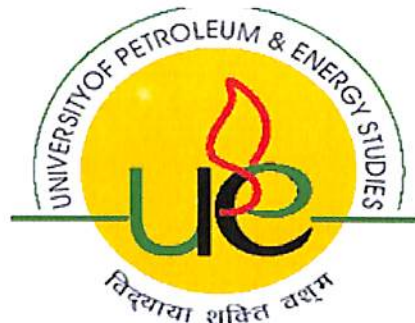# Dissertation Report
# On
# Development Of A Framework Of
# Knowledge Management For Oil and Gas Industry

**Submitted by**
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**Submitted To**
College of Engineering
University of Petroleum & Energy Studies
SCO- 9-12, Sector-14, Gurgaon, India

# BONAFIDE CERTIFICATE

This is to certify that Mr. Amit Kumar Goyal, a student of University Of Petroleum Energy Studies, Gurgaon, pursuing M.Tech (Petro-Informatics), has successfully completed dissertation work. As part of his curriculum, the dissertation report entitled, *'Development of a framework of Knowledge Management for Oil and Gas Industry'*, submitted by the student to the undersigned is an authentic record of his original work, which he has carried out under my supervision and guidance.

I wish him all the best.

Date: 14/4/08

Prof. Rajeshwari Sharma Deb

# ACKNOWLEDGEMENT

The study was realized during the fall of 2007 at University of Petroleum and Energy Studies, Gurgaon.The study basically based on *oil and gas organizations*. The essence of the study deals with how oil and gas organizations measure their readiness to adopting knowledge management .This is a topic of current interest in the management literature and its importance of it in today's business life has begun to attract major attention. I would like to thank my mentor *Prof. Rajeshwari Sharma Deb,UPES* for their support and guidance during the work.

More over I like to show appreciate to *Mr. Sujinder Singh*, Business Analyst IOCL, New Delhi for his useful help, support and guidance during this research, the man who really was my interior supervisor of this dissertation.

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Special thanks for my dear Infosys friend for making this study possible.

Finally I should thank all friends who helped me during this dissertation.

**Amit Kumar Goyal**

# ABSTRACT

Knowledge management is not something new. It is going to be something tangible and in another word there is a kind of revolution on this topic today. Nowadays all successful organizations are becoming knowledge-based and they try to have knowledge management and knowledge sharing as integral part of their attendance for achieving competitive advantage among other businesses. So many articles and retrospective theories and frameworks have been reviewed for doing this research. In this study I have tried to develop a framework for oil and gas companies, which have no knowledge management, to measure its readiness to accept knowledge management and the focus of research has been on knowledge sharing which is a key for knowledge management. The research has been done with the help of oil and gas organizations in distributing my questionnaire and also helping me in correcting and adjusting my framework, to describe and analyze how companies can understand the factors for developing and adopting knowledge management in their communities.

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## Introduction

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# 1 Introduction

*This first chapter introduces the concept of knowledge and why knowledge management is an inseparable part for oil and gas companies. It starts with a brief background addressing why knowledge is an interesting topic. After this, it moves into the definition and importance of the title of my research. This report moves into the problem definition, in which focuses on the application of knowledge, knowledge sharing and knowledge management. Then it covers the research question and research methodology. After that it will explain the background of oil and gas industry. Finally this chapter will then move to discuss the limitations of the research and after that it will describe the structure and chapters of this report.*

## 1.1 Background

In the present post industrial society, knowledge has become a key resource of the economy. Today when most of the jobs are becoming more intensive, majority of the employees are moving to knowledge intensive industries. At this century all the successful companies are information and trying to get competitive advantage from knowledge and the ways for managing it. The way organizations interpret new skills, the learning capability is becoming a key role in organizations. The presence of success is forcing organizations to become more dynamic in their operations and adopt innovative approaches to be competitive.

The discourse of knowledge management has developed during the last decade, and there are some fingerprints of knowledge management and knowledge sharing in successful companies as well as in oil and gas companies also.

There was very little activity before 1990, and in some areas almost everything dates after 1995. There is a growing recognition in the business community about the importance of knowledge as a critical resource for organizations.

The real aim of an organization is to become aware of its knowledge, individual and making itself for getting efficient use of knowledge that it has or can obtain gradually.

Managing the knowledge here does not mean as the real meaning of management which means powerful authority and control, this type of management fails with knowledge because no one can control another person's mind-where the knowledge is.

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Instead, managers must go through leadership, management, and personal behaviour, and then they must try to create and nurture a culture and an infrastructure that simulates workers to create, use and share their knowledge.

When an organization lives in an unpredictable and challenging world, it must also be a learning organization, capable and infrastructure of individuals to create and share their knowledge to achieve desired goals and objectives.

The most important part of knowledge management process with respect to trust is knowledge transfer or in better term knowledge sharing. It is frequently commented that in order for people to be willing to share their knowledge, they must have trust.

It has even been commented that, "trust is, after all, the single most important precondition for knowledge exchange".

Also, trust has been discussed as a prerequisite for tacit knowledge sharing.

Sharing knowledge and particularly, sharing of tacit knowledge is a risky behaviour, as the individual doesn't know how the knowledge will be used. Furthermore, the trustor doesn't know that the value that is associated with the knowledge will be transferred to the trustee.

Finally a key element of knowledge management is building and nurturing a knowledge sharing culture.

A number of organizations are developing knowledge sharing proficiencies as part of their recognition and reward systems. Knowledge sharing effectiveness is a critical aspect of knowledge management.

The concept within the knowledge management community is that 80% of knowledge management is people and culture, and 20% is technology that a key component of the people and culture factors deals with encouraging a knowledge sharing environment within the organization.

Some knowledge management has a maturity model in which the highest level is "Sharing".

## 1.2 Title definition and importance

Knowledge management is a process of transforming information from the knowledge based resources into usable knowledge. Organization adopts knowledge management practices as a strategy to exchange employee's knowledge within the organizations.

The implementation of knowledge management lets employees to share their best practices at work in order to increase productivity and reduce cost among all units of

organizations, also knowledge management is a way to capture what their customers demand and respond quickly on the product development.

The essential part is to make the right knowledge available to the right person at the right time.

To increase passion of enterprises to adopt KM in their organization, at the first step they should now how well knowledge is being sharing in their organizations.

And they can measure their readiness to adopt KM in their organizations. Because of this developing a framework to measure organizations readiness to adopt knowledge management in their organizations "has been chosen as my report title to put one step forward for getting more familiar with importance of knowledge sharing and its main role in knowledge management process.

## 1.3 **Problem definition**

The most successful and modern organizations are seen as knowledge-based enterprises in which knowledge management is important for competitiveness. KM can be seen as a Response to both problems and opportunities created by new ways of organizing business.

Knowledge management enables sustainable competitive advantage for organizations and influences on different parameters of the organizations.

In the organizations really they need to manage the knowledge and adopt it because:

- A high rate of competition and innovation among companies.
- Reduction in staffing creates a need to replace informal knowledge with formal methods.
- Competitive pressures reduce the size of the work force that holds valuable business knowledge.
- Retirement and mobility of the work force leads to loss of knowledge.
- Changes in strategic direction resulting in the loss of knowledge in a specific area.
- Most of their work is information based.
- Organizations are competing on the basis of knowledge.
- Products and services are endowing with a significant information component.
- The need for life-long learning is an inescapable reality.

So we can consider all of the above mentioned parts as future problems or even as existing problems in the organizations. In brief knowledge and information have become the medium in which business problems occur. Managing knowledge represents the primary opportunity for achieving substantial savings, significant improvements in human performance, and competitive advantage. It's not just a Fortune 500 business problem, small companies need formal approaches to knowledge management even more, because they don't have the market leverage, and resources that big companies do. They have to be much more flexible, more responsive, and more" right", because even small mistakes can be fatal to them.

## 1.4 Research Question

The research model is aimed at helping and building the foundation to provide answers to the following research question:

*What is the most appropriate framework for understanding factors that influence the adoption of Knowledge Management in the oil and gas industries?*

## 1.5 Research Methodology

Related to the topic, it has been done in two steps:

**A:** at the first step I had so many studies reviewied related to my topic and identifying some effective factors for sharing knowledge in the organization. I should mention because of limitation of time and such a discussable and wide title I have just concentrated on the case of KM process in the case of knowledge sharing to narrow down my research.

At the first step I used a standard questionnaire, for understanding the condition of knowledge sharing in oil and gas industry. Then by getting those collected data and analyzing them, I got that how can I help these companies to get involved in KM and implementing those special factors that will be explained in my framework to get ready for adoption of KM.

**B:** for evaluation the result of all those studies in the part A and finding the appropriate framework for knowledge sharing the Delphi model was chosen as one of my methods for this survey research .This method can be used whenever we wants to talk about one specific topic but there is a lack of knowledgeable people to discuss about ad there is a limited background about that.

At the first step I distributed one questionnaire to measure the current condition of Company and then related to its condition I have developed a framework for oil and gas industries that illustrates those factors helping it to get ready for adoption of KM.

This Descriptive Research has two parts: at the first step by reviewing different literature and getting the most appropriate questionnaire for gathering my data I got my data by distributing among 152 people, and also got my important influencing factors from literatures and developed framework, then at the second step, influences on the management of knowledge, I developed a framework. At the second step by using Delphi study, in fact, all of the influenced

factors on KM have been explored .At the second step , a conceptual framework has been developed for measurement of the organizations readiness of KM and all of the explored factors of first step have been injected to my model ,and by running Delphi model and distributing my framework among 15 people who were panel of expert ,I find the exact influenced factors and also their priority in a specific industry (Oil and Gas industry).

## 1.6 Background to Companies

### *Aricent Technologies*

Aricent is a full-service, full-spectrum communications software company. We're committed to powering communications for all of their's clients - the world's leading communications equipment manufacturers, device manufacturers and service providers. No other company offers the depth and breadth of services and products. And no other company delivers such a unique combination of innovation, excellence and results.

**From strategy to software implementation.**
They integrated services and extensive product portfolio are designed to help you solve your most complex software design and development problems.

**From handset to infrastructure**
From consumer-facing devices to the underlying infrastructure, Aricent has the software expertise you need.

**By wireless, wire line, cable, and satellite.**
Aricent software touches every point in the rapidly converging communications network.

**From complex applications to the network core.**

Aricent helps you at all layers of communication

### *Asia Consulting Group (ACG)*

Asia Consulting Group (ACG) evaluates infrastructure markets & projects on merchant principles to answer key investor & project promoter concerns:

- Will this market or project deliver the returns the client is projecting?
- Is the project viable under pure market & competition conditions?
- What are the potential investment, opportunity and competition risks?
- How realistic are the business plan & off take contracts in light of market developments?
- What will be in impact of regulatory, policy & political changes on the market & project?
- What are the client's realistic strategic & tactical options?

Asia Consulting Group (ACG) was founded in 1994 by Asian expatriate & American consultants working with top consulting firms in the United States & Europe. The academic background of ACG partners is in business, engineering, finance and law from MIT (Massachusetts Institute of Technology) and Harvard.

• Asia Consulting Group has grown to over 50 Professionals - Consultants, Analysts, Researchers and Advisors worldwide today.

• The firm was organized under the Hon. Chairmanship of Mr. S.C. Ho who is also the Chairman of CIDC (China Investment Development Corporation), YFY Group, & Taipei Business Bank. CIDC represents over $30B turnover in industrial enterprises in Asia. Mr. Ho holds an MS in Mechanical Engineering from the Wisconsin University (USA) and BS degree from National Cheng King University (ROC).

• Asia Consulting Group is a privately held firm & country directors have independent responsibility for service portfolio development to address regional & sector specific requirements of client companies.

• Asia Consulting Group has established a reputation for consulting excellence and meeting the strategy challenge in complex and evolving Asian infrastructure markets.

## Daniel Fluor Corporation

Fluor Corporation is one of the world's largest, publicly owned engineering, procurement, construction, and maintenance services companies. Over the past century, Fluor, through its operating subsidiaries, has become a trusted global business leader by providing exceptional services and technical knowledge across every phase of a project. Clients rely on Fluor to deliver world-class solutions that optimize their assets, improve their competitive position, and increase their long-term business success.

Consistently rated as one of the world's safest contractors, Fluor's primary objective is to develop, execute, and maintain capital projects on schedule, within budget, and with operational excellence. The individual and collective expertise of their's global workforce of more than 46,000 provides cost-effective, intelligent solutions in a timely manner. In addition to project offices, Fluor maintains a network of offices in more than 25 countries across 6 continents. Our outstanding dependability, expertise, and safety distinguish Fluor as the preeminent leader in the global building services marketplace.

Fluor is a FORTUNE 500 company that is ranked #1 in FORTUNE magazine's "Engineering, Construction" category of America's largest corporations. Fluor has been consistently listed among the top five companies in that same category on FORTUNE's annual survey of America's Most Admired Companies and is also the only U.S.-based company in that category on FORTUNEs Global Most Admired Companies list. ENR (Engineering News-Record) magazine ranks Fluor #1 on its Top 100 Contractors by New Contracts list and #2 on its Top 400 Contractors and Top 100 Design-Build Firms lists. This recognition emphasizes Fluor's ability to successfully execute large, financially complex projects around the globe.

Fluor serves clients in a wide variety of traditional and evolving industries worldwide, including chemicals and petrochemicals; commercial and institutional; government services; healthcare; life sciences; manufacturing; microelectronics; mining; oil and gas; power; telecommunications; and transportation infrastructure.

## Indian Oil Corporation Limited

Indian Oil Corporation Ltd. is currently India's largest company by sales with a turnover of Rs. 220,779 crore (US $51 billion), the highest-ever for an Indian company, and profits of Rs. 7499 crore (US $1.73 billion) for fiscal 2006. Indian Oil is also the highest ranked Indian company in the prestigious Fortune 'Global 500' listing, having moved up 18 places to the 135th position this year based on fiscal 2006 performance. It is also the 20th largest petroleum company in the world.

In this section you can peruse through the profile and spread of Indian Oil across the country & abroad. You can also know about Indian Oil's current financial performance, special initiatives and causes along with the prestigious recognitions & awards that has come its way for exceptional performances.

## *Indian Oil Tanking Limited*

INDIAN Oil tanking Ltd (IOTL), a 50:50 joint venture between Indian Oil and Oil tanking GmbH of Germany, is setting up a Rs 600-crore terminal facility for crude oil and refined petroleum products in South India.

The project will support the proposed six million tonne refinery of Nagarjuna Oil Corporation at Cuddalore, Tamil Nadu, in which IOTL will have a minority stake.

While not confirming the location of the facility, sources said that the board of IOTL had already approved the project and is awaiting the financial closure of the refinery, which is expected shortly.

The sources said that the company would set up single buoy mooring facility for unloading crude oil, and a marketing terminal for the refined product. The project is expected to boost IOTL's turnover to well beyond Rs 500 crore, and provide a major impetus to bottom line growth, likely to be between Rs 30 and Rs 50 crore.

IOTL registered a net profit of Rs 14 crore on a turnover of Rs 273 crore in the last fiscal. The group turnover, which includes contributions from Stewarts & Lloyds and Zuari Indian Oil tanking (ZIOL), is Rs 338 crore.

The company had acquired 55 per cent stake in S&L in December 2004. ZIOL, a JV with Zuari Industries, offers terminalling services to oil marketing companies in Goa. Overall, the IOTL group offers its services from 14 locations in the country including Mumbai and Chennai (LPG).

Apart from terminalling facilities, IOTL has an engineering procurement and construction division, which is currently executing orders worth Rs 500 crore in the traditional areas of terminal facility or tankage and also in fields such as piping, crude oil dehydration plant, gas station construction and so on.

With investments pouring into sectors such as power, metal, oil and natural gas, and also infrastructure development, the company is expecting further growth in EPC business in the future.

While terminalling services will continue, the company is now striving to strengthen its engineering and equipment manufacturing capacities.

## 1.7 Structure and chapters of research

After the introduction chapter, in chapter two I have the Literature review chapter

which starts with an introduction for knowledge management an organizational knowledge and also knowledge sharing existed frameworks for knowledge management?

In chapter three I have explained my research methodology and the validity and reliability of questionnaire.

In chapter four there is analyzing of the all gathered data and doing different tests to get the real result of presented hypotheses and all asked main options.

In chapter five I have talked about the finding items and also there is recommendation for oil and gas industry to get the most appropriate factors to adopt knowledge management within its organization, and also I have presented my framework for KM adoption in organizations.

Chapter six which has named Reflection includes the learnt points of doing this research and passion of re-doing this research.

# Chapter-2

## Literature Review

> ➤ **Introduction of Knowledge Management**
> ➤ **Knowledge Sharing**
> ➤ **Knowledge Conversion and Transformation**
> ➤ **Information and Knowledge Value**
> ➤ **Framework for knowledge Management**
> ➤ **Issues of Knowledge Sharing in Managing Knowledge**

## 2 Literature Review

*This chapter will bring up the relevant literature and theories needed to find answers and connect to our research questions. First a presentation of key concepts is made so that it becomes easier to understand the research area.*

*Then, I look deeper in knowledge management key which is knowledge sharing and all literatures insisting on influencing factors on knowledge sharing and then I move into presented frameworks in this area.*

## 2.1 Introduction of knowledge management

Idea of knowledge management (KM) has created considerable interest .It has drowns managers, consultants, economists, and business school academics into an unusual interaction .This may be because it helps managers 'earlier interest in core competencies, their communication, and their transfer .There is also awareness of knowledge as an important economic asset, and of the special problems of managing such assets.

Knowledge management may help pull together ideas about corporate culture, networking and social capital. Knowledge management is a systematic process of creating, maintaining and nurturing an organization to make the best use of its individual and collective knowledge to achieve the corporate mission.

Broadly viewed as sustainable competitive advantage or achieving high performance. The main aim for an organization is to become aware of its knowledge, individually and collectively, and to shape itself so that it makes the most effective and efficient use of the knowledge it has or can obtain. Management here does not mean control in the sense of strong authority and direction.

This style of management fails with knowledge because no one can control another person's mind, where the knowledge is. Instead managers must first set examples through leadership, management, and personal behaviour .Then they must strive to create and nurture a culture and an infrastructure that stimulates workers to create use and share their knowledge and that also supports their freedom to act effectively over a broad range of situations.

When an organization lives in a challenging world ,it must also be a learning organization ,capable of handling change, uncertainty ,and complexity .That is the culture and infrastructure must be such that individuals and groups of individuals can and will continuously question their belief s in order to create and apply their new knowledge to achieve desired goals and objectives.

### 2.1.1 Definition of knowledge management

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Management is concerned with the entire process of discovery and creation of knowledge, dissemination of knowledge, and the utilization of knowledge then we are strongly driven to accept that knowledge management is much more than a "technology thing" and that elements of it exist in each of our jobs.

Knowledge management is the management of the organization towards the continuous renewal of the organizational knowledge base , this means creation of supportive organizational structures, facilitation of organizational members, putting IT-instruments with emphasis on teamwork and diffusion of knowledge (as e.g. groupware) into place. There are many definitions of KM. In the table 2.1 a few definitions have been mentioned.

| KM Source | Definition of Knowledge Management |
|---|---|
| **Thomas Bertels 1996** | The management of the organization towards the continuous renewal of the organization knowledge base , this means creation of supportive organizational structures, facilitation of organization members, putting IT – instruments with emphasis on teamwork and diffusion of knowledge (as e.g. groupware) into place. |
| **Denham Grey** | An audit of "intellectual assets" that highlights unique sources, critical functions, and potential bottlenecks, which hinders knowledge flows to the point of use. It protects intellectual assets from decay, seeks opportunities to enhance decisions, services and products through adding intelligence, increasing value and providing flexibility. |
| **J. Hibbard** | Knowledge Management is a process of locating, organizing, and using the collective information and expertise within an organization, whether it resides on paper, or in the minds of people, and distributing it wherever it benefits most. |
| **Brain Newman** | Knowledge Management is the collection of processes that govern the creation, dissemination, and utilization of knowledge. |
| **Karl-Eric Sveiby** | The art of creating value from an organization's intangible assets. |
| **Karl Wiig 2004** | Focusing on determining, organizing, directing, facilitating, and monitoring knowledge-related practices and activities required to achieve the desired business strategies and objectives. |

*Table2.1: Some Definitions of Knowledge Management*

So, knowledge management (KM) a set of management activities aimed at designing and influencing processes of knowledge creation and integration including processes of sharing knowledge ,has emerged as one of the most influential new organizational practices.

## 2.1.2 Necessity of adoption of knowledge management in organizations

Corporate sectors adopt KM practices as a strategy to exchange employee's knowledge and inherit institutional memories¨ within the organizations. The implementation of KM allows employees to share their best practices at work in order to enhance productivity and reduce cost among all units of the organization.

In addition, KM is a way to capture what their customers demand and respond quickly on the product development. The essence is to make the right knowledge available to the right person at the right time.

Recent years have seen an explosive increase of interest in KM. As well as a massive outpouring of books and articles on KM, many organizations have embarked upon their own KM Programs. As a result of though competition in the market place and the shift from a resource-based economy to a knowledge based economy, organizations are looking it gains competitive advantage through managing and maximizing their most valuable asset-knowledge. And nowadays modern organizations are increasingly seen as knowledge –based enterprises in which proactive knowledge management is important for competitiveness .For increasing passion of the enterprises to adopt knowledge management in their organizations , at the first they should be convinced with benefits of KM.

We view agility in organizations not as a goal or a strategy, but rather as a fundamental existence necessity. Organizations have always had to be sufficiently agile to adjust to their changing environment or cease to exist. The only reason agility is being discussed in recent years is because the environment is changing faster than it used to, and faster than most organizations are capable of matching. This is a new and unfamiliar business situation, and poses a threat to organizational viability.

Interestingly, this observation about agility not really being a new thing is similar to what many are beginning to say about knowledge management. In neither case is it that we are rediscovering something we forgot; but rather that the old mechanisms which have been there all the time are no longer adequate in the way they are being practiced

We can consider the necessity of this asset with these points that:

The early focus of KM is strengthening operations by improving knowledge and its availability. The emerging focus of it is making the enterprise more competitive from strategic perspectives.

"To survive and prosper, you need to innovate faster than your competitors– It is not enough to learn faster" It is necessary for organizations to adopt it, because it improves effectiveness of personal actions at work and at home, and also it strengthens enterprise behaviours to:

- Increase value to customers.
- Provide strong competitive position for customers.
- Improve stockholder's relations.
- Capability to be responsible societal citizen.

KM provides opportunities for people and organizations to make more effective and knowledgeable decisions.

Knowledge management is significant for all big and small businesses because it provides:

### *In personal part:*

- Improved earnings potentials
- More effective personal decision making
- Raised quality of life.

### *In Industrial part:*

- Greater competitive effectiveness
- Better products and services
- Beneficial for customers and consumers.

### *In Societal Part:*

- Increased progress from better educated citizenry
- Improved social and economic environments
- More desirable society

Some other necessities that should be mentioned here are:

- Marketplaces are increasingly competitive and the rate of innovation is rising.
- Reductions in staffing create a need to replace informal knowledge with formal methods.
- Competitive pressures reduce the size of the work force that holds valuable business knowledge.
- The amount of time available to experience and acquire knowledge has diminished.
- Early retirement and increasing mobility of the work force lead to loss of knowledge.
- There is a need to manage increasing as small operating companies are trans national sourcing operations.
- Changes in strategic direction may result in the loss of knowledge in a specific area.
- Most of our work is information based.
- Organizations compete on the basis of knowledge.

- Products and services are increasingly complex, endowing them with a significant information component.
- The need for life-long learning is an inescapable reality.

## 2.1.3 Differences of knowledge-based organizations with other organizations

Many current top organizations have made significant changes in the way they do business in the past decade and have been able to create performance through change management and deliberately develop fundamental characteristics needed for success.

These characteristics must provide those responses necessary to excel in today's environment. The use of simulation, integrated product terms, and world wide subject matter experts operating virtually have been instrumental in bringing new knowledge and ideas together to rapidly produce product desired by a sophisticated and demanding market. Examples of these capabilities are:

1- Mass customization where economic order quantities of one are being pursued.

2- Agility, the ability of an organization to move rapidly in response to changing and unique customer needs. Creativity and innovation have come to the forefront as key success factors with organizations striving to develop and unleash these capacities throughout their workforce, using a combination of management, workers customers, and the ability to pull collaborative teams together.

Examples are Wal-Mart, Hewlett-Packard, IBM, Texas Instruments, Motorola, and the Chaparral Steel Company.

These world-class organizational structures have moved significantly away from bureaucratic decision making, and have modified their hierarchies to include team based organizations and horizontal structures.

These organizations encourage cross-communication by all employees, supported by technology such as e-mail and groupware (Coleman, 1997), and reward employees who play a strong role in influencing organizational direction and decision making.

These same organizations, working predominantly in the fast-moving world of information and knowledge application, recognize the value of decisions made at the lowest qualified level and the payoff from smart workers who know their jobs. However for employees at all levels to use their knowledge to make effective decisions, they must understand the context within which those decisions are made.

This context is provided through shared vision, clear values, and strong organizational direction and purpose, combined with open communication. "Smart companies put significant effort into transferring their vision, purpose, and goals to all employees. Good employee decision making stems from understanding their work in terms of its impact on

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adjacent areas of the organization, as well as its direct impact on the customer. This requires effective empowerment and systems thinking and customer orientation and focus".

Some characteristics of knowledge-based organizations can be considered as followings:

- "Be well prepared" which include acquiring knowledge continuously from all available resources and building it into an integrated picture , bringing together seemingly unrelated information to create new and unusual perspectives and to understand the surrounding world.

- "provide excellent outcome oriented thinking" which means to be continuously innovative and creative and use all relevant knowledge. It also includes reframing problems and utilizing different perspectives for their solutions, understanding situations beyond their appearances, and discriminating and characterizing as an aid to problem solving.

- "choose appropriate postures" includes adopting suitable behaviour in a given situation and anticipating future changes, putting effort in proportion to the situation's importance ,and coordinating all relevant parties to build consensus.

- "Make outstanding decisions" which consists of identifying objectives, considering alternatives and consequences, setting priorities, an selecting the best alternative. Intelligent behaviour of subsystems within a knowledge-based organization can best be seen in the effective use of teams.

Learning and knowledge will have become two of the three most important emergent characteristics of the future world-class organization. Learning will be continuous and widespread, utilizing mentoring, classroom, and distance learning and will likely be self-managed with strong infrastructure support. The creation, storage, transfer, and application of knowledge (and perhaps wisdom) will have been refined and developed such that it becomes a major resource of the organization as it satisfies customers and adapts to environmental competitive forces and opportunities.

The third characteristic of knowledge-based organizations will be that of organizational intelligence, and intelligent behaviour described as:

"Be well prepared, provide excellent outcome oriented thinking, choose appropriate rural flint and now one morning and a key For the 79, from one folder with the nineteen date, none of the common man postures, and make outstanding decisions".

## 2.1.4 Advantages of Knowledge Management

- Nowadays all successful organizations are achieving knowledge management advantages as a competitive advantage for having added value among their competitors .Knowledge management advantages can be described as following:
- Increase utilization and management of corporate knowledge assets for maximum return.
- A central knowledge repository links with information and data.
- Improve accessibility and information sharing between employees and also it allows accuracy in locating and transferring tacit and explicit knowledge, speeding access and simplifying retrieval and transfer.
- Reduce time on information gathering.
- Reuse information rather than reinventing the wheel.
- Gain a competitive advantage.
- Improve services and turn-around.
- Capture knowledge to share.
- Deal with industry changes.
- Improve business processes.
- Remove activities with no value.
- Minimize loss of intellectual property.
- Increase customer satisfaction and loyalty.
- Decrease support costs.
- Learning what we know to sell it.
- Learning how to manage the knowledge.
- Idea creation
- Sharing of tasks and roles.
- Determining best practices.
- Greater and easier access to knowledge.
- Increasing knowledge sharing and creating.
- Knowledgeable people motivate to use their knowledge.
- Lower operating costs and fewer.
- Sense that everyone is contributing Sense that everyone is contributing.
- Change cultures to share cultures to share knowledge.
- Better understand trends understand trends.
- Increase productivity and Increase productivity and Innovation.
- Make rapid and accurate decisions rapid and accurate decisions.

## 2.1.5 History of Creation of Knowledge Management

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The idea of knowledge management has arrived very recently; indeed, as Davenport and Prusak (2000) comment, it was still in its infancy only in 1998. Thus, we are not able to see a linear development over time in this area; development has been rapid and chaotic, even though it is still possible to discern some decisive factors.

To some extent," knowledge management has gained academic legitimacy on the back of Nonaka's work, but the driving force in the corporate world has come from major consultancy companies seeking to capitalize on the enormous potential of information technology in a period following disenchantment with the methods and prescriptions of re-engineering".

The idea is pretty simple, since it starts with the neo-economic view of the strategic value of organizational knowledge and then uses familiar IT software such as databases and electronic conferencing to facilitate the acquisition, sharing, storage, retrieval, and utilization of knowledge. As such, the conceptual logic follows the technical view of organizational learning as expounded by Huber and colleagues.

### 2.1.6 Knowledge Management Concepts and principles

Knowledge Management is about applying the collective knowledge of the entire workforce to achieve specific organizational goals. It is about facilitating the process by which knowledge is created, shared and utilized. Knowledge is defined as "the fact or condition of knowing something with a considerable degree of familiarity through experience, association or contact.

Effective organizational knowledge creation best occurs through the spiral process where knowledge is converted from tacit to explicit in a continuous and dynamic cycle.
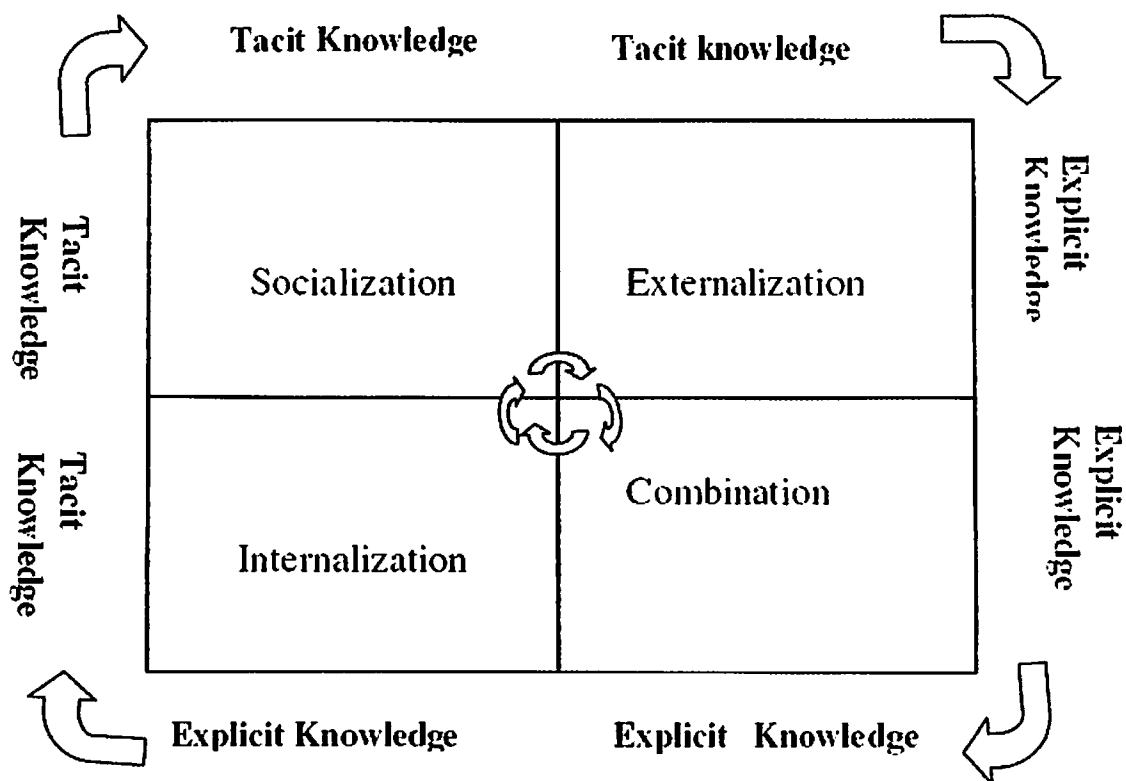
*Figure 2.1: The Knowledge-Creating Company:*

As illustrated in Figure 2.1 it is when tacit knowledge and explicit knowledge interact that innovation occurs. Knowledge creation is facilitated by deliberately managing the cycle. Organizational knowledge creation begins with socialization, where individuals share experience and mental models. It develops into externalization when individuals use metaphors or analogies to articulate hidden tacit knowledge that is otherwise difficult to communicate. It moves into the combination phase for knowledge to be articulated, shared and expounded. Finally, individuals learn by doing and internalizing the new knowledge. The spiral begins again as the experience-based operational knowledge learned in the first cycle provides a larger knowledge base for continuous innovation and growth. It is this model that demonstrates how knowledge comes into action.

## 2.2 Knowledge Sharing

The mantra within the knowledge management community is that 80% of knowledge management is people and culture, and 20% is technology. A key Component of the people and culture factors deals with encouraging a knowledge sharing environment within the organization.

Kochikar has developed a knowledge management maturity model in which the highest level is "Sharing". This level involves reaching the institutionalization of a culture of sharing, whereby sharing becomes second nature to all. Organizational boundaries are rendered irrelevant, and knowledge flow frictionless.

Knowledge sharing has become a cornerstone in many top companies .Xerox's reputation has been built on a strong knowledge sharing culture. Xerox's Eureka system contains many thousands of tips to help repair technicians worldwide who repair copiers at clients' sites.

At Xerox, Knowledge sharing has become part of a fabric inside the company for all employees. Dow Corning has created clubs to promote research and development interaction for knowledge sharing purposes. Many organizations like American Management Systems have created Corporate Knowledge Centers in core competency areas to encourage online communities of practice for increased knowledge sharing.

Lockheed-Martin applies Knowledge sharing by matching the type of knowledge with the right transfer method.

Knowledge is not always easy to share, sometimes it is inaccessible. According to the Delphi Group, a study of more than 700 US companies showed that the majority of corporate knowledge is in employees' brains which present a challenge in trying to share this knowledge.

About 12% of the corporate knowledge was in electronic knowledge bases, 42% in employees' brains, 26% in paper documents, and 20% in electronic documents.

In order to elicit and represent the knowledge in people's heads in a formal way, the knowledge acquisition bottleneck plays a critical role.

The knowledge engineering paradox states that the more expert an individual, the more complied is his/her knowledge ,and the harder it is to extract this knowledge .This makes knowledge sharing a challenging task, but an organization can promote and nurture its knowledge sharing culture by instilling knowledge sharing measures within a motivate and reward structure within an organization.

Several organizations already have developed knowledge sharing proficiencies in order to further encourage the use of knowledge sharing within the organization and externally to the organization's customers.

The World Bank has learning and knowledge sharing criteria as part of their employees' annual job performance review. Arthur Anderson once had six levels of knowledge sharing proficiencies, and in order to be promoted ,one needed to reach at least level five .American Management Systems evaluates employees partly on how well they

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contribute to the organization's knowledge repositories and what is the value-added benefit derived from applying knowledge from these repositories.

British Petroleum Consulting has similar measures for knowledge sharing as part of their employee's performance review.

In order to leverage employee know-how ,Organizations have found that developing knowledge sharing proficiencies for the organization and incorporating these proficiencies as part of the employee's annual appraisal seems to be a necessary step in helping to build and jump-start a knowledge sharing culture. As the knowledge sharing process becomes institutionalized over time, the culture for knowledge sharing will become a natural occurrence in the organization.

### 2.2.1 Tacit Knowledge Sharing

Sharing tacit knowledge requires individuals to share their personal beliefs about a situation. At that point, justification becomes public. Each individual is faced with the tremendous challenge of justifying his or her true beliefs in front of others, and it is this need for justification and human connectedness that makes the sharing of tacit knowledge a highly fragile process.

The sharing of tacit knowledge among individuals with different backgrounds, perspectives, and motivations is a critical step for organizational knowledge creation. The individuals' emotions, feelings, and mental models have to be shared to build mutual trust. To enable that sharing .we need an arena in which individuals can interact with each other through face-to-face dialogues. It is here that they share experiences and synchronize their bodily and mental rhythms. The mind of the organization is created as individuals interact and trigger behaviour patterns with each other. Therefore, the enlarged knowledge, described in the section above, will not come to the organization's favour unless it is articulated and shared throughout the organization by social interactions. Pascarella also states that when people share knowledge, the group's effectiveness and productivity increase. Furthermore, within a team the individuals get an opportunity to exchange information and experiences that may facilitate knowledge creation.

Brown asserts that one thing to do in order to create profit from the intellectual capital in the organization is to create a cross section-team of workers and managers. This team will have far more insight than any single one person will. Drew agrees that new knowledge must be shared within a network, typically involving customers and suppliers. However, Drew (1996) suggests that one also has to be aware of the added risk in loss of control and potential competitive advantage in doing so.

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The key in order to acquire tacit knowledge is experience .Without personal experience it is almost impossible to share other individual's thinking processes. An important fact is that tacit knowledge can be acquired without a common language, but through observations, imitation and practice. In the organization is often interconnected with culture.

## 2.2.2 Difficulties of sharing tacit knowledge

Herrgard argues that difficulties of sharing tacit knowledge mainly can be related to perceptions and language, but also to time, value, and distance. Limited accommodation and threat to self-image are individual barriers to knowledge creation.

Perception and language are considered the main difficulties in sharing tacit knowledge. Tacit knowledge is so internalized that it has become a natural part of our behaviour and thinking. As most of our tacit knowledge is part of our unconsciousness, we seldom are aware of its full range, and therefore experience problems when trying to share and express what we do not know we know.

Further, as tacit knowledge is held in a nonverbal form, we experience difficulties when trying to share it with others through words, either written or orally. Herrgard also points out difficulties when a novice is learning from an expert. An expert often uses a terminology that a novice never has been exposed .Sharing knowledge is based on a common mental grid, and if individuals do not understand each other, they can not share tacit knowledge.

Distance raised difficulties when attempting to share tacit knowledge .any multilocation, virtual, and global organizations experience problems with sharing tacit knowledge .This is because the most common form of sharing tacit knowledge is through face-to-face interaction. Even through a great deal of communication happens through modern information technology, face-to-face interaction is preferred when building a trustworthy relationship. Treat to self-image is something embedded in all of us, Krogh in argue that many companies find it difficult to overcome this knowledge sharing barrier. what we know and how that effects what we do-is often at the root of personal identity. Because knowledge is so intimately tied to self-image, people may resist sharing what they know. This often takes two forms: we resist sharing knowledge that only we possess so we do not make ourselves less valuable to the company, and we resist sharing our thoughts, beliefs, and ideas if it involves potentially making fools of ourselves. Therefore, a culture that values sharing and is open for new ideas, no matter how wrong they may seem, is a knowledge-sharing culture.

### 2.2.3 Knowledge sharing proficiencies

A knowledge sharing proficiency is an attribute that allows the creation of knowledge to take place through an exchange of ideas, expressed either verbally or in some codified way.

Some organizations like Johnson & Johnson and The World Bank have knowledge fairs geared to promoting an increase in knowledge sharing and generating new colleague-to colleague relationships for better transfer of tacit knowledge (ibid).

A number of organizations have already created knowledge sharing as a guiding principle for the organization. For example, the Public Service Commission in Canada has "Knowledge, Information, and Data Should Be Shared" as one of their four guiding principles. Specifically, they indicate:

- Sharing will be rewarded. We will create an environment where people feel free to contribute what they know and to seek out knowledge from colleagues (ibid).

- Performance evaluations should be linked to how well a person contributes to generating, assessing, and transferring knowledge (ibid).

- Knowledge will be available to all employees except where there is a demonstrated need for confidentiality or protection of privacy (ibid).

- Our knowledge will be shared to support collaboration with other federal government departments, other levels of government, and our other partners (ibid).

- We will establish processes and tools to enable us to capture and share our knowledge in order to support collaboration (ibid).

## 2.3 Knowledge Conversion and Transformation

In the organizational context, personal (individual) knowledge and organizational knowledge are created, manipulated, transformed and used in decision making. Personal knowledge is used for personal decision making whereas organizational knowledge is utilized in organization wide decision making. Personal knowledge is always tied to personal action and personal valuation while organizational knowledge is tied to organizational valuation. Perhaps the best-known concept within knowledge management is the distinction between tacit and explicit knowledge.

Tacit knowledge is something implicit and ambiguous, intertwined with our personal values, beliefs, intentions, working manners, etc. Although dichotomized, there is a continuum between these two extremes and much of knowledge lies between the two ends. Possibly, at least a part of tacit knowledge can be converted to explicit knowledge,

which is a necessary condition for organizational knowledge creation. Although 'all knowing is personal knowing', all knowledge is not necessarily personal knowledge. Creating collective knowledge by mobilizing the knowledge of individuals is the key challenge of organizational knowledge management. The challenge is to build, combine and integrate the knowledge assets of many thousands of individuals.

## 2.4 Information and knowledge value

According to Emery (1969), information gains its value from the effect it has on the behaviour of the organization. In order for new information to have value it must fulfills the following three conditions:

1. It must affect the existing analogue representation of the real world contained in the data base;

2. Any change in the representation must then affect the decisions made as a function of the data base;

3. An increase must occur in the utility derived as a result of changed decisions. Information thus has value only if it changes the organization's formal view of the world, if decisions are sensitive to such a change, and if utility is sensitive to difference in decisions. Thus, the information is valued through decisions. We must note that this definition of information value is not limited by any means to the financial value of the decisions. Emery's definition of information value is closely related to the theory of information richness.

According to this theory, information richness is defined as the ability of information to change understanding within a given time interval. It is also generally assumed that knowledge makes a difference to individuals' actions.

In their definition of knowledge, Davenport suggests that knowledge "is a high value form of information that is ready to apply to decisions and actions". From the decision-making perspective, knowledge is the understanding the decision maker / makers have in the decision context.

Thus, knowledge obtains value, economic or otherwise, only through successful decision making. Knowledge is instrumentalized through decisions. Because the origin of knowledge is tied to the actions taken, the nature of the actions also defines the contents of knowledge.

According to the teleological conceptualization of action, the central concept of any action is the decision taken among alternative courses of action in order to attain the desired end.

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## 2.5 Frameworks for knowledge management

The utility of a framework is that it describes a phenomenon in the form of key factors, constructs, or variables and their relationships. The framework might be considered as an early point or area on the research continuum. It provides the basis for further research that can become more and more rigorous as methodologies become more sophisticated. A comprehensive framework allows an organization to gain perspective as well as provides focus to improve effectiveness. There have been several efforts at developing frameworks to understand knowledge management (KM) phenomena.

These frameworks can be broadly classified into two categories: descriptive frameworks and prescriptive frameworks. The descriptive frameworks attempt to characterize the nature of KM phenomena, whereas prescriptive frameworks prescribe methodologies to follow in conducting knowledge management.

Descriptive frameworks can be further classified into broad and specific categories. A broad framework is one that attempts to describe the whole of KM phenomena. A specific framework focuses on a particular aspect of this phenomenon.

### 2.5.1 Model of Organizational Knowledge Management

Arthur Andersen and APQC (1996) have advanced a model comprised of seven KM processes that can operate on an organization's knowledge. As illustrated in Figure 3.3, these processes can be create, identify, collect, adapt, organize, apply, and share. The nature of organizational knowledge that they process is not characterized in this model.

Nor does it characterize the nature of the processes themselves. The model identifies four organizational enablers that facilitate the workings of the KM processes: leadership, measurement, culture, and technology. The model does not detail the nature of the enablers

Knowledge management influences identified in this framework are:

- Culture
- Leadership
- Measurement
- Technology

## 2.5.2 Framework of Intangible Assets

Sveiby (1997) frames the notion of organizational knowledge as intangible assets. As depicted in Figure2.2, the framework is comprised of three components: external structures, internal structures, and employee competence. External structures include customer and supplier relationships, brand names, trademarks, and the company's reputation or image. Internal structures include patents, concepts, models, computer and administrative systems, and organizational culture. Employee competence consists of skills and knowledge bases of individuals within an organization. Employees use their skills and knowledge base to act in a wide variety of situations in order to create tangible or intangible assets. When the employees' competencies are directed toward entities
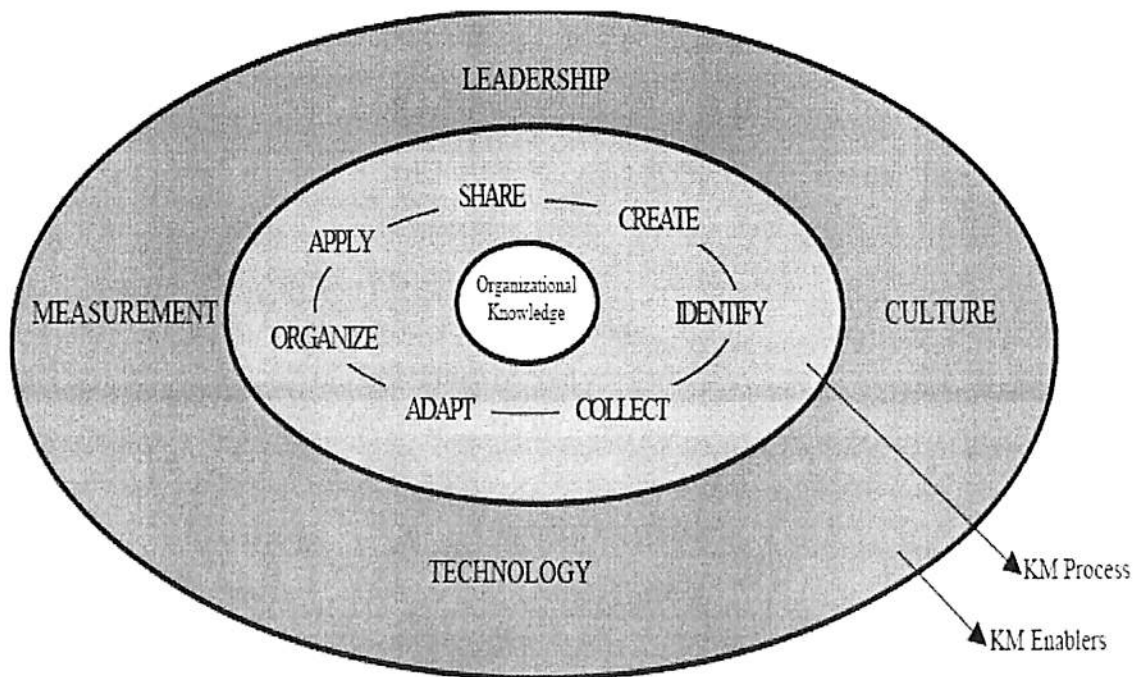


*Figure2.2: Organizational Knowledge Management Model.*

outside of the organization, then they are considered to yield external structures; if those efforts are directed inward, then they are considered to create internal structures.

| INTANGIBLE ASSETS | | |
|---|---|---|
| EXTERNAL STRUCTURE | INTERNAL STRUCTURES | EMPLOYEE COMPETENCE |
| (brands, customer and supplier relationships) | (The organization: management, legal structure, manual systems, attitudes, R&D, software | (Education, experience) |
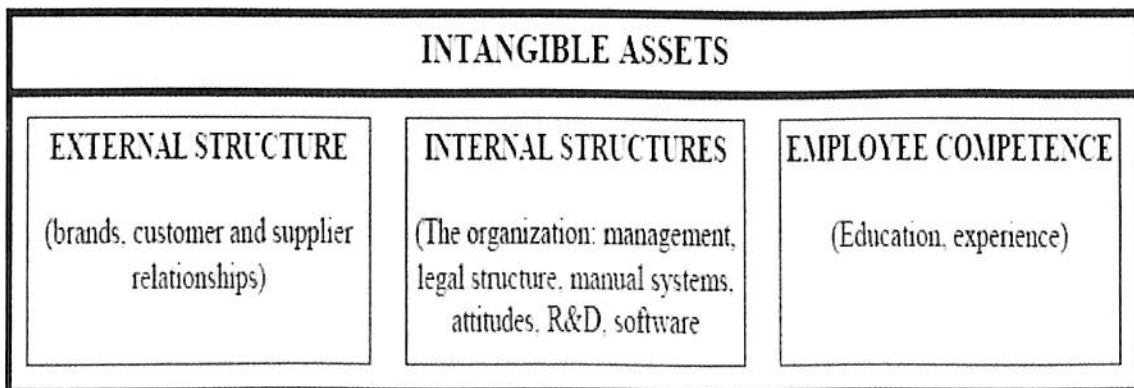
*Figure 2.3: Intangible Asset Framework*

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### 2.5.3 Model of Intellectual Capital

Petrash (1996) has advanced a model involving three types of organizational resources that are referred to as intellectual capital: human capital, organizational capital, and customer capital. Human capital is the knowledge that each individual has and generates.

Organizational capital is the knowledge that has been captured or institutionalized as the structure, process, and culture of an organization. Customer capital "is the perception of value obtained by a customer from doing business with a supplier of goods and/or services".

As illustrated in Figure 2.54, this model recognizes that relationships among the three major types of intellectual capital lead to financial outcomes (i.e., value). The dotted lines represent the management of intellectual assets. Maximizing the interrelationships among the three kinds intellectual capital increases the organization's "value creating" space. In Figure2.54, this is illustrated by creating maximum overlap among the three rings of capital. As explained Knowledge resources identified in this framework are:

- . Human capital
- Organizational capital
- Customer capital
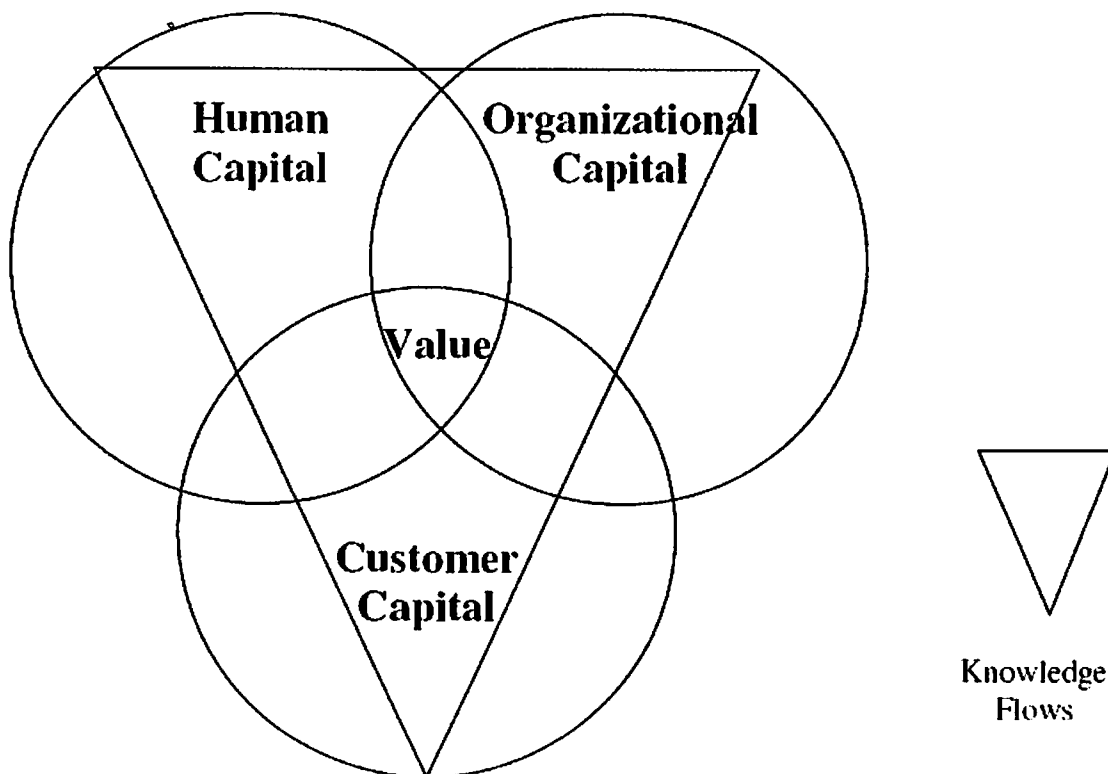


*Figure 2.4: Intellectual Capital Model*

## 2.5.4 A Three Folds Framework: Knowledge Management Influences



E : Environmental Influences

M: Managerial Influences

R: Resource Influences
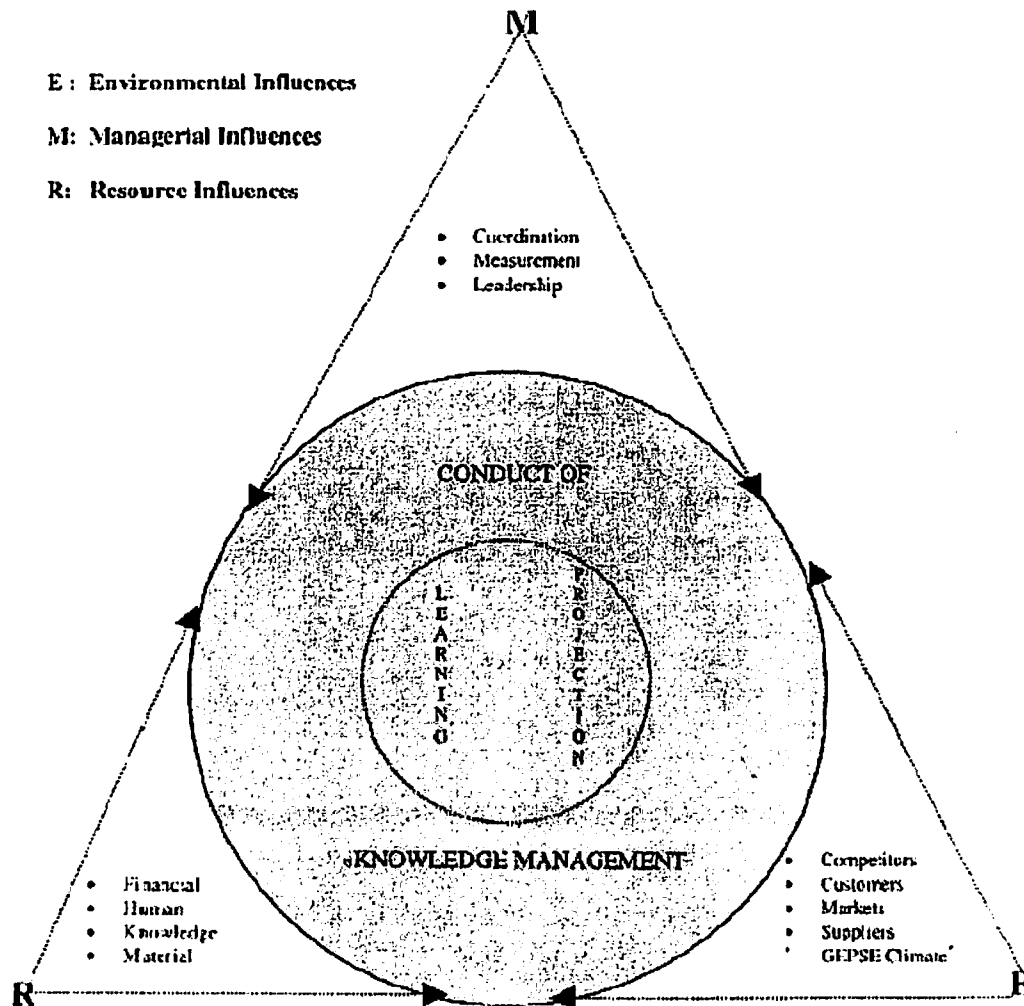
*Figure 2.5 Knowledge management influences*

**Resource influences:**

Both knowledge resources and other resources *affect* the way in which KM is conducted in an organization. Financial resources could put a ceiling on the capital expended on knowledge manipulation activities. Similarly, participants' knowledge manipulation skills (e.g., human resources) both constrain and facilitate knowledge manipulation activities.

Each of these types of knowledge resources influences the conduct of KM in an organization. That is, the knowledge an organization has influences the nature and outcome of its knowledge work. For instance, Kodak's culture has valued chemical engineering knowledge related to film design more than the mechanical engineering associated with equipment design (Leonard-Barton, 1995). Similarly, KM conduct is influenced by infrastructure, strategy, purpose, knowledge artefacts, and available

participant knowledge. Also in his research on investigation of factors that affecting the management of knowledge in organizations implies that:

*Resource influences should include:*

- IT
- Customers

### Managerial Influences:

The conduct of KM is affected not only by the existence of various resources, but also by the deployment of these resources. Here is where managerial influences on KM conduct come into play. Such influences govern the state of an organization's knowledge resources and the use of knowledge manipulation skills in performing the activities in Figure 2.

As indicated in Figure 2.5, managerial influences on the conduct of KM include the factors of leadership, coordination, and measurement.

### Leadership:

Leadership has been recognized as a factor influencing the conduct of .The characteristics of leaders range from being manipulators of culture to architects and catalysts. In writing about leadership, Mort Meyerson, CEO for Perot Systems, says "the way to be a leader today is different" as leaders can no longer function as sole decision makers the way they could 15 years ago at EDS when competition was stable. Meyerson states that the essence of leadership today is to make sure that an organization knows itself. In today's knowledge based economy a successful leader will be one who can effectively manage both organizational knowledge resources and associated knowledge manipulation skills.

He or she creates conditions that allow participants to readily exercise and cultivate their knowledge manipulation skills, to contribute their own individual knowledge resources to the organization's pool of participant knowledge, and to have easy access to relevant knowledge resources. A study conducted by Andersen and APQC revealed that one crucial reason why organizations are unable to effectively leverage knowledge is because of a "lack of commitment of top leadership to sharing organizational knowledge or there are too few role models who exhibit the desired behaviour" .

### Coordination

Coordination refers to managing dependencies among activities. It aims to harmonize activities in an organization by ensuring that proper resources are brought into play at

appropriate times and that they adequately relate to each other during the conduct of activities.

In the conduct of KM, dependencies that need to be managed include those among knowledge resources (e.g., alignment of participants' knowledge with strategy, diffusion of knowledge among participants), those among *Measurement*. Another managerial influence on the conduct of KM is the installation of mechanisms for measuring knowledge resources, knowledge manipulation skills and activities, and the results of KM in terms of organizational learning and projection. Such measurement becomes a basis for evaluation of leadership, coordination, and resources. It can indicate where adjustments in these may be needed.

## Control

Control is concerned with ensuring that needed knowledge resources and processors are available in sufficient quality and quantity, subject to required security. Two critical issues here are protection of and quality of knowledge resources, unauthorized modification, and erroneous assimilation is crucial for the effective management of knowledge.

In establishing sufficient controls to govern the quality of knowledge used in an organization, management needs to consider two dimensions: knowledge validity and knowledge utility.

## Measurement

Another managerial influence on the conduct of KM is the installation of mechanisms for measuring knowledge resources, knowledge manipulation skills and activities, and the results of KM in terms of organizational learning and projection. Such measurement becomes a basis for evaluation of leadership, coordination, and resources. It can indicate where adjustments in these may be needed. It may help evaluate the impact of an organization's KM on bottom-line performance.

Interestingly, this is an under-implemented area.

The feasibility of measuring knowledge resources or processes and linking them to financial results is not only difficult but also controversial. There exist two schools of thought: One believes knowledge assets and processes can be measured, and the other contends "you're a fool if you buy into this". Whatever the case, the framework in Figure 2.5 posits that the conduct of

KM is influenced by

(1) whether an organization attempts to measure its knowledge resources and/or performance of its knowledge manipulation activities,

(2) how it goes about measuring these, and

(3) how effective the measures are. In the research on investigation of factors that affecting the management of knowledge in organizations implies that:

*Management influences should include:*

- Quality
- Communication
- Education
- Deployment
- Organizational planning
- Strategy and objective setting
- Training
- Communication
- Internal marketing
- Reward factors
- Organizational structure factors

**Environmental Influences:**

Aside from internal factors (resource and managerial influences), entities outside an organization also affect its conduct of KM. The environment determines or constrains what knowledge resources should or can be acquired, as well as what the knowledge manipulation skills are available (via a labor pool or available technology). As Figure 2.5 illustrates, external influences include such factors as competition, customers, markets, suppliers, and the GEPSE (governmental, economic, political, social, and educational) climate. Examples of these are many, varied, and largely self-evident. Detailed investigations of these are warranted. In this research, investigation of factors that affecting the management of knowledge in organizations implies that:

*Environment influences should include:*

- Products
- Services
- Customers
- Suppliers

Also, imply that the role of individual learning ,knowledge results in the competency to perform:

- Organizational culture
- Knowledge infrastructure

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- Capability and competency
- Ability to deal with change
- Global cultures
- Technology push
- Competition
- Inter-organizational culture

In this their research, the investigation of factors affecting knowledge management in organizations developed a framework for this reason which identifies leadership and culture as influencing factors on knowledge management.

## 2.6 Issues of knowledge sharing in managing knowledge

I developed issues of knowledge sharing by three main options influences, which are management, resource, and environment. Managerial influence consists of leadership, control, coordination and measurement.

### 2.6.1 Managerial influences

*Leadership:*

It is concerned with building a trusting environment conducive to sharing knowledge.

*Coordination:*

It is concerned with developing and integrating reward and incentive systems that encourage knowledge sharing, as well as scheduling knowledge flows. *Control:*

It is concerned with governing the content and channels of sharing for instance in this case it should be clarified that what can and cannot be shared and with whom it can be shared, ensuring that knowledge is shared, is of adequate quality and that sharing is not counterproductive, for instance sharing of knowledge that may sabotage new initiatives.

*Measurement:*

It can aim at assessing and evaluating the knowledge sharing process.

If sharing is linked to reward systems:

How can sufficient credit are given to individuals/teams for sharing?

What type of knowledge sharing is entitled for reward?

How can we measure what and how much is shared and its impacts on organizational performance?

### 2.6.2 Resource influences

Human participants' personal beliefs and experiences may affect their approaches to sharing.

How can computer systems be employed to facilitate sharing?

An organization's culture knowledge resource will have a major impact on creating and maintaining a knowledge sharing environment. Infrastructure may dictate the channels of communications and sharing.

Artefacts (such as office facilities and libraries) may affect knowledge sharing.

### 2.6.3 Environment influences

Technology advances may affect the modes and channels of sharing. It can Create means to break knowledge-sharing barriers such as geographically dispersed locations. Government regulation can inhibit knowledge sharing. Actions of a competitor can dampen knowledge sharing.

# Chapter-3

## Research Methodology

- ➢ Research Purpose
- ➢ Research Approach
- ➢ Data collection method
- ➢ Sample Selection
- ➢ Literature Study
- ➢ Issues regarding validity and reliability
- ➢ Different types of used statistical tests

# 3 Research Methodology

*A method is a tool that can help solve problems and reach new knowledge). This chapter will present the procedure of the research .I will describe what methods have been used and how I created this thesis .In order to do this there are a series of steps to be followed and these steps are showed in figure 3.1.Finally,I discuss the methodology problems and what has been made to overcome these problems in order to strengthen validity and reliability of this study.*
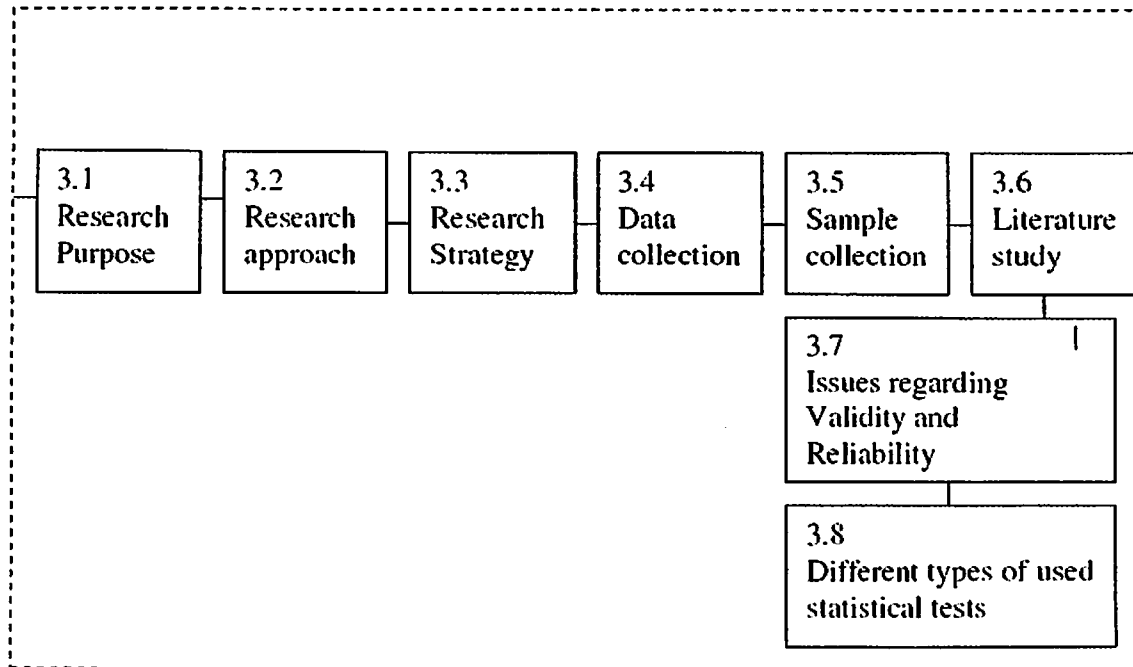


*Figure 3.1: Schematic presentation of the methodology*

## 3.1 Research Purpose

Yin mentions that scientific research has three purposes: explore, describe, or explain. Eriksson and Wiedershem-Paul put this distinction between purposes

into categories. They divide research into three different categories: Exploratory, descriptive and explanatory.

*Exploratory* research is useful when the problem is difficult to limit, when the perception of which model to use is diffuse and it is unclear what characteristics and relations that are important.

The purpose of an exploratory research is to gather as much information as possible about a specific subject. It is further common to use many different sources to gather this information. An exploratory study should be designed by stating a purpose and stating the criteria to judge the exploration successful. *Descriptive* research is appropriate when

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a problem is clearly structured and when intention is not to conduct research about factors related to causes and symptoms.

As presented by Miles and Huberman with reference to Bernard to describe is to make "complicated things understandable by reducing them to their component parts". According to Eriksson and Wiedershem-Paul (1997), the researcher conducting the study knows what he or she wants to investigate but not the answers.

*Explanatory* research is useful when studies involve relations between causes and symptoms. The researcher investigates however; a simple stimuli or factor affects one another .It is this identification of factors, which together cause a certain phenomena. According to Yin an explanatory research approach could also be used when the study aim to explain certain phenomena from different perspectives or situations with given set of events.

I will in this study explore, describe and possibly start to find factors affecting the adoption of KM in oil and gas industry where is no knowledge management. Because the investigated area lack in previously studies, my study is primarily exploratory .Since I strive to describe the discovered patterns of the exploratory stage, my research will also be descriptive.


## 3.2 Research approach

There are two main research approaches to choose from when conducting research in social science: Qualitative and quantitative method. There is one significant difference between these two approaches. In the quantitative approach, results are based on numbers and statistics that are presented in figures. Whereas in the qualitative approach where focus lies on describing an event with the use of words. Which approaches to choose depends on the problem definition together with what kind of information that is needed. The two approaches can in cases where it is suitable also be combined.

The purpose for both qualitative and quantitative approach is to create a better understanding of the society and to comprehend how individuals, groups and institutions act and have an influence on each other.

To reach each purpose different paths are however taken. The quantitative approach uses generalizations, based on the processes results of the investigation. For the qualitative approach the research problem is described out of the situation as a whole, without basing it on generalization. Both methods have strengths and weaknesses .The approach best suited depends therefore on the specific study's research problem and accompanying research question.

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Quantitative research approach transform the information to numbers and amounts that later gets analyzed statistically .Quantitative studies tend to be more structured and formulized. The quantitative approach is also characterized by being study few variables an a large number of entities. To find answers to its research problem this is normally done in a board sense by using surveys with already set answering alternatives. Furthermore, this approach is considered especially useful when conducting a wide investigation that contains many units. Qualitative research approach aims at reaching a better understanding of the phenomenon being studied, they also tend to be relative flexible. Using this approach the researcher tries to separate the specific or odd and strives to create a complete understanding of the situation. Characteristics of qualitative studies are that they are based largely on the researcher's own description, emotions and reactions. The qualitative approach also includes a great closeness to the respondents or to the source that the data is being collected from. The qualitative approach is characterized by gather abundant information and to investigate several variables from a few numbers of entities .To take use of the possibility to gather high quality data the most common way to do this is with the use of case studies and interviews where no set answering alternatives are being offered.

My study has a quantitative approach based on my research purpose and research question ,which required me to analyze data statistically ,also my research is in other way qualitative as I develop an framework based on my own understanding and emotions of the answers of respondents and also exists theories in this case. As mentioned before I have gathered abundant information for investigating several variables few numbers of entities. Also to take use of possibility to gather high quality data the most common way to do my dissertation with the use of case of oil and gas industry. The survey approach made it possible for us to get a better communication and relation with the respondents, which were important considering the purpose with this study.

## 3.3 Research Strategy

As a foundation for my research I have chosen a survey method. My intentions were to find in-depth information regarding the reality within an organization, in order to achieve a more holistic view of the situation(Wiedershem-Paul and. Doing My dissertation with oil and gas organizations, made it possible for me to get a better communication and relation with the respondents, which were important considering the purpose with this study. In this study I have chosen a single study object .This with the intention to receive

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the kind of in-depth information I needed in order to achieve my purpose with the study. The chosen organization is a car producer company which is one of the best in automotive industry in Iran.

## 3.4 Data collection method

In collecting primary data the researcher has a specific purpose to carry it out, whereas others that collect secondary data, does it for a different purpose. In this research, I have collected primary data through questionnaire. I have also collected secondary data in terms of documentation, by gathering information from oil and gas industries website.

This complementary information was mainly intended for describing the companies' background. I provided a brief explanation to the concept of knowledge management and knowledge sharing in the beginning of questionnaire. This was made to prevent unnecessary confusion for the respondent concerning the topic. I used a standard questionnaire which has been developed by in the laboratory for knowledge management at the university of Maryland-Baltimore County. For getting the most appropriate framework to measure oil and gas industries readiness to adopt KM, my recommended framework has been justified by sending my framework to panel of experts with Delphi model.

Delphi was originally developed by the Rand Corporation in the 1950s as a business forecasting tool. Since its inception, variations of the Delphi method have been used worldwide. Delphi has broad-based applications including formulating policy options, evaluating budget allocations, specifying corporate objectives and establishing manpower requirement. Delphi is very useful when there is limited background information available to facilitate decision making or idea generating, or when measuring tastes, opinions or community values and when information is either intangible or shrouded in uncertainty.

## 3.5 Sample selection

In conducting my questionnaire the choices depended on the fact that the company had employees that was involved or had been active in knowledge management and knowledge sharing cases. The procedure of selecting people for taking part of my questionnaire was based on stratified random sampling. This meant that although we had chosen our sample in order to some variable as their education or their organizational position ,I lost some control over how well informed my respondents were in the issues asked and at the time whether to which extent they had been involved in

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knowledge sharing and knowledge management cases. Of course, there was also a need to get theses people willing to share their knowledge of this specific topic with us by answering my questions.

To make it easy for the respondent to provide me with answers through the questionnaire I used also the Persian version. The questionnaire was first pre tested on a test group that gave me some valuable insights. I re-translated a few questions and added the brief introduction before presenting it to my second test group .I hoped to get tips that are more objective by using a new test group.

Since these people didn't know anything what I had in mind before showing it to them .This, the second time I had no problems of understanding from none of my test-respondents. Since there was no need for additional questions from the test group, I went on using the verified version of the questionnaire to gather data. For developing my conceptual framework, the panel or group of expert participants were sent the framework which they were requested to anonymously complete. I explain that questions are usually broad-based and open-ended, requiring subjective judgments. The participant therefore requires good communication skills to provide a coherent and accurate response to the framework asked. The participants are instructed to return the corrected framework to the Delphi coordinator who was me to edit the participant's responses. This action can be continued in three or four round for getting all suggestion of participants. However, Cuhls & Kuwahara state that one
or two rounds of Delphi are adequate.


## 3.6 Literature study

In order to obtain certain knowledge about the subject to investigated and to find a frame of reference ,a literature study was a natural and essential ingredient in the research process .It brought me to the level of knowledge that made me able to sort out relevant information and to find different approaches to the problem. Different theories ,thinking and frameworks regarding knowledge , knowledge sharing and knowledge management were gathered through books ,articles and research publications.

Keywords used in the search process were knowledge management, knowledge sharing, conceptual framework, adoption, Delphi method. Moreover, I have also used the references in books and articles in order to find further, appropriate literature. An additional search has been made using the internet and various famous WebPages. The literature finally used in this study has been selected through a subjective judgment approach out of all the literature found during the literature study process.

## 3.7 Issues regarding Validity and reliability

There are two common measurement problems that the researchers need to consider when determining if the study has been successful or not. These are reliability and validity .Reliability is the degree of accuracy of the collected data, i.e. if the study is repeated, the identical results were emerged. Validity is concerned with if the researchers have studied what they intended to do and nothing else.

To establish what sort of reliance and quality the research study is entitled to Yin propose four commonly used testing methods. These testing methods could be described as construct validity, internal validity, external validity and reliability.

- *Internal validity:* establishes a casual relationship in which certain conditions are shown to lead to other conditions, as distinguished from fake relationships.
- *External validity:* establishes the domain to which a study's finding can be generalized.
- *Construct validity:* establishes a correct operational measure for the concepts being studied.
- *Reliability:* demonstrating that the procedures of a study such as the data collection can be repeated by others with the same results. Internal validity only applies for explanatory or casual studies, and not for descriptive or exploratory studies. Since my study is descriptive and somehow exploratory internal validity wasn't necessary to be measured.

### 3.7.1 Validity

In the beginning of the study process I made a thorough literature study in order to find the most appropriate theories .However, I was not able to exclude the possibility that there might exist other theories more suitable for my study . Another important factor, regarding the validity, is whether the persons were asked by questionnaire were the ones possessing the most accurate and valuable information for this study. My questionnaire has been seen by my knowledge management in English version and all its ambiguities and problems were removed and after getting correct and getting validate and being approved by my supervisors they were used.

### 3.7.2 Reliability

A measure is considered reliable if a person's score on the same test given twice is similar .It is important to remember that reliability is not measured it is estimated. There are two ways that reliability is usually estimated, test/retest and internal consistency. Test/retest is the more conservative method to estimate reliability .Simply put, the idea

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behind test/pre test is that you should get the same result on test 1 as you do on test 2.The three main components to this method are as follows:

- Implement your measurement instrument at two separate times for each subject.
- Compute the correlation between the two separate measurements.
- Assume there is no change in the underlying condition or trait you are trying to
- measure between test 1 and test 2.

Internal consistency estimates reliability by grouping questions in a questionnaire that measure the same concept. For example you could write two sets of three questions that measure the same concept and after collecting the responses ,run a correlation between those two groups of three questions to determine if your instrument reliably measuring that concept. The primary difference between test/retest and internal consistency estimates of reliability is that test/retest involves two administrations of the measurement instrument, whereas the internal consistency method involves only administration of that instrument. Regarding the test/retest issues, I measured my responding company with the use of questionnaire, since I had a minimum of control over who took part in the questionnaire I could suffer in reliability .I used the random stratified sampling within a certain population in oil and gas industry, who were with high education and also high organizational position .

## 3.8 Different types of used statistical testes

In different type of analysis for studying hypothesis of this research has been used as following:

1- Statistical test of mean for my population:

This test has been used for studying and analyzing the current condition's elements separately.

2- Test of Kolmogorov-Smirnov & Shapiro-Wilk

For test of normality of variables, this test is appropriate when the data are at least ordinal and the research situation calls for a comparison of an observed sample distribution with a theoretical distribution. and distribution Histogram is used for showing normality distribution for each question.

3- Test of Friedman

This test has been used for giving priority to all main options and sub-options of current knowledge sharing situation of oil and gas industry.

4- Correlation Test:

This test is used for investigating the correlation between all main options and sub option of knowledge sharing.

# Chapter-4

## Data Analysis

> ➤ Analyzing the condition of respondent sample
> ➤ Descriptive analyses with usage of frequency
> ➤ Data analysis on each category
> ➤ Descriptive analysis with Normality curve
> ➤ Normality distribution with usage of tests of Normality
> ➤ Priority of knowledge sharing factors by usage of tests of Normality
> ➤ Priority of knowledge sharing factors by using Friedman test
> ➤ Correlation Matrix for all asked questions

## *4 Data Analysis*

*All have been presented in this chapter, are descriptive and analytical analysis of dissertation .In these analysis, at the first step, there is condition of sample about their job experiences, education and also their position in the organization .Then frequency distribution of each option and sub option has been described. Analyzing and studying all options and variables for measuring the current situation has been developed. These analyses have been done by test of Kolmogrov-Smirnov and Shapiro-wilk, and Friedman has been done and for analyzing the effects of each factor on each other factor analysis has been done.*

## 4.1 Analyzing the condition of Respondents sample

All information is based on the reply of questionarrie which is  shown here on Appendix-5

*A) Frequency table and Bar chart of status of sample degree*

|  | Frequency of PhD | Frequency of Master Degree Holders | Frequency of Bachelor Degree Holders | Total |
|---|---|---|---|---|
| The People | 10 | 29 | 113 | 152 |
| Percentage | 6.58 | 19.1 | 74.32 | 100 |

*Table 4.1. Distribution of education condition of sample members*

According to table 4.1 the most of consisted people in my sample are educated and most of them are Bachelor degree holders which is about 50%.
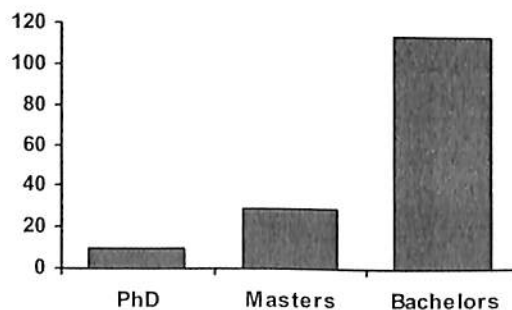


Figure 4.1. Bar chart of education status of sample members

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**B)** *Frequency table and Bar chart of organizational position of sample members*

|  | A<br>Manager | B<br>Boss | C<br>Chief Expert | D<br>Expert | Total |
|---|---|---|---|---|---|
| The People | 7 | 48 | 37 | 60 | 152 |
| Percentage | 4.60 | 31.5 | 24.5 | 39.4 | 100 |

Table 4.2 *Distribution of organizational position of sample members*

According to table 4.2 the most of consisted people in my sample have a high organizational position and most of them have a great position of being boss and expert which can mentioned in order of 28.57 %and 42.86%.
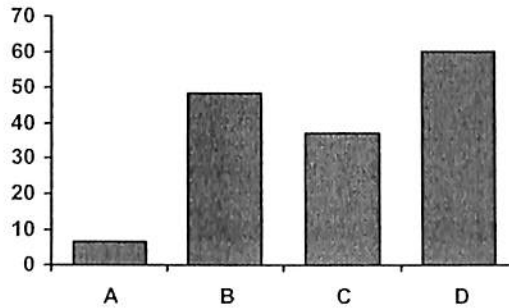


Figure 4.2. *Bar chart of organizational position of sample members*

**C)** *Frequency table and Bar chart of years of experience of sample members*

|  | A<br>(Up to 5) | B<br>(5 to 10) | C<br>(10 to 15) | D<br>(15 to 20) | E<br>(20 to 25) | Total |
|---|---|---|---|---|---|---|
| The People | 45 | 29 | 37 | 25 | 16 | 150 |
| Percentage | 29.1 | 19.7 | 24.3 | 16.4 | 10.5 | 100 |

Table 4.3 *Distribution of years of experience of sample members*

According to table 4.3 the most of consisted people in my sample are experienced people and about 35.71 %of the them have at least 5 years experience in their careers which can mentioned that tee research sample readers are very well experience according to their assigned responsibilities.
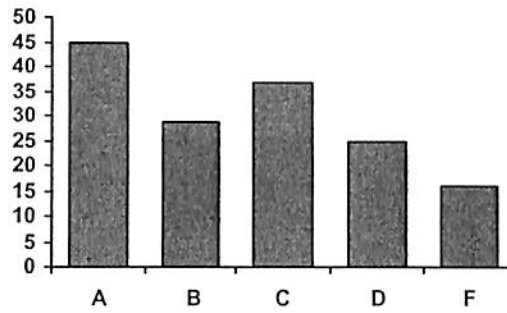
*Figure 4.3. Bar chart of years of experience of sample members*

## 4.2 Descriptive analysis with usage of Frequency distribution

### A) About Communication
**Q1: capturing key expertise in an online way**

Table 4.4

|         |                   | Frequency | Percent | Valid Percent |
|---------|-------------------|-----------|---------|---------------|
| Valid   | Strongly Disagree | 37        | 24.3    | 24.5          |
|         | Disagree          | 55        | 36.2    | 36.4          |
|         | Neutral           | 24        | 15.8    | 15.9          |
|         | Agree             | 29        | 19.1    | 19.2          |
|         | Strongly Agree    | 6         | 3.9     | 4.0           |
|         | Total             | 151       | 99.3    | 100.0         |
| Missing | System            | 1         | .7      |               |
| Total   |                   | 152       | 100     |               |

According to table 4.4, the current situation shows that about 36.2 percent of oil and gas employees disagree that their key expertise are captured in an online way and just about 3.9 percent strongly agree that they get their expertise in an online way.

**Q2: getting appropriate lessons learned which have been sent to employees**

Table 4.5

|       |                   | Frequency | Percent | Valid Percent |
|-------|-------------------|-----------|---------|---------------|
| Valid | Strongly Disagree | 13        | 8.6     | 8.6           |
|       | Disagree          | 62        | 40.8    | 40.8          |
|       | Neutral           | 12        | 7.9     | 7.9           |
|       | Agree             | 43        | 28.3    | 28.3          |
|       | Strongly Agree    | 22        | 14.5    | 14.5          |
|       | Total             | 152       | 100.0   | 100.0         |

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According to Table 4.5, the current situation shows that about 40.8 percent of oil and gas organization's employees disagree that they can get appropriate lessons learned in areas that they can benefit and just 14.5 percent strongly agree that they get appropriate lessons learned in areas where they can benefit. It means some employees with mentioned amount receive appropriate lessons learned which are related to their job or maybe to their education.

**Q3: having time to chat informally with my colleagues**

Table 4.6

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 1 | .7 | .7 |
|  | Disagree | 19 | 12.5 | 12.5 |
|  | Neutral | 16 | 10.5 | 10.5 |
|  | Agree | 85 | 55.9 | 55.9 |
|  | Strongly Agree | 31 | 20.4 | 20.4 |
|  | Total | 152 | 100.0 | 100.0 |

According to table 4.6, the current situation shows that about 55.9 percent of oil and gas organization's employees agree that there is adequate time for chatting informally with their colleagues, it means the most number of employees have time to chat informally with their colleagues and just about .7 percent strongly disagree with this option, which means 3.57 percent of oil and gas organization's employees don't have time to chat with their colleagues.

**Q4: Individualized learning is usually transformed into OL through documenting this knowledge into our organizational knowledge repository**

Table 4.7

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 17 | 11.2 | 11.4 |
|  | Disagree | 54 | 35.5 | 36.2 |
|  | Neutral | 40 | 26.3 | 26.8 |
|  | Agree | 30 | 19.7 | 20.1 |
|  | Strongly Agree | 8 | 5.3 | 5.4 |
|  | Total | 149 | 98.0 | 100.0 |
| Missing | System | 3 | 2.0 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.7, the current situation shows that about 36.2 percent of oil and gas organization's employees disagree that individualized learning is usually transformed into OL through documenting knowledge into the repository of organizational knowledge and just about 5.4 percent strongly agree about it.

**B) About KM environment**

**Q5: There are many knowledge fairs/exchanges in your organization to spawn new colleague relationships**

**Table 4.8**

| | | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 12 | 7.9 | 8.1 |
| | Disagree | 51 | 33.6 | 34.5 |
| | Neutral | 24 | 15.8 | 16.2 |
| | Agree | 50 | 32.9 | 33.8 |
| | Strongly Agree | 11 | 7.2 | 7.4 |
| | Total | 148 | 97.4 | 100.0 |
| Missing | System | 4 | 2.6 | |
| Total | | 152 | 100.0 | |

According to the table 4.8, the current situation shows that about 33.6 percent of oil and gas organization's employees disagree that in their organization they have many fair/exchanges of knowledge to spawn new colleague relationships, and just about 7.2 percent of them strongly agree that there are many knowledge fairs/exchanges in their organization to spawn new colleague relationships.

**Q6: There are lessons learned and best practices repositories within your organization.**

**Table 4.9**

| | | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 20 | 13.2 | 13.4 |
| | Disagree | 62 | 40.8 | 41.6 |
| | Neutral | 25 | 16.4 | 16.8 |
| | Agree | 39 | 25.7 | 26.2 |
| | Strongly Agree | 3 | 2.0 | 2.0 |
| | Total | 149 | 98.0 | 100.0 |
| Missing | System | 3 | 2.0 | |
| Total | | 152 | 100.0 | |

According to the table 4.9 and the mentioned Pie chart, the current situation shows that about 40.8 percent of employees disagree that in their organization, where they work,

they have repositories of lessons learned and best practices and just about 2.0 percent of employees strongly agree with having repositories of lessons learned and best practices within their organization.

**Q7: You have a mentoring program within your organization**

Table 4.10

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 19 | 12.5 | 12.8 |
|  | Disagree | 55 | 36.2 | 37.2 |
|  | Neutral | 31 | 20.4 | 20.9 |
|  | Agree | 42 | 27.6 | 28.4 |
|  | Strongly Agree | 1 | .7 | .7 |
|  | Total | 148 | 97.4 | 100.0 |
| Missing | System | 4 | 2.6 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.10, the current situation shows that about 36.2 percent of employees disagree that they have a mentoring program within their organization whereas just about .7 percent of employees strongly agree that they have a mentoring program within their organization.

**Q8: You have centers of Excellence in your organization whereby you can qualify to become a member/affiliate of the center**

Table 4.11

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 33 | 21.7 | 22.3 |
|  | Disagree | 60 | 39.5 | 40.5 |
|  | Neutral | 25 | 16.4 | 16.9 |
|  | Agree | 28 | 18.4 | 18.9 |
|  | Strongly Agree | 2 | 1.3 | 1.4 |
|  | Total | 148 | 97.4 | 100.0 |
| Missing | System | 4 | 2.6 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.11, the current situation shows that about 39.5 percent of employees disagree that they have centers of Excellence in their organization whereby they can qualify to become a member/affiliate of the center whereas just about 1.3 percent oil and gas organization's employees strongly agree that they have centers of

Excellence in their organization whereby they can qualify to become a member/affiliate of the center.

**Q9: You typically work in teams or groups**

Table 4.12

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 8 | 5.3 | 5.3 |
|  | Disagree | 42 | 27.6 | 28.0 |
|  | Neutral | 15 | 9.9 | 10.0 |
|  | Agree | 71 | 46.7 | 47.3 |
|  | Strongly Agree | 14 | 9.2 | 9.3 |
|  | Total | 150 | 98.7 | 100.0 |
| Missing | System | 2 | 1.3 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.12, the current situation shows that about 46.7 percent of employees agree that they typically work in teams or groups whereas about 5.3 percent of them strongly disagree that they typically work in teams or groups. It shows that in oil and gas organization's almost 50 percent of employees work in teams or groups.

**Q10: Our main product is our knowledge**

Table 4.13

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 12 | 7.9 | 8.1 |
|  | Disagree | 46 | 30.3 | 31.1 |
|  | Neutral | 24 | 15.8 | 16.2 |
|  | Agree | 46 | 30.3 | 31.1 |
|  | Strongly Agree | 20 | 13.2 | 13.5 |
|  | Total | 148 | 97.4 | 100.0 |
| Missing | System | 4 | 2.6 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.13, the current situation shows that about 31.1 percent of employees Disagree that their main product is their knowledge and also the same amount is for agree employees whereas just about 8.1 percent of employees strongly disagree that their main product is their knowledge.

**Q11: Do you feel that you have a knowledge sharing culture within your organization versus knowledge hoarding one**

Table 4.14

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 23 | 15.1 | 15.4 |
|  | Disagree | 58 | 38.2 | 38.9 |
|  | Neutral | 30 | 19.7 | 20.1 |
|  | Agree | 37 | 24.3 | 24.8 |
|  | Strongly Agree | 1 | .7 | .7 |
|  | Total | 149 | 98.0 | 100.0 |
| Missing | System | 3 | 2.0 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.14, the current situation shows that about 38.2 percent of employees Disagree that they have a knowledge sharing culture within their organization versus knowledge hoarding one whereas just about .7 percent of employees strongly agree that they have a knowledge sharing culture within their organization versus knowledge hoarding one.

**Q12: You have a high percentage of teams with shared incentives whereby the team members share common objectives and goals.**

Table 4.14

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 13 | 8.6 | 8.7 |
|  | Disagree | 57 | 37.5 | 38.0 |
|  | Neutral | 31 | 20.4 | 20.7 |
|  | Agree | 43 | 28.3 | 28.7 |
|  | Strongly Agree | 6 | 3.9 | 4.0 |
|  | Total | 150 | 98.7 | 100.0 |
| Missing | System | 2 | 1.3 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.15, the current situation shows that about 37.5 percent of employees disagree that they have a high percentage of teams with shared incentives whereby the team members share common objectives and goals whereas just about 3.19 percent of employees are strongly agree that they have a high percentage of teams with shared incentives whereby the team members share common objectives and goals.

**Q13: There are online communities of practice in your organization where you can exchange views and idea.**

*Table 4.16*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 28 | 18.4 | 18.7 |
|  | Disagree | 57 | 37.5 | 38.0 |
|  | Neutral | 37 | 24.3 | 24.7 |
|  | Agree | 26 | 17.1 | 17.3 |
|  | Strongly Agree | 2 | 1.3 | 1.3 |
|  | Total | 150 | 98.7 | 100.0 |
| Missing | System | 2 | 1.3 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.16, the current situation shows that about 38.0 percent of employees disagree that there are online communities of practice in their organization where they can exchange views and ideas whereas just about 1.3 percent of employees strongly agree that there are online communities of practice in their organization where they can exchange views and ideas.

## C: About Organizational facilities

**Q14: You are promoted and rewarded based upon my ability to share your knowledge with others**

*Table 4.17*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 35 | 23.0 | 23.3 |
|  | Disagree | 57 | 37.5 | 38.0 |
|  | Neutral | 28 | 18.4 | 18.7 |
|  | Agree | 27 | 17.8 | 18.0 |
|  | Strongly Agree | 3 | 2.0 | 2.0 |
|  | Total | 150 | 98.7 | 100.0 |
| Missing | System | 2 | 1.3 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.17, the current situation of oil and gas organization's shows that about 38.0 percent of employees disagree that they are promoted and rewarded based upon their abilities to share their knowledge with others whereas just about 2.0 percent of them strongly agree that they are promoted and rewarded based upon their ability to share their knowledge with others.

**Q15: There is an adequate budget for professional development and training in your organization**

*Table 4.18*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 14 | 9.2 | 9.5 |
|  | Disagree | 31 | 20.4 | 20.9 |
|  | Neutral | 26 | 17.1 | 17.6 |
|  | Agree | 62 | 40.8 | 41.9 |
|  | Strongly Agree | 15 | 9.9 | 10.1 |
|  | Total | 148 | 97.4 | 100.0 |
| Missing | System | 4 | 2.6 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.18, the current situation of oil and gas organization's shows that there are about 40.8 percent of employees agree that there is an adequate budget for professional development and training in their organization whereas about 9.2 percent of employees strongly disagree that there is an adequate budget for professional development and training in their organization.

**Q16: Success, failure or war stories are systematically collected and used in your organization**

*Table 4.19*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 22 | 14.5 | 14.8 |
|  | Disagree | 51 | 33.6 | 34.2 |
|  | Neutral | 37 | 24.3 | 24.8 |
|  | Agree | 36 | 23.7 | 24.2 |
|  | Strongly Agree | 3 | 2.0 | 2.0 |
|  | Total | 149 | 98.0 | 100.0 |
| Missing | System | 3 | 2.0 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.19 and the mentioned Pie chart, the current situation of company shows that about 33.6 percent of employees disagree that success, failure or war stories are systematically collected and used in their organization whereas just about 2.0 percent of oil and gas organization's strongly agree that success, failure or war stories are systematically collected and used in their organization.

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**Q17: *The measurement system in your organization incorporates intellectual and customer capital, as well as the knowledge capital of your products of services***

*Table 4.20*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 17 | 11.2 | 11.4 |
|  | Disagree | 36 | 23.7 | 24.2 |
|  | Neutral | 54 | 35.5 | 36.2 |
|  | Agree | 37 | 24.3 | 24.8 |
|  | Strongly Agree | 5 | 3.3 | 3.4 |
|  | Total | 149 | 98.0 | 100.0 |
| Missing | System | 3 | 2.0 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.20 , the current situation shows that about 35.5 percent of employees don't have any idea about this question and about 3.3 percent disagree that the measurement system in their organization incorporates intellectual and customer capital ,as well as the knowledge capital of their products or services whereas just about strongly agree that the measurement system in their organization incorporates intellectual and customer capital ,as well as the knowledge capital of their products or services.

**Q18: *You have the technological infrastructure to promote a knowledge sharing environment within our organization***

*Table 4.21*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 12 | 7.9 | 8.1 |
|  | Disagree | 38 | 25.0 | 25.5 |
|  | Neutral | 24 | 15.8 | 16.1 |
|  | Agree | 65 | 42.8 | 43.6 |
|  | Strongly Agree | 10 | 6.6 | 6.7 |
|  | Total | 149 | 98.0 | 100.0 |
| Missing | System | 3 | 2.0 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.21, the current situation of oil and gas organization shows that about 42.8 percent of employees agree that they have the technological infrastructure to promote a knowledge sharing environment within their organization whereas about 6.6 percent of employees strongly disagree that they have the technological infrastructure to promote knowledge sharing environment within their organization.

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*Q19: You typically have integrated assignment where the number of projects in which more than one department participates occurs*

*Table 4.22*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 5 | 3.3 | 3.4 |
|  | Disagree | 29 | 19.1 | 19.7 |
|  | Neutral | 50 | 32.9 | 34.0 |
|  | Agree | 60 | 39.5 | 40.8 |
|  | Strongly Agree | 3 | 2.0 | 2.0 |
|  | Total | 147 | 96.7 | 100.0 |
| Missing | System | 5 | 3.3 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.22, the current situation shows that about 40.8 percent of employees agree that they typically have integrated assignment where the number of projects in which more than one department participates occurs whereas about 3.4 percent of oil and gas organization's employees strongly disagree that they typically have integrated assignment where the number of projects in which more than one department participates occurs.

*Q20: You have internal surveys on teaching which surveys employees to see if the departments are supporting and creating opportunities for one another*

*Table 4.23*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 25 | 16.4 | 16.9 |
|  | Disagree | 64 | 42.1 | 43.2 |
|  | Neutral | 23 | 15.1 | 15.5 |
|  | Agree | 31 | 20.4 | 20.9 |
|  | Strongly Agree | 5 | 3.3 | 3.4 |
|  | Total | 148 | 97.4 | 100.0 |
| Missing | System | 4 | 2.6 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.23 and the mentioned Pie chart, the current situation shows that about 42.1 percent of employees disagree that they have internal surveys on teaching which surveys employees to see if the departments are supporting and creating opportunities for one another whereas just about 3.3 percent of employees strongly

agree that they have internal surveys on teaching which surveys employees to see if the departments are supporting and creating opportunities for one another.

***Q21: We track the degree to which the organization is entering team-based relationships with other business units, organizations or customers***

**Table 4.24**

|       |                   | Frequency | Percent | Valid Percent |
|-------|-------------------|-----------|---------|---------------|
| Valid | Strongly Disagree | 17        | 11.2    | 11.7          |
|       | Disagree          | 53        | 34.9    | 36.6          |
|       | Neutral           | 32        | 21.1    | 22.2          |
|       | Agree             | 38        | 25.0    | 26.2          |
|       | Strongly Agree    | 5         | 3.3     | 3.4           |
|       | Total             | 145       | 95.4    | 100.0         |
| Missing | System          | 7         | 4.6     |               |
| Total |                   | 152       | 100.0   |               |

According to the table 4.24 and the mentioned Pie chart, about 32.14 percent of employees disagree that they track the degree to which the organization is entering team-based relationships with other business units, organizations or customers whereas just about 7.14 percent of employees strongly agree that they track the degree to which the organization is entering team-based relationships with other business units, organizations or customers.

***Q22: The organization's office layout is conductive to speaking with your colleagues and meeting people***

**Table 4.25**

|       |                   | Frequency | Percent | Valid Percent |
|-------|-------------------|-----------|---------|---------------|
| Valid | Strongly Disagree | 10        | 6.6     | 6.8           |
|       | Disagree          | 27        | 17.8    | 18.5          |
|       | Neutral           | 23        | 15.1    | 15.8          |
|       | Agree             | 73        | 48.0    | 50.0          |
|       | Strongly Agree    | 13        | 8.6     | 8.9           |
|       | Total             | 146       | 96.1    | 100.0         |
| Missing | System          | 6         | 3.9     |               |
| Total |                   | 152       | 100.0   |               |

According to the table 4.25, the current situation shows that in oil and gas organization about 50.0 percent of employees agree that the organization's office layout is conductive

to speaking with their colleagues and meeting people whereas just about 6.6npercent of employees strongly disagree that the organization's office layout is conductive to speaking with their colleagues and meeting people. It shows that about 50.0 percent of offices layout in oil and gas organization is conductive to speaking for its staff and also for its meeting people and it's a good opportunity for knowledge sharing.

## D: About Measurement

**Q23: The reuse rate of "frequently accessed /reused" knowledge in your organization is high**

*Table4.26*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 11 | 7.2 | 7.6 |
|  | Disagree | 35 | 23.0 | 24.1 |
|  | Neutral | 46 | 30.3 | 31.7 |
|  | Agree | 46 | 30.3 | 31.7 |
|  | Strongly Agree | 7 | 4.6 | 4.8 |
|  | Total | 145 | 95.4 | 100.0 |
| Missing | System | 7 | 4.6 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.26, the current situation for knowledge sharing in oil and gas organization shows that about 30.3 percent of employees agree that the reuse rate of "frequently accessed /reused " knowledge in their organization is high and just about 7.2 percent of employees strongly agree that the rate of "frequently accessed /reused " knowledge in their organization is high.

**Q24: The distribution of knowledge to appropriate individuals in my organization is done actively on a daily basis**

*Table 4.27*

|  |  | Frequency | Percent | Valid Percent |
|---|---|---|---|---|
| Valid | Strongly Disagree | 20 | 13.2 | 13.6 |
|  | Disagree | 76 | 50.0 | 51.7 |
|  | Neutral | 30 | 19.7 | 20.4 |
|  | Agree | 19 | 12.5 | 12.9 |
|  | Strongly Agree | 2 | 1.3 | 1.4 |
|  | Total | 147 | 96.7 | 100.0 |
| Missing | System | 5 | 3.3 |  |
| Total |  | 152 | 100.0 |  |

According to the table 4.27 and the mentioned Pie chart , about 50 percent of employees disagree that the distribution of knowledge to appropriate individuals in their organization is done actively on a daily basis whereas just about 7.14 percent of employees agree that the distribution of knowledge to appropriate individuals in their organization is done actively on a daily basis.

*Q 25: New ideas generating innovative products or services are a frequent occurrence in my organization*

*Table 4.28*

|         |                   | Frequency | Percent | Valid Percent |
|---------|-------------------|-----------|---------|---------------|
| Valid   | Strongly Disagree | 4         | 7.14    | 8.33          |
|         | Disagree          | 22        | 39.29   | 48.83         |
|         | Neutral           | 6         | 10.71   | 12.50         |
|         | Agree             | 8         | 14.29   | 16.67         |
|         | Strongly Agree    | 8         | 14.29   | 16.67         |
|         | Total             | 48        | 85.71   | 100.0         |
| Missing | System            | 8         | 14.29   |               |
| Total   |                   | 56        | 100.0   |               |

According to the table 4.28 and the mentioned Pie chart , the current situation of knowledge sharing in oil and gas organization shows that about 39.29 percent of oil and gas organization employees disagree that new ideas generating innovative products or services are a frequent occurrence in their organization whereas just about 7.14 percent of employees strongly disagree that new ideas generating innovative products or services are a frequent occurrence in their organization.

## 4.3 Data Analysis on Each Category

The inventory consists of 25 questions, divided into four parts. The first part deals with "Communication flow" which tries to assess how knowledge and communication exchanges are captured and disseminated throughout the organization. The "Knowledge Management Environment" which looks at internal cultural factors related to knowledge management within the organization. The third part deals with "Organizational Facilitation" which assesses the sophistication of the knowledge management infrastructure and knowledge sharing capability within the organization. The last part deals with the "Measurement" assess the likelihood of knowledge sharing and knowledge management being successful within the organization. This inventory has 25 questions that strongly agree equals 4 points, agree is 2 points, neutral is zero points, disagree is -2 points, and strongly disagree is -4 points. The maximum score is 100, that

is, if one answered strongly agree to each question. The following scale was used to determine if the organization rates an A, B, C, D, or F in terms of knowledge sharing:

A: 76-100 points (minimum is 13 questions are strongly agree and 12 questions are agree).

B: 50-75 points (minimum is 25 questions marked agree)

C: 0-49 points (minimum is 25 questions marked neutral).

D: minus 50-minus1 (minimum is 25 questions marked disagree).

F: minus 100-minus 51 (minimum is 25 questions marked strongly disagreeing).

Taking "Strongly agree "as A," Agree "as B, "Neutral" as C, "Disagree "as D, and

"Strongly Disagree" as F, the data analysis based on the survey results and question categories (number of questions per category is shown in parentheses; numbers in table represent counts) is shown in Table 4.29

| | A (Strongly Agree) | B (Strongly Agree) | C (Strongly Agree) | D (Strongly Agree) | F (Strongly Agree) | Score | Average Score |
|---|---|---|---|---|---|---|---|
| About Communication(4) | 67 | 187 | 92 | 190 | 68 | -10 | -2.5 |
| About KM Environment(9) | 60 | 382 | 242 | 488 | 168 | -644 | -71.6 |
| About Organization Facilitation(9) | 62 | 429 | 297 | 386 | 157 | -294 | -32.7 |
| About Measurement(3) | 17 | 100 | 114 | 162 | 47 | -244 | -81.3 |

Table 4.29: Data Analysis on Each Category

In calculating the score for each category, I take A as +4, B as +2, C as 0, D as -2, and F as -4, As there are four questions in the first category (i.e., communication flows), nine questions in the second category, and so forth, the average score is the smoothed score after considering the different number of questions in each category .The result average scores are comparable. So, from the data in the table, it can be seen that oil and gas industries has a relatively better communication flow versus three other options. For the first factor as you see in the following figure, in case of communication flow, the average score is about -2.5 that the assigned level for it is D.
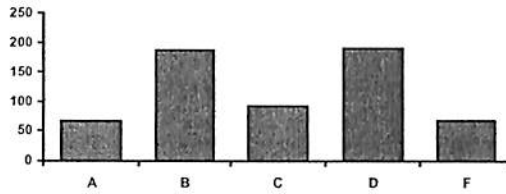
*Figure 4.4: Bar chart of Respondents frequency in communication flow*

This figure means that in oil and gas industry, there is a little bit knowledge sharing in case of communication flow, but it need to be supported by technologically systems and other kinds of supports.
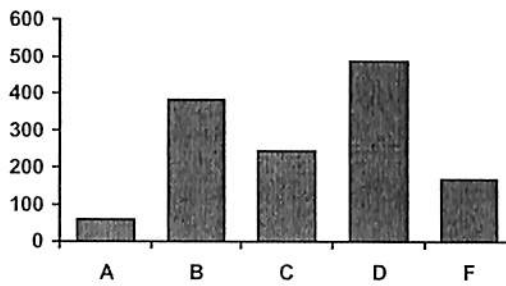


*Figure 4.5: Bar chart of Respondents frequency in KM environment*

For the second option which is KM environment as we see in figure 4.5 the average score is -71.6 which are located in F level.
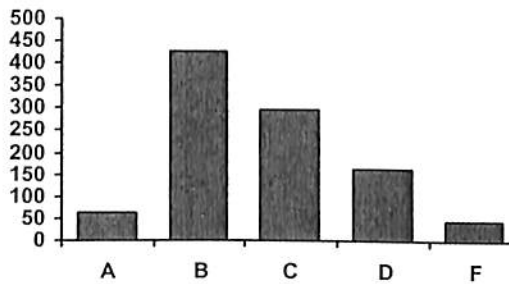


*Figure 4.6: Bar chart of Respondents frequency in Organization Facilitation*

According to the table 4.29 for the third factor which is organization facilitation, ,the average score is about -32.7 which is located in D level and frequency of respondent has been figured at figure 4.6.

70
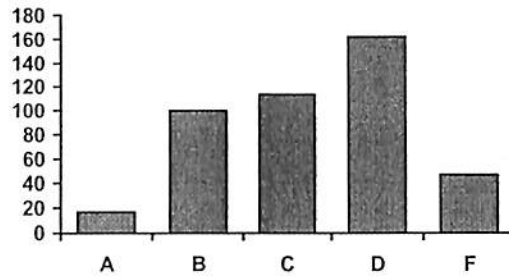
Figure 4.7: Bar chart of Respondents frequency in Measurement case

And forth factors, Measurement, the average score is – 81.3, which is located in F /level, and the frequency of respondent for this option is at the following figure. It means these last three factors can be mentioned as obstacles for knowledge sharing.

In categorizing these obstacles from importance aspect, I can say those are located in order:

      *1) Organization facilitation*

      *2) Knowledge management environment*

      *3) Measurement*

## 4.3.1 The Table of Data Analysis Overally

| | A (Strongly Agree) | B (Strongly Agree) | C (Strongly Agree) | D (Strongly Agree) | F (Strongly Agree) | Score | Average Score |
|---|---|---|---|---|---|---|---|
| All The Questions | 206 | 1098 | 745 | 1226 | 440 | -1192 | -47.68 |
| Percentage | 5.60 | 30.3 | 20.1 | 32.2 | 11.7 | | |

Table 4.30: Table of data analysis of respondents frequency overally

According to the Table 4.30 and the figure 4.8 you can see that the average score is about -47.68 which the assigned level for it is D.
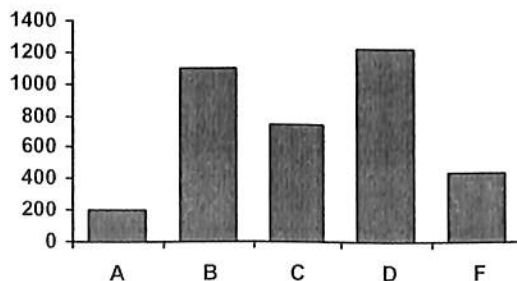


Figure 4.8: Bar chart of Respondents frequency Overally

71

However, in all four categories the average score is a D, which suggests that the organization is not faring well at all in terms of knowledge sharing and overall knowledge management.

## 4.4 Descriptive Analysis with Normality Curve

### *About Communication:*

**Q1: capturing key expertise in an online way**

**Descriptive**

| Question1 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -1.17 | .190 |
| 95% Confidence | Lower Bound | -1.54 | |
| Interval for mean | Upper Bound | -.79 | |

**Table 4.31**



Std. Dev = 2.34
Mean = -1.2
N = 152.00

*Figure 4.9: Distribution Histogram of Q1*

As we see in the table and in related distribution histogram, which doesn't show But the neighbourhood of the total normal distribution, with 95% confidence in test of hypothesis, the mean value is about -1.17 which indicates a negative opinion

72

about this question exists, and can be one negative opinion about this question exists, and can be one negative point in knowledge sharing process.

**Q2: get appropriate lessons learned sent to you in areas where you can benefit**

### Descriptive

| Question2 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | .86 | .195 |
| 95% Confidence | Lower Bound | .47 | |
| Interval for mean | Upper Bound | 1.24 | |

**Table 4.32**



*Figure 4.10: Distribution Histogram of Q2*

As we see in the table and in related distribution histogram which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .86 which indicates a Positive opinion about this question exists ,and can be one Positive point in knowledge sharing process

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**Q3: usually have time to chat informally with your colleagues.**

**Descriptive**

| Question3 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | 1.66 | .149 |
| 95% Confidence | Lower Bound | 1.36 | |
| Interval for mean | Upper Bound | 1.95 | |

**Table 4.33**
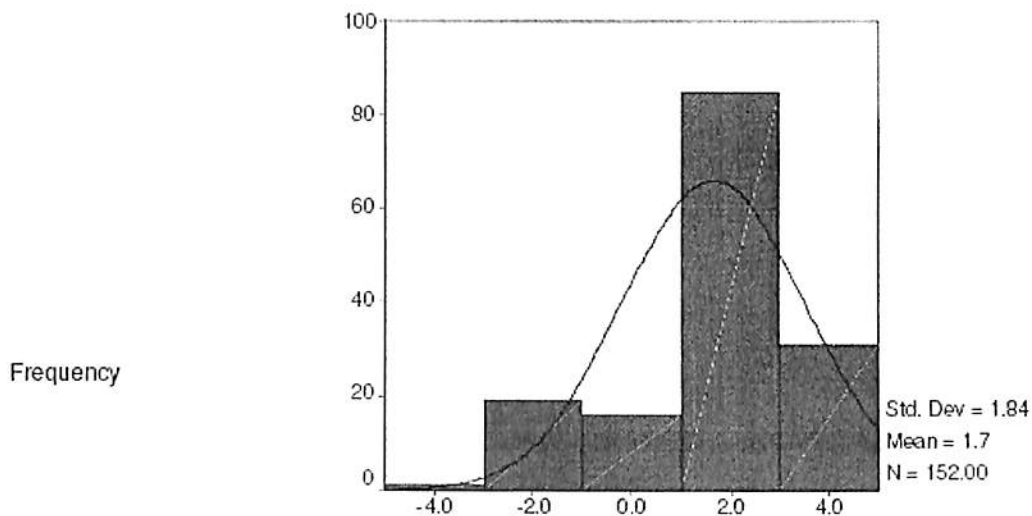


*Figure 4.11: Distribution Histogram of Q3*

As we see in the table and in related distribution histogram which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about 1.66 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process

**Q4: Individualized learning is usually transformed into organizational learning through documenting this knowledge into your organization's knowledge repository.**

| Question4 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.56 | .177 |
| 95% Confidence | Lower Bound | -.91 | |
| Interval for mean | Upper Bound | -.21 | |

**Table 4.34**
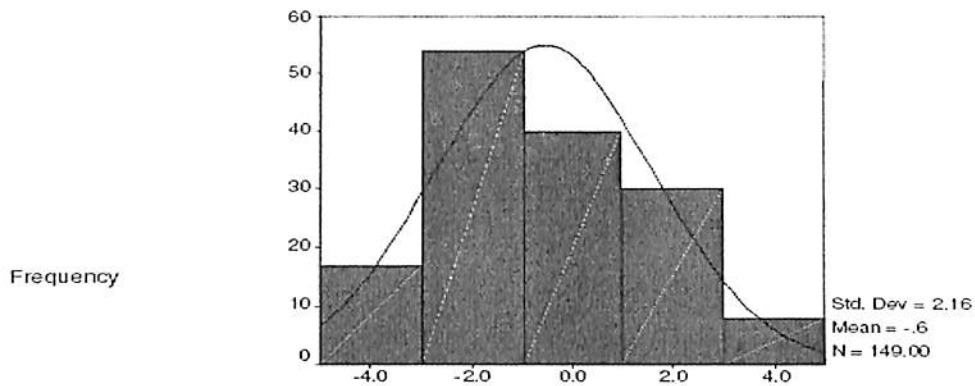
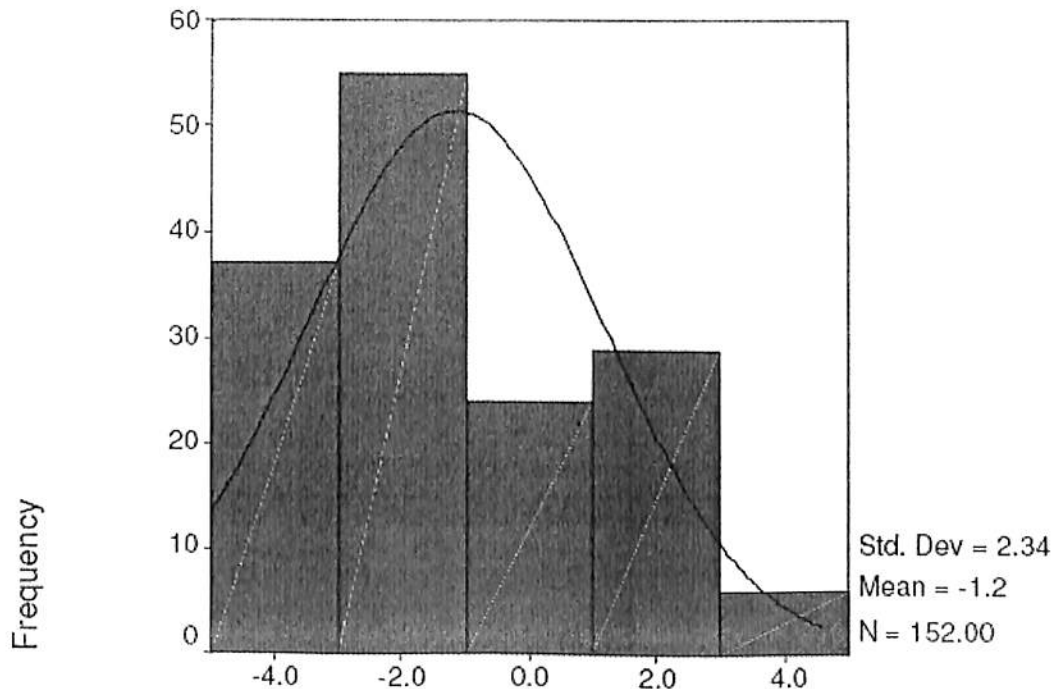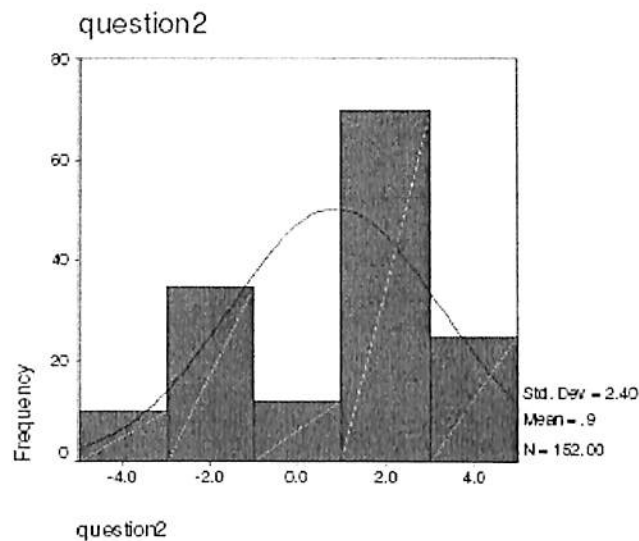*Figure 4.12: Distribution Histogram of Q4*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.56 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process.

## About KM Environment

**Q5: There are many knowledge fairs or exchanges in your organization to spawn new colleague relationships.**

**Descriptive**

| Question5 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.04 | .188 |
| 95% Confidence | Lower Bound | -.41 | |
| Interval for mean | Upper Bound | .33 | |

**Table 4.35**
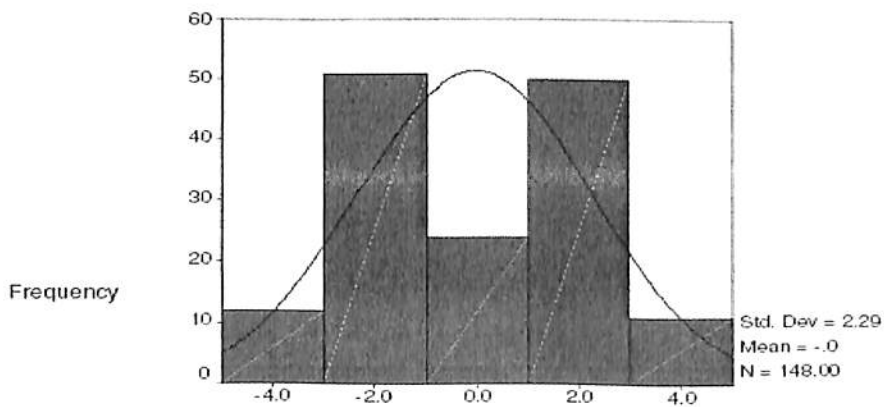


*Figure 4.13: Distribution Histogram of Q5*

75

As you see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.04 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process.

**Q6: There are lessons learned and best practices repositories within your organization.**

**Descriptives**

| Question6 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.77 | .176 |
| 95% Confidence Interval for mean | Lower Bound | -1.11 | |
| | Upper Bound | -.42 | |

**Table 4.36**
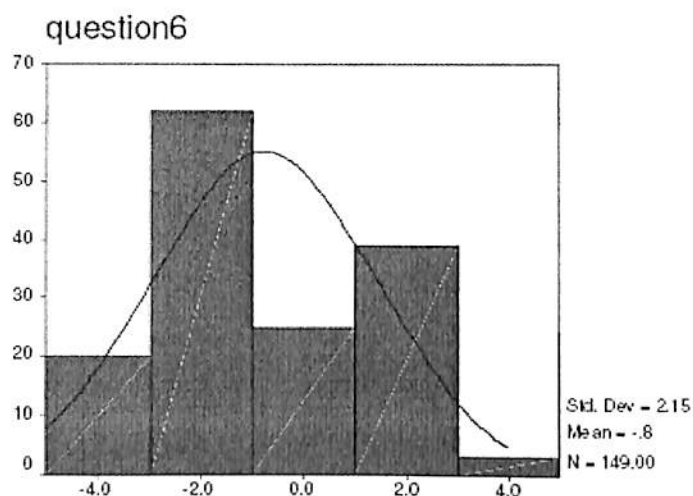


*Figure 4.14: Distribution Histogram of Q6*

As you see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.77 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process.

**Q7: We have a mentoring program within my organization.**

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**Descriptive**

| Question7 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.66 | .172 |
| 95% Confidence | Lower Bound | -1.00 | |
| Interval for mean | Upper Bound | -.32 | |

**Table 4.37**
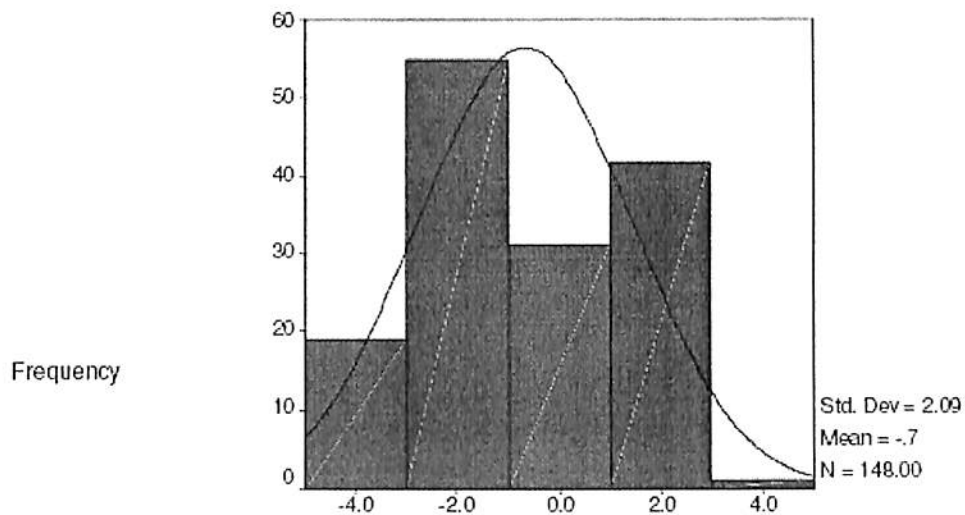


*Figure 4.15: Distribution Histogram of Q7*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.66 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process.

**Q8: You have Centers of Excellence in our organization whereby you can qualify to become a member/affiliate of the center.**

**Descriptive**

| Question8 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -1.27 | .176 |
| 95% Confidence | Lower Bound | -1.62 | |
| Interval for mean | Upper Bound | -.92 | |

**Table 4.38**

*Figure 4.16: Distribution Histogram of Q9*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -1.27 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process.

**Q9: You typically work in teams or groups.**

**Descriptive**

| Question9 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | .55 | .184 |
| 95% Confidence | Lower Bound | .18 | |
| Interval for mean | Upper Bound | .91 | |

**Table 4.39**
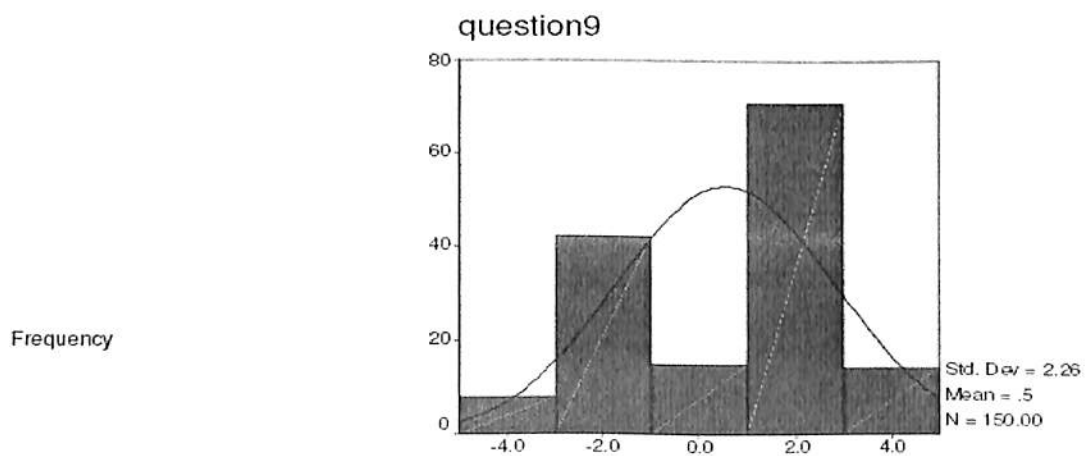


*Figure 4.17: Distribution Histogram of Q9*

78

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .55 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process

**Q10: your our main product is our knowledge**

**Descriptive**

| Question10 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | .22 | .200 |
| 95% Confidence | Lower Bound | -.18 | |
| Interval for mean | Upper Bound | .61 | |
| | | | |

**Table 4.40**
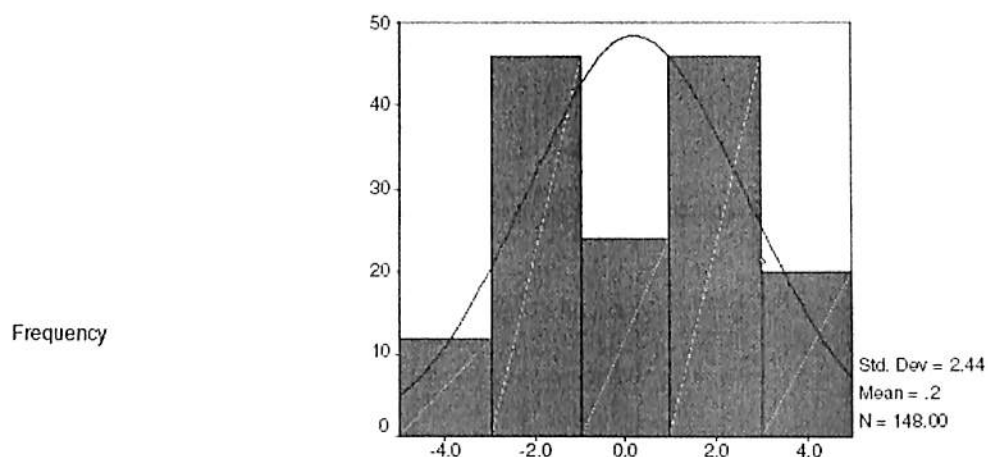


*Figure 4.18: Distribution Histogram of Q10*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .22 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process

**Table 4.41 Q11: you feel that you have a knowledge sharing culture within your organization versus a knowledge hoarding one.**

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## Descriptive

| Question11 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.87 | .172 |
| 95% Confidence Interval for mean | Lower Bound | -1.21 | |
| | Upper Bound | -.53 | |

**Table 4.40**
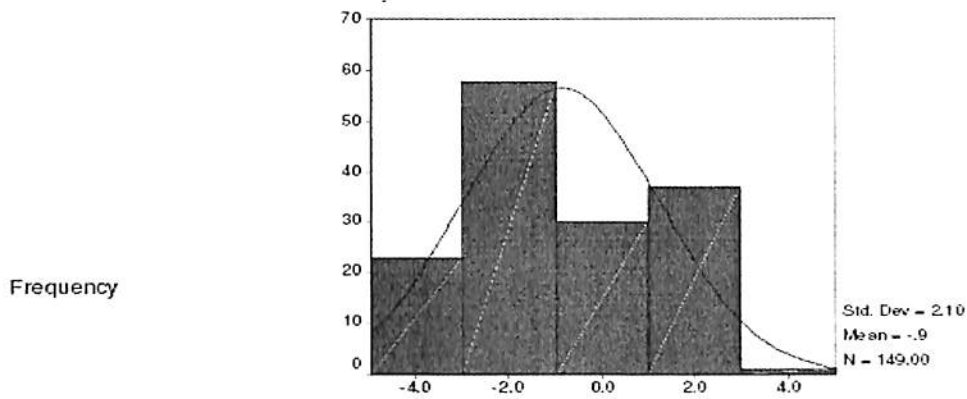


*Figure 4.19: Distribution Histogram of Q11*

As we see in the table and in related distribution histogram, which doesn't show normal distribution, with 95% confidence in test of hypothesis, the mean value is about -.87 Which indicates a negative opinion about this question exists, and can be one negative point in knowledge sharing process

**Q12:You have a high percentage of teams with shared incentives whereby the team members share common objectives and goals.**

## Descriptive

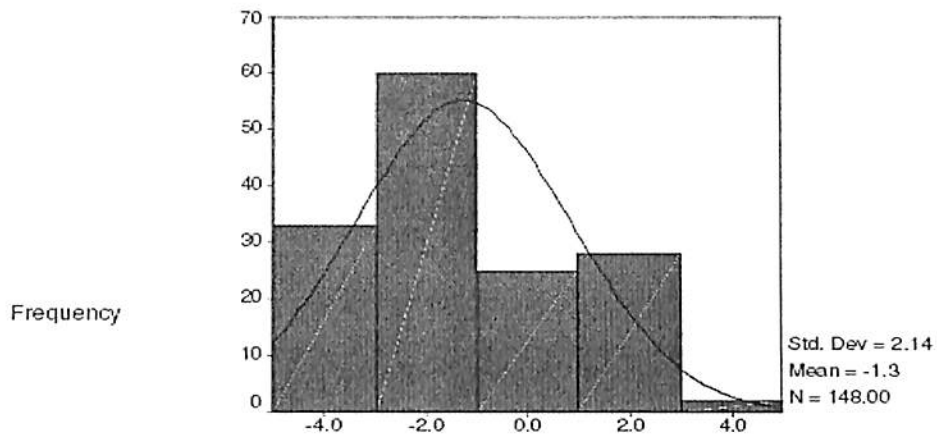| Question12 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.37 | .175 |
| 95% Confidence Interval for mean | Lower Bound | -.72 | |
| | Upper Bound | -.03 | |

**Table 4.42**
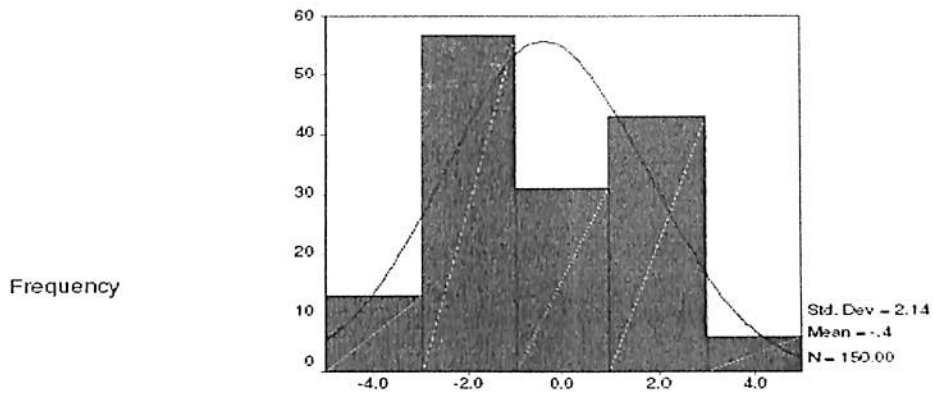
*Figure 4.20: Distribution Histogram of Q12*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.37 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process

**Q13: There are online communities of practice in my organization where we can exchange views and ideas in areas of common interest.**

**Descriptive**

| Question13 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -1.11 | .168 |
| 95% Confidence | Lower Bound | -1.44 | |
| Interval for mean | Upper Bound | -.78 | |

**Table 4.43**



*Figure 4.21: Distribution Histogram of Q13*

81

As we see in the table and in related distribution histogram, which doesn't show normal distribution, with 95% confidence in test of hypothesis, ,the mean value is about -1.11 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process.

*About Organizational Facilitation*

**Q14: you are promoted and rewarded based upon your ability to share your knowledge with others.**

**Descriptive**

| Question14 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -1.25 | .178 |
| 95% Confidence | Lower Bound | -1.61 | |
| Interval for mean | Upper Bound | -.90 | |

**Table 4.44**
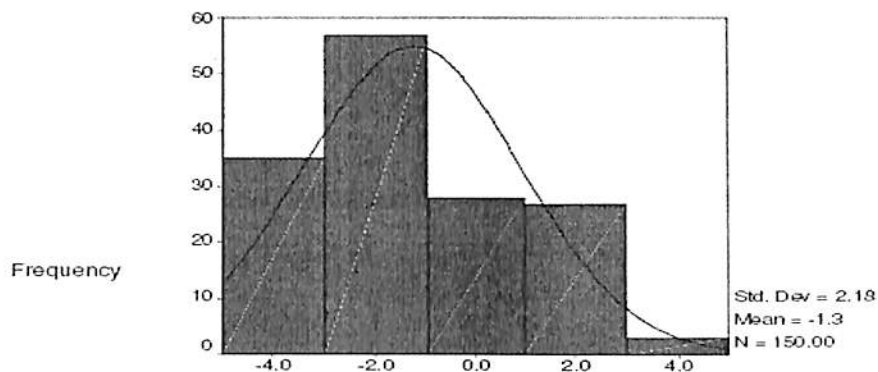


*Figure 4.22: Distribution Histogram of Q14*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -1.25 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process

**Q15: There is an adequate budget for professional development and training in your organization.**

**Descriptive**

| Question15 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | .45 | .193 |
| 95% Confidence | Lower Bound | .07 | |
| Interval for mean | Upper Bound | .83 | |

**Table 4.45**

82
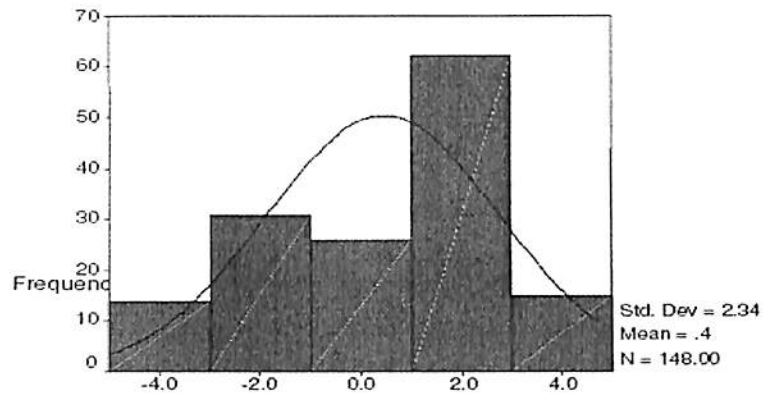
*Figure 4.23: Distribution Histogram of Q15*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .45 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process

**Q16: Success, failure, or war stories are systematically collected and used in your organization.**

**Descriptive**

| Question16 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.71 | .175 |
| 95% Confidence | Lower Bound | -1.06 | |
| Interval for mean | Upper Bound | -.37 | |

**Table 4.46**



question16
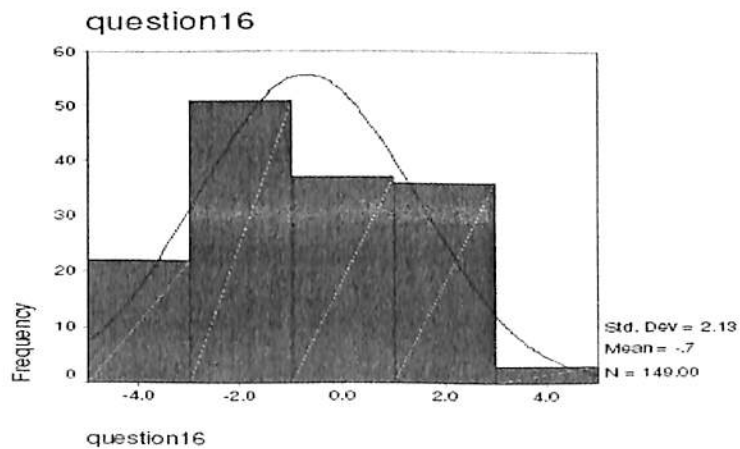
*Figure 4.24: Distribution Histogram of Q16*

83

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.71 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process

**Q17: The measurement system in your organization incorporates intellectual and customer capital, as well as the knowledge capital of your products or services.**

**Descriptive**

| Question17 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.31 | .169 |
| 95% Confidence Interval for mean | Lower Bound | -.64 | |
| | Upper Bound | -.03 | |

**Table 4.47**



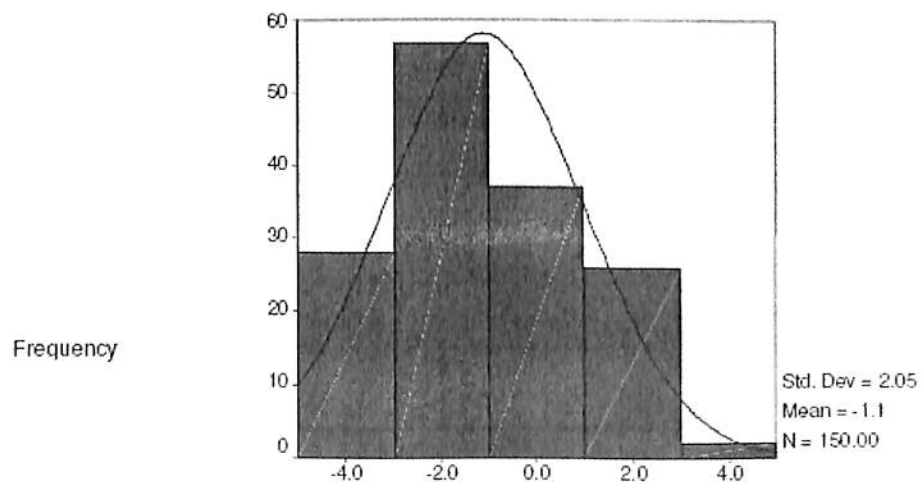question17

Std. Dev = 2.06
Mean = -.3
N = 149.00
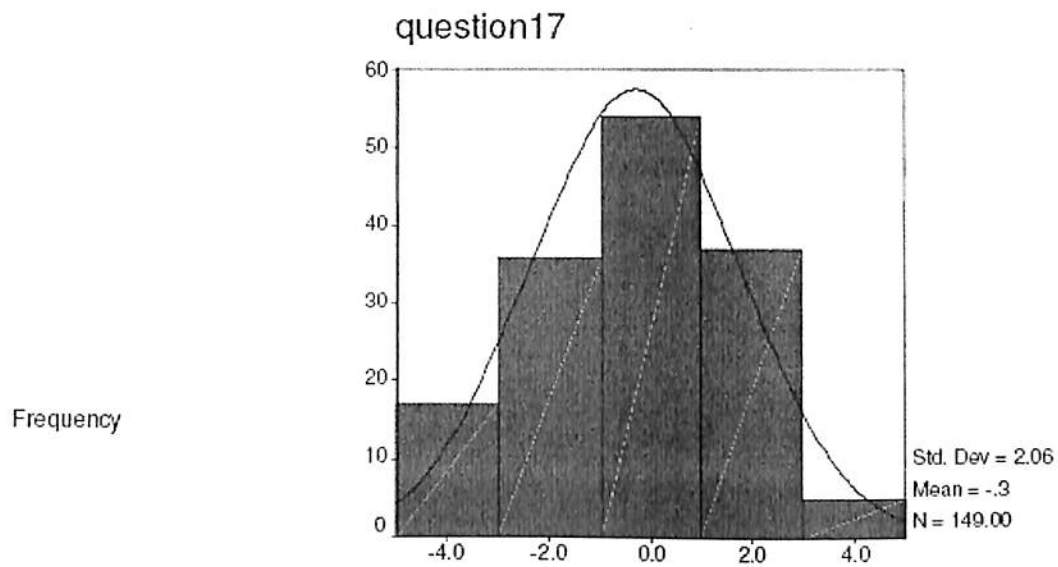
*Figure 4.25: Distribution Histogram of Q17*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.31 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process

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**Q18: you have the technological infrastructure to promote knowledge sharing environment within your organization.**

**Descriptive**

| Question18 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | .31 | .184 |
| 95% Confidence Interval for mean | Lower Bound | -.06 | |
| | Upper Bound | .67 | |

**Table 4.48**



question18

*Figure 4.26: Distribution Histogram of Q18*

As you see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .31 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process

**Q19: We typically have integrated engagements where the number of projects in which more than one business unit participates occurs**

**Descriptive**

| Question19 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | .37 | .147 |
| 95% Confidence Interval for mean | Lower Bound | .08 | |
| | Upper Bound | .66 | |

**Table 4.49**

85

*Figure 4.27: Distribution Histogram of Q19*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .37 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process

**Q20: You have internal surveys on learning which surveys employees to see if business units are supporting and creating opportunities for one another.**

**Descriptive**

| Question20 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.66 | .172 |
| 95% Confidence Interval for mean | Lower Bound | -1.00 | |
| | Upper Bound | -.32 | |

**Table 4.50**
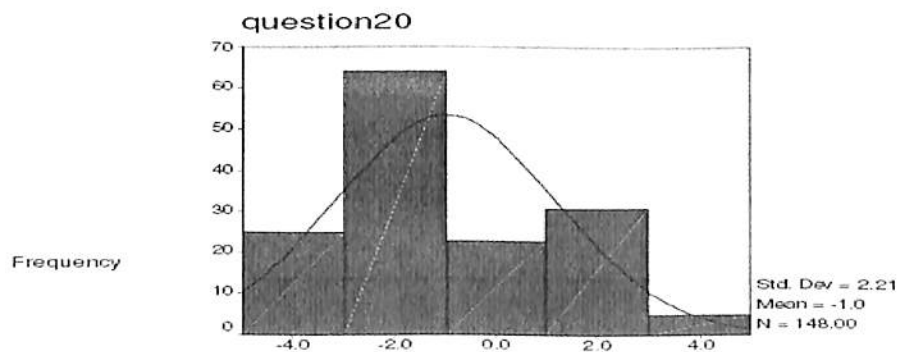


*Figure 4.28: Distribution Histogram of Q20*

86

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -.99 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process

**Q21: You track the degree to which the organization is entering team based relationships with other business units, organizations or customers.**

**Descriptive**

| Question21 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.54 | .180 |
| 95% Confidence | Lower Bound | -.89 | |
| Interval for mean | Upper Bound | -.18 | |

**Table 4.51**



*Figure 4.29: Distribution Histogram of Q21*

With 95% confidence in test of hypothesis, the mean value is about -.54 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process

**Q22: The organization's office layout is conducive to speaking with colleagues/ meeting people.**

**Descriptive**

| Question22 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | .71 | .181 |
| 95% Confidence | Lower Bound | .35 | |
| Interval for mean | Upper Bound | 1.07 | |

**Table 4.52**

question22
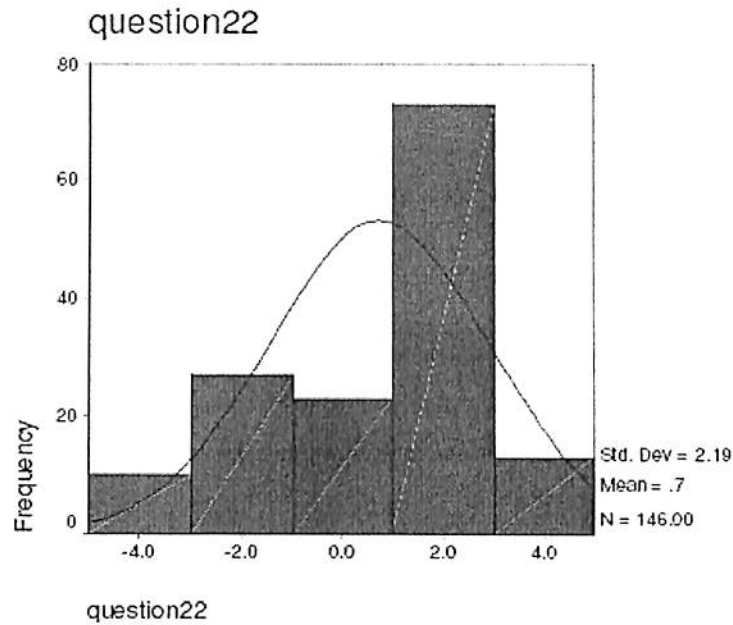
*Figure 4.30: Distribution Histogram of Q22*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .71 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process.

***About Measurement***

**Q23: The reuse rate of 'frequency accessed/reused' knowledge in your organization is high.**

**Descriptive**

| Question23 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | ..04 | .171 |
| 95% Confidence | Lower Bound | -.30 | |
| Interval for mean | Upper Bound | .38 | |

**Table 4.53**

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question23

Std. Dev = 2.06
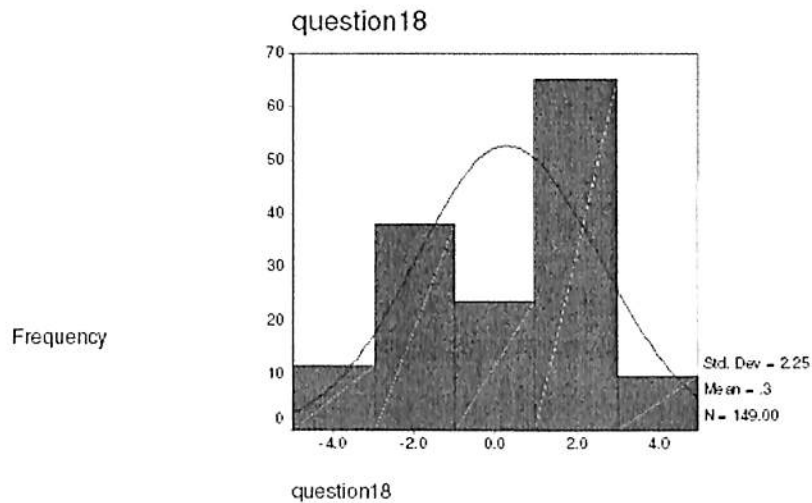Mean = .0
N = 145.00
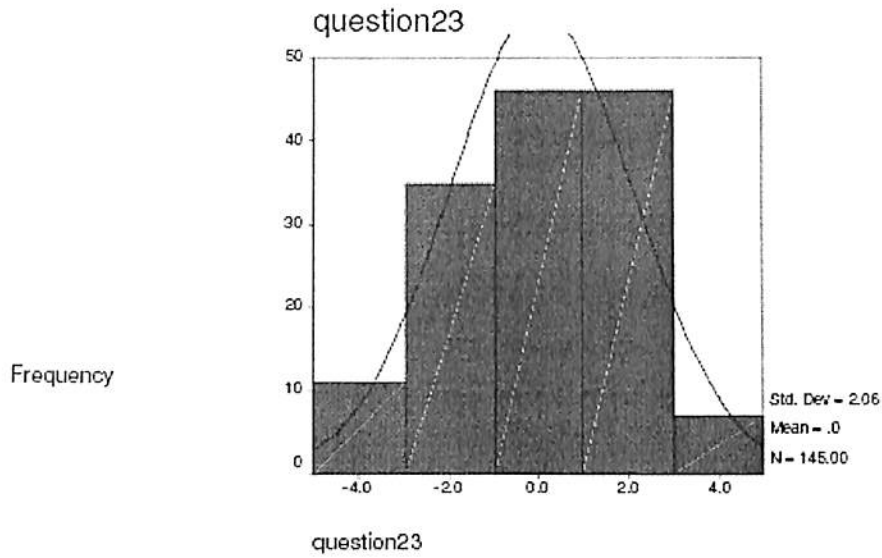
*Figure 4.31: Distribution Histogram of Q23*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about .04 which indicates a positive opinion about this question exists ,and can be one positive point in knowledge sharing process

**Q24: The distribution of knowledge to appropriate individuals in your organization is done actively on a daily basis.**

**Descriptive**

| Question24 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -1.27 | .152 |
| 95% Confidence Interval for mean | Lower Bound | -1.57 | |
| | Upper Bound | -.96 | |

**Table 4.54**

## question24
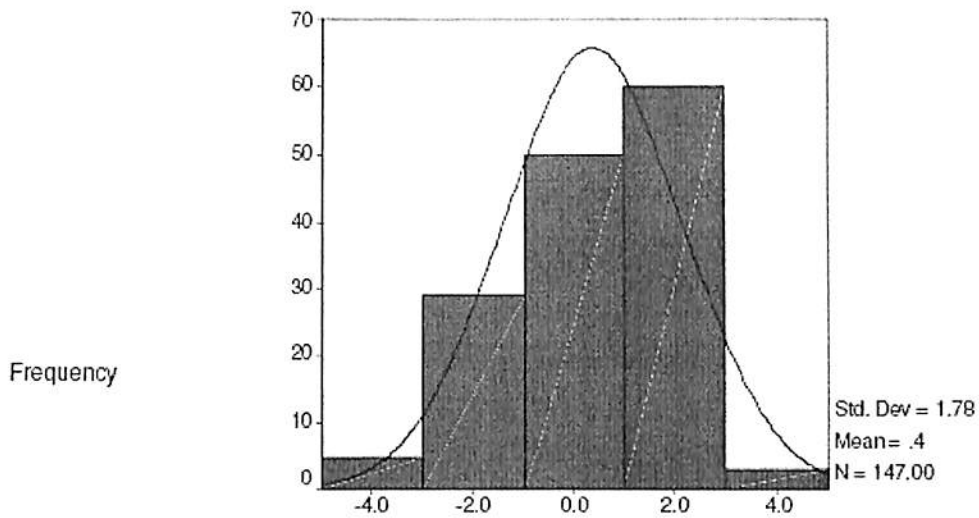


Std. Dev = 1.84
Mean = -1.3
N = 147.00

question24
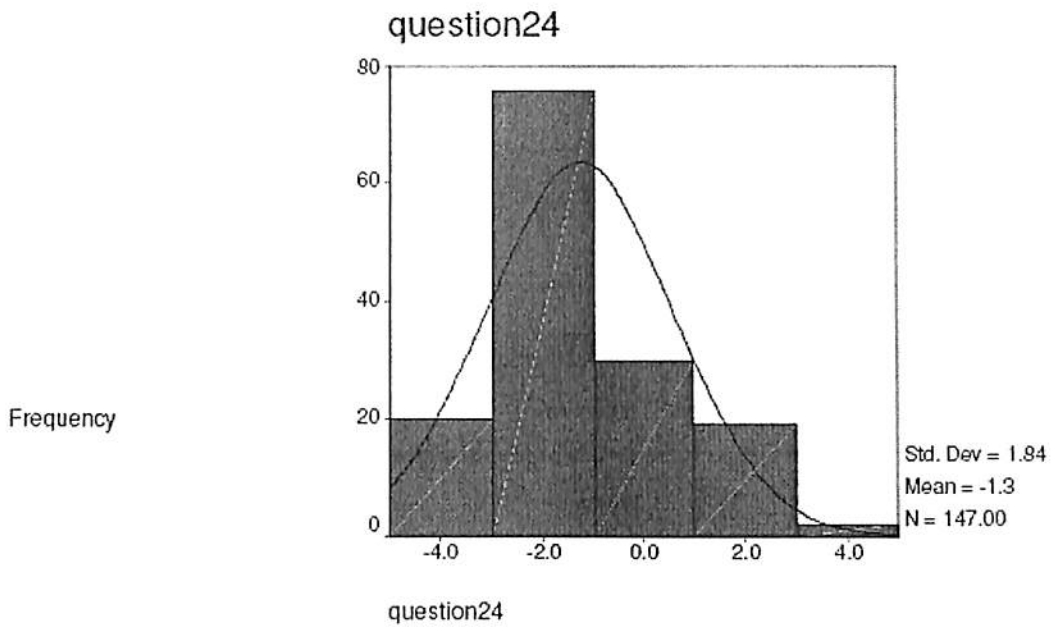
*Figure 4.32: Distribution Histogram of Q24*

As we see in the table and in related distribution histogram, which doesn't show normal distribution ,with 95% confidence in test of hypothesis, ,the mean value is about -1.27 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process .

**Q25: New ideas generating innovative products or services are a frequent occurrence in my organization.**

**Descriptive**

| Question25 | | Statistics | Standard Error |
|---|---|---|---|
| Mean | | -.43 | .179 |
| 95% Confidence | Lower Bound | -.79 | |
| Interval for mean | Upper Bound | -.08 | |

**Table 4.55**

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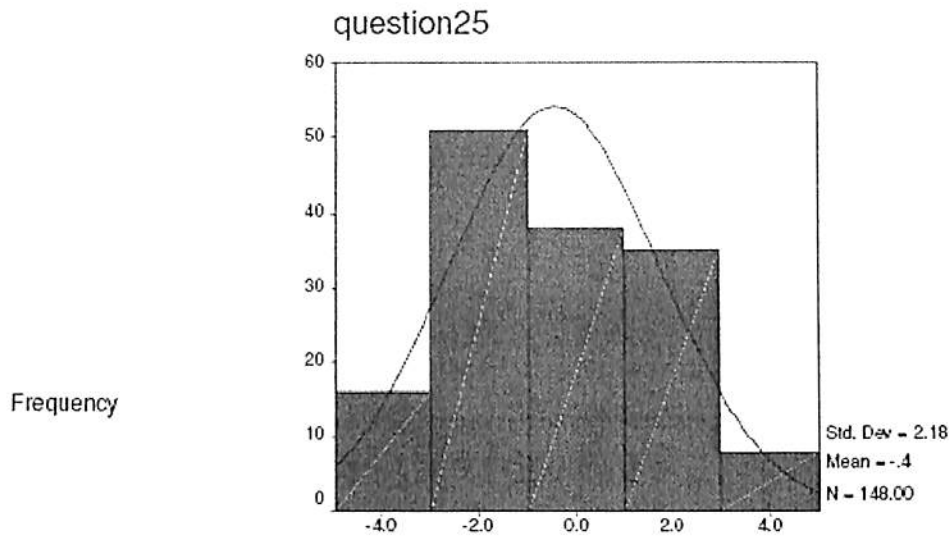
*Figure 4.33: Distribution Histogram of Q25*

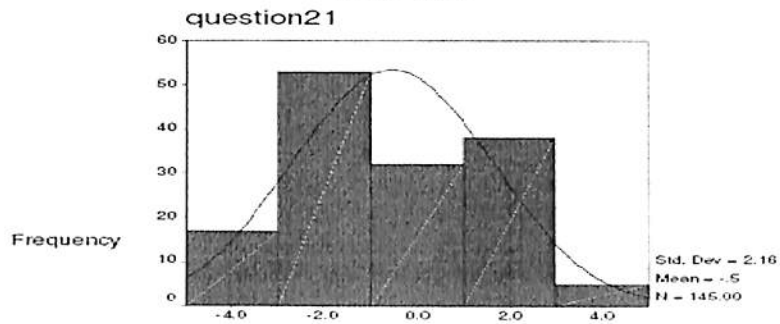As you see in the table and in related distribution histogram, which doesn't show normal distribution, with 95% confidence in test of hypothesis, ,the mean value is about -0.43 which indicates a negative opinion about this question exists ,and can be one negative point in knowledge sharing process.

## 4.5 Normality distribution with usage of Tests of Normality

Normality distribution has been investigated by using test of normality with Kolmogorov-Smirnov and Shapiro-Wilk.

For investigating normality of distribution about 4 main options which are Communication, KM Environment, Organization Facilitation and Measurement, Kolmogorov-Smirnov nonparametric test has been conducted.

### About communication

*Q1: Key expertise is often being captured in an online way in your organization*

**Test of Normality**

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question1* | *.249* | *55* | *.000* | *.875* | *55* | *.000* |

**Table 4.56**

According to the table 4.56 achieved p-values is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This

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result exactly is the same as what we were expecting and most of the people agree that key expertise is not being captured in online way in their organization and the achieved result confirm it.

**Q2: You get appropriate lessons learned sent to me in areas where youl can benefit.**

### Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *Df* | *Sig.* | *Statistic* | *df* | *Sig* |
| question2 | .308 | 152 | .000 | .847 | 152 | .000 |

***Table 4.57***

According to the Table 4.57 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that they don't get appropriate lessons learned sent to them in areas where they can benefit and the achieved result confirm it.

**Q3: You usually have time to chat informally with your colleagues.**

### Test of Normality

| | Kolmogorov-Smirnov | | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | | *Statistic* | *df* | *Sig* |
| question3 | .337 | 152 | .000 | | .809 | 152 | .000 |

***Table 4.58***

According to the table 4.58 achieved p-values is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that they usually don't have time to chat informally with their colleagues and the achieved result confirm it.

**Q: Individualized learning is usually transformed into organizational learning through documenting this knowledge into your organization's knowledge repository.**

### Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| question4 | .224 | 149 | .000 | .903 | 149 | .000 |

***Table 4.59***

According to the table 4.59 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This

result exactly is the same as what we were expecting and most of the people agree that Individualized learning is not usually transformed into organizational learning through documenting this knowledge into their organization's knowledge repository, and the achieved result confirm it. The result from this option is that about communication the asked questions had not followed a normal distribution.

## About KM Environment

**Q5: There are many knowledge fairs/exchanges in your organization to spawn new colleague relationships.**

### Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| question5 | .229 | 148 | .000 | .881 | 148 | .000 |

*Table 4.60*

According to the table 4.60 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that there are not many knowledge fairs/exchanges in their organization to spawn new colleague relationships, and the achieved result confirm it.

**Q6: There are lessons learned and best practices repositories within your organization.**

### Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| Question6 | .267 | 149 | .000 | .868 | 149 | .000 |

*Table 4.61*

According to the table 4.61 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that there are not lessons learned and best practices repositories within their organization, and the achieved result confirm it.

**Q 7: You have a mentoring program within my organization.**

## Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question7* | *.239* | *148* | *.000* | *.867* | *148* | *.000* |

*Table 4.62*

According to the table 4.62 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that they don't have a mentoring program within their organization, and the achieved result confirm it.

**Q8: You have centers of excellence in our organization whereby you can qualify to become a member/affiliate of the center.**

## Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *Df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question8* | *.262* | *148* | *.000* | *.868* | *148* | *.000* |

*Table 4.63*

According to the table 4.63 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that they don't have any center of excellence in their organization whereby they can qualify to become a member/affiliate of the center, and the achieved result confirm it.

**Q9: You typically work in teams or groups.**

## Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question9* | *.307* | *150* | *.000* | *.842* | *150* | *.000* |

*Table 4.64*

According to the table 4.64 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that they typically don't work in teams or groups, and the achieved result confirm it.

**Q 10: Our main product is our knowledge.**

According to the table 4.73 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exact y is the same as what we were expecting and most of the people do not agree that their main product is their knowledge, and the achieved result confirm it.

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question10* | *.214* | *148* | *.000* | *.892* | *148* | *.000* |

*Table 4.65*

**Q11: You have a knowledge sharing culture within our organization versus a knowledge hoarding one.**

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question11* | *.248* | *149* | *.000* | *.870* | *149* | *.000* |

**Table 4.66**

According to the table 4.66 achieved p-values is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that they don't feel having a knowledge sharing culture within their organization versus a knowledge hoarding one, and the achieved result confirm it.

**Q 12: You have a high percentage of teams with shared incentives whereby the team members share common objectives and goals.**

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *Df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question12* | *.243* | *150* | *.000* | *.882* | *150* | *.000* |

*Table 4.67*

According to the table 4.67 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution This result exactly is the same as what we were expecting and most of the people agree that

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they do not have a high percentage of teams with shared incentives whereby the team members share common objectives and goals ,and the achieved result confirm it.

*Q13: There are online communities of practice in your organization where you can exchange views and ideas in areas of common interest.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question13* | *.235* | *150* | *.000* | *.889* | *150* | *.000* |

### Table 4.68

According to the table 4.68 achieved p-values is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution. This result exactly is the same as what we were expecting and most of the people agree that ,and the achieved result confirm it. The result from this option is that about KM Environment the asked questions had not followed a normal distribution.

## About Organizational Facilitation

*Q14: You are promoted and rewarded based upon your ability to share your knowledge with others.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question14* | *.247* | *150* | *.000* | *.877* | *150* | *.000* |

### Table 4.69

According to the table 4.69 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

*Q 15: There is an adequate budget for professional development and training in your organization*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question15* | *.267* | *148* | *.000* | *.878* | *148* | *.000* |

### Table 4.70

According to the table 4.70 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

***Q 16: Success, failure, or war stories are systematically collected and used in your organization.***

## Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question16* | *.217* | *149* | *.000* | *.893* | *149* | *.000* |

***Table 4.71***

According to the table 4.71 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

***Q17: The measurement system in your organization incorporates intellectual and customer capital, as well as the knowledge capital of your products and services.***

## Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *Question17* | *.204* | *149* | *.000* | *.905* | *149* | *.000* |

***Table 4.72***

According to the table 4.72 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

***Q18: You have the technological infrastructure to promote knowledge sharing environment within your organization.***

## Test of Normality

|  | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *Question18* | *.277* | *149* | *.000* | *.864* | *149* | *.000* |

***Table 4.73***

According to the table 4.73 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

*Q19: You typically have integrated engagement where the number of projects in which more than one business unit participates occurs.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question19* | *.249* | *147* | *.000* | *.856* | *147* | *.000* |

*Table 4.74*

According to the table 4.82 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

*Q 20: You have internal surveys on learning which surveys employees to see if business units are supporting and creating opportunities for one another.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *Question20* | *.278* | *148* | *.000* | *.871* | *148* | *.000* |

*Table 4.75*

According to the table 4.83 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

*Q21: You track the degree to which the organization is entering team based relationships with other business units, organizations or customers.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| *question21* | *.233* | *145* | *.000* | *.891* | *145* | *.000* |

*Table 4.76*

According to the table 4.76 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

*Q 22: The organization's office layout is conducive to speaking with colleagues /meeting people.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| question22 | .311 | 146 | .000 | .845 | 145 | .000 |

**Table 4.77**

According to the table 4.77 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

## About Measurement

*Q23: The reuse rate of 'frequency accessed/reused 'knowledge in your organization is high.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| Question23 | .195 | 145 | .000 | .902 | 145 | .000 |

**Table 4.78**

According to the table 4.78 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

*Q 24: The distribution of knowledge to appropriate individuals in your organization is done actively on a daily basis.*

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| question24 | .308 | 147 | .000 | .852 | 147 | .000 |

**Table 4.79**

According to the table 4.79 achieved p-value is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution.

**Q25: New ideas generating innovative products or services are a frequent occurrence in your organization.**

## Test of Normality

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | *Statistic* | *df* | *Sig.* | *Statistic* | *df* | *Sig* |
| question25 | .216 | 148 | .000 | .904 | 148 | .000 |

*Table 4.80*

According to the table 4.80 achieved p-values is about 0.00 that is less than 0.05 which means that question among asked people had not followed normal distribution

## 4.6 Priority of Knowledge Sharing Factors by using Friedman Test

According to Friedman test we can give priority to all factors of knowledge sharing .In fact for showing the role of each question at each category ,Friedman test has been used.

### 4.6.1 Friedman test About Communication flow

At the first main option, which is communication flow we have four questions that should be ranked by Friedman test. As you see at the Table 4.81, the third question with mean rank of 3.34 has the highest rank in agreement case, and the first question with mean rank of 1.97 has the highest rank in disagreement case among respondents. In fact the first question is an important obstacle in knowledge sharing process in oil and gas organization.

### Ranks

| | Mean Rank |
|---|---|
| Question3 | 3.34 |
| Question 2 | 2.45 |
| Question 4 | 2.24 |
| Question 1 | 1.97 |

*Table 4.81: Ranks of questions of Communication flow*

As we see from oil and gas organization employees point of view the first question is less considered in their company as one factor for knowledge sharing and the third question has been considered more than other questions in communication flow.

**Test Statistics**

| N | 148 |
|---|---|
| Chi-Square | 131.834 |
| Df | 3 |
| Asymp. Sig. | .000 |

**Friedman Test**

*Table 4.82: Friedman test of Communication flow*

As we see at the Table 4.82 Asymp.sig is .000 and because of being less than .05, there is a significant differentiation between mentioned questions.

## 4.6.2 Friedman test About KM environment

At the second main option, which is KM environment, we have nine questions that should be ranked by Friedman test. As you see at the Table 4.83, the ninth question with mean rank of 6.37 has the highest rank in agreement case, and the eighth question with mean rank of 3.89 has the highest rank in disagreement case among respondents .In fact the eighth question is an important obstacle in knowledge sharing process in oil and gas organizations.

**Ranks**

| | Mean Rank |
|---|---|
| Question9 | 6.37 |
| Question10 | 5.71 |
| Question 5 | 5.59 |
| Question12 | 5.30 |
| Question7 | 4.72 |
| Question6 | 4.71 |
| Question11 | 4.57 |
| Question13 | 4.15 |
| Question8 | 3.89 |

*Table 4.83: Ranks of questions of KM environment*

As we see from oil and gas organization employees' point of view, the ninth question is less considered in their company as one factor for knowledge sharing and the eighth question has been considered more than other questions in KM environment.

**Test Statistics**

| N | 139 |
|---|---|
| Chi-Square | 123.509 |
| Df | 8 |
| Asymp. Sig. | .000 |

**Friedman Test**

*Table 4.84: Friedman test of KM environment*

As we see at the Table 4.84 Asymp.sig is .000 and because of being less than .05 ,there is a significant differentiation between mentioned questions.

## 4.6.3 Friedman test About Organizational Facilitation

At the third main option, which is Organization Facilitation, we have nine questions that should be ranked by Friedman test. As you see at the Table 4.85, the twenty second question with mean rank of 6.13 has the highest rank in agreement case, and the fourteenth question with mean rank of 3.73 has the highest rank in disagreement case among respondents .In fact the fourteenth question is an important obstacle in knowledge sharing process in oil and gas organization.

**Ranks**

| | Mean Rank |
|---|---|
| Question22 | 6.31 |
| Question15 | 5.87 |
| Question19 | 5.64 |
| Question18 | 5.59 |
| Question17 | 4.90 |
| Question21 | 4.62 |
| Question16 | 4.37 |
| Question20 | 4.16 |
| Question14 | 3.73 |

*Table 4.85: Ranks of questions of Organization Facilitation*

As we see from oil and gas organization employees' point of view, the fourteenth question is less considered in these organizations as one factor for knowledge sharing and the twenty questions has been considered more than other questions in Organization Facilitation part.

**Test Statistics**

| N | 138 |
|---|---|
| Chi-Square | 135..458 |
| Df | 8 |
| Asymp. Sig. | .000 |

**Friedman Test**

*Table 4.86: Friedman test of Organization Facilitation*

As we see at the Table 4.86 Asymp.sig is .000 and because of being less than .05 ,there is a significant differentiation between mentioned questions.

## 4.6.4 Friedman test About Measurement

At the Forth main option, which is Measurement, we have three questions that should be ranked by Friedman test. As you see at the Table 4.87, the twenty third questions with mean rank of 2.24, has the highest rank in agreement case, and the twenty forth question with mean rank of 1.70 has the highest rank in disagreement case among respondents .In fact the twenty forth question is an important obstacle in knowledge sharing process in oil and gas organizations.

**Ranks**

|  | Mean Rank |
|---|---|
| Question23 | 2.24 |
| Question25 | 2.06 |
| Question24 | 1.70 |

**Friedman Test**

*Table4.87: Ranks of questions of Measurement*

As we see from oil and gas organization employees' point of view, the twenty forth question is less considered in their company as one factor for knowledge sharing and the twenty third questions has been considered more than other questions in Organization Facilitation part.

**Test Statistics**

| N | 144 |
|---|---|
| Chi-Square | 34.867 |
| Df | 2 |
| Asymp. Sig. | .000 |

**Friedman Test**

*Table 4.88: Friedman test of Measurement*

As we see at the Table 4.88 Asymp.sig is .000 and because of being less than .05, there is a significant differentiation between mentioned questions in Measurement part.

## 4.6.5 Friedman test Overall

As I considered for showing the role of each question the test of Freidman was conducted, we have twenty five questions that should be ranked by Friedman test overall. As you see at the Table 4.89, the third question with mean rank of 19.07,has the highest rank in agreement case, and the twenty forth question with mean rank of 9.55 has the highest rank in disagreement case among respondents ,which in order fall in two main options, the first one Communication flow, and the second one Measurement .In fact the twenty forth question is an important obstacle in knowledge sharing process in oil and gas organizations.

**Ranks**

|  | Mean Rank |
|---|---|
| Question3 | 19.07 |
| Question22 | 16.57 |
| Question9 | 16.05 |
| Question15 | 15.88 |
| Question19 | 15.27 |
| Question18 | 15.07 |
| Question10 | 14.51 |
| Question23 | 14.16 |
| Question5 | 14.01 |
| Question2 | 13.83 |
| Question17 | 13.49 |
| Question12 | 13.03 |
| Question25 | 12.40 |
| Question21 | 12.15 |
| Question7 | 12.14 |
| Question4 | 12.00 |
| Question16 | 11.65 |
| Question11 | 11.60 |
| Question6 | 11.30 |
| Question20 | 11.21 |
| Question14 | 10.15 |
| Question1 | 10.06 |
| Question13 | 10.05 |
| Question8 | 9.82 |
| Question24 | 9.55 |

*Table4.89: Ranks of questions of Overall*

As you see from oil and gas organization employees' point of view, the twenty forth question is less considered in their company as one factor for knowledge sharing and the third question has been considered more than other questions overall.

**Test Statistics**

| N | 121 |
|---|---|
| Chi-Square | 428.614 |
| Df | 24 |
| Asymp. Sig. | .000 |

**Friedman Test**

*Table 4.90: Friedman test of overall*

As we see at the Table 4.98 Asymp.sig is .000 and because of being less than .05, there is a significant differentiation between all mentioned questions overall.

## 4.7 Correlation Matrix for all asked questions

Twenty-five questions have been asked from 56 respondents by distributing the questionnaire among them, has four main options, as are Communication flow, KM environment, organization facilitation and Measurement. Now we want to know after answering those mentioned questions by respondents, whether the way of their answering is affecting other main options or not .For this reason four main options will be analyzed. In fact by analyzing four main options not only we can summarize all those information and data, but also we can recognize all effective and important factors. In the table 4.91 which is mentioned in Appendix, when we analyze those main four options, we expecting to face a good correlation between factors, but when we get

Correlation matrix we face any considerable correlation between 25 questions, and when we analyze four main options, those 25 questions can be together in 6 compiled as you see in table 4.92.

# Chapter-5

## Findings and conclusion

> ➢ Finding and conclusion
> ➢ Results
> ➢ Recommendation
> ➢ Knowledge Sharing Framework
> ➢ Future Studies
> ➢ Limitations and Troubles of research

### 5 Findings and Conclusion

*In this research, all efforts of researcher is to shows all affecting factors on knowledge sharing and at the end on knowledge management exists in oil and gas organizations. And by statistical works which were shown in previous chapter is completely clear. Those main factors and their sub factors were analyzed and the result showed that any knowledge sharing factors exist, which were can be defined by having the correct way of communication flow, having environment for knowledge management, having sufficient Organization facilitation and at the end measuring knowledge management in oil and gas organization.*

*The statistical works included Friedman test has been done for giving priority to all factors and sub-factors and by correlation matrix we got there is any significant correlation between knowledge sharing factors and sub-factors in oil and gas organization.*

*For getting these results and necessary result the questionnaire was distributed among educated people of oil and gas organizations.*

## 5.1 Results

All result of distributing the questionnaire among Oil and gas organizations employees shows that all the answers are near to Disagree and completely disagree. It means all people of sample agree that in Oil and gas organizations there is no knowledge sharing. For showing existence and inexistence of knowledge sharing and as a result knowledge management, all affecting factors on knowledge sharing have been used for these reasons which are as following:

*1- Communication flow*

*2- Knowledge management environment*

*3- Organization facilitation*

*4- Measurement*

For each question according to getting data from 152 questionnaire all related tables and graphs have been designed which show frequency of answered different options. Among answers sometimes, not answered questions have been seen that can be named as missing value, but I should mention that all data analyzing have been done according to frequency of respondent people for their real answers to questions In distribution histogram which has been done and analyzed for each question, they don't follow any normality distribution, which for this result the test of normality has been done. From the result of respondents we can get that all respondents agree that they need such a these mentioned factors in our organization for having knowledge sharing

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environment and they answers shows that these factors are really affecting knowledge sharing in our organization.

They respond show that these mentioned factors are not considered as important as they really are in making knowledge management comes true. And these factors don't have very good condition and this result is not convenience for this corporation and management should be convinced to create a community for knowledge sharing in this company. About 25 questions have been investigated and each question shows important factors for creating a situation for knowledge sharing. The number of affecting sub-factors for each main option is as following:

For Communication flow (4 factors), for knowledge management Environment (9 factors), for Organizational facilitation (9 factors) and at the end for measurement (3 factors) exists which have been analyzed separately. Those questions have given priority by Friedman test and each question has its own importance, although there is not big difference between their importance's, they can be given priority anyway. This priority was described in previous chapter but will be described here more.

In questionnaire the most agreed factor for creating knowledge sharing community, according to data analysis in each category Communication flow has "D" rate . If an organization rates as an A overall, it has done very well in knowledge sharing. A "B" knowledge sharer means that the organization does well in knowledge sharing.

In rating as a "C" knowledge sharer, even though there is some knowledge sharing culture. It is not good to be ranked as "D" or "F" respectively, as Oil and gas organizations ranks. As you observed in previous chapter we ranked our four main parts by taking" A" as +4 ,"B" as +2,"C" as 0,"D" as -2 and" F" as -4,As 76 100 points ranks A,50-75 points ranks B,0-49points ranks C, minus 50-minus 1 ranks "D" and minus 100-minus 51 ranks "F", we can see the Oil and gas organizations in Communication part which has average score of -2.5 ranks" D" and also in part of Organizational facilitation with average score of -32.7 ranks "D" and in KM Environment with average score of -71.6 and Measurement with average score of -81.3 the organization ranks F, it is not good to be ranked as "D" or "F" which means that the culture and environment in the organization resists knowledge sharing, and there are few, if any, strategies, technologies, and communication channels for knowledge sharing .The Oil and gas organizations which ranks overall "D" with average score of -47.68 , which means that this organization is not faring well at all in terms of knowledge sharing and overall knowledge management. At the first Oil and gas organizations step should check all the possible obstacles to knowledge sharing by examining the output from questionnaire.

Also, Oil and gas organizations should can take advantages of other best practices, and develop a knowledge sharing strategy for the organization.

Oil and gas organizations should leverages knowledge sharing factors as has been explained in questionnaire as its annual performance evaluation. It means colleagues should learn to share their knowledge by trusting to each other, have a continuous learning, open to new ideas, Shares own knowledge ,always learning from others , applying knowledge in their daily works and building partnerships for learning and knowledge sharing. I think oil and gas organizations should make a big difference in its training section, as it should make a big change in culture of employees that we are not here just for training you, we are all together one team, that should learn from each other, letting each other teach courses that normally we do just in one way. Eliminating all those bureaucracies that don't let management and ordinary employees even see each other to get in touch and be involved in knowledge of each other. There should be some announcement for conferences and RFPs (request for proposals) to colleagues, and putting together joint sessions at conference. Also Oil and gas organizations should engage its people (all those involved people in their company)

to help strengthen the department versus ones to enhance individuals' achievement, they should always think of We not Me. Oil and gas organizations has a better situation in part of communication flow, although it ranks is "D", its score is better than other 3 parts. Other parts can be ranked in order as following:

- Organizational Facilitation
- KM environment
- Measurement

As you saw, oil and gas organizations are not faring well in Measurement case, and also it does not have any convenience environment for KM. By Friedman test which was explained in previous chapter we got in each main part, which question is getting the less agreement score and is lacking more than other involved questions in knowledge sharing. As I mentioned before in Communication flow ,the third question which was about having time to chat informally with their colleagues ,has the highest score with mean rank of 3.34 in agreement case and the first question which was about capturing key expertise in an online way in their organization ,has the lowest score with the mean rank of 1.97 in disagreement case, it means that the Oil and gas organizations, should cares a lot about training its employees and wholly its people in online way instead of traditionally training, by creating its necessity environment and technology and at the end training their employees for getting their expertise through internet or intranet and the most important thing creating and developing the culture of this critical option.

About the second main part which is KM Environment that consists of 9 questions the ninth question, which was about working in teams or groups in Oil and gas organizations, has the highest mean rank with about 6.37 in agreement case and the eighth question which was about having centers of excellence in their organization whereby they can qualify to become a member/affiliate of the center, has the lowest mean rank of about 3.89 in disagreement Case among other mentioned questions at this main part. I think the company should pay more attention for crating centers of excellence in company and in promoting its people to qualify themselves by rewarding systems to get involved in these centers. Many organizations like American Management Systems have created corporate knowledge Centers in core competency areas to encourage online communities of practice for increased knowledge sharing. This factor can not come true unless the management assigns an adequate budget for this serious affair. About the third main part which is about Organizational Facilitation that consist of 9 questions, the twenty-second question ,which was about the layout of the organization's office is conductive to speaking with their colleagues and meeting people, has the highest mean rank with about 6.13 in agreement case and the fourteenth question which was about promoting and rewarding them based on their abilities to share their knowledge with others ,has the lowest rank with the mean rank of about 3.73 in disagreement case among other mentioned questions at this main part. I think the company should cares more about rewarding system to encourage its people to share their knowledge as other Companies same as Xerox and Ford has done before. the Oil and gas organizations should change its strategies and reconstruct its policies upon knowledge sharing culture and effectiveness, how they help knowledge sharing culture to be expanded in the company and informing others about benefits of this asset and rewarding employees by doing beneficial researches in this case. developing "motivate " and "reward" system for encouraging knowledge management and sharing is very difficult at the first step specially for governmental companies, because they have limited budget for these thing  and they haven't have this kind of system in their organizations anymore. At the first these kind of organizations should be informed about the value of this asset for their organizations to get appropriate finance fir this importance affair, the second one they should  understand that by applying this rewarding system to their strategies and policies the can get more benefit in the future by caring about this option. About the last main part which is about Measurement that consists of 3 questions, the twenty-third question, which was about the highness reuse rate of "frequency accessed/reused" knowledge in their organization, has the highest mean rank of about 2.24 in agreement case, and the twenty-forth question which was

about doing actively on a daily basis in distributing of knowledge to appropriate individuals in their organization, has the lowest rank of about 1.70 in disagreement case. It means oil and gas companies is not faring well at distributing appropriate knowledge to appropriate individuals on a daily basis or may be on a monthly basis. I think training section is responsible for this critical section, I mean Training section should realize that which kind of knowledge is appropriate for which person and how should it be transformed to it. By knowing that is this knowledge convenience for that person who is working in this part regarding to its daily duties, and then making this knowledge to be transformed in online way. Wholly, if I want to put all questions regarding to the Friedman test by their caring rate and mean rank, I should say the third question is the most agreed one among other options for being existed in oil and gas organizations and the twenty fourth questions is the lowest agreed among other questions in oil and gas organizations.

According to the correlation matrix which has been mentioned in previous chapter and will be seen in Appendix part, you can see there is no relationship between questions and between any main parts. Here ,I should mention that oil and gas organization according to the ranks of Data analysis by A,B,C,D,F; should cares more about Measurement with the rank of "F" for the score of -81,3 in case of its tree parts as are in following with their importance:

- The distribution of appropriate knowledge to appropriate person on a daily basis (Mean Rank=1.70).
- Caring about new ideas generating innovative products or services(Mean Rank=2.06)
- Caring about the rate of "frequently accessed/reused" knowledge in their organization.(Mean Rank=2.24) In The case of KM Environment which the company is not faring well at all with the rank of "F" for the score of -71.6, oil and gas organization should care about the following options by their priority:
- Having centers of excellence in oil and gas organizations, whereby they can qualify to become a member/affiliate of center.(Mean Rank=3.89)
- Having online communities of practice in oil and gas organizations where they can exchange views and ideas.(Mean Rank=4.15)
- Creating a knowledge sharing culture within the organization Versus knowledge hoarding one.(Mean Rank=4.57)
- Creating repositories for lessons learned and best practices in Oil and gas organizations (Mean Rank =4.71)

- Creating a mentoring program within Oil and gas organizations(Mean Rank=4.72)
- Developing teams with shared incentives whereby the team members share common objectives and goals.(Mean Rank=5.30)
- Caring more about creating the knowledge fairs/exchanges within Oil and gas organizations to spawn new colleagues to colleague relationships.(Mean Rank=5.59)
- They really think that their main product is their knowledge.(Mean Rank=5.71)
- Working in teams and groups should be their mission.(Mean Rank=6.37)
- In the case of Organizational Facilitation which the company has the better condition comparing to other main options with the rank of "D" for the score of -32.7, oil and gas organization should care about the following options by their priority:
- Having promotion and rewarding system based upon abilities of employees to share their knowledge with others.(Mean Rank=3.73)
- Having internal surveys on teaming which surveys employees to see if the departments are supporting and creating opportunities for one another.(mean
- Rank=4.16)
- Collecting and using Success, Failure or War stories ,systematically, in Oil and gas organizations(Mean Rank=4.37)
- Tracking the degree to which the organization is entering team-based relationships with other business units, organizations or customers.(Mean Rank=4.62)
- The measurement system in Oil and gas organizations should incorporates intellectual and customer capital, as well as the knowledge capital of their products and services.(Mean rank=4.90)
- Having technological infrastructure to promote a knowledge sharing environment within Oil and gas organizations(Mean Rank=5.59)
- Having integrated assignments for the number of projects in which more than one department participates occurs(Mean Rank=5.64)
- Allocating adequate budget for professional developments and training in oil and gas organizations.(Mean Rank=5.87)
- The layout of organization's office should be conductive to speaking with their colleagues and meeting people.(Mean Rank=6.13)
- In the case of Communication which the Oil and gas organizations has the best situation among other three main options ,with the rank of "D" for the score of

2.5,Which means Oil and gas organization should care about following options regarding to their priorities:

- Capturing key expertise in an online way in Oil and gas organizations (Mean Rank=1.97)
- Transforming individualized learning into organizational learning through documenting this knowledge into their organization's knowledge repository.(Mean Rank=2.24)
- Sending appropriate lessons learned for staff in areas where they can benefit.(Mean Rank=2.45)
- Letting staff to have time for chatting informally with their colleagues.(Mean Rank=3.34).

As I explained all options importance and their priority the Company should care a lot about those options for creating knowledge sharing community.

## 5.2 Recommendations

1- This research should be done every other year to evaluate all affecting factors on "knowledge sharing" and finally on" Knowledge management".

2- Some researches should be done to get the most important factors affecting culture of people in organizations for "knowledge management adoption".

3- Promoting managers to help their employees to share their tacit knowledge by providing secure community within organizations.

4- Promoting rewarding system for enhancing knowledge sharing culture.

5- Using all present resources in order to speed up knowledge sharing culture.

6- Creating a convenience infrastructure for knowledge sharing.

7- Creating competitive environment for knowledge sharing by putting evaluation of employees on this case.

8- Having control on needed knowledge resources and processors that these are available in sufficient quality and quantity.

9- Caring about those people who are innovative and always are ready for giving new ideas.

10- Making the layout of organization's office convenience for knowledge sharing.

11- Making centers of excellence that people can qualify themselves to be member of it.

12- There should be a measurement system for evaluating knowledge resources, processors, leadership.

13- There should be coordination among employees that they think they are working for the same goals and objectives.

14- Distribution of knowledge among employees should be appropriate according to they daily responsibilities and it should e done in appropriate time.

15- There should not be big gap among management and employees that staff easily share their knowledge and say their opinion without any bureaucracy.

16- There should be commitment of top leadership to sharing organizational knowledge.

17- There should be strong commitment for employees to work in teams or group.

18- Management should care more about the staff's communication that should give the time for chatting informally.

19- Management team should give a high priority to KM on the agenda.

20- Staff should think of knowledge sharing instead of knowledge hoarding with this motto that give to get.

21- Employees always should think of us not me.

22- Senior management should cares about adequate budget for creating convenience infrastructure for knowledge sharing and finally knowledge management adoption.

23- There should be exchanges of experiences and knowledge among people of organizations by creating online communities for this reason.

24- Training section should cares more about e-training and creating online communities in which employees can get key expertise in an online way.

25- Training section which is responsible for training of staff should send appropriate lessons to appropriate person in appropriate time in online way.

26- Making employees willing and free to explore and share their knowledge by having and developing knowledge friendly culture.

27- Management should always be responsible for all mentioned affecting factors and make that the mission of the company.

28- The organization should think that their main product is their knowledge and all its goals are besides it.

29- Management should create trusting culture by providing secure community for it.

30- All the organizations units should supporting and creating opportunities for one another.

31- For all project of organization, all business units should participate.

32- .Success, Failure or war stories should be collected and used in organizations.

33- Rewarding system of organizations should be based only upon sharing knowledge with others.

34- There should be mentoring program within the organizations.

35- There should be repositories in organizations where individuals learning can be transformed into organizational learning by documenting that kind of knowledge.

## 5.3 Knowledge sharing Framework

Delphi methodology was chosen to conduct my framework for this study, among panel of experts who were about 15 people in Oil and gas organizations Delphi model is very useful when there is limited background information available to facilitate decision making or idea generating, or when measuring tastes, opinion or community values and when information is either intangible or shrouded in uncertainty.

Those participants of my Delphi model were employees of Oil and gas organizations who had adequate knowledge in this case and in another word, really were expert of knowledge management. The objectives of a Delphi study may include

- determining or develop[ping a range of possible alternatives
- exploring or exposing underlying assumptions or information leading to differing judgments
- seeking out information which may generate a consensus of judgment on the part of the respondent group
- correlating informed judgments on a topic spanning a wide range of disciplines
- educating the respondent group as to the diverse and inter-related aspects of the topic

The panel of expert participants was sent the framework which they were requested to anonymously complete. The participant therefore requires good communication skills to provide a coherent and accurate response to the questions asked. The participants are instructed to return the completed framework to the Delphi coordinator who objectively syntheses and edits the participants' responses. The results of round one form the second framework, which is more structured than the first round. In this second round, participants are asked to explore and rate the full range of anonymously presented responses of other participants. The completed frameworks are once again returned to the Delphi coordinator who calculates a statistical group response.

### 5.3.1 Respondents' specifications

The respondents should have two specifications together:

A: Being familiar with knowledge management and knowledge sharing

B: Should be worked in Oil and gas organizations and having the adequate knowledge to complete the framework, who were all in high position of organization and already were working on KM projects. Those who answered the framework and completed it were about 15 people that were adequate and sufficient for this study according to the

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topic of my research and my framework which is so new topic among Iranian communities. Some information about respondents is summarized in following table.

| Age | Job Experience (Year) | Job Position | | | Education | |
|---|---|---|---|---|---|---|
| | | Manager | Boss | Chef-expert | Master(person) | PHD(person) |
| 29-42 | 10-15 | 2 | 7 | 6 | 11 | 4 |

*Table 5.1: Respondents Specifications*

## 5.3.2 The First round of Delphi for Knowledge Sharing Framework

After defining the experts who can be involved in Delphi study, for explaining how they should complete the framework one letter got prepared. (Appendix B).

The summary of this letter was this; the topic is developing a conceptual framework for knowledge sharing which leads to knowledge management that with the Delphi model it going to be run. And for validating this study, they were asked to write down their specifications as is in appendix B. The first key element of my framework came from literature review and its wholly shape came from consulting.

Although those collected people for this Delphi model were completely familiar with this topic, I prepared a summary about knowledge sharing and knowledge management to give them more information about it.

### 5.3.3 The Second round of Delphi for Knowledge sharing Framework

By collecting the first round of framework, the first round got finished. At the second round, these responses were investigated precisely to summarizing and classifying of responses can be done easily. The result of the first round with one letter pinned together to be sent to those experts again. At the second round respondents didn't changed their idea except 1 or 2 people that add something more and wholly they emphasized on their given idea and there was no need to go to the third round. You can see the letter in Appendix C. The result of second round is as next page.

# Management Resources Organization

## 5.3.4 Conceptual Framework for Knowledge sharing at the first
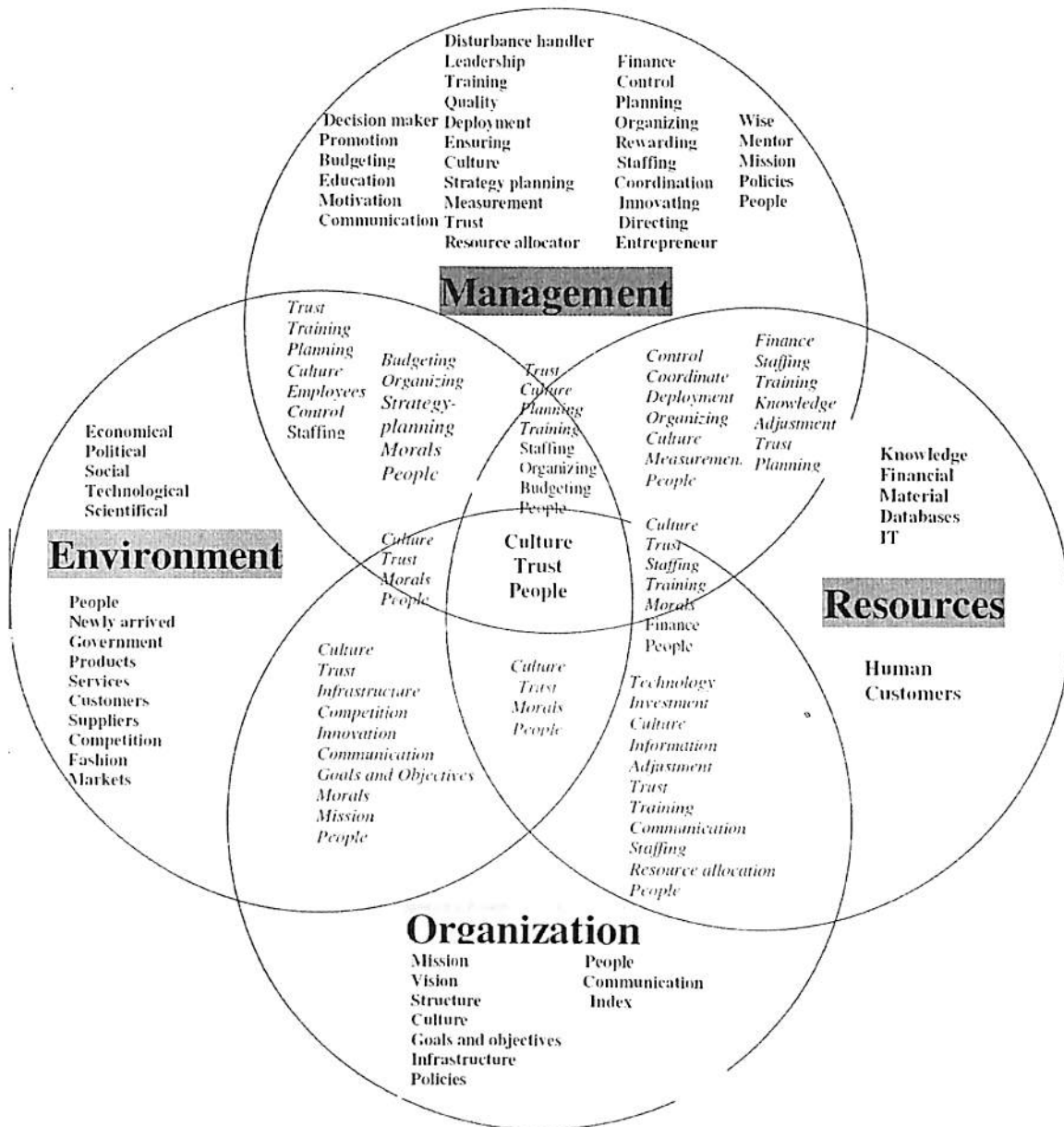


*Figure 5.1: KSF first round*

## 5.3.5 The result of Delphi process

After collecting all responses of panel of experts about the framework at the second round, I got that although 2 people have made a little bit changes in their responses, others didn't change their idea .so three wasn't any new idea and so there was convergence among respondent's answers. So, at this level, because of stability of opinion of respondents, the Delphi process was completely accomplished and was finished. The completed framework after the second round of Delphi process is at the next page. \

## 5.3.6 Conceptual Framework for adopt Knowledge Sharing at the Second Round
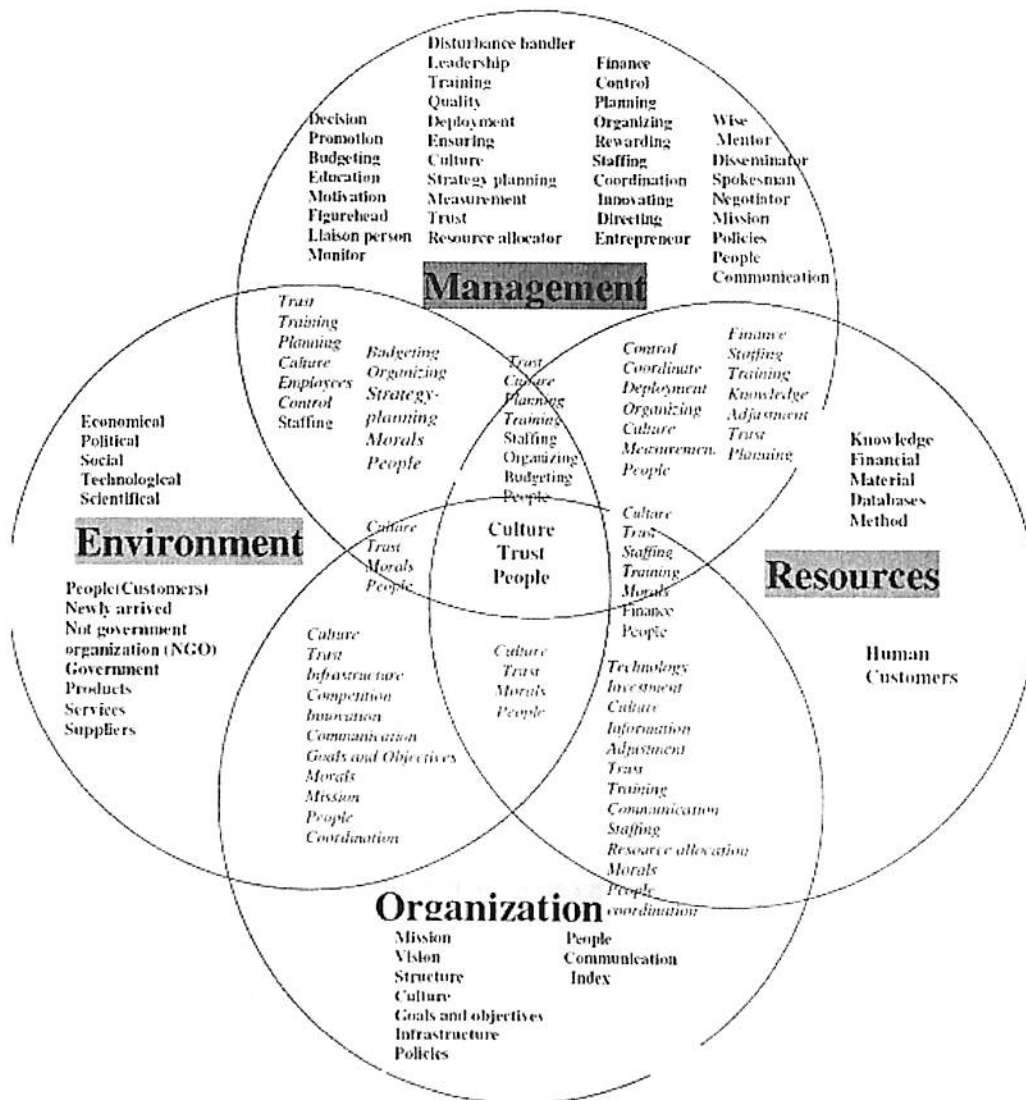


Figure 5.2: KSF second round

## 5.3.7 Data Analysis

According to the all responses for framework based on Delphi model, at the present time I can say that, the most important factors affecting knowledge sharing in organizations are:

1- Culture (13/15)

2- Trust (13/15)

3- People (10/15)

Morals also was another mentioned element after People with 8 idea, but another tiny element have been mentioned from 1-7 times, that because of not getting into those element and mentioning its detailed ,they have not been mentioned. But those elements which are written in red colour in each circle is the most agreed one in that circle. As I said before by changing the culture of people and making the secure atmosphere for people to trust each other in order to share their knowledge, we can get ready for adopting knowledge management in our organizations. "The most important part of knowledge management process with respect to trust is knowledge transfer or knowledge sharing, it is frequently commented that in order for people be willing to share their knowledge, they must have trust".

Trust has been discussed as a perquisite for tacit knowledge sharing .

Also as this famous sentence mentions that: The mantra within the knowledge management community is that 80% of knowledge management is people and culture, and 20% is technology, a key component of people and culture factors deals with encouraging a knowledge sharing environment within the organization.

## 5.4 Future Studies

The notion of KM is in itself nothing new. The area is however experiencing revolutionary process aiming to conceptualize the team into something more tangible and explicit.

Finally, my research has indicated those factors affecting knowledge management adoption in oil and gas industry and it can be expanded in future to all Iranian automotive industries. The research also showed that which factors should each involved part in Knowledge management community should have to help the organizations remove those obstacles and motivate themselves to adopt knowledge management by creating knowledge sharing culture. This research also, could be done through a survey, a case study, or combination of both. This is done in order to obtain accurate and sufficient results from the researched data.

## 5.5 Limitations and troubles of research

These troubles and limitations can be categorized as following:

A :Limitations of study's resources: although there were so many articles and also books about knowledge management ,the approved articles about knowledge sharing attributes and elements were so limited and in fact primary resources were inaccessible but accessing to some scientific and famous websites covered this great gap.

**B:** Limitation in finding knowledge based people: indeed knowledge based people who were respondent of my questionnaire and also my framework which I run by Delphi model, must had two factors coincidently:

1- Being familiar with the exact concept of knowledge management/sharing and its specification and also familiar with proficiencies these two make for involved organizations.

2- Being familiar with problems which have been made as a result of non knowledge-based organizations. it means that people who were asked ,should had had a management experiences or being really familiar with KM discourses. The first problem in my research was finding those experts that had these specifications together. And the second problem was that because of being so busy those my mentioned sample , they didn't have enough time to consider to my questionnaire or some how they postponed replying it for 2 or 3 weeks and this made so many problems for me.

# Chapter-6

## *Reflection*

> ➤ **Learn points of doing this research**
> ➤ **Passion of re-doing this research**

# 6 Reflection

*This chapter will describe learnt points of doing this research and what is the passion of doing this research.*

## 6.1 Learnt points of doing this research

I learned to motivate all organizations to emphasize on the following elements:

- Tell stories, with sufficient details.
- Establish a process for filtering out trivial, low-value practices.
- If you build it they will not come. Push the knowledge to users.
- Provide peer-recognition of people who share knowledge.
- Hi-Tech works only if there is Hi-Touch.
- System must have automatic feedback.
- Culture of knowledge sharing must exist.
- Capture Hi-Value, Proven Practices.
- Recognize participants
- Culture of knowledge sharing

## 6.2 Passion of re-doing this research

If I have to do this research again, I will do it in the case of following

1- How organizations change the culture of their people for knowledge sharing

2-Hiow Create a trustable environment for employees to Share their knowledge.

3- How Care more about employees who are an important factor in KM adoption.

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# Appendices

- ➢ **Appendix A: Questionnaire**
- ➢ **Appendix B: Letter of framework for the first round**
- ➢ **Appendix C: Letter of framework for the second round**
- ➢ **Appendix D: Correlation matrix**

# Appendices

## Appendix A: Questionnaire

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| **About Communication:** | | | | | |
| **Key expertise is often captured in an online way in organization.** | | | | | |
| **You get appropriate lessons learned sent to them in areas where they can benefit.** | | | | | |
| **You usually have time to chat informally with your colleagues.** | | | | | |
| **Individualized learning is usually transformed into organizational learning through documenting this knowledge into your organization's knowledge repository.** | | | | | |
| **About KM Environment:** | | | | | |
| **There are many knowledge exchanges within organization to seed new colleague to colleague relationships.** | | | | | |
| **There are lessons learned and best practices repositories within** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| your organization. | | | | | |
| You have a mentoring program within our organization. | | | | | |
| You have centers of excellence in our organization whereby you can qualify to become a member/affiliate of the center. | | | | | |
| You typically work in teams . | | | | | |
| Your main product is your knowledge. | | | | | |
| You feel that you have a knowledge sharing culture within your organization like knowledge hoarding one. | o | | | | |
| You have a high percentage of teams with shared incentives whereby the team members share common objectives and goals. | | | | | |
| There are online communities of practice in your organization where you can exchange views & ideas. | | | | | |
| About Organizational | | | | | |
| You are promoted and rewarded based upon your ability to share your knowledge with | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| others. | | | | | |
| There is an adequate budget for professional development and training in your organization. | | | | | |
| Success, failure, or war stories are systematically collected and used in your organization. | | | | | |
| The knowledge system in your organization incorporates intellectual and customer capital, as well as the knowledge capital of our products or services. | | | | | |
| You have the technological infrastructure to promote a knowledge sharing environment within our organization. | | | | | |
| You have integrated an assignment where the number of projects in which more than one department participates occurs. | | | | | |
| You have internal surveys on teaming which surveys employees to see if the departments are supporting and creating opportunities for | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| one another. | | | | | |
| You have to track the degree to which the organization is entering team-based relationships with other business units, organizations or customers. | | | | | |
| About Measurement: | | | | | |
| The reuse rate of "frequently accessed/reused" knowledge in your organization is high. | | | | | |
| The distribution of knowledge to appropriate individuals in your organization is done actively on a daily basis. | | | | | |
| New ideas generating innovative products or services are a frequent occurrence in your organization. | | | | | |

## Apendix B: Letter of framework for the first round

Dear Sir/Ma'am,

Please answer the following questions and be sure that your information will be kept secret and no one even is informed of your ordered framework.

Please have a look at the knowledge sharing framework at the next page and edit it as you think is more correct.

By Delphi model I want to run this framework for among experts and after each time getting back your answers, I will adjust my model again turn the model round you.

Please help me in this research .Thanks for all your helps.

Amit Goyal,

Student of Master of Technology (Petro Informatics)

University of Petroleum and Energy Studies, Gurgaon


Name...................................

Surname ...............................

Education ..............................

Career .................................

Job experience .......................

Age ........................... (Years)

Job Position ........................... (Manager, Boss, Chef Expert, Expert)

# Appendix C: Letter of framework for the second round

Dear Mr/Ms ....................

Thanks for all your helps and your effective contribution about my conceptual framework for knowledge sharing.

The framework at the next page has been adjusted by getting your feedbacks at the first turn.

Now, please tell me your own opinion of this framework and make it more correct and if you want to support your idea, please write down some explanative words, or if you want to correct your previous order at the first turn you can do it and tell your reason for it. Thanks a lot,

# Appendix D: Correlation Matrix
## Communalities

|  | Initial | Extraction |
|---|---|---|
| question1 | 1.000 | .545 |
| question2 | 1.000 | .673 |
| question3 | 1.000 | .691 |
| question4 | 1.000 | .590 |
| question5 | 1.000 | .669 |
| question6 | 1.000 | .627 |
| question7 | 1.000 | .619 |
| question8 | 1.000 | .506 |
| question9 | 1.000 | .477 |
| question10 | 1.000 | .678 |
| question11 | 1.000 | .594 |
| question12 | 1.000 | .585 |
| question13 | 1.000 | .508 |
| question14 | 1.000 | .611 |
| question15 | 1.000 | .657 |
| question16 | 1.000 | .628 |
| question17 | 1.000 | .656 |
| question18 | 1.000 | .545 |
| question19 | 1.000 | .691 |
| question20 | 1.000 | .696 |
| question21 | 1.000 | .690 |
| question22 | 1.000 | .669 |
| question23 | 1.000 | .555 |
| question24 | 1.000 | .598 |
| question25 | 1.000 | .556 |

*Extraction Method: Principal Component Analysis.*

# Appendix E: Data Based on Questionarrie

| | Qusetion1 | Qusetion2 | Qusetion3 | Qusetion4 | Qusetion5 | Qusetion6 | Qusetion7 | Qusetion8 | Qusetion9 | Qusetion10 | Qusetion11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Strongly Disagree | 37 | 13 | 1 | 17 | 12 | 20 | 19 | 33 | 8 | 12 | 23 |
| Disagree | 55 | 62 | 19 | 54 | 51 | 62 | 55 | 60 | 42 | 46 | 58 |
| Neutral | 24 | 12 | 16 | 40 | 24 | 25 | 31 | 25 | 15 | 24 | 30 |
| Agree | 29 | 43 | 85 | 30 | 50 | 39 | 42 | 28 | 71 | 46 | 37 |
| Strongly Agree | 6 | 22 | 31 | 8 | 11 | 3 | 1 | 2 | 14 | 20 | 1 |
| System | 1 | 0 | 0 | 3 | 4 | 3 | 4 | 4 | 2 | 4 | 3 |
| Total | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |

| | Qusetion11 | Qusetion12 | Qusetion13 | Qusetion14 | Qusetion15 | Qusetion16 | Qusetion17 | Qusetion18 | Qusetion19 | Qusetion20 | Qusetion21 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 23 | 13 | 28 | 35 | 14 | 22 | 17 | 12 | 5 | 25 | 17 |
| | 58 | 57 | 57 | 57 | 31 | 51 | 36 | 38 | 29 | 64 | 53 |
| | 30 | 31 | 37 | 28 | 26 | 37 | 54 | 24 | 50 | 23 | 32 |
| | 37 | 43 | 26 | 27 | 62 | 36 | 37 | 65 | 60 | 31 | 38 |
| | 1 | 6 | 2 | 3 | 15 | 3 | 5 | 10 | 3 | 5 | 5 |
| | 3 | 2 | 2 | 2 | 4 | 3 | 3 | 3 | 5 | 4 | 7 |
| | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |