19 aim to reveal, among the success factors of reengineering which one makes reengineering implementations successful in general and which is the most important one from employees' point of view.

Question 17: Which factors do you think make the reengineering applications successful

In order to respond question 17 firstly, an analysis of the variable q17 is needed. With the aim of being able to analyze the responses of question 17, every answer given by each employee is valued, in other words, described to the SPSS 11.5 Software numerically. The table below shows the outcomes of Frequency Listing Statistics of q17

Table VII.48 Frequency Listing of the Success Factors of Reengineering

	Value	Frequency	Valid Percent	Cumulative Percent
TopManagement Support	1	15	20	20
Employees	2	5	6.7	26.7
Team working	3	15	20	46.7
Employee Communication	4	13	17.3	64
Efficiency	5	6	8	72
Planning	6	2	2.7	74.7
Customer Orientation	7	1	1.3	76
Cost,speed,time factors	8	3	4	80
IT	9	6	8	88
Process analysis	10	3	4	92
Innovative structure	11	3	4	96
Control& Continuous Improvement	12	1	1.3	97.3
Proper methods	13	2	2.7	100
Total		75	100	

As can be noticed from the above table, among the SMS employees who responded the questionnaire 20 % of them views top management support and team working as an important success factor of reengineering. In addition to that, 17.3 % of the employees think that communication with employees during and before the implementation of reengineering projects is an important factor which makes reengineering implementations successful. The other success factors that were brought up by employees are increase in work efficiency , use of IT, experienced and specialized employees themselves, planning and resources , process analysis , innovative structure which attaches importance to new ideas and combines these with experience, cost, speed and time factors , use of proper methods and tools ,customer orientation, control and continuous improvement of processes.

Question 19: In your opinion, which of these below success factors of reengineering have a significant impact on reengineering projects success?

- ☐ Top Management's Commitment & Support
- ☐ Communication with Employees
- ☐ Customer Orientation
- ☐ Use of Information Technology

In order to respond this question , an analysis of the variable q19 is needed.
The table below shows the outcomes of Frequency Listing Statistics of q19

Table VII.49 Frequency Listing of the Four Success Factors of Reengineering

	Value	Frequency	Valid Percent	Cumulative Percent
TopManagement Commitment and Support	1	26	34.7	34.7
Communication with Employees	2	36	48	82.7
Customer Orientation	3	1	1.3	84
Information Technology	4	12	16	100
Total		75	100	

As can be noticed from the above table, communication with employees before and during the reengineering implementations is perceived to be the overriding success factor of reengineering by 48 % of SMS employees. Besides, 34.7 % of SMS employees think that top management and support is the most important success factor of reengineering.It can also be seen that the findings of question 19 nearly supports the findings of question 17.

VII.7.15 Analysis of the Importance of Success Factors in Reengineering Implementations in SMS

Question 20 aims to discover, among the success factors of reengineering which one is attached more importance to in SMS from the employees' point of view.

In order to respond question 20, firstly an analysis of the variable q20-1, q20-1, q20-3 and q20-4 is needed. The variable q-20-1 is coded as "Top Management Commitment and Support", q-20-2 is coded as "Communication with Employees" ,q20-3 is coded as " Customer Orientation" and lastly q20-4 is coded as " IT" in SPSS 11.5 software. The frequency listings of each variable can be seen in the below tables:

Table VII.50 Frequency Listing for the Importance of Top Management Commitment and Support in SMS

	Frequency	Percent	Valid Percent	Cumulative Percent
Low	1	1.3	1.3	1.3
Neutral	4	5.3	5.3	6.7
High	44	58.7	58.7	65.3
Extremely High	26	34.7	34.7	100
Total	75	100	100	

As can be seen from the above table, 1.3% of SMS employees who responded the questionnaire think that the importance of Top Management and Commitment as a success factor of reengineering in SMS is low, 5.3 % of them are neutral, 58.7 % of them thinks it is high, and 34.7 % of them thinks that the importance of Top Management Commitment and Support is extremely high in SMS as a success factor.

Table VII.51 Frequency Listing for the Importance of Communication with Employees in SMS

	Frequency	Percent	Valid Percent	Cumulative Percent
Low	1	1.3	1.3	1.3
Neutral	6	8	8	9.3
High	41	54.7	54.7	64
Extremely High	27	36	36	100
Total	75	100	100	

As can be seen from the above table, 1.3% of SMS employees who responded the questionnaire think that the importance of Communication with Employees in SMS is low as a success factor of reengineering, 8 % of them are neutral, 54.7 % of them thinks it is high, and 36 % of them thinks that the importance of Communication with Employees is extremely high in SMS as a success factor.

Table VII.52 Frequency Listing for the Importance of Customer Orientation in SMS

	Frequency	Percent	Valid Percent	Cumulative Percent
Low	5	6.7	6.7	6.7
Neutral	19	25.3	25.3	32
High	37	49.3	49.3	81.3
Extremely High	14	18.7	18.7	100
Total	75	100	100	

As can be noticed from the above table, 6.7% of SMS employees who responded the questionnaire think that the importance of Customer Orientation in SMS is low as a success factor of reengineering, 25.3 % of them are neutral, 49.3 % of them thinks it is high, and 18.7 % of them thinks that the importance of Communication with Employees is extremely high in SMS as a success factor

Table VII.53 Frequency Listing for the Importance of IT in SMS

	Frequency	Percent	Valid Percent	Cumulative Percent
Extremely Low	1	1.3	1.3	1.3
Neutral	7	9.3	9.3	10.7
High	35	46.7	46.7	57.3
Extremely High	32	42.7	42.7	100
Total	75	100	100	

As can be realized from the above table, 1.3 % of SMS employees who responded the questionnaire think that the importance of IT in SMS is extremely low as a success factor of reengineering, 9.3 % of them are neutral, 46.7 % of them thinks it is high, and 42.7 % of them thinks that the importance of IT is extremely high in SMS as a success factor.

As can be understood from all the above tables, 93.4 % of SMS employees think that the company attaches high importance to "Top Management Commitment and Support" as a success factor of reengineering. 90.7 % of SMS employees think that the company gives high importance to "Communication with Employees" whereas 68% of employees have the opinion that the company gives weight to Customer Orientation as a success factor. Finally 89.4 % of SMS employees think that the company attaches high importance to IT as a success factor of reengineering

The figures indicate that Top Management Commitment and Support is given the utmost importance as a success factor of reengineering in SMS while Communication with Employees takes the second place and IT takes the third one in terms of importance from employees' point of view. Customer Orientation seems to take the last place according to the figures obtained from the survey results.

The findings of question 20 also supports the findings of question 19 and it designates that the most important success factors which are " Top Management Commitment and Support" and "Communication with Employees " from employees point of view are also considered to be the success factors of reengineering which the SMS company attaches the most importance to.

VII.7.16 The Correlation Between the Variables and the Experience of the Employees

In this part of the study, whether there is an association between the perceptions of employees about reengineering initiatives that have been conducted in SMS and the experience of these employees are tried to be probed.

Table VII.54 Correlation between Top Management Commitment & Support and Experience

		Experience	Top M. Commitment & Support
Experience	Pearson Correlation	1	.407 **
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Top M. Commitment & Support			
	Pearson Correlation	.407**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

Table VII.55 Correlation between Employee Productivity and Experience

		Experience	Employee Productivity
Experience	Pearson Correlation	1	.456 **
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Employee Productivity			
	Pearson Correlation	.456**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

As can be seen from the tables since the significance level (p=0.000) is smaller than the alpha value which is 0.05 it can be concluded that each of these two variables (Top Management Commitment and Support and Employee Productivity) shown in the tables are positively and significantly correlated with experience which means employees who have been working for SMS for a longer period of time have the perception that the reengineering implementations have been supported by top management and have improved their productivity.

Table VII.56 Correlation between Employee Morale & Motivation and Experience

		Experience	Employee Morale& Motivation
Experience	Pearson Correlation	1	.386 **
	Sig.(2 tailed)	.	.001
	Number of cases	75	75
Employee Morale& Motivation			
	Pearson Correlation	.386**	1
	Sig.(2 tailed)	.001	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

Table VII.57 Correlation between Aimed Objectives and Experience

		Experience	Aimed Objectives
Experience	Pearson Correlation	1	.533 **
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Aimed Objectives			
	Pearson Correlation	.533**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

Since the significance levels (p=0.000 and p=0.001) for each variables (Employee Morale and Motivation and Aimed Objectives) are smaller than the alpha value which is 0.05 it can be concluded that each of these two variables shown in the tables are positively and significantly correlated with experience which means employees who have been working for SMS for a longer period of time have the perception that the reengineering implementations have improved the morale and motivation of employees and have helped aimed objectives to be accomplished.

Table VII.58 Correlation between Information Sharing and Experience

		Experience	Information Sharing
Experience	Pearson Correlation	1	.416 **
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Information Sharing			
	Pearson Correlation	.416**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

Since the significance level (p=0.000) is smaller than the alpha value which is 0.05 it can be concluded that the variable (Information Sharing) shown in the above table is positively and significantly correlated with experience which means employees who have been working for SMS for a longer period of time have the perception that the reengineering implementations have increased information sharing.

Table VII.59 Correlation between Process Simplification and Experience

		Experience	Process Simplification
Experience	Pearson Correlation	1	. 581**
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Process Simplification			
	Pearson Correlation	.581**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

Since the significance level (p=0.000) is smaller than the alpha value which is 0.05 it can be concluded that the variable (Process Simplification) shown in the above table is positively and significantly correlated with experience which means employees who have been working for SMS for a longer period of time, in other words experienced employees have the perception that as a result of reengineering implementations processes have simplified.

Table VII.60 Correlation between Customer Satisfaction and Experience

		Experience	Customer Satisfaction
Experience	Pearson Correlation	1	.464 **
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Customer Satisfaction			
	Pearson Correlation	.464**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

Table VII.61 Correlation between Reengineering Success and Experience

		Experience	Reengineering Success
Experience	Pearson Correlation	1	.745 **
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Reengineering Success			
	Pearson Correlation	.745**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

Table VII.62 Correlation between Reengineering Satisfaction and Experience

		Experience	Reengineering Satisfaction
Experience	Pearson Correlation	1	.726 **
	Sig.(2 tailed)	.	.000
	Number of cases	75	75
Reengineering Satisfaction			
	Pearson Correlation	.726**	1
	Sig.(2 tailed)	.000	.
	Number of cases	75	75

** Correlation is significant at 0.01 level (2- tailed)

The above tables also show that each of the three variables (Customer Satisfaction, Reengineering Success, and Reengineering Satisfaction) is positively and significantly correlated with experience as p values (p=0.000) are smaller than the alpha value which is 0.05.

At this point it should be emphasized that since the absolute value of Pearson Correlation Coefficient (r) indicates the strength, with larger absolute values indicating stronger relationships; we can say that the correlation between Reengineering Success, Reengineering Satisfaction and Experience is considerably high**.** [46]

So, it can be stated that employees who have been working for SMS for a longer period of time have the perception that the reengineering implementations have increased sharing and customer satisfaction and are successful as well as satisfactory.

PART VIII

A PROPOSED BPR METHODOLOGY

1. Identify the Necessity for Change

Any company contemplating on reengineering its processes should first recognize that a need for change is vital. Asking fundamental questions about the way business is done within the company, helps companies judge the way they operate and helps them detect whether a need for change is required or not.

2. Ensure Top Management's Commitment and Support

Having recognized the need for change it is also important that this necessity of change is approved by top management. Top management's commitment and support should also be gained and sustained over the orientation of the project through it's implementation to guarantee that things are done smoothly.

3. Communicate the Necessity for Change with Employees

After getting the approval for the need for change from top management, this need should be communicated throughout the company so that employees can comprehend the company's strategy for the future, why change is needed, their role in it and benefits that the company will gain with reengineering. By doing this, the company can eliminate the resistance that may come from the employees.

4. Develop Process Objectives

In this step, organizations should determine the objectives they want to attain with business process reengineering. These desired objectives should ensure the company's vision and strategy to be accomplished and that's why should be compatible with them. These objectives which may be cost reduction, cycle time reduction, increase in quality, increase in speed or increase in market share etc. should be put in order in terms of importance for the company.

It should also be borne in mind that the attempt of reengineering may require the company's vision to be redefined.

5. Form a Reengineering Team

During this step the reengineering team which will undertake the reengineering initiative should be formed. Here, the selection of competent team members is critical. That's why the right combination of people who are familiar with BPR concepts and with proper abilities and experience must be chosen.

It is also crucial to describe the roles and liabilities of each team member explicitly so that they could completely comprehend their part in the project and dedicate themselves accordingly.

6. Determine the Scope and Scale of the Project and Develop a Project Schedule

Having identified the expectations from the BPR project along with the objectives the company wants to achieve with it , the next step is defining the scope and context of the project which is supposed to be consistent with these objectives and expectations.

If a company –wide performance improvement is aimed then the scope and context of the BPR project must encompass the core processes that delivers value to target markets customers and stakeholders.

In addition to that, team members should get together and set a project schedule which includes the duration time and also elaborates what will be done in each step of the project.

7. Designate the Processes to be Reengineered

At this step; dependent on the set BPR objectives and scope of the BPR Project, the processes which need to be reengineered should be identified and prioritized in terms of redesign urgency and their contribution to these BPR objectives.

Among these process alternatives the most significant processes are selected for redesign and “To-be” process models are developed.

8. Analysis and Understanding of Current Processes

Even though some practitioners and researchers allege that the analysis of existing processes may undermine the creativity and imagination of team members on reengineering, it is momentous to understand the existing processes; process works flows fully and explicitly and identify non-value adding activities, bottlenecks and flaws in these processes before reengineering. Doing so, will enable that the problems in existing processes are not repeated in new processes.

9. Design the New Processes

Having selected the processes to be reengineered and developped the feasible “to-be “process models, the next step is the redesign of these selected processes.

While executing the redesign effort it is important to take into account the needs and recommendations of customers in target markets, suppliers or even logistics companies that the company may regularly work with. It should also not be forgotten that the overriding factor the company must consider while conducting the redesign effort, is fulfilling the needs and requirements of the customers and target markets more efficiently and effectively than its rivals.

10. Take Advantage of IT

Information technology, as generally considered to be an enabler of business process reengineering sometimes may not be congruent to the current infrastructure of the company and must be altered in order to suit the newly designed processes.

That's why IT elements needed to assist redesigned processes along with the requirements vital for the smooth transition from existing processes to new processes should be identified.

11. Include Collaborators such as Suppliers and Freight Forwarders in the Reengineering Initiative

As it has been witnessed in the reengineering initiatives carried out in SMS, cooperation with suppliers and even logistics companies while conducting BPR creates a collaborative atmosphere and ensures long term business relationships based on mutual trust which will be profitable and beneficial for both sides.

12. Pilot the New Processes

Before the real implementation, performing a pilot version of the new processes will be beneficial. Because doing so will help some application problems to be detected ahead and solved accordingly. The aim of the pilot implementation is to overview the design of the new processes and to identify and overcome the potential flaws that might occur in the real implementation stage.

13. Train Employees Who Have Relevance with the Redesigned Processes

As can be clearly understood from the survey application conducted on SMS employees, communicating with employees before and during the reengineering project and training employees who will be directly involved in the newly designed processes will be very useful.

At this point, the company should conduct training programs to ensure concerned employees acquire the necessary skills in order to operate the new process.

14. Implement the New Processes

At this stage, the company should make a transition plan which will enable the smooth transition from the current process to the new process. Here , deciding on the type of transition is important.

The type of transition may be a gradual transition or an overnight transition but whatever the type of transition to the new system will be it is important to select the best way of crossing for the real implementation to be successful.

15. Monitor and Improve the New Processes Constantly

Reengineering does not end with only redesigning existing business processes. Growing conditions of competition and continuously changing customer needs and requirements makes the continuous monitoring and improvement of redesigned processes compulsory for companies.

That's why the effort of reengineering should be thought as a starting point instead of an end point if the company wants to gain competitive advantage over rivals and fulfill the needs and wants of target customers more efficiently and effectively.

PART IX

CONCLUSIONS

In this thesis , today's one of the most popular change management concepts " Business Process Reengineering " has been examined from different perspectives. The BPR applications related with production, logistics and procurement in A&D and PTD business units of a multinational company (SMS Company) as well as proposes for further improvement for these applications have been presented and finally a survey has been conducted with the company employees in order to assess their perceptions on reengineering applications which have been executed in their company.

Survey results have exhibited that among 75 of employees who responded the questionnaire; most of them know what actually the term "Reengineering" is and agree with the reengineering definition that is mostly stated in the literature.

The outcomes of the research have revealed that most of the SMS employees are satisfied with reengineering implementations and find these implementations successful.

Employees perceptions towards reengineering applications executed in the company are that top management commitment and support has been provided for these applications, as a consequence of these implementations employee productivity, morale, motivation has increased, aimed objectives have been reached , and information sharing and customer satisfaction has augmented. Contrary to the expected consequences of BPR, employee empowerment has not increased and processes have not become simpler from the employees point of view.

It must also be stressed that managers' and non –manager employees 'point of view differ from each other to some extent. Managers' perceptions towards reengineering and the results of reengineering seem to be more positive compared to the perceptions of non manager employees.

Between SMS employees who find reengineering implementations in SMS successful, most of them conceive these implementations as successful since work efficiency has increased after these implementations. Other reasons for success in reengineering implementations which have been put forward by employees are need analysis, innovation, customer orientation, plan, report and control, accurate change management, top management's support, information sharing and use of IT, communication with employees before and during the reengineering implementation, involving employees into the change management process and good results that have come up with reengineering projects.

However, among SMS employees who find reengineering implementations in SMS unsuccessful, most of them think that the reason of failure in these implementations is the fact that as a consequence of BPR implementations they are not empowered enough and their role in decision making mechanism is still limited. Other reasons that have been broached by employees as lack of success in reengineering projects are insufficient planning for BPR, slow implementation, flaws that have come up with new programs or systems, not involving employees in the change management process adequately, not sufficiently using IT, not considering the needs of other departments and lack of team working.

From the outlook of the thesis, key success factors of reengineering which have found out to be the most important ones are top management commitment and support, communication with employees, team working, and the composition of a suitable reengineering team and information technology from the employees' point of view.

Other success factors which have been brought up by employees are increase in work efficiency , experienced and specialized employees themselves, planning and resources , process analysis , innovative structure which gives importance to fresh and creative ideas, cost, speed and time factors , use of proper methods and tools ,customer orientation, control and continuous improvement of processes.

Among the four success factors of reengineering which has indicated in the survey "Communication with Employees" is the overriding success factor of reengineering in SMS from employees point of view." Top Management Commitment and Support", on the other hand, comes the second whereas "IT" takes the third place in terms of importance from employees' point of view. "Customer Orientation" seems to take the last place according to the survey results.

When the importance given by SMS to above mentioned success factors of BPR is analyzed it is seen that "Top Management Commitment and Support" is given the utmost importance as a success factor of reengineering in SMS while "Communication with Employees" takes the second place and "IT" takes the third one in terms of importance from employees' point of view. "Customer Orientation" seems to take the last place according to the figures obtained from the survey results.

In addition to the above mentioned findings, BPR projects which have been carried out in procurement, logistics and production divisions proved the importance of IT once more in supporting BPR.

The projects have also revealed that IT is the key enabler together with organizational enablers. Organizational enablers such as team working and empowerment are as important as IT in the success of BPR initiatives. However, survey results exhibited that empowerment is not sufficiently executed in SMS from the employees' point of view which may require top management to focus on this issue more in the near future.

PART X

DISCUSSIONS AND EVALUATIONS

Even though it is being discussed whether BPR in reality is a management fad or not and is being approached with a critical attitude by some researchers and practitioners, BPR is an effective management approach adopted and applied widely by companies and can have very successful results if implemented properly. When we have a look at the BPR applications of companies we see that some of them failed to be successful or could not achieve the targeted business results because of improper implementations. That's why the important point that I have to highlight here is that BPR is not a simple approach to attain and it can be a congruent solution for a company only if it is implemented successfully and ambitiously.

Besides proper and careful implementation, there are also some other factors that play a significant role in the success of BPR projects. As also revealed by survey results obtained from the A&D and PTD business units of a multinational electronics and electrical equipment company , "Top Management's Commitment and Support" is one of these important success factors in reengineering projects. If top management does not provide strong and consistent support in terms of money, resources, or leadership over the life of the project, this weakens the BPR projects chance for success. Top management should also ensure constant control over the BPR projects to monitor how things are actually proceeding and to take action before any difficulty arises.

The survey results also showed that "Communication with Employees" is another success factor which is as crucial as "Top Management Commitment and Support".

Expressing the need for change and benefits that will be gained through reengineering before the implementation of reengineering project, helps employees have a thorough knowledge of the project, comprehend the necessity of change and as a result diminishes the resistance likely to come from employees.

During the implementation stage of the BPR project, communication between employees who take part in the reengineering projects as well as the ones who do not take part in these projects but who will be directly or indirectly affected by the reengineering implementations is also important. For instance, the reengineering project may take the production department in but the procurement department may also be affected by the consequences of this project. In this condition, like employees who participate in the project and who work in production, employees working in procurement should also be aware of every detail, progress and results of the project in order to ensure mutual understanding and to improve collaboration and decision-making.

The "Reengineering Team Composition and Team Working" is also vital for the success of BPR applications. The reengineering team should be well organized and combine a mix of people and skills. The team must also include people who are knowledgeable about the current process as well as people who are unfamiliar with the process and aim to bring a fresh look to the team, people who actively use these process and know every detail, people who have enough technical knowledge and who are open minded, imaginative and work well together. In addition, I must underline that team working and team spirit must be generated not only in the reengineering team but also across the whole company. By this way, employees can act towards the same direction to attain common objectives.

As also supported by the survey results another important success factor of reengineering is "IT". IT is a major enabler and an essential element of most BPR projects and can give companies a competitive advantage by improving their competitive position. At this point, it must be underlined that in order to reap the benefits of IT; the building of appropriate IT infrastructure and proper implementation is important. Because if IT infrastructure is inappropriately built and implemented; it can create barriers to responding to the rapidly changing business environment. That's why companies should be aware of current technologies necessary for redesigning business processes and information needs of these processes to ensure that suitable IT platform and IT components are selected and built.

“Customer Orientation” is also crucial for the success of reengineering initiatives. Since being customer oriented constitutes the essence of almost every company policy, it is inevitable for companies’ reengineering efforts to aim at markets. That’s why every reengineering effort should be directed to fulfill the needs and wants of customers in target markets.

In addition to the above mentioned success factors, for BPR projects to be successful it is also important that they are conducted in accordance with the company’s overall strategy. If BPR projects and the company strategy do not complement each other, it is only possible to achieve short-term performance gains rather than long term performance improvements. That’s why companies should thrive to ensure the harmony between BPR efforts and the company’s strategy.

As survey results also indicated , BPR projects also entail the good analysis of the current state and needs of the company and consequently identifying whether a need for change is really essential or not. Having identified the necessity for change, process or processes that needs to be altered should be identified. Contrary to the Hammer and Champy’s approach which does not take into account the current processes while designing the new ones, I think the existing process / processes, process works flows, problems and bottlenecks associated with these processes should be analyzed well and they must be designed to bring away these problems.

My observation is that analyzing existing processes and comprehending the underlying flaws related with these processes before the redesign stage does not limit the creativeness of the reengineering team on the contrary; as my experience in SMS proves it gives an insight about what can be done for improvement.

Another point that should be underlined here is the importance of identifying the scope of the project and organizational fields that will be affected. Scrutinizing the organizational areas to be affected involves determining the needs of other organizational departments, which have direct relevance with the process that is going to be redesigned, while conducting the reengineering efforts. Since BPR necessitates having a broad perspective, implementing reengineering in one organizational area without keep count of other organizational areas will likely to produce negative results and lead to failure.

The selection of proper methods and tools is also paramount for reengineering. Here I have to state that in my opinion there is no single approach or method which is apt for all companies and can be claimed as the most acceptable. Companies should first assess their needs, the internal environment and external environment they are serving and should set an approach specific to them by combining different tools and methods.

The reengineering projects in SMS have also drawn attention to the fact that embarking on BPR initiatives without considering the suppliers and even logistics companies in some occasions, is not enough for success. Here, it must be stressed that BPR is a holistic approach and that's why should encompass the collaborators as well as the company itself and BPR projects should be realized in a cooperative way.

Another important point is that the gains any company will have with reengineering may not be actually realized in the short run, it may take some time to realize the real benefits of BPR. That's why the success of BPR projects should be assessed in terms of the benefits they ensure in the long run rather than in the small run.

If we were to discuss the survey results, the findings of the survey have elicited that most of the employees perceptions towards reengineering applications executed in the company are positive. At this point , it must be emphasized that managers' and non–manager employees' point of view differ from each other to some extent and that managers' perceptions towards reengineering and the results of reengineering seem to be more positive compared to the perceptions of non manager employees. This difference is clearly noticed in their perceptions towards employee empowerment and process simplification. Even though most employees think that processes have not become simpler and empowerment has not increased after reengineering, managers' perception towards employee empowerment and process simplification are more affirmative than non manager employees'.

In my opinion, the reason of this negative perception towards process simplification can be explained by looking at the correlation between employees' experience and the answers they have given to the question related with process simplification. When we have a look at the Correlation Analysis results we see that the more experienced the employees, the more positive perceptions they have concerning process simplification. In other words; the employees who have been working for SMS for more than 10 years think that as a result of reengineering initiatives that have been executed in SMS, processes have been simplified.

Since experienced employees know the company and the reengineering applications which have been put into practice better than employees who have been working in the company for a short period of time, they can assess these applications more accurately with an objective perspective.

In addition, because of the fact that experienced employees work for the company for a long period of time they also have the chance to evaluate the company's past and applications carried out in the past and compare them with new applications more correctly and precisely.

The negative perception towards employee empowerment, on the other hand, shows that processes are still running under the control of top management in SMS and as a consequence employees do not take part in the decision making mechanism efficiently. This may be evaluated as a lacking point of reengineering projects in SMS. That's why, in my opinion the company must attach more importance to this issue and focus its efforts to resolve this.

REFERENCES

[1] Aktan,C.: "2000'li yıllarda Yeni Yönetim Teknikleri: İnsan Mühendisliği", TÜGİAD Yayını, İstanbul ,Türkiye, **(1999)** 21-23

[2] http:// en.wikipedia.org/wiki/Business_process_reengineering (Erişim tarihi: Ocak **2006**)

[3] http://www.strassmann.com/pubs/reeng/roots.html (Erişim tarihi: Ocak **2006**)

[4] http://www.adb.gu.se/~kai/pub/thesis.pdf (Erişim tarihi: Şubat **2006**)

[5] http:// www.managingchange.com/bpr/bprcult/2bpr.htm

(Erişim tarihi:Ocak **2006**)

[6] Hammer,M.;Champy,J.: "Reengineering the Corporation - A Manifesto for Business Revolution",Harper Business, NewYork,USA, **(2001)** 35 -49

[7] Peppard,J.;Rowland,P.: "The Essence of Business Process Re-engineering" ,Prentice Hall, London, England, **(1995)** 20, 237-244

[8] Davenport,T.H.: "Process Innovatıon :Reengineering Work Through Information Technology", Ernst& Young , Boston, USA,**(1993)** 2-5

[9] Grover ,V;Malhotra ,M.K.: "Business Process Reengineering :A Tutorial on the Concept,Evolution,Method,Technology and Application",Journal of Operations Management,Columbia , USA, **(1997)** 197

[10] O' Neill,P.; S.Sohal,A.:" Business Process Reengineering - A Review of Recent Literature" , *Technovation* , **(1999)** 574

[11] Stahl, D.A.: "Reengineering: The Key to Survival and Growth under PPS", *Nursing Management*, 29 **(1998)** 14

[12] Chan,L.C; Choi,C**.:** " A Conceptual and Analytical Framework for Business Process Reengineering", *International Journal of Production Economics*, 50 **(1997)** , 212-214

[13] Wheeler,W.A.; Johansson,H.J.; McHugh ,P.;Pendlebury,A.J.: "Business Process Reengineering : Breakpoint Strategies for Market Dominance" , John Wiley & Sons Ltd., Chester **,**UK, **(1993)** 57-59

[14] Browne, J.; O'Sullivan,D.: "Reengineering the Enterprise" , Chapman & Hall , Galway, Ireland, **(1995)** 132-133

[15] http:// www.findarticles.com/p /articles/mi_m4153/is_n3_v52/ai_17178856 (Erişim tarihi: Nisan **2006**)

[16] Tsalgatidou,A.:"Methodologies for Business Process Modelling and Reengineering" , Department of Informatics and Telecommunications University of Athens, **(1995)** 6-8

[17] Vakola,M.; Rezgui,Y.: "Critique of Existing Business Process Re-engineering Methodologies- The Development and Implementation of a New Methodology ", *Business Process Management Journal*, UK,**(2000)** 244

[18] Fitzgerald,B.; Murphy,C. : "Business Process Reengineering , The Creation and Implementation of a Methodology ", *Executive Systems Research Centre*, **(1996)** 4-7

[19] Stoica,M.;Chawat,N.;Shin,N.: "An Investigation of the Methodologies of Business Process Reengineering " , *Information Systems Education Journal* , **(2004)** 6

[20] Muthu,S.;Whitman,L.;Cheraghi,H**.**: "Business Process Reengineering: A Consolidated Methodology" , *Proceedings of the 4 th Annual International Conference on Industrial Engineering Theory*, USA, **(1999)** 2-4

[21] http://www.bpmg.org (Erişim tarihi: Mayıs **2006**)

[22] Olalla ,M.F.: " Information Technology in Business Process Reengineering" ,*Forthy–Seventh International Atlantic Economic Conference* ,Vienna-Austria, **(1999)** 583

[23] http://www.dod.mil/comptroller/icenter/learn/reeng.htm
(Erişim tarihi: Mayıs **2006**)

[24] Davenport,T.H.;Short,J.E.;Ernst and Young **,** " The New Industrial Engineering :Information Technology and Business Process Redesign ", *Sloan Management Review,* **(1990)** ,12

[25] Laframboise,K.: " An Examination of the Role of Information Technology As An Enabler of Business Process Reengineering " , *MSc Thesis,*Concordia University , The Faculty of Commerce and Administration , Montreal, Quebec,Canada , **(1995)** 25

[26] La Rock,N.: "Examining the Relationship Between Business Process Reengineering and Information Technology ", *Bowie State University Research Report* ,Maryland ,USA, **(2003)** 14

[27] Jih, Wen-Jang Kenny , Owings , Patrick , " From In Search of Excellence to Business Process Reengineering : The Role of Information Technology ",*The Executive's Journal* , 11 **(1995)** 6-7

[28] Kohli,R.;Hoadley,E.: "Towards Developing a Framework for Measuring Organizational Impact of IT-Enabled BPR : Case Studies of Three Studies " *Database for Advances in Information Systems* , 37 **(2006)** 42

[29] Shoes R.A.: " Reengineering the Factory : A Primer for World-Class Manufacturing", ASQC Quality Pres, Wisconsin , USA , **(1994)** 1

[30] Love ,P.E.D.; Gunasekaran, A.: " Process reengineering: A review of enablers" , *International Journal of Production Economics,* 50 **(1997)** ,194-195

[31] Knights , D.; Willmott, H.: " The Reengineering Revolution: Critical Studies of Corporate Change", Sage Publications ,London , UK , **(2000)** 157

[32] Selladuraı ,R.: "An Organizational Profitability , Productivity , Performance (PPP) Model : Going Beyond TQM and BPR " , *Total Quality Management* , 13 **(2002)** 615

[33] http:// www.kmbook.com/bpr.htm (Erişim tarihi: Nisan **2006**)

[34] Fazel , F.: " TQM vs.BPR " , *Quality Progress Publications*, 36 **(2003)** 59-60

[35] Harvey, S.;Millett ,B.: “OD ,TQM and BPR : A Comparative Approach”, *Australian Journal of Management & Organizational Behaviour* , 2 **(1999)** ,38-39

[36] http:// www.netlib.com/bpr1.shtml (Erişim tarihi: Nisan **2006**)

[37] Huemann, M.; Keegan,A.;Turner, J.R.: “Human Resource Management in the Project– Oriented Company : A Review”, *International Journal of Project Management*, 25 **(2007)** 317

[38] Compiled by the Staff of the Institute of Industrial Engineers. : “BPR : Business Process Re-engineering Current Issues and Applications “,Inst. of Industrial Engineers, Industrial Engineering and Management Press, Norcross, Georgia, **(1993)** 26-27

[39] http://www.doc.ic.ac.uk/~nd/surprise_95/journal/vol2/tmkl/article2.html (Erişim tarihi: Haziran **2006**)

[40] http://www.bilgiyonetimi.org/cm/pages/mkl_gos.php?nt=502 (Erişim tarihi: Temmuz **2006**)

[41] http://filebox.vt.edu/users/hmeyer2/examples.html (Erişim tarihi: Haziran **2006**)

[42] http://www.usc.edu/its/doc/statistics/help/statsamples/reliability.shtml (Erişim tarihi: Nisan **2007**)

[43] Curwin,J.;Slater R.:” Quantitative Methods for Business Decisions”,Thomson Business Process,Birmingham,UK, **(1996)** 289

[44] http ://www.wvu.edu/~phsyed/sportpsych/zizzi/chi_square.pdf (Erişim tarihi: Mart **2007**)

[45] http://academic.uofs.edu/department/psych/methods/cannon99/level2b.html (Erişim tarihi: Mart **2007**)

[46] http://www.cs.uu.nl/docs/vakken/arm/SPSS/spss3.pdf (Erişim tarihi:Nisan **2007**)

APPENDIX

APPENDIX A

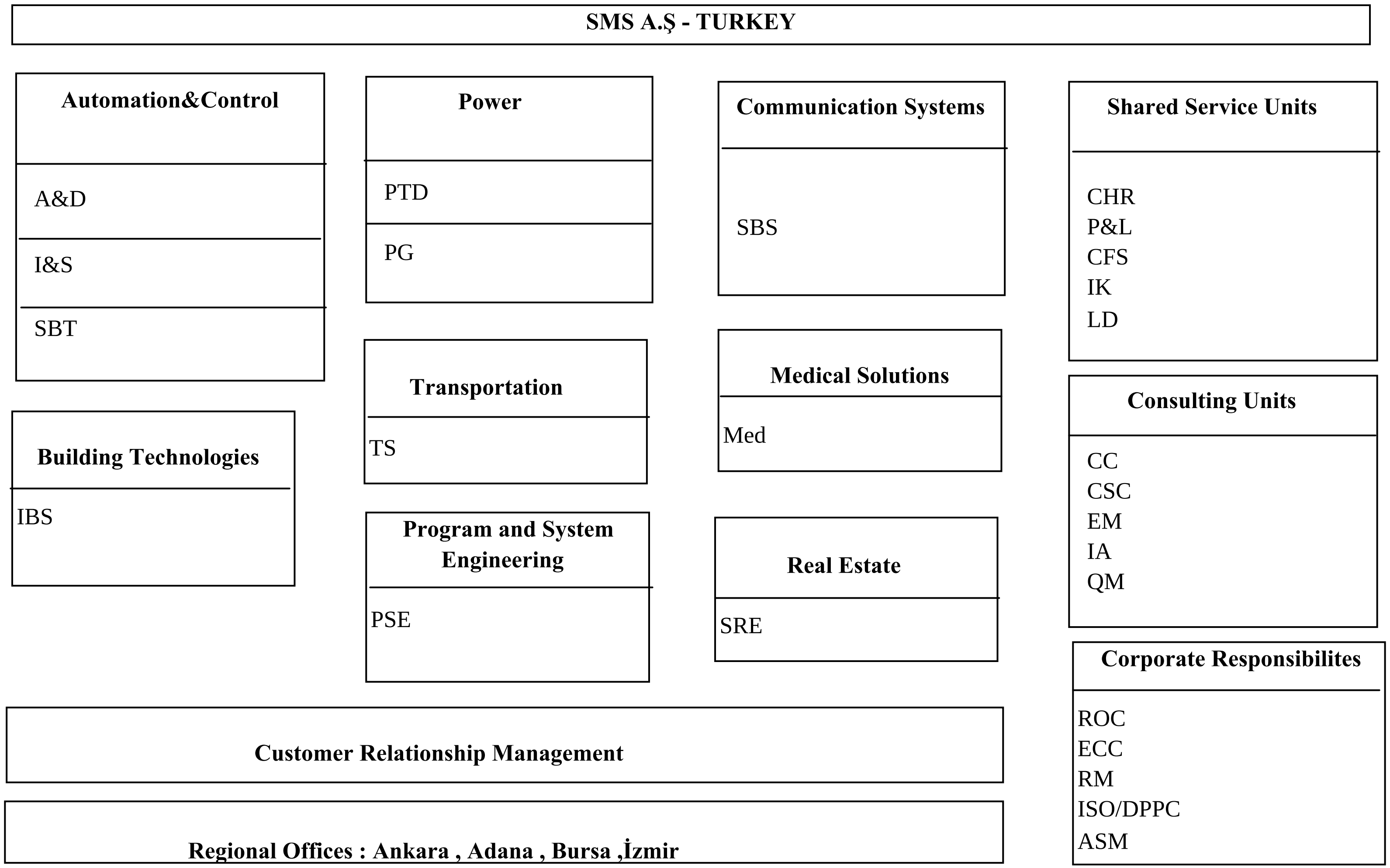


Figure A.1 Organization Chart of SMS Turkey A.Ş

APPENDIX A1

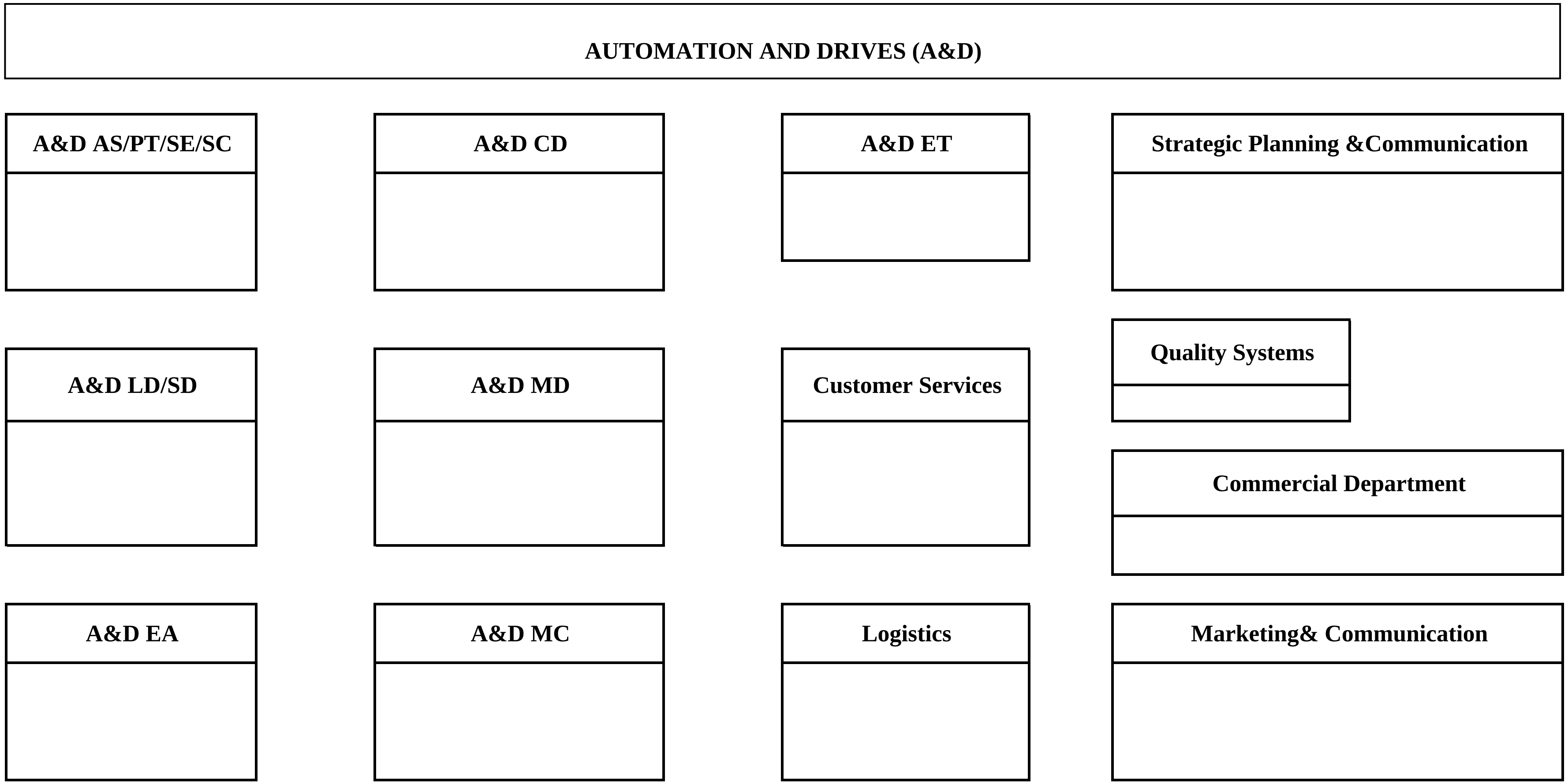


Figure A1.1 Organization Chart of SMS A&D Business Unit

APPENDIX A2

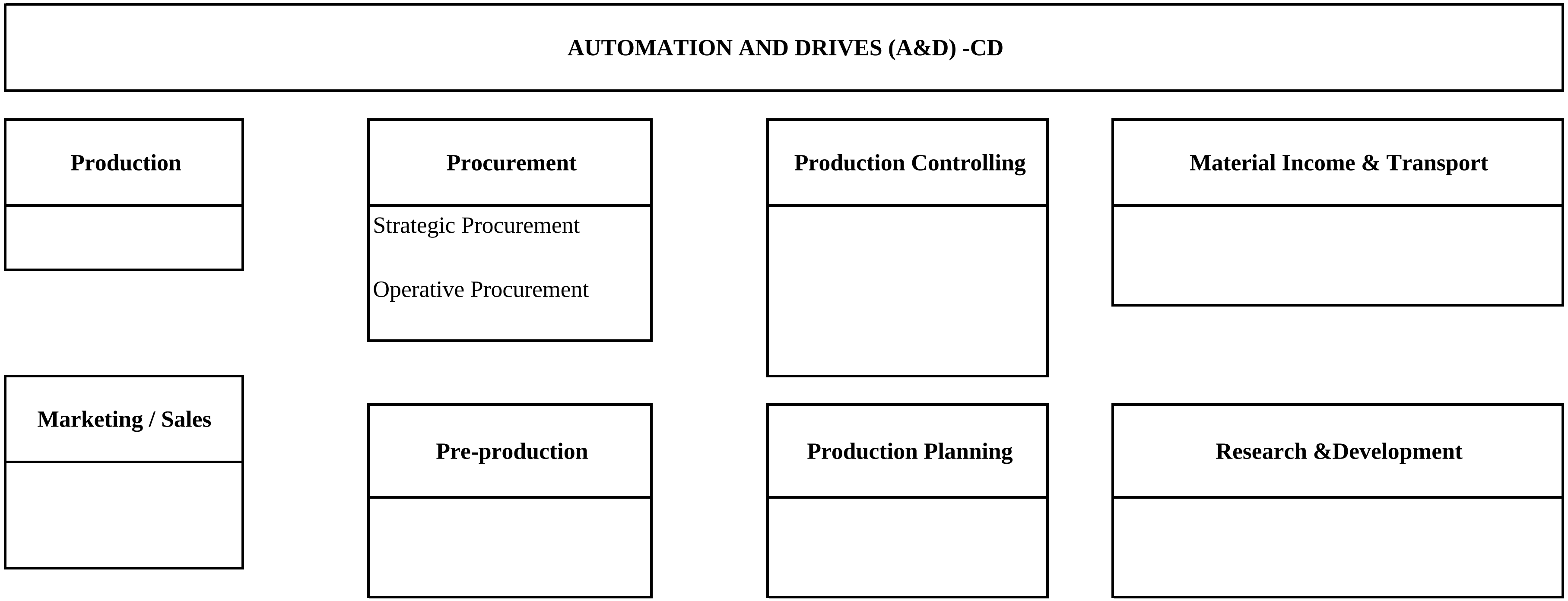


Figure A2.1 Organization Chart of SMS A&D-CD Sub Business Unit

APPENDIX A3

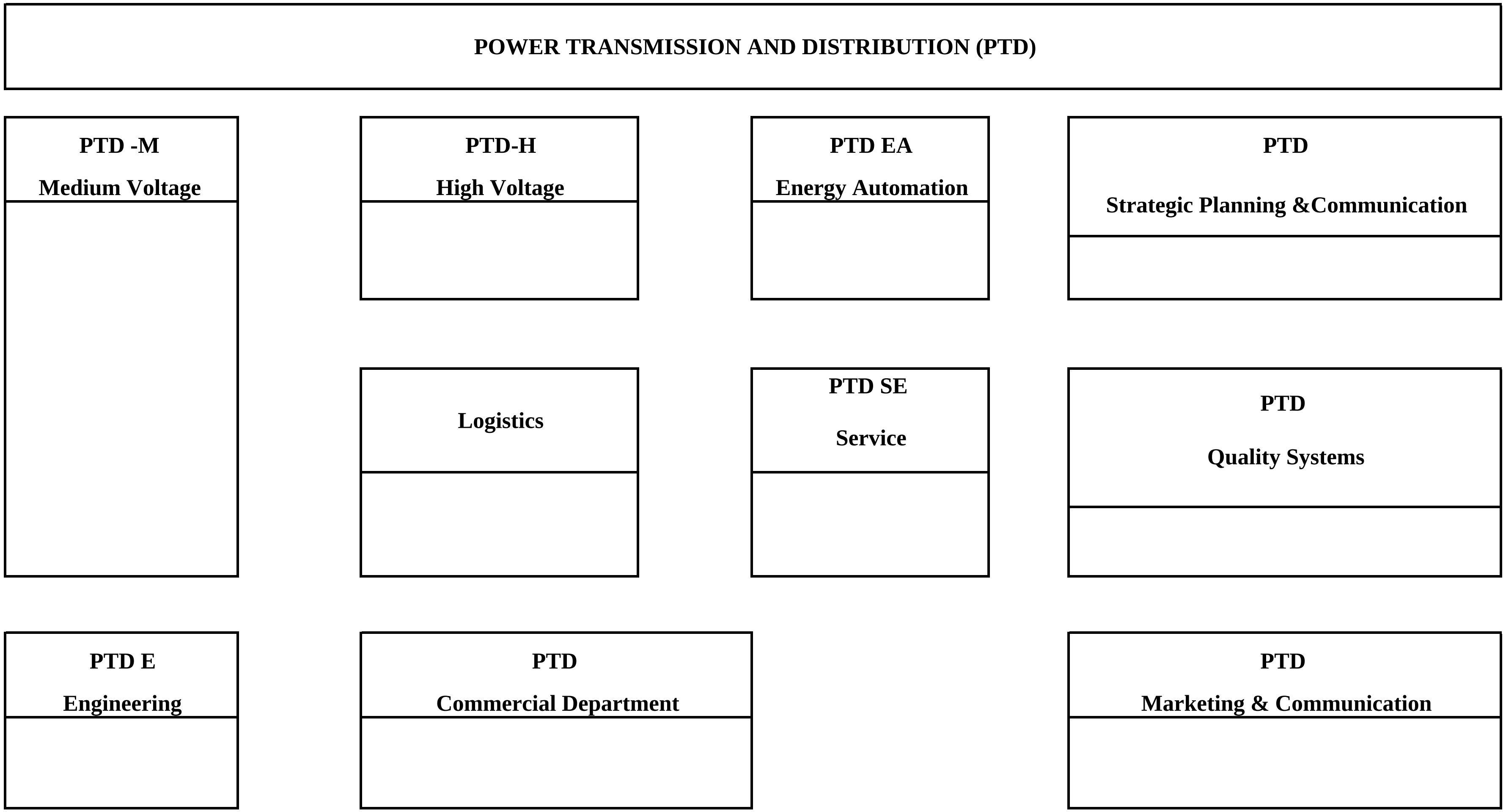


Figure A3.1 Organization Chart of SMS PTD Business Unit

APPENDIX A4

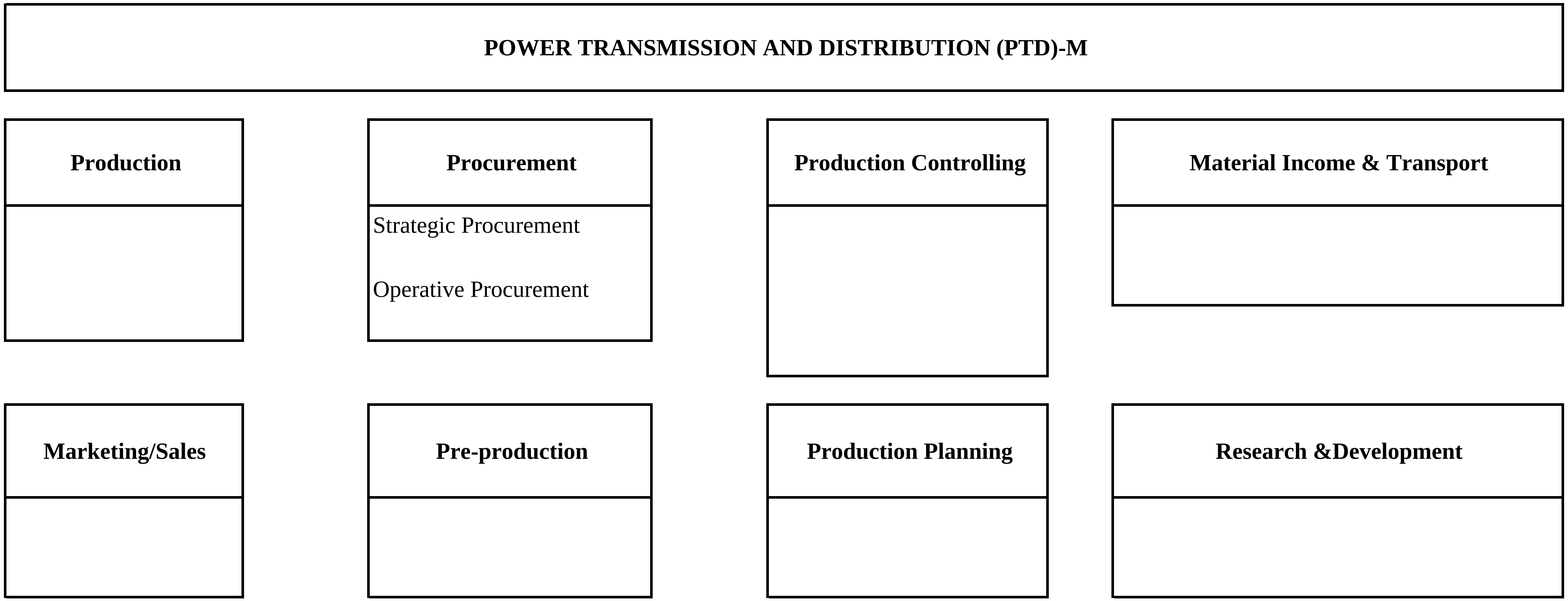


Figure A4.1 Organization Chart of SMS PTD-M Sub Business Unit

APPENDIX B

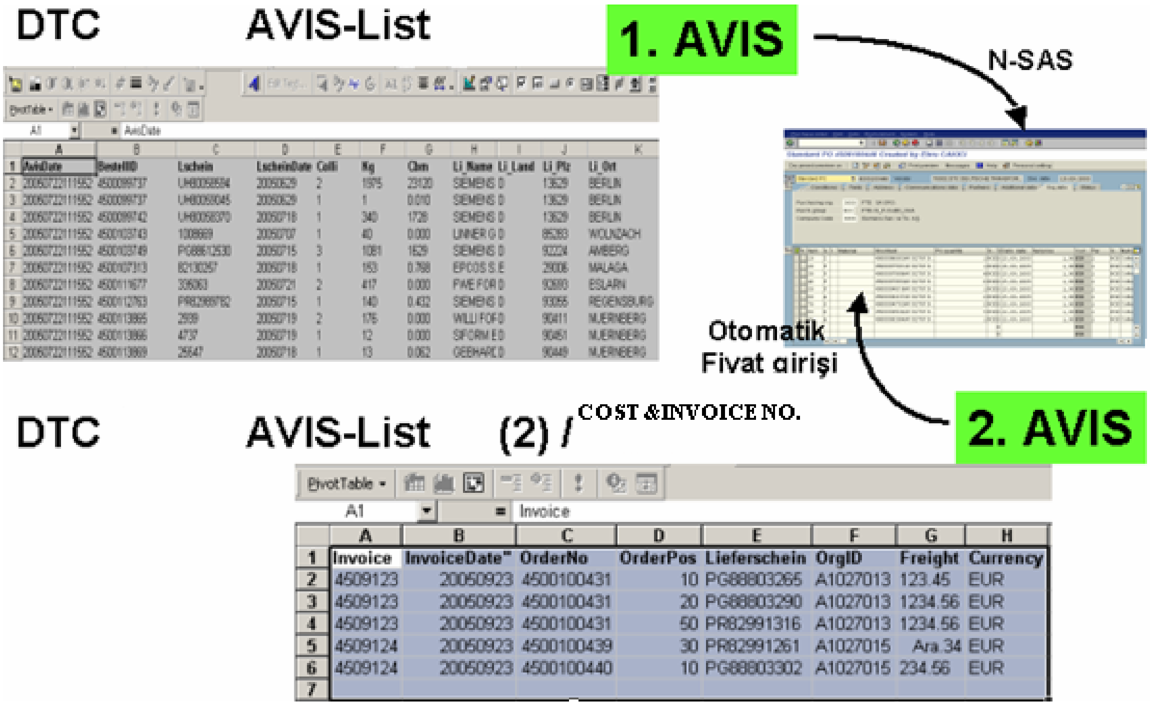
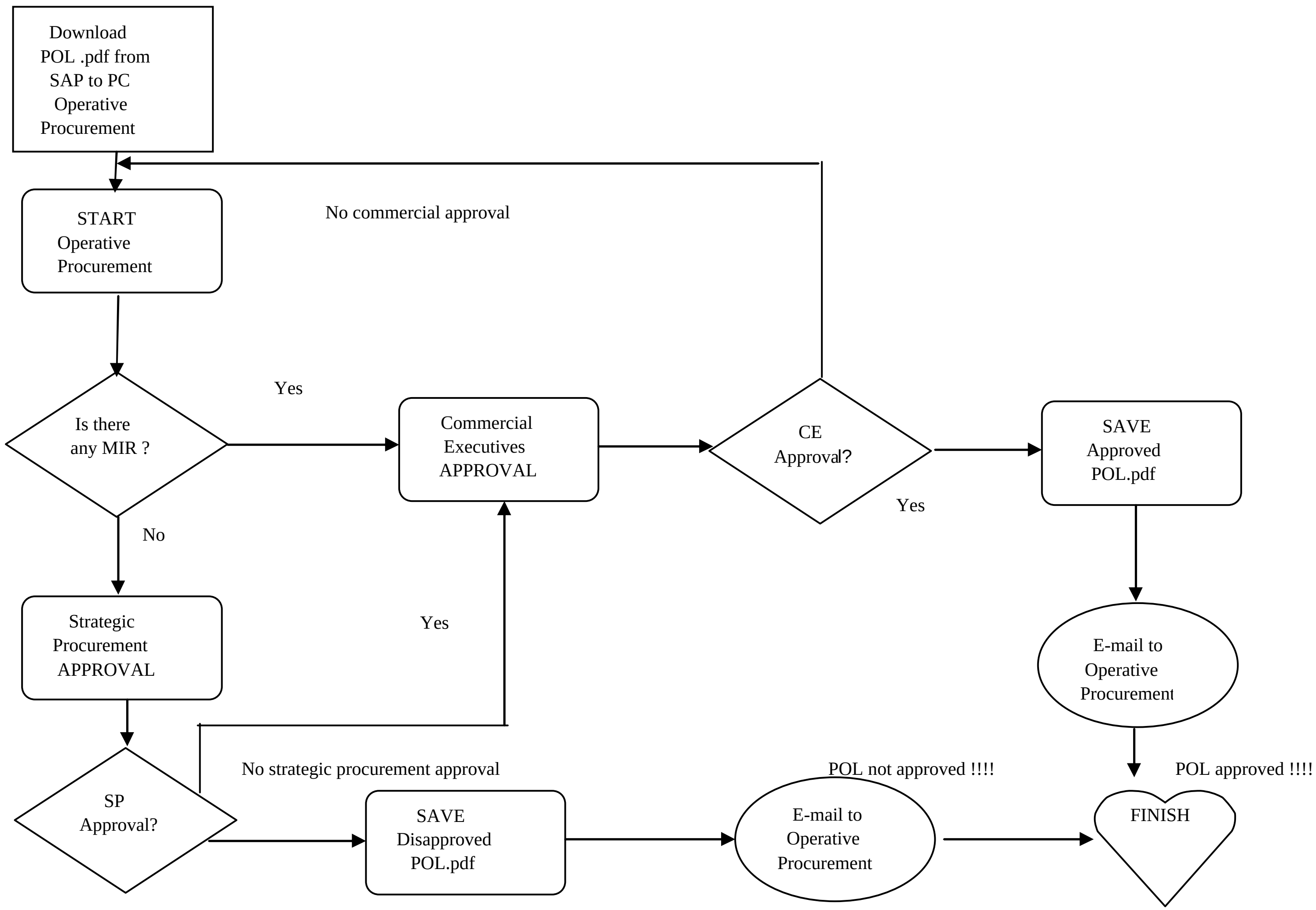


Figure B.1 AVIS 1 & AVIS 2 Lists

APPENDIX C



;ineered Order Approval Process

APPENDIX D

Survey Form

The survey form below has been prepared to be a basis for an academic research study which aims at comparing your company before and after the implementation of reengineering. Thank you for your cooperation.

Please put a cross mark next to each statement below which designates your opinions for the following questions

Beliz Özsoy

1) Your gender: 1. ☐ Male 2. ☐ Female

2) Please fill in the following section about your position

☐ Top Level Manager
☐ Middle Level Manager
☐ Non Manager Employee

3) How long have you been working for this company: ……………………. (year)

4) Do you agree with the below definition of business process reengineering?

Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical , contemporary measures of performance, such as cost, quality , service and speed.

☐ Yes
☐ No

Using the scale below please indicate how much you agree with the below statements regarding the reengineering initiatives executed in your company.

(1: Strongly Disagree…….5: Strongly Agree)

	1	2	3	4	5
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
5- Top management's commitment and support has been ensured for the implementation of reengineering initiatives.	☐	☐	☐	☐	☐
6-As a result of reengineering initiatives, workers productivity has increased.	☐	☐	☐	☐	☐
7-As a result of reengineering initiatives, workers morale levels and motivation have increased.	☐	☐	☐	☐	☐
8-As a result of reengineering initiatives, worker empowerment has been augmented.	☐	☐	☐	☐	☐
9-As a result of reengineering initiatives , aimed objectives have been accomplished.	☐	☐	☐	☐	☐
10- As a result of reengineering initiatives, processes have been simplified.	☐	☐	☐	☐	☐
11-As a result of reengineering initiatives, information sharing in the company has increased.	☐	☐	☐	☐	☐
12-As a result of reengineering initiatives, customer satisfaction level has increased.	☐	☐	☐	☐	☐

13) Please designate how successful you find the reengineering initiatives which have been carried out in your company.

(1) Very Unsuccessful	(2) Not Successful	(3) Neutral	(4) Successful	(5) Very Successful
□	□	□	□	□

If you find the reengineering initiatives that have been executed in your company unsuccessful please answer question 14, if you find the reengineering initiatives that have been executed in your company successful please answer question 15 , by skipping question 14.

14) Please indicate the reasons why you find the reengineering applications which have been carried out in your company unsuccessful.

…………………………………………………………………………………………
………

15) Please indicate the reasons why you find the reengineering applications which have been carried out in your company successful.

…………………………………………………………………………………………

16) Please indicate how much you are satisfied with the reengineering initiatives which have been put into practice in your company.

1. I am very unsatisfied □
2. I am unsatisfied □
3. I am neither unsatisfied/nor satisfied □
4. I am satisfied □
5. I am very satisfied □

17) Which factors do you think make the reengineering applications successful?

…………………………………………………………………………………………

18) Which of the below definitions you think is the appropriate definition of reengineering?

- ☐ Reengineering : Little improvements that are made in business processes
- ☐ Reengineering : Little ,cost effective improvements that are made in business processes
- ☐ Reengineering : Radical redesign of business processes to achieve dramatic improvements in performance measures such as cost, quality , service and speed.

19) In your opinion, which of these below success factors of reengineering have a significant impact on reengineering projects success ?
(Please mark only one choice which indicates your opinion)

- ☐ Top Management Commitment & Support
- ☐ Communication with Employees
- ☐ Customer Orientation
- ☐ Use of Information Technology

20) What do you think is the degree of importance of the below mentioned success factors of reengineering in the reengineering projects that have been implemented in your company?

	Extremely low (1)	**Low** (2)	**Neutral** (3)	**High** (4)	**Extremely High** (5)
Top Management Commitment & Support	☐	☐	☐	☐	☐
Communication with Employees	☐	☐	☐	☐	☐
Customer Orientation	☐	☐	☐	☐	☐
Use of Information Technology	☐	☐	☐	☐	☐

APPENDIX E

Coding Key

Each question asked in the survey is a variable which can be seen in the table below. In order to measure employees apprehensions about the ramifications that reengineering has brought, a liken scale of five points (1: Strongly Disagree- 2: Disagree-3: Neutral- 4: Agree-5: Strongly Agree) is used which is an attitude measurement technique used in research in which the respondents specify their level of agreement to a statement.

The variables that are gauged with the questions and how they are coded for the data analysis can be seen in the following table:

Variable	Description	Scale	Code
Var001	Survey no	Nominal	
Var002	Gender	Nominal	1. Male 2. Female
Var003	Position	Nominal	1. Manager 2. Non-Manager
Var004	The Employee's Experience in SMS	Ratio	1.1-10 2.11-20 3. 21-40
Var005	Definition of Reengineering	Nominal	1. Yes 2. No
Var006	Perception towards Top Management's Commitment&Support	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

Variable	Description	Scale	Code
Var007	Perception towards Efficiency Increase	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
Var008	Perception towards Moral &Motivation Increase	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
Var009	Perception towards Empowerment Increase	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
Var010	Perception towards Accomplishment of Aimed Objectives	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
Var011	Perception Towards Process Simplification	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

Variable	Description	Scale	Code
Var011	Perception Towards Information Sharing Increase	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
Var012	Perception Towards Customer Satisfaction Increase	Interval	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
Var013	Reengineering Success	Interval	1. Very Unsuccessful 2. Unsuccessful 3. Neutral 4. Successful 5. Very Successful
Var014	Reasons for Lack of Success in Reengineering Implementations	Nominal	1.Employees are not empowered enough 2. Employees do not participate in the change process enough 3. Slow Implementation 4. New program flaws 5. Insufficient planning 6. Insufficient IT 7. Not considering other departments needs 8. Lack of team working

Variable	Description	Scale	Code
Var015	Reasons for Success in Reengineering Implementations	Nominal	1.Communication with Employees 2. Increase in Efficiency 3. Employee Participation 4. Top Management Support 5. Information Sharing 6. Innovation 7. Results 8. Need Analysis 9. Customer Orientation 10. Plan, report, control 11. Change Management
Var016	Reengineering Satisfaction	Interval	1. Very Unsatisfied 2. Unsatisfied 3. Neutral 4. Satisfied 5. Very Satisfied
Var017	Success Factors in Reengineering Implementations	Nominal	1.Top Management Support 2. Employees 3. Team Working 4. Employee Communication 5. Efficiency 6. Planning 7. Customer Orientation 8. Cost,speed,time factors 9. IT 10. Process Analysis 11. Innovative Structure 12.Control and Continuous Improvement 13. Proper methods

Variable	Description	Scale	Code
Var018	Appropriate Definition of Reengineering	Nominal	1. Little improvements in business processes 2. Little cost effective improvements in business processes 3. Radical redesign of business processes
Var019	Four Success Factors of Reengineering	Nominal	1. Tom Management Commitment &Support 2. Communication with Employees 3. Customer Involvement 4. Information Technology
Var020-1	The Importance of Top Management Commitment and Support in SMS	Interval	1. Extremely low 2. Low 3. Neutral 4. High 5. Extremely High
Var020-2	The Importance of Communication with Employees in SMS	Interval	1. Extremely low 2. Low 3. Neutral 4. High
Var020-3	The Importance of Customer Orientation in SMS	Interval	1. Extremely low 2. Low 3. Neutral 4. High 5. Extremely High
Var020-4	The Importance of IT in SMS	Interval	1. Extremely low 2. Low 3. Neutral 4. High 5. Extremely High

CURRICULUM VITAE

<u>BELİZ ÖZSOY</u>

Personal İnformation

Place and Date of birth: İstanbul- 29.09.1979

Gender: Female

Nationality: TC.

Job experience

17.09.2005- ..... TEM Makina ve Dış Ticaret Ltd.Şti , Foreign Trade Specialist

Education

2004- **Master: Marmara University**

Engineering Management (English based master program)

1999-2003 **University : Yıldız Technical University**

Business Administration (GPA:3,44)

1993-1997 **High school: Haydarpaşa Super High School**

Training

2003 (1 October-1 November) **Executrain**

Position: Marketing and Sales Department Trainee

Courses and Certificates

2003 * **"Return on investment " Certificate program- Executrain**

1991-1993 * **İdem Private Language Course**

2003-2004 * **Italian Cultural Center**