

**A STUDY ON IMPACT OF TECHNOLOGY OUTSOURCING IN MOBILE
COMMUNICATION COMPANIES**

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A PROJECT REPORT

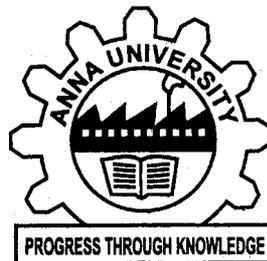
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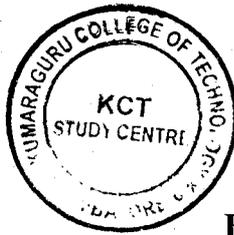
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ABSTRACT

Outsourcing is a very important concept which has gained momentum in recent years. Outsourcing strategy is used in various domains like IT, Telecom, Manufacturing etc. Companies have benefited in many ways by outsourcing their core technology and also their non-core technical activities. Many Mobile service providers have started to outsource their core technology to vendors who are specialized in a particular technology. This has helped mobile service providers to introduce attractive value added service in market.

As the Telecom market is being crowded by service providers providing better service to the customers in mandatory. This study aims out in finding the ways by which outsourcing of core technology impacts the functioning of Mobile Communication companies. The benefits and limitations faced by Service providers as a result of outsourcing their core technology are also studied.

This study will also bring out the importance of Technology Outsourcing in Telecommunication field as the market is getting crowded with service providers and better service is the only way for success and survival. Primary data is used for analysis and it is collected by means of structured questionnaire. Samples are taken from Engineers working in the Mobile communication companies. Hypotheses are framed and analyzed using chi-square analysis. Further, percentage analysis is also used for analyzing the data. Based on the data analysis it is found that the advantages of Technology Outsourcing overweigh its disadvantages and it is highly required by Mobile Companies in this competitive era.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND STUDY

1.1.1 Telecommunication

Telecommunication is the assisted transmission over a distance for the purpose of communication. In earlier times, this may have involved the use of smoke signals, drums, semaphore, flags or heliograph. In modern times, telecommunication typically involves the use of electronic devices such as the telephone, television, radio or computer. Early inventors in the field of telecommunication include Alexander Graham Bell, Marconi and John Logie Baird. Telecommunication is an important part of the world economy and the telecommunication industry's revenue was estimated to be \$1.2 trillion in 2006.

1.1.2 Cellular Mobile Communication

Cellular Mobile communication is a wireless telecommunication method. Here voice and data are transferred through air. The subscribers are given a card known as the SIM card to access the telecom network. The Service providers are telecom operators who provide the necessary infrastructure which has the necessary technology to accomplish communication. The customer use the Mobile phones to access the network of the Service providers. In recent years Mobile phones have become an integral part in the life of the people. From layman to businessmen all have started using the mobile phones. Here the

coverage area is divided into number of cells and hence the name cellular mobile communication.

In general there are two types of techniques which are used to facilitate communication through air interface. They are,

GSM -> Global System for Mobile Communication.

CDMA -> Code Division Multiple Access

In India we are using both GSM and CDMA technology. Companies like Airtel, Aircel, Vodafone use GSM technology and companies like Reliance TTSL and MTS use CDMA technology. Both the technologies have their own advantages and disadvantages. Compare to CDMA operators, GSM operators have more subscriber base in their network. There were 297.26 million GSM Mobile subscribers (75.88%) compared to 94.50 million CDMA subscribers (24.12%) at the end of March 2009.

1.1.3 Core Technology

This is the technology by which operators provide mobile communication service to the customers. Core technology is the basic technology with which the mobile service is provided to the customers through the network. Basically GSM and CDMA are the two basic standards used to communicate in air interface. There are lots of telecommunication equipments which are used to accomplish the communication process. The most important of them are MSC, BSC, BTS, IN and many other network nodes. Mobile Switching Center forms the heart of the communication network which controls and coordinates various activities in the network.

1.1.4 Information Technology in Telecommunication

Information Technology solutions are highly essential to operate the mobile communication network. IT is also required for maintaining and operating mandatory applications like e-mail, intranet etc. Further, all the telecommunication equipments are accessed by LAN and WAN technologies. Hence to provide and maintain this infrastructure highly specialized skills are required. As the telecom network grows the IT needs will also increase and gets complex. These technologies do not add any value to the customers but are extremely important for the smooth operations of the business.

1.1.5 Operators and Vendors

Cellular service providers establish the telecommunication network by the help of external vendors who are the suppliers of the core technology. For example, Ericsson acts as the core technology supplier for companies like Aircel, Airtel in Tamilnadu, Nokia Siemens Network acts as the core technology supplier for Vodafone. In general a company uses the assistance of various vendors for acquiring various technologies. Mobile service providers are called as the operators who provide mobile communication service for the customers. Operators depend upon various vendors to provide service to the customers. For core technology they depend on one vendor and for Value added services they get service from another vendor. A good relationship between operator and vendor is highly essential for the successful functioning of the business.

COMPANY PROFILE

1.2.1 AIRTEL

AIRTEL is one of Asia's leading providers of telecommunication services with presence in all the 22 licensed jurisdictions (also known as Telecom Circles) in India, and in Srilanka. We served an aggregate of 105,195,762 customers as of June 30, 2009; of who 102,367,881 subscribe to our GSM services and 2,827,881 use our Telemedia Services either for voice and/or broadband access delivered through DSL. We are the largest wireless service provider in the country, based on the number of subscribers as of June 30, 2009. We also offer an integrated suite of telecom solutions to our enterprise customers, in addition to providing long distance connectivity both nationally and internationally. We have recently forayed into media by launching our DTH and IPTV Services. All these services are rendered under a unified brand "Airtel".

The company also deploys, owns and manages passive infrastructure pertaining to telecom operations under its subsidiary Bhatia Infratel Limited. Bharti Infratel owns 42% of Indus Towers Limited. Bharti Infratel and Indus Towers are the two top providers of passive infrastructure services in India. Company shares are listed on The Stock Exchange, Mumbai (BSE) and The National Stock Exchange of India Limited (NSE). The company has a strategic alliance with SingTel. The investment made by SingTel is one of the largest investments made in the world outside Singapore, in the company.

The company's mobile network equipment partners include Ericsson and Nokia. In the case of the broadband and telephone services and enterprise services (carriers), equipment suppliers include Siemens, Nortel, Corning, among others. The Company also has an information technology alliance with IBM for its group-wide information technology requirements and with Nortel for call center technology requirements. The call center operations for the mobile services have been outsourced to IBM Daksh, Hinduja TMT, Teletech & Mphasis.

1.2.2. VODAFONE

Vodafone Essar is a leading provider of wireless telecommunications services in India. The company serves about 35 million subscribers located in every major region of the country. In addition to standard and prepaid wireless subscriptions, Vodafone Essar offers such services as text messaging and the wireless distribution of such content, as music and news. It also caters to corporate customers with wireless email and other services. Vodafone Essar, previously Hutchison Essar is a cellular operator that covers 23 telecom circles in India. Despite the official name being Vodafone Essar, its products are simply branded Vodafone. It offers both prepaid and postpaid GSM cellular phone coverage throughout India with good presence in the metros.

Vodafone Essar provides 2.75G services based on 900 MHz and 1800 MHz digital GSM technology, offering voice and data services in 23 of the country's 23 license areas. It is among the top three GSM mobile operators of India. Vodafone Essar is owned by Vodafone 52%, Essar Group, 33% and other

Indian nationals, 15%. On February, 2007, Vodafone agreed to acquire the controlling interest of 67% held by Li Ka Shing Holdings in Hutch-Essar for US\$11.1 billion, piping Reliance Communications, Hinduja Group, and Essar Group, which is the owner of the remaining 33%. The whole company was valued at USD 18.8 billion. . The transaction closed on May 8, 2007. Nokia Siemens is the main vendor which provides core network solution across India. All core network operations are done and maintained by Nokia Siemens Network.

In a country growing as fast as India, a strategic and well managed business plan is critical to success. Initially, the company grew its business in the largest wireless markets in India — in cities like Mumbai, Delhi and Kolkata. In these densely populated urban areas it was able to establish a robust network, well known brand and large distribution network - all vital to long-term success in India. Then it also targeted business users and high-end post-paid customers which helped Hutchison Essar to consistently generate a higher Average Revenue per User ("ARPU") than its competitors. By adopting this focused growth plan, it was able to establish leading positions in India's largest markets providing the resources to expand its footprint nationwide.

1.2.3. RELIANCE COMMUNICATIONS

The Late Dhirubhai Ambani dreamt of a digital India — an India where the common man would have access to affordable means of information and communication. Dhirubhai, who single-handedly built India's largest private sector company virtually from scratch, had stated as early as 1999: "Make the

tools of information and communication available to people at an affordable cost. Reliance Communications is the flagship company of the Anil Dhirubhai Ambani Group (ADAG) of companies. Listed on the National Stock Exchange and the Bombay Stock Exchange, it is India's leading integrated telecommunication company with over 85 million customers.

They will overcome the handicaps of illiteracy and lack of mobility."It was with this belief in mind that Reliance Communications (formerly Reliance Infocomm) started laying 60,000 route kilometers of a pan-India fiber optic backbone. This backbone was commissioned on 28 December 2002, the auspicious occasion of Dhirubhai's 70th birthday, though sadly after his unexpected demise on 6 July 2002.

Reliance Communications has a reliable, high-capacity, integrated (both wireless and wireline) and convergent (voice, data and video) digital network. It is capable of delivering a range of services spanning the entire infocomm (information and communication) value chain, including infrastructure and services — for enterprises as well as individuals, applications, and consulting. Today, Reliance Communications is revolutionizing the way India communicates. Reliance Communications is the second largest Mobile operator in Indian market after Bharti Airtel having a huge customer base. RCOM provides both GSM and CDMA service. Reliance Communications have outsourced their core network operation to Alcatel-Lucent technologies.

1.3 PROBLEM DISCUSSION

Mobile communication sector has greatly influenced the economy of India. It has also influenced the life of people in many ways. People use mobile phones for different purposes. The use of them to run their business, to stay connected etc there is no doubt that Mobile phones have become an integral part of people's life. There are lots of service providers who provide mobile communication service to subscribers. Some of the operators are state owned BSNL & MTNL, Bharathi Airtel, Aircel, Vodafone, Reliance, TTSL, MTS etc. Apart from the mentioned there are lots of operators who are preparing to launch their service in India. Some of them are LOOP telecom, Swan, Datacom etc.

Retaining customers and capturing new customers is of high importance for service providers not only to stay competitive but also to survive in market for long time. Hence operators have to provide better service to stay competitive in the market. Outsourcing plays a vital role in enhancing the overall network performance. By outsourcing their non core technical activities Companies can concentrate on their core technical activities by outsourcing their non-core technical activities like Information Technology Solutions. Some companies have also benefited by outsourcing their core network technology and this has greatly helped companies to strengthen their core competency. The technical expertise of the vendor can be fully utilized as a result of outsourcing. Though there are lots of benefits of outsourcing the core technology there are some limitations outsourcing the core technology to the external vendors. Based on the above discussion the aim of this research is to bring out the benefits that the mobile communication companies will experience by outsourcing its core technology. Also it will also bring the positive and negative impacts of

technology outsourcing. Therefore the research problem is stated as below:

“To gain better understanding on how Technology Outsourcing impacts the performance of the Cellular Mobile Service Providers”.

1.4 NEED FOR THE STUDY

There are various reasons for conducting research in the area of Technology Outsourcing. We are living in an era of Telecommunication revolution. There is a rapid development of technology in the field of Mobile communication. Of the various areas of Telecommunication Cellular Mobile communication has gained popularity among people. Nowadays, Mobile phones have become an integral part in the life of the people. People use mobile phones to run their business, to stay connected, for entertainment purpose and many more. There is another point which is to be considered at this point of time, mobile phone penetration is growing in an alarming phase in India. Operators are adding more than ten million subscribers each month. The need for a mobile phone has become very important for many people. Hence, it is the duty of the Operators to provide best service to the customers. The DOT (Department of Telecommunication) has predicted that India will have one billion customers in the year 2014. Also, there are lots of operators who are new entrants in the telecom market are emerging successfully. Recently the Russian based MTS achieved one million subscriber base in India. The Government has removed lot of investment restrictions and it has resulted in the inflow of FDI, especially in the Telecommunication Sector.

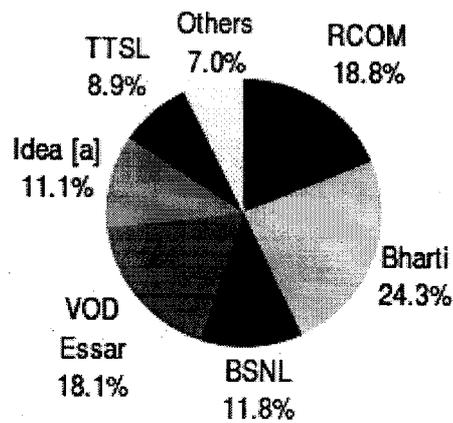


Fig 1.1. Market share of Mobile Service Providers

The above mentioned developments have clearly shows that there is a competitive atmosphere in the Service sector market. Fig 1.1 shows the market share captured by Mobile service providers in Indian market. The market is getting crowded by service providers. BSNL which had the major share in the market has lost a huge market due the arrival of new service providers who follow very aggressive market strategy. The customers are highly concerned about service provided by the Operators. They have lot of options to choose the network. It is not like 15 to 20 years before where BSNL was the only choice for the people. So, in order to stay competitive in the market the service providers should provide better service than the competitors to retain customers and also to add new customers. Outsourcing is highly essential in this scenario as it helps to provide the latest technology in the market as they are expert in their area. For example Airtel has outsourced its core technology operations to Ericsson (Sweden) who are experts in telecommunication equipments. This has greatly benefited Airtel

and it is the leading Mobile service provider in India. Hence, this project will bring out the ways in which Outsourcing has helped the Telecom service providers in India which has resulted in great market penetration and enhanced customer satisfaction. Also, existing Telecom players who are loosing grounds in market has to take necessary action to outsource its operations to survive in the market. For example, the market share of the state owned Telecom company BSNL was approximately 24% there years before and now the market share of BSNL is around 11%. Various reasons can be stated for the downfall of BSNL. The old network architecture and management style can be considered as the main reason for this downfall. Companies have to change according to the circumstances in order to maintain their market share and to be competitive. The study will also bring the ways in which outsourcing has improved the effectiveness of the business operation.

1.5 OBJECTIVES

1. To bring out the importance of outsourcing of technology in the mobile communication industry of India.
2. To study the ways in which outsourcing of core technology has improved the operations of the core network.
3. To study the positive and negative impacts of technology outsourcing.
4. To justify that the burden of non-core technical activities has been removed as a result of technology outsourcing.

1.6 SCOPE

1. To analyze the potential benefits of Technology outsourcing.
2. To create an awareness about the concept of Technology outsourcing and its importance in mobile communication industry.
3. The role played by Technology outsourcing in Mobile communication companies in Tamilnadu is studied through this project.
4. To identify limitations of Technology Outsourcing and suggest ways to overcome those limitations.

1.7 DELIVERABLES

To find the key benefits of Outsourcing the Core technology and its limitations and also to suggest the ways to overcome the limitations of Technology Outsourcing.

CHAPTER 2: LITERATURE SURVEY

Based on the research problem various concepts about outsourcing are given in the following text.

1. **Maurice F. Greaver** has described outsourcing in her book **Strategic Outsourcing** as “Outsourcing is the act of transferring some of an organization’s recurring internal activities and decision rights to outside providers, as set forth in a contract”. “Strategic outsourcing” defines the correct approach and implementation for outsourcing, and something as important as the setting up- how to proceed and handle issues, once it is in place. “Like marriage, outsourcing is much easier to consummate than it is to terminate, and recover from, if done poorly”, says Maurice F. Greaver II, stressing on the importance of a good beginning. He quotes British philosopher Alfred North Whitehead saying “Seek simplicity and distrust it”, in other words, it takes time to implement an outsourcing initiative and longer to do it right. At the outset, he illustrates a case of a failed outsourcing project, where the customer finds himself stuck in a messy situation when he wants to reiterate the contract due to technical issues and malfunctions. According to the author, outsourcing is not a thing to be ashamed of. Historically, outsourcing was used when an organization could not perform due to incompetence, lack of capacity, financial pressures or technical failures. But now outsourcing is not the solace of a dysfunctional company, but is being practiced to restructure successful organizations.

2. According to Jacques du Preez, GM of MWEB division, Netsight, "outsourcing of IT decisions has grown exponentially in the last few years, and it does not look like the trend is slowing down. This is mainly because the factors that make the outsourcing of IT maintenance so attractive will always be there. Every company wants to achieve cost savings. Every company wants to focus on what they know best and factors such as access to innovation, increased speed to market, and service quality are very vital. All of which combine to make outsourcing a worthwhile value proposition."

Some key benefits of outsourcing IT:

1. Increased productivity by optimally utilizing resources
2. Gain competitive edge by focusing on core business areas
3. Lower costs through lesser overheads and expenses
4. Access to world-class IT skills, experience and resources

The keys to a successful outsourcing relationship are transparency, trust and collaboration, says du Preez, "Without this combination the relationship will be fraught with frustration and the goals will not be met." A core competency is a knowledge, skill, or ability that contributes to successful completion of a task on the job. By outsourcing the non core activities of the firm the companies can concentrate to enhance its core competency.

3. In an article written in 1990 entitled, **The Core Competence of the Corporation**, C. K. Prahalad and Gary Hamel coined the term core competencies, or the collective learning and coordination skills behind a firm's product line. According to the authors, core competencies lead to the development of core products. Core products can be used to build a larger number of

end-user products. The authors went on to say that core competencies arise from the integration of multiple technologies and the coordination of diverse production skills.

It is important to distinguish between individual competencies or capabilities and core competencies. Individual capabilities stand alone and are generally considered in isolation. Gallon, Stillman, and Coates (1995) made it explicit that core competencies are more than the traits of individuals. They defined core competencies as "aggregates of capabilities, where synergy is created that has sustainable value and broad applicability.

By providing superior service to the customers the company will have a competitive advantage over other companies in the market. According to the Competitive Advantage model of Porter, a competitive strategy takes offensive or defensive action to create a defensible position in an industry, in order to cope successfully with competitive forces and generate a superior return on investment. According to Michael Porter, the basis of above average performance within an industry is sustainable competitive advantage.

4. Based on Michael Porter's book "Competitive Strategy" there is two types of competitive advantage.

1. Cost leadership
2. Differentiation

In general technology is the relationship that society has with its tools and crafts, and to what extent society can control its environment. The Merriam-Webster dictionary offers a definition of the term: "the practical application of knowledge especially in a particular area" and "a capability given by the practical application of knowledge". Ursula Franklin, in her 1989 "Real

World of Technology" lecture, gave another definition of the concept;

it is "practice, the way we do things around here". The term is often used to imply a specific field of technology, or to refer to high technology or just consumer electronics, rather than technology as a whole. Bernard Stiegler, in *Techniques and Time, 1*, defines technology in two ways: as "the pursuit of life by means other than life", and as "organized inorganic matter."

5. David Ricardo discovered comparative advantage when he investigated the question of why a country that could most cheaply produce all tradable goods would trade with a higher cost country.

Ricardo's answer is that the opportunity cost of producing one good in terms of the other was different in the two countries. He was able to show that total output would increase if each country specialized in the product in which it had relative advantage. He then showed that the increased output would be shared by the terms on which the countries would trade one product for the other.

In Ricardo's example, the different opportunity cost ratios of producing wine and cloth in the two countries are due to inherent differences in geography, climate and soil.

Modern production functions, however, are based on acquired knowledge. They operate the same in all countries. These production functions do not reflect country-specific inherent differences that result in different opportunity cost ratios on which comparative advantage depends.

6. Edinburgh Melanie Goody, Director of Research and Information Services, KPMG UK LLB has explained the sense of Outsourcing in the *Business Information Review* as given below:

Outsourcing defines a range of strategies for organising and providing services to the organisation through the delegation of work to designated partners. Observations of the market for business research and information services would indicate that outsourcing is widespread practice, even if its nature has been described "embryonic" (Ward, 2004, p. 227). Large, well-known companies in the financial sector, such as Abbey, American Express, Deutsche Bank and Standard Chartered (Bolanos, 21 January 2005), GE Capital (Plumb, 2004, p. 4), and McKinsey, Bain, Goldman Sachs and Lehman Brothers (Taylor, 2004, p. 5) rely on partners to cover the research requirements of their in-house analysts. A review of the portfolio of services offered by such companies, who can all claim high-profile clients, indicates growth in this particular industry sector (Ward, 2004, p. 232).

However, there is little evidence available to provide a strong assessment of the true extent to which business research and information services in UK firms are outsourced, Or of the benefits and risks of outsourcing as a business strategy. It is suspected that one reason for this is that many companies are reluctant to admit to delegating work to a Third party. This is particularly pertinent when prevalent outsourcing practice is to sub-contract to partners remote from the UK: some estimates have suggested that 80% of outsourcing activity is provided in India, and the market is growing in Eastern Europe (Fields, 2005). So, whilst there is an established body of literature on outsourcing in general (for example, Johnson, 1997), and IT outsourcing in particular (see, for example, Lacity & Willcocks, 2001), as well

as some material on outsourcing in library and information services (LIS) - albeit mainly focused on public sector concerns (for example, Ball, Barton, Earl & Dunk, 2002; DNH, 1995) - its relevance to business research and information services provision has not been explored extensively. Indeed, to date only one significant report exists on this theme in the context of the business information environment, namely the work of Ward published in 2004.

Outsourcing in the context of business research and information services provision

A review of relevant, and recent¹, literature reveals that the term “outsourcing” represents a number of activities related to the delegation of work from one unit to a third party. There are different “flavours” of outsourcing, as shown in Table 1. In short, the understanding of the term depends upon whether: The work is delegated to a third party within the same organisation, or externally; The physical location of the staff that carries out the delegated work is within same country as those who delegate the work to them, or abroad.

Table 2.1: Forms of outsourcing

Work completed	By internal staff	By external staff
In same country	Sometimes, but not normally labelled as outsourced service.	Not normally labelled as outsourced service. More likely to be labelled "contracting out" or "externalisation".
Abroad	Often labelled as outsourced service. Also known as "off-shored service", or "captive" outsourcing.	Normally labelled "outsourced service".

7. As Howells and James (2001) discuss, the nature of R&D and technical work, macro innovation environment associated with the life cycles of technologies are certain factors identified as underlying these fundamental shifts in the internal-external balance of knowledge in and beyond the firm. Teece (1996) summarizes the consensus among scholars on the underlying properties of technological innovation. These appear to characterize innovation independently of the organization context where it takes place. Path dependency and cumulative nature are meant to the technology trajectory. New products and process developments for a particular organization are likely to lie in the technological neighborhood of previous process (Dosi, 1982). The knowledge, know-how developed by firms is often highly tacit and

difficult to articulate and codify (Franbach and Schillewaert, 2002). This also explains why imitation is often costly and the difficulty of innovation diffusion. The more the knowledge about a particular technology can be codified, the easier it is to be transfer, and the more speedily and extensively such technology can be diffused. Firms prefer to develop "difficult to copy" technologies in-house generally. In the absence of strong intellectual property right or patent protection, tacit technologies are recognized to provide more durable source of competitive advantage than those could easily be codified. Appropriability of a certain technology and technological knowledge is the extent to which the company that first to discover or develop is able to capture the benefits arising from it (Pisano, 1991). Highly appropriable technology tends to be kept in-house, while those that are difficult to appropriate are often within a variety of collaborations from external partners. With strong IPR protection, the incentive effect can be realized, that is, a firm with innovations can profit from the innovations under a profound legal protection. Thus, technologies of strong IPR protection could be more available on the marketplace, while firms have higher propensity to source the technology externally. Therefore, we make the proposition:

Proposition 1: As the IPR regime of the target technology is strong, the firm is more likely to source it externally.

Nelson and winter (1982) were probably the first to use the notion of 'technological regime'. According to them, the sense of potential, of constraints, and of not yet exploited opportunities, implicit in a regime focuses the attention of engineers on certain directions in which progress is possible, and provides strong guidance as to the tactics likely to be faithful for probing in that

direction. In other words, a regime not only defines boundaries, but also trajectories to those boundaries. A technological regime can be broadly defined by the particular combination of four fundamental factors: (1) technological opportunities, (2) appropriability of innovations, (3) cumulativeness of technological advances, and (4) properties of the knowledge base. Considering the nature of knowledge, technological knowledge involves various degrees of specificity, tacitness, complexity, and independence. The knowledge relevant to innovative activities may be easily identifiable and isolated or rather it may be part of a larger system, and therefore difficult to compose in "chunks" (Malerba and Orsenigo, 1997). The characteristics of the

Technology according to the four dimensions strongly affects the ways firms can effectively get access to the relevant knowledge. Independent technology may not be necessarily developed internally, meanwhile systemic technology is considered to develop internally (Chesbrough and Teece, 1996; Chiesa, et al. 2000). Therefore, we derive the proposition:

Proposition 2: As the target technology tends to be independent to the firm, the firm is more likely to source it externally. When the complexity of a technology increases, the knowledge developed by organizations is often increasingly tacit. That is, it is difficult even impossible to articulate and codify. The more tacit, complex, and part of a larger system, the more relevant are informal means of knowledge transmission, in turn, the internal development might be considered less risky and higher control. Thus, the proposition is proposed as follows:

Proposition 3: As the target technology tends to be codifiable, the firm is more likely to source it externally.

8. Dibbern Jens in the publication "**Database for Advances in Information Systems**" has given explanation for Technology outsourcing as: For some time there has been widespread acknowledgement that Information Technology (IT) has become the engine that drives the modern organization. Over the last decade, one of the more widespread developments in meeting an organization's IT needs is the growth in the practice of outsourcing. In fact, when Eastman Kodak announced that it was outsourcing its information systems (IS) function in 1989 to IBM, DEC and Businessland it created quite a stir in the information technology industry. Never before had such a well-known organization, where IS was considered to be a strategic asset, turned it over to third party providers (Applegate & Montealegre, 1991). Since then both large and small companies have found it acceptable, indeed fashionable, to transfer their IS assets, leases and staff to outsourcing vendors (Arnett & Jones, 1994). Kodak appears to have legitimized outsourcing, leading to what some have called "the Kodak effect" (Caldwell, 1994). Senior executives at well known companies in the U.S. and abroad have followed Kodak's example and signed long term contracts worth hundreds of millions of dollars with outsourcing "partners". A number of high-profile multi-billion dollar "mega-deals" have been signed which has raised awareness even more. A Dataquest report (2000) notes that since 1989 there have been over 100 of these mega-deals (Young, 2000).

Studies performed by Dataquest and the Yankee Group estimated global revenues for IS outsourcing have been growing at a rapid rate. The Outsourcing Institute's survey of 1200 companies

indicates that 50% of all companies with IS budgets of \$5 million or more are either outsourcing or evaluating the option. They also report that one-twelfth of IS dollars spent in 1995 flowed through an outsourcing contract and that this proportion was rising fast. Another view of the IS outsourcing market comes from an International Data Corporation report, which using a narrow definition of IS outsourcing, noted actual global IS outsourcing spending to be \$40 billion in 1996 growing to reach \$71 billion in 2003 representing a growth rate of 12.2% per annum (IDC, 1999). A Dataquest report stated the IS outsourcing industry revenue to be \$194 billion in 1999 and growing to \$531 billion by 2002 (Young, 2000). So by any stretch of the imagination, the IS outsourcing market is significant.

Although companies outsource IS for many reasons (Willcocks and Fitzgerald, 1994), industry watchers generally attribute the growth of the IS outsourcing market to two primary phenomena (Lacity & Willcocks, 2001). First, interest in IS outsourcing is largely a consequence of a shift in business strategy. Many companies have recently abandoned their diversification strategies - once pursued to mediate risk - to focus on core competencies. Senior executives have come to believe that the most important sustainable competitive advantage is strategic focus by concentrating on what an organization does better than anyone else while outsourcing the rest. As a result of this focus strategy, IS came under scrutiny. Senior executives frequently view the entire IS function as a non-core activity, and believe that IT vendors possess economies of scale and technical expertise to provide IS services more efficiently than internal IS departments. Second, the growth in outsourcing is a function of the unclear value delivered by IS. In many companies, senior

executives view IS as an overhead - an essential cost but one to be minimized nevertheless.

9. VIJAY GURBAXANI who is the Associate Dean and Associate Professor at the Graduate School of Management, University of California, Irvine has explained Technology outsourcing as given below: three kinds of strategic intent for outsourcing: *IS improvement*, *business impact*, and *commercial exploitation*. IS improvement focuses on enhancing the efficiency and effectiveness of the IS function and the IT resource more broadly. Business impact focuses on improving the contribution of IT to company performance within its existing lines of business. Commercial exploitation focuses on leveraging technology-related assets----applications, infrastructure, and knowledge----in the marketplace through the development and marketing of new technology products and services. The typical belief underlying outsourcing for IS improvement is that IT is important but not of core importance to the business and is better managed by outsourcing vendors who are better equipped than internal staff to keep pace with new technologies, skills, and processes. This type of outsourcing is not confined to aging technologies and systems that companies wish to get off the balance sheet or for which they wish to rid themselves of the management responsibility. In fact, some of the fastest-growing segments of the IT outsourcing marketplace are emerging areas like migration from mainframe to client-server-based platforms and desktop computer systems management. IT outsourcing for business impact is based on the premise that outsourcing Vendors are a critical source of the latest skills and capabilities, and are better than internal IS organizations at achieving business results with IT. Specific goals include aligning IT resources with business needs,

delivering new IT-based business capabilities, reengineering business processes with IT, and even process outsourcing, whereby not only the technology but also responsibility for performing the business process and achieving targeted business results is turned over to the vendor. Commercial exploitation focuses on realizing the external value of internally developed IT assets by creating new lines of business and generating new revenue and profit while also offsetting costs and improving return. This kind of strategic intent for IT outsourcing is centered on leveraging IT assets in the marketplace. The drivers of IT outsourcing for commercial exploitation are the growing importance of IT as a component of products and services, the emergence of standard platforms and shared services in many industries, increased funding requirements for IT assets, the need to develop and acquire critical knowledge and expertise, and the search for new channels for IT-based products and services. The underlying rationale of commercial exploitation is that return on investments in IT can best be maximized by exploiting synergies with outsourcing partners who provide channels to customers as well as needed resources, capabilities, and expertise. To the outsourcing vendors, client firms are sources of industry-specific expertise and technology assets. Moreover, the ability to continue to develop new and innovative systems in competitive and complex industries requires an ongoing presence in the industry itself. For companies pursuing this kind of strategic intent for outsourcing, IT is not seen as something they are not very good at or something secondary to the business but rather represents something they are competent at that is integral to the products and services they sell or could potentially sell in the marketplace. As one might expect, the nature of the outsourcing relationship varies significantly with strategic intent. Performance measures,

compensation structure, and vendor selection criteria vary with strategic intent in a consistent way. Therefore, it is critical for business and IT strategists to explicitly understand their strategic intent for outsourcing, because the factors that determine success, the inherent risks and rewards, and the kinds of relationships needed will be vastly different depending on the intent and objectives. Furthermore, solutions that are appropriate in one instance may be counterproductive in others. Indeed, failures in outsourcing can often be attributed to a mismatch between the strategic intent of the client and the corresponding motivation of the vendor. It is also important to recognize the intent and ambition for outsourcing will likely change over the course of the contract as the business and the technology both evolve. Therefore, it is important to anticipate shifts in priorities and to build flexibility into contracts and alliances to deal with them. Our findings are surprising given the conventional wisdom that suggests companies outsource IS activities that are akin to commodities, but retain their strategic activities. Our research suggests quite the opposite. Even when senior managers at companies view IT as strategic; they do not always believe they ought to retain ownership and control of the production process for IS. In fact, in many companies, outsourcing is often regarded as the means by which companies can realize the strategic potential of IT, something they have been unable to realize through in-house IT departments.

10. Pantry and Griffiths (2004) demonstrate how much of the extra work load is associated with managing outsourcing relationships in general, most notably the one between the organisation and the supplier. Workload issues that arise when dealing with suppliers include:

- managing disputes over the contract ;
- dealing with a provider that fails to deliver service to the agreed level ;
- devising strategies for compensating for the inadequacies of the outsourcing agency in the face of customer expectations which may have been raised in advance of the implementation of the new service.

Other relationships that require careful servicing are those further up the chain of the delivery of information to end-users. Not only should the service be available when it is needed, but there has to be a set of mechanisms that allows for the originator of the request to provide feedback on the suitability of what has been delivered, and to ask for follow-up information if required. Too great a separation between the outsourced supplier and end-users can be problematic. For example, supplier employees are at a disadvantage in achieving a deep understanding of end-user information requests due to physical distances, and opportunities for knowledge transfer from internal researchers to contract researchers are few. Identification of these problems is in line with the literature on organisational absorptive capacity, which specifically warns firms that wish to improve their capacity to innovate should not outsource their operations (Cohen & Levinthal, 1990). Managers of research and information services who have fought long battles to ensure that business researchers are placed in client teams within their organisations, rather than in a centralised function, may find it difficult to accept a new system which undermines the arguments for close collaboration between information professionals and the end-users that they serve.

Other relationships that require careful management are those between the staff who have instigated the outsourcing agreement and the research and information services staff most directly affected by the new arrangements. The dangers of inadequate buy-in for any type of outsourced service include:

- criticism of the new system and supplier;
- failure to cooperate;
- creation of an “us and them” environment;
- resentment over having to take the blame for any inadequacies of the new service and/or extra duties required which distract them from other work, such as monitoring service delivery.

CHAPTER 3: METHODOLOGY

3.1 Type of Project

The type of research design used in this study is descriptive. Descriptive research uses a set of scientific methods and procedures to collect raw data and create data structures that describe the existing characteristics of a defined target population.

3.2 Target Respondents

Data is collected from Engineers working in the Mobile communication companies where the core technical department is outsourced. Data is collected from Engineers working in Airtel, Vodafone and Reliance. The corresponding outsourcing partners are Ericsson, Nokia-Siemens Network and Alcatel-Lucent Technologies.

3.3 Assumption

The data is planned to be collected from as many as employees working in the company. Data is to be collected from outsourced employees working in core technology domain in three companies. Hence it is assumed that the conclusion of the study will represent the entire population.

3.4 Constraints

Data is difficult to be collected from all the employees in a domain of an organization due to time and administrative factors.

3.5. Limitations.

- a) The study is restricted only to selected telecommunication companies.
- b) The data to be collected is only from selected target respondents who represent a portion of the population.

3.6 Sampling Methods.

- Non-Probability sampling.
- Convenience sampling is the type of non-probability sampling which is used for sampling design

3.7 Data collection method.

Structured Questionnaire is used to collect primary data.

Rating scales are used in the questionnaire. The below given are the type of rating scales used in questionnaire.

1. Category scale
2. Likert scale.

3.8 Statistical Tools for analysis and interpretation

3.8.1 Chi-Square test:

Chi-Square test is conducted to test whether two or more attributes are associated or not. It describes the magnitude of the discrepancy between theory and observation. Chi-square can only be used if the experimental data or sample observation are independent of each other. The data collected must be drawn at

random from the universe or population they use the following formula for calculating the value of chi-square.

$$X^2 = \frac{(O_i - E_i)^2}{E_i}$$

Where O_i = observed frequency

E_i = expected or theoretical frequency

The degree of freedom is calculated from the frequency table called contingency table by using the formula $d.f = (C-1)(R-1)$

Where, c = no. of cell frequencies in columns; r = no. of frequencies in rows.

This test is most widely used non-parametric test in statistical work. This test is also known as 'Chi-square test of goodness of fit'.

3.8.2 PERCENTAGE ANALYSIS

Percentage analysis is used to know mean, median, mode, skewness and kurtosis of the variables that are used for the study. Beyond this feature it can also be used to find out the division of parts among each category of a variable. This is done by means of bar chart which displays the number of responses among each category of a variable and the percentage of responses that falls towards each category of the variable. If there are any missing values in between the values of entire data collection process, this analysis will provide a suitability to omit that entire response

$$\text{Percentage Analysis} = \frac{\text{Number of respondents}}{\text{Total no of respondents}} * 100$$

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

4.1) Chi-Square Tests

4.1.1) Technology Outsourcing Vs Operation and Maintenance

Null Hypothesis H₀:

There is no significant association between Technology outsourcing and effective Operation and Maintenance of core network.

Alternate Hypothesis H₁:

There is significant association between Technology outsourcing and effective Operation and Maintenance of core network.

Outsourcing	Operation & Maintenance(O & M)					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	26	10	7	3	4	50
VODAFONE	23	18	5	2	2	50
RELIANCE	21	20	4	3	2	50
Total	70	48	16	8	8	150

Table 4.1.1 Operation & Maintenance

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	1.38	8	.005	Significant

INFERENCE

From the above table it is clear that the p value is less than 0.05 we accept H₁ and reject H₀. Hence there is significant association between Technology outsourcing and operation & maintenance. Hence, Outsourcing has helped these Mobile companies to maintain their network in an efficient way.

4.1.2) Technology Outsourcing Vs Value added services

Null Hypothesis H0:

There is no significant association between Technology outsourcing and Value added services.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and value added services.

Outsourcing	Value added services					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	14	10	8	11	7	50
VODAFONE	11	12	11	9	7	50
RELIANCE	8	19	13	6	4	50
Total	33	41	32	26	18	150

Table 4.1.2. Value added Services

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	18.31	8	.019	Significant

INFERENCE

From the above table it is clear that the p value is less than 0.05 we accept H1 and reject H0. Hence there is significant association between Technology outsourcing and Value added services. Hence, Outsourcing has helped these Mobile companies to launch more and attractive value added services to customers and maintain a large marker share.

4.1.3) Technology Outsourcing Vs Co-operation between employees

Null Hypothesis H0:

There is no significant association between Technology outsourcing and co-operation between employees.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and co-operation between employees.

Outsourcing	Co-operation between employees					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	8	7	10	13	12	50
VODAFONE	10	5	11	18	6	50
RELIANCE	8	10	15	12	5	50
Total	26	22	36	42	24	150

Table 4.1.3. Co-operation between employees

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	12.28	8	.139	Not Significant

INFERENCE

From the above table it is clear that the p value is greater than 0.05 we accept H0 and reject H1. Hence there is no significant association between Technology outsourcing and co-operation between employees. Hence, as a result of outsourcing there is always a lack of co-operation between the outsourced employees and non outsourced employees.

4.1.4) Technology Outsourcing Vs Burden of non-core technical activities

Null Hypothesis H0:

There is no significant association between Technology outsourcing and burden of non-core technical activities.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and burden of non-core technical activities.

Outsourcing	Burden of non-core activities					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	11	16	9	9	5	50
VODAFONE	15	14	6	12	3	50
RELIANCE	8	19	11	8	4	50
Total	34	49	26	29	12	150

Table 4.1.4. Non-Core activities

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	16.82	8	.032	Significant

INFERENCE

From the above table it is clear that the p value is less than 0.05 we accept H1 and reject Ho. Hence there is significant association between Technology outsourcing and burden of non core technical activities. Hence, Outsourcing has helped these Mobile Companies to concentrate on core technical activities rather than non-core activities which does not add value to customer but is essential.

4.1.5) Technology Outsourcing Vs Competitive advantage

Null Hypothesis H0:

There is no significant association between Technology outsourcing and competitive advantage.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and competitive advantage.

Outsourcing	Competitive advantage					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	11	25	3	7	4	50
VODAFONE	19	10	16	4	1	50
RELIANCE	21	14	4	9	2	50
Total	51	49	23	20	7	150

Table 4.1.5. Competitive advantage

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	17.42	8	.026	Significant

INFERENCE

From the above table it is clear that the p value is less than 0.05 we accept H1 and reject H0. Hence there is significant association between Technology outsourcing and competitive advantage. Hence, Outsourcing of core technology acts as a source of competitive advantage for mobile companies.

4.1.6) Technology Outsourcing Vs In depth domain knowledge

Null Hypothesis H0:

There is no significant association between Technology outsourcing and in depth domain knowledge.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and in depth domain knowledge.

Outsourcing	In depth domain knowledge					Total
	Excellent	good	Normal	Poor	Worst	
AIRTEL	8	20	14	8	-	50
VODAFONE	21	16	8	5	-	50
RELIANCE	11	9	16	14	-	50
Total	40	45	38	27	-	150

Table 4.1.6. Domain Knowledge

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	16.24	8	.039	Significant

INFERENCE

From the above table it is clear that the p value is less than 0.05 we accept H1 and reject H0. Hence there is significant association between Technology outsourcing and In depth domain knowledge. Hence, Outsourcing of core technology has helped Engineers to gain in depth knowledge in their domain.

4.1.7) Technology Outsourcing Vs Knowledge across domains

Null Hypothesis H0:

There is no significant association between Technology outsourcing and knowledge across domains.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and knowledge across domains.

Outsourcing	Knowledge across domains					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	4	11	6	19	10	50
VODAFONE	12	8	6	21	3	50
RELIANCE	9	13	4	16	8	50
Total	25	32	16	56	21	150

Table 4.1.7. Knowledge across domains

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	11.17	8	.192	Not Significant

INFERENCE

From the above table it is clear that the p value is greater than 0.05 we accept H0 and reject H1. Hence there is no significant association between Technology outsourcing and knowledge across domains. Hence, Outsourcing of core technology does not help Engineers to gain knowledge across various domains.

4.1.8) Technology Outsourcing Vs Customer complaint rectification

Null Hypothesis H0:

There is no significant association between Technology outsourcing and customer complaint rectification.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and customer complaint rectification.

Outsourcing	Customer complaint rectification					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	14	12	19	5	-	50
VODAFONE	6	17	12	9	6	50
RELIANCE	11	20	6	10	3	50
Total	31	49	37	24	9	150

Table 4.1.8 Complaint rectification

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	16.09	8	.041	Significant

INFERENCE

From the above table it is clear that the p value is less than 0.05 we accept H1 and reject Ho. Hence there is significant association between Technology outsourcing and customer complaint rectification. Hence, Outsourcing has helped these Mobile companies to rectify various customer complaints in an effective manner in appropriate time.

4.1.9) Technology Outsourcing Vs Network Planning

Null Hypothesis H0:

There is no significant association between Technology outsourcing and effective Network planning.

Alternate Hypothesis H1:

There is significant association between Technology outsourcing and effective Network planning.

Outsourcing	Network Planning					Total
	strongly agree	agree	neutral	disagree	strongly disagree	
AIRTEL	15	21	10	4	-	50
VODAFONE	5	19	21	3	2	50
RELIANCE	11	16	17	4	2	50
Total	31	56	48	11	4	150

Table 4.1.9 Network Planning

Chi-Square Tests

Outsourcing	value	df	P value	Remarks
Pearson Chi-square	18.03	8	.021	Significant

INFERENCE

From the above table it is clear that the p value is less than 0.05 we accept H1 and reject Ho. Hence there is significant association between Technology outsourcing and Network planning. Hence, Outsourcing has helped these Mobile companies to plan their network effectively.

4.2

PERCENTAGE ANALYSIS

4.2.1) Technological Innovations

Technological Innovations	Frequency	Percent
Very Satisfied	38	25.3
Satisfied	76	50.7
Neutral	16	10.7
Unsatisfied	15	10
Very Unsatisfied	5	3.3
Total	150	100

Table 4.2.1 Innovation in Outsourcing

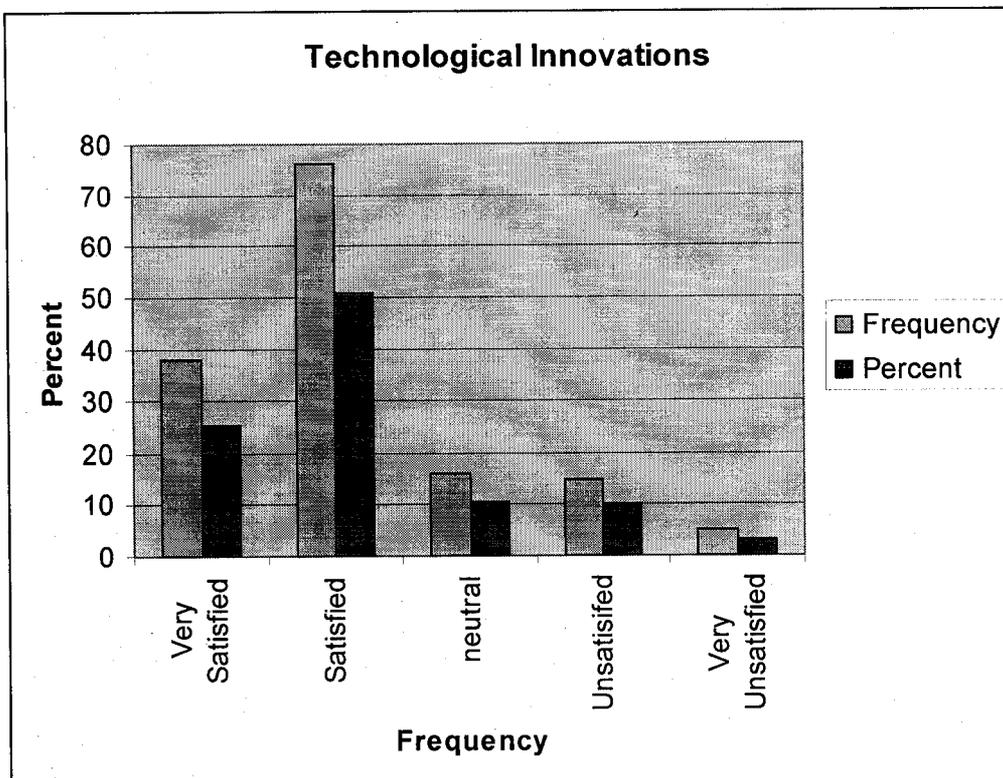


Figure 4.2.1 Innovations

INFERENCE

Form the above analysis 76 percent of Engineers are satisfied with the rate of technological innovations that takes place in the outsourced mobile companies. Hence outsourcing of core technology has helped mobile companies to innovate more technologies.

4.2.2) Training needs Fulfillment

Training needs	Frequency	Percent
strongly agree	27	18
agree	82	54.7
neutral	17	11.3
disagree	15	10
strongly disagree	9	6
Total	150	100

Table 4.11 Training fulfillment in Outsourcing

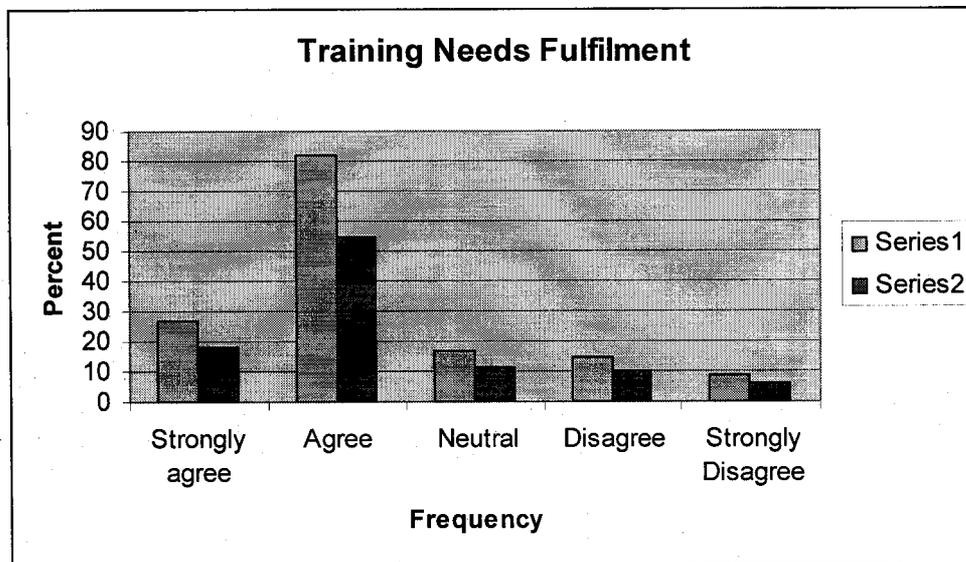


Figure 4.2.2 Training Needs

INFERENCE

Form the above analysis 72 percent of Engineers agree that outsourcing of core technology has helped Engineers to satisfy their various training needs in their respective technical domains.

4.2.3) Technology Outsourcing a wise decision by management.

Wise decision by management	Frequency	Percent
strongly agree	55	36.7
agree	49	32.7
neutral	30	20
disagree	5	3.3
strongly disagree	11	7.3
Total	150	100

Table 4.12 Outsourcing decision

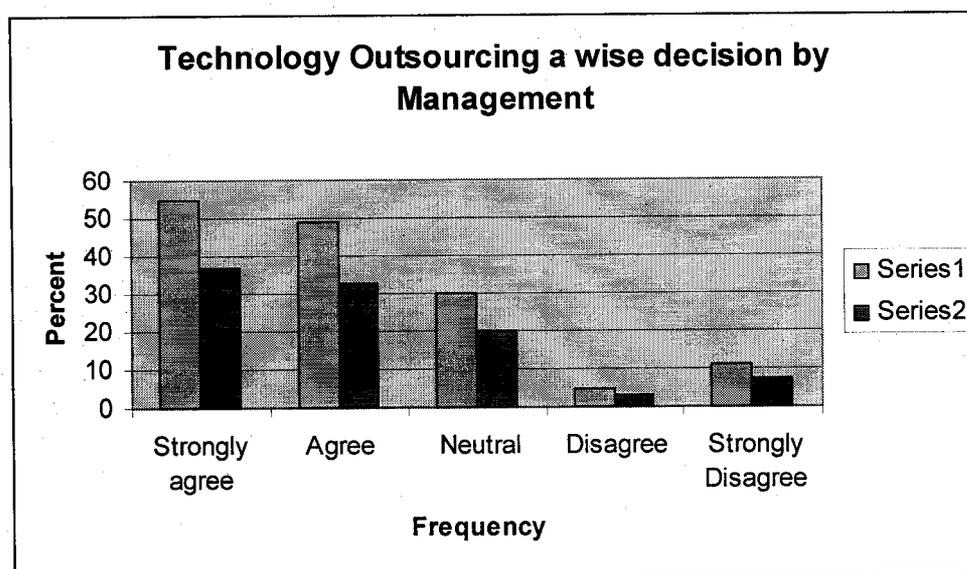


Figure 4.2.3 Management Decision

INFERENCE

From the above analysis it is clear that 69 percent of Engineers agree that Outsourcing is a wise decision taken by the management for the successful functioning of mobile communication companies.

4.2.4) Technology Outsourcing and Protection of internal competency

Internal competency	Frequency	Percent
strongly agree	3	2
agree	11	7.3
neutral	40	26.7
disagree	68	45.3
strongly disagree	28	18.7
Total	150	100

Table 4.13 Internal Competency

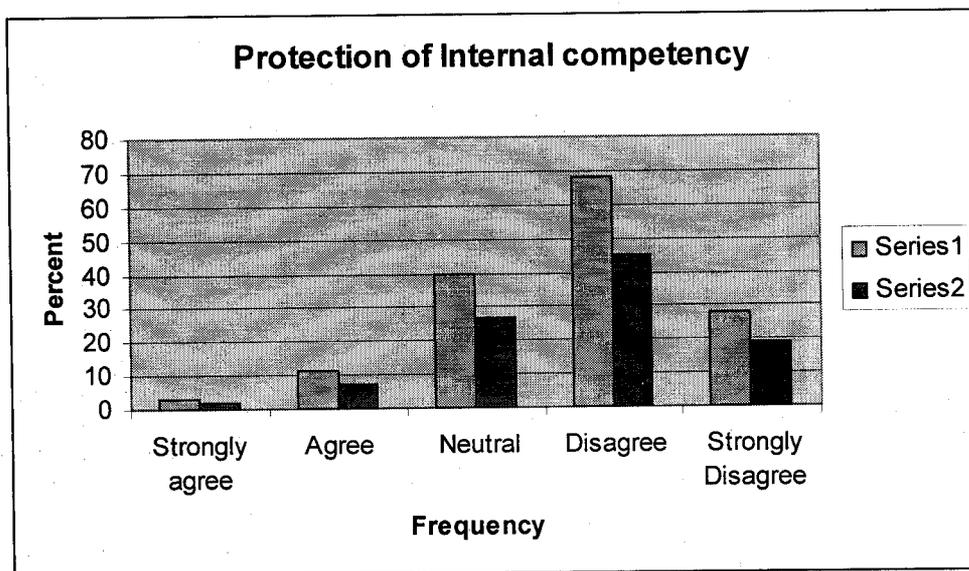


Figure 4.2.4 Internal Competency

INFERENCE

From the above analysis it is clear that 64 percent of Engineers disagree that even after outsourcing of core technology the internal competency of the company can be protected from reaching the knowledge of the vendor.

CHAPTER 5: CONCLUSIONS

5.1 SUMMARY OF FINDINGS

Positive Findings

- New Technologies are implemented in the network quickly and in an efficient manner as the outsourcing vendor is a specialist in that particular domain.
- As a result of outsourcing non-core technical activities like IT, company can concentrate more on enhancing their core competence rather than wasting time on non core technical activities which are highly essential but does not add any value to customers.
- Mobile communication companies are able to launch more value added services to the customers which will give additional revenue to the company as a result of outsourcing.
- The operation and maintenance of core network nodes like MSC, BSC, and Softswitch are done in an efficient and better way as a result of outsourcing.
- Technology outsourcing acts as a source of competitive advantage for mobile communication companies. Outsourced mobile companies are able to reap more benefits when compared to the non outsourced companies.

- Engineers are becoming more knowledge oriented as a result of Technology outsourcing since the outsourcing partner has an in depth knowledge in that technical domain.
- Customer complaints are resolved in an effective manner as a result of technology outsourcing. Customer concerns are cleared in a timely manner as a result of core technology outsourcing.
- Network planning is done in efficient way where the core technology is outsourced as the vendor is more experienced in the area of concern. As all the core departments have separate responsibilities each department are able to plan there area effectively.
- Technological innovations have increased in the company as a result of outsourcing of core technology.

Negative findings

- There is always a lack of co-operation between the outsourced employees and non-outsourced employees.
- As a result of technology outsourcing Engineers are not able to update with knowledge across various domains.
- The company's internal competency and strengths are known to the vendors and it is shared with others.

5.2 SUGGESTIONS

- Proper plans should be developed by the management to ensure a better co-operation and co-ordination between the outsourced and non-outsourced employees.
- Company policies should be made such that a vital internal secret of the company which acts as a competitive strength to the company is not known to the outsourcing partner.
- The benefits of Technology outsourcing has to be shared with all the stakeholders of the company.
- All the non-core technical activities which are still not outsourced by the company should be outsourced by the company, so that it can concentrate on its core competency.
- Full benefits of Technology Outsourcing should be exploited and proper remedy has to be taken to overcome its limitations.
- Engineers should be should be trained in such a way that they are updated with new technologies across various domains.

5.3 CONCLUSION

The project is carried over by a uniform questionnaire and by getting response from 150 Telecom Engineers. Hypothesis are framed and analyzed accordingly.

The results of the data analysis clearly show that the Technology Outsourcing is highly beneficial for Mobile communication companies. Technology Outsourcing has helped companies to bring new innovations to market and has also made companies more competitive. There are some limitations of Technology Outsourcing, but the benefits of Technology outsourcing overweigh the limits of technology outsourcing. New entrants in the mobile communication industry should adapt this process in their companies to capture market and also to sustain in the market.

ANNEXURE

A Study on Impact of Technology Outsourcing in Mobile Communication companies

1. Service Provider a) Airtel () b) Reliance () c) Vodafone
()
2. Outsourcing Partner a) Ericsson () b) Nokia Siemens Network () c) Alcatel-Lucent
()
3. Department: a) Switch () b) Transmission () c) RF ()
4. In what ways Technology Outsourcing has added value to the customers?
 - a) Improved network performance () b) More value added services ()
 - c) Better customer service () d) Continuity in better service ()
5. In what ways Technology Outsourcing has added value to the network performance?
 - a) Decreased network outage time () b) Better network maintenance ()
 - c) Better fault rectification () d) Segmentation of activities ()
6. How are various technical activities performed after outsourcing of core network technology?
 - a) Highly systematic () b) Well coordinated ()
 - c) Well planned () d) Poorly planned ()
7. In what ways managers are benefited as a result of Technology Outsourcing?
 - a) Improved work ethics () a) Better coordination ()
 - c) Speedy completion of projects () d) Reduced risk in activities ()

VS=Very satisfied S=Satisfied N=Neutral US=Unsatisfied VU=Very

Unsatisfied

8	What is your opinion about working in an Outsourced company, compared to working in a non-outsourced company?	VS	S	N	US	UU
9	Are you satisfied with the rate of technological innovations which takes place in the outsourcing environment?	VS	S	N	US	UU

W=Worst E=Excellent G=Good N= Normal P=Poor

10	How do you feel about customer complaints rectification after outsourcing the core technology?	E	G	N	P	W
11	After outsourcing of core technology, how is the domain knowledge of engineers working in various departments?	E	G	N	P	W
12	What is the satisfaction level of employees across various departments with respect to accomplishments of tasks as a result of Technology outsourcing?	E	G	N	P	W

Please tell us how well you agree with the following statements. Please enter the data as per the guidelines given below.

SA = Strongly Agree A = Agree N = Neutral D = Disagree SD = Strongly Disagree

13	Mobile companies concentrate more on enhancing the core technology by outsourcing non core technical activities	SA	A	N	D	SD
14	There are always some conflicts of interest between the management of the company and outsourcing partner which results in the breakdown of communication	SA	A	N	D	SD
15	There is always a strong co-operation between outsourced and non outsourced employees in doing various tasks.	SA	A	N	D	SD
16	Operation and maintenance of core network nodes are made easier and efficient as a result of technology outsourcing	SA	A	N	D	SD
17	Training needs of employees are better satisfied when Outsourcing of core technology is done in the company?	SA	A	N	D	SD
18	Network planning is better done in outsourced mobile companies than in non-outsourced companies?	SA	A	N	D	SD
19	Outsourcing of technology acts as a source of competitive advantage for mobile companies.	SA	A	N	D	SD
20	Technology outsourcing has streamlined the technical activities across various departments in the company	SA	A	N	D	SD
21	Company's internal competency is protected even after outsourcing core technology to vendors.	SA	A	N	D	SD
22	In today's competitive business environment Technology outsourcing is extremely important for mobile communication companies	SA	A	N	D	SD
23	Engineers are becoming more specialized in many new technologies of various domains as a result of outsourcing core technology	SA	A	N	D	SD
24	New technologies are implemented in the network quickly and efficiently because the technology solution provider has a lot of expertise in that domain	SA	A	N	D	SD
25	Technology Outsourcing is a wise decision taken by the management for the successful functioning of the company	SA	A	N	D	SD

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