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Advantages and Disadvantages of Maintenance Outsourcing in Manufacturing Companies: With Special References to Jubail Industrial City – KSA

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Abstract
The research study presents, discusses and offers understanding on outsourcing, the most important benefits (advantages) and potential risks (disadvantages) associated with-in. It emphasizes the outsourcing specialized maintenance activities and its role in business success.
In this research, a hypothesis were develop whether the benefits of outsourcing maintenance in manufacturing companies are more than expected risk associated on this. Overall result of the survey ruled out that outsourcing provides more advantage than disadvantage in a manufacturing industry.
Manufacturing industry is the major contributor to the Kingdom's economy wherein Jubail is the largest industrial city in the Middle East. This is also the home of Middle East's largest and world's fourth largest petrochemical company. Outsourcing maintenance has been one of the pillars of manufacturing industries in Jubail as become apparent thru the outcome of the study. The research has paved a way for everyone who are engaged in outsourcing maintenance in providing them wise decision making.
Managers need to contemplate maintenance outsourcing if it provides potential advantage to their company. Contractor qualification classifications established on the set conditions done by the government is recommended. More studies regarding maintenance outsourcing is needed in the academics as well as in advance forums.
The author has successfully developed statistical survey wherein the respondents are professionals, engineers and management of prestigious manufacturing industries in Jubail, It is an impressive feedback that majority of manufacturing industries most likely practice and recommend outsourcing for the maintenance. 84.6% of the overall respondents practice outsourcing in the manufacturing industries and 80.0 % of them is highly recommending outsourcing here in Jubail Industrial City. Likewise, the author recommended future expanded studies interrelated with outsourcing and maintenance.
Keywords: Outsourcing, Maintenance, Manufacturing Industries. Jubail Industrial City.

1. Introduction

No matter which industry it is that your business is under, you would have encountered the term outsourcing at one point or another. For many manufacturing industries who would like to save on labor costs without sacrificing the efficiency of work done, outsourcing has become a viable alternative for running certain aspects of their business.

This study is very significant herein KSA particularly in Jubail, since majority of business industries in this area are on manufacturing companies wherein dependencies of outsourcing is enormous. This is the very first study of maintenance outsourcing in the Kingdom and the paper is one of its kind wherein it will be the very foundation of succeeding propositions. It will provide insight and help understand the industrial company all that matters and concerning outsourcing. Furthermore, expanded studies regarding outsourcing on all sectors could easily be achieved thru this pioneered study of outsourcing. A big part of the outsourcing equation, particularly for managers facing hiring freezes, cuts in training budgets, aging maintenance workforces, and hard-to-find skilled labor pools, is maintenance outsourcing. Today, maintenance outsourcing provided by outside vendors is covering more and more maintenance tasks once handled by in-house staff.

As a general view, most of the industry has widely accepted maintenance outsourcing and embracing their rewards. A study made here in Saudi Arabia resulted that most of the manufacturing staff widely accepts outsourcing advantages as a positive practice for some of the maintenance activities. In manufacturing industries here in KSA particularly Eastern province, outsourcing for services is most broadly utilized.

The most outsourced maintenance type for manufacturing industries are the corrective and scheduled maintenance. Usually, company adhere to outsource more manpower during turnaround scheduled maintenance wherein the jobs are no longer routine activities or works. Turnaround or shutdown typically requires huge manpower and in house staff is not sufficient to cover the jobs, hence company do outsourcing. Next to this point is the special skills wherein resources for some exceptional task are not available in-house. The equipment or system function being outsource ranks third while providing contractor for the spare parts store jobs in cases like warehouse comes fourth. Not surprisingly, providing an outsource manpower for the whole maintenance function is the least thing to do. Most management and staff objective is provide the customers an assurance for

the equipment readiness and performance.

It is overwhelming feedback that majority of manufacturing industries most likely embrace and recommend outsourcing for the maintenance. Hence, organizations pay for only the services they need and when they need them. It also reduces the need to hire and train specialized staff, brings in engineering expertise from the outside, and reduces capital expense, yielding better control of operating costs. The outsourcing arrangement can change, as your maintenance needs change. The research study is a milestone that brings opportunity for the management and likewise the contractor to have an idea, expound their strategy and improve the services of outsourcing maintenance in manufacturing industry.

1.1. Importance of the Study

In today's world of ever-increasing competition, organizations are forced to look for new ways to generate value. The world has embraced the phenomenon of outsourcing and companies have adopted its principles to help them expand into other markets and to achieve competitive advantages through cost reduction and performance improvement. The traditional outsourcing emphasis on tactical benefits like cost reduction (for example, cheaper labor cost in low-cost countries), this concept have more recently been replaced by productivity, flexibility, speed and innovation in developing business applications, and access to new technologies and skills. It is significant to understand the literature on the outsourcing so as to acquire insight and guidance about the advantages and disadvantages of outsourcing.

The ability to have a prerequisite knowledge and understanding on the business economy and the industry of Jubail is significant in understanding the potential risk and benefits in deciding to outsource.

The maintenance function is one of the most costly function of the operation management. It can contributes to the overall organization strategy, since the reliability and performance of the operation /production units, systems or equipment can have the significant impact to the performance of the company and its completive advantage, such as the cost of production, product quality and availability, company reputation and customer satisfaction.

This study is the first one applied in the field of maintenance outsourcing within GCC countries and it is a strong base for further studies in the future.

1.2. Limitations

The study has several limitations, it focus only on the maintenance outsourcing in industrial manufacturing organization within a Jubail Industrial Area. It has limited time and resources. Moreover, the project only credited with three credit hours Additional to that, The author was limited to access primary data for maintenance outsourcing practices in order to do further deep analysis.

The study focus on the types of maintenance that are mostly outsourced, but did not discuss deeply what types have to be insourced.

The study concentrate on the manufacturing companies (the outsourcing companies), the service providers not included.

The study was more general and did not focus on particular outsourcing case study in order to analyzer the real output of the outsourcing practice that is being done.

The study do not imply trend analysis for the past years about outsourcing.

Influence or impact of various new communication technologies such as internet, messaging and social networks on growing outsourcing industries were not considered in the study.

The development of outsourcing in a fast pace growing competition among freelancers was also not discussed.

1.3. Statement of Problem

As can be seen the main text, Outsourcing and maintenance management is a very important discipline in the field of operation management. It is important source of decision-making and can play significant impact to the company success strategy. Moreover, it is very important contributor to secondary sector of the economy as illustrated in Fig. 8, for this reason it is mandatory to study, explain and give insight about of the role of successful outsourcing and to evaluate the several advantages and disadvantages associated with outsourcing of maintenance, which are very important to be considered for outsourcing decision evaluation.

1.4. Questions of the Study

A. What are the most important advantages of the maintenance outsourcing?
B. What are the disadvantages associated with the maintenance outsourcing?
C. Are the advantages of the maintenance outsourcing more than the associated disadvantages or not?

1.5. Purpose of the Study

The purpose of the research is to give insight and discuss advantages and disadvantages of outsourcing maintenance activities within industrial sector.

The study evaluate whether the advantages expected from outsourcing maintenance activities are more than the associated disadvantages or not. This is done thru extensive research activities on several outsourcing literature and K.S.A business economy particularly in Jubail. Further manifestation will include the survey responses and result which was carefully prepared thru broad statistical analysis and definitive discussions. Doing so will provide concrete insight and guidance for managers and professionals in weighing outsourcing potential risk and advantages as a leverage in deciding to outsource.

1.6. Hypotheses

H_0: The expected disadvantages associated with outsourcing of maintenance are more than or likely to the anticipated advantages. (Disadvantages ≥ advantages).

H_A: The anticipated advantages of outsourcing of maintenance are more than the expected disadvantages. (Disadvantages < advantages).

2. Background

2.1. Economy

Definition of Economy: The large set of inter-related economic production and consumption activities which aid in determining how scarce resources are allocated.

Investopedia explains "Economy": The economy encompasses everything related to the production and consumption of goods and services in an area (Investopedia Nov 2014).

Sectors of economy: A nation's economy can be divided into various sectors to define the proportion of the population engaged in the activity sector. This categorization is seen as a continuum of distance from the natural environment. The continuum starts with the primary sector, which concerns itself with the utilization of raw materials from the earth such as agriculture and mining. From there, the distance from the raw materials of the earth (About.com, 2014).

- Primary Sector: The primary sector of the economy extracts or harvests products from the earth. The primary sector includes the production of raw material and basic foods. Activities associated with the primary sector include agriculture (both subsistence and commercial), mining, forestry, farming, grazing, hunting and gathering, fishing, and quarrying. The packaging and processing of the raw material associated with this sector is also considered to be part of this sector. The primary sector of the economy is the sector of an economy making direct use of natural resources. This includes agriculture, forestry, fishing and mining. This is contrasted with the secondary sector, producing manufactured goods, and the tertiary sector, producing services.
- Secondary Sector: The secondary sector of the economy manufactures finished goods. All of manufacturing, processing, and construction lies within the secondary sector. Activities associated with the secondary sector include metal working and smelting, automobile production, textile production, chemical and engineering industries, aerospace manufacturing, energy utilities, engineering, breweries and bottlers, construction, and shipbuilding. This sector generally takes the output of the primary sector and manufactures finished goods. These products are then either exported or sold to domestic consumers and to places where they are suitable for use by other businesses. This sector is often divided into light industry and heavy industry.
- Tertiary Sector: The tertiary sector of the economy is the service industry. This sector provides services to the general population and to businesses. Activities associated with this sector include retail and wholesale sales, transportation and distribution, entertainment (movies, television, radio, music, theater, etc.), restaurants, clerical services, media, tourism, insurance, banking, healthcare, and law.

The tertiary sector of the economy (also known as the service sector or the service industry) is one of the three economic sectors.

The service sector: consists of the "soft" parts of the economy, i.e. activities where people offer their knowledge and time to improve productivity, performance, potential, and sustainability, what is termed affective labor. A nation's economy can be divided into three main sectors, Primary Sector, Secondary Sector and Tertiary Sector (About.com, 2014). Fig. 1. Secondary sector generally takes the output of the primary sector and manufactures finished goods. It is the process of transformation of the good into processed products. It is called the production process or manufacturing.

2.2. Manufacturing industry

It refers to any business that transforms raw materials into finished or semi-finished goods using machines, tools

and labor. Manufacturing sectors include production of food, chemicals, textiles, machines and equipment. (eHow, 2014)

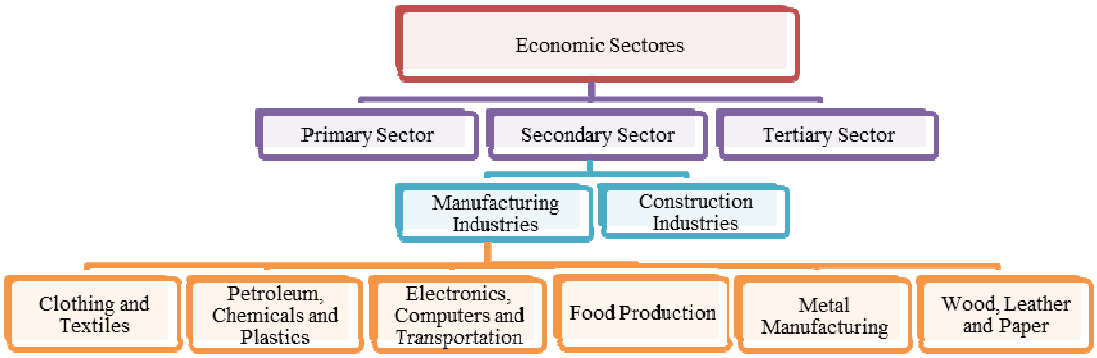
Types of Manufacturing Industries: Manufacturing plays a huge role in modern society, as everything from knitting to oil extraction to steel production falls within this sector of business. The concept of manufacturing rests upon the idea of transforming raw materials either organic or inorganic into products that are usable by society. The Bureau of Labor Statistics classifies manufacturing into hundreds of subsections (eHow, 2014).

- Clothing and Textiles: Companies that process raw wool, cotton and flax to make cloth are categorized under the clothing and textiles sector. This also applies to using wool and cloth to make clothes, outerwear, upholstery fabrics and bedding.
- Petroleum, Chemicals and Plastics: The process of turning chemicals, coal and crude oil into usable products, along with the making of soaps, resins, paints and pesticides and medicines belong to this sector of manufacturing.
- Electronics, Computers and Transportation: Though these fields are closely related, they are usually treated as different sectors of manufacturing. Most all of the products in this sector of the manufacturing industry use electric power, and all require a power source. Within this sector of manufacturing, you will find all appliances and microprocessors, semi-conductors, chips and all audio-visual equipment. The transportation sector is self-defining, as it contains all automobiles, trains and planes that do not fall under other sectors, such as metalwork or chemical manufacturing.
- Food Production: The inclusion of agriculture into manufacturing in modern society shows how agriculture has changed over the years, imitating more of a food production factory than an organic-style farm of just a century ago. As the simplest of all manufacturing industries, in includes all forms of food production from the farm to the dinner table including such work as canning and purifying.
- Metal Manufacturing: Along with oil and chemical manufacturing, metals belong to heavy industry, while the remaining sectors are generally considered as light industry or consumer-oriented industry. The production of metals includes all forms of iron, aluminum and steel manufacturing, as well as forging, engraving, coating and stamping.
- Wood, Leather and Paper: Wood production includes all forms of manufacturing floors or housing, as well as sawing and laminating. Under leather industries, you will find all tanning and curing, but the creation of leather clothes falls belongs to clothing and textiles. The paper production process is typified by the cleansing of raw wood pulp into paper products of various kinds.

2.3. Key sectors in the Kingdom's economy:

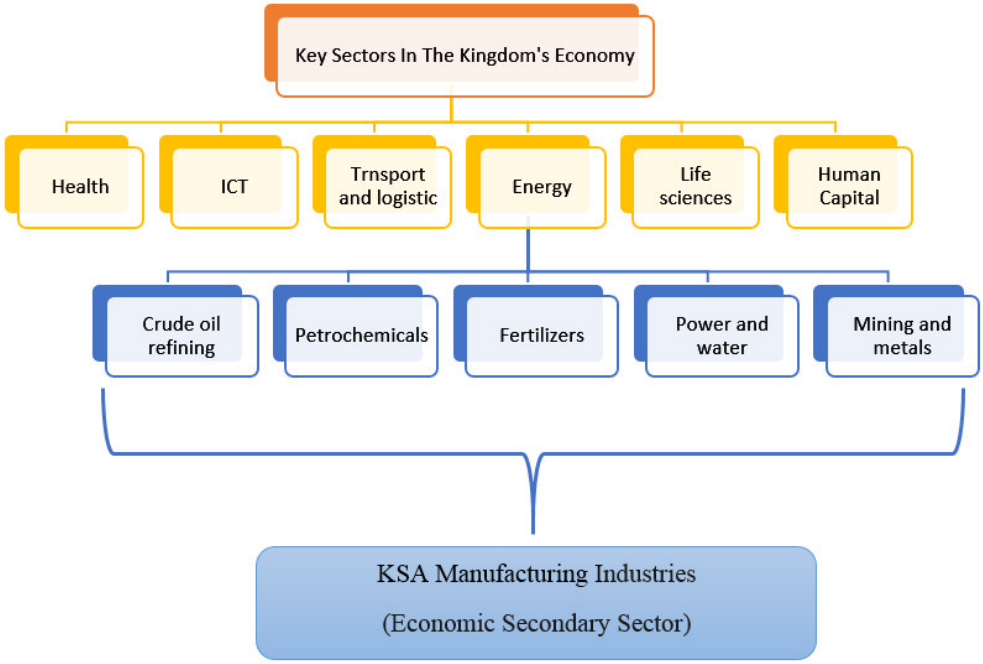
Key sectors in the Kingdom's economy are Energy which includes Crude oil refining, Petrochemicals, Fertilizers, Power and water, Mining and metals. Transport and logistics, ICT, Health, Life sciences and Human Capital (Saudi general investment authority, 2014). Fig.3. Crude oil refining, Petrochemicals, Fertilizers, Power and water, Mining and metals all are part of industrial manufacturing which are the secondary sector of the economy as illustrated in fig.1.

Fig. 2: Manufacturing Industries as Secondary Sector of Economic



Source: Developed by the author (Ahmed Al-Mutairi)

Fig. 3: Key Sectors in the Kingdom's Economy



Source: Developed by the author (Ahmed Al-Mutairi)

The above figure illustrate that the manufacturing industries is a major factor of the secondary sector as well as contributor to KSA economic.

2.4. Industrial cities in Saudi Arabia:

While Saudi Arabia's economic base continues to be dominated by oil, the Kingdom has taken steps to diversify the economy. Today, industrial products make up more than 90 percent of the Kingdom's non-oil exports. Saudi Arabia exports petrochemicals, plastics, metal goods, construction materials and electrical appliances to some 90 countries. Petrochemical and other oil-based industries are concentrated at industrial cities in major urban centers. These plants use natural gas and natural gas liquids that were previously flared, as well as refined products from the oil industry to manufacture products that would in turn feed non-oil industries. Concentration on industrial plants in specific areas also facilitates the provision of vital support services, such as water, power and transportation. The Jubail Industrial City on the Arabian Gulf has dozens of factories and industrial facilities, including a desalination plant, a seaport, a vocational training institute and a college. The Yanbu Industrial City on the Red Sea has a modern port, refineries, a petrochemical complex and many manufacturing and support enterprises. The government offered incentives for the establishment of private companies at the industrial cities. The Saudi Arabian Basic Industries Corporation (SABIC), created in 1976, set up non-oil industrial facilities that use as feedstock natural gas and natural gas liquids manufactured by the oil industry. SABIC is owned 70 percent by the Saudi government and 30 percent by shareholders from the six Gulf Cooperation Council (GCC) countries. SABIC quickly became the backbone of Saudi Arabia's successful industrialization. By 1994, it had 15 major plants operating in Jubail, Yanbu, and Jeddah, with an annual production of 13 million metric tons. By 2002, total production was 40.6 million tons of basic and intermediate chemicals, polymers, plastics, industrial gases, fertilizers, steel and other metals; this figure is expected to exceed 48 million tons by 2010. One of the most ambitious economic projects to date is the massive King Abdullah Economic City near Jeddah, which broke ground in December 2005. The residential and commercial megaproject will include a dedicated port, an industrial park, a residential and hotel complex, and educational facilities. In 2006, Custodian of the Two Holy Mosques King Abdullah launched similar economic cities in Rabigh, Hail and Madinah. Plans are also underway for an economic city in Makkah. (Saudi embassy, 2014)

Jubail City: It is a city in the Eastern province on the Persian Gulf coast of Saudi Arabia. It is the largest industrial city in the Middle East. It also home to the Middle East's largest and world's fourth largest petrochemical company. It has the world's largest IWPP (Independent Water and Power Project) producing 2743.6 MW of electricity and 800,000 m3 of water daily. Jubail comprises the Old Town of Al Jubail, which was a small fishing village until 1975, and the new industrial area. Jubail Industrial City is the largest civil engineering project in the world today.

In 1975, the Saudi government designated Jubail as the site for a new industrial city. Rapid expansion and industrialization ensued. The new industrial and residential areas were named Madīnat al Jubayl aṣ Ṣinā`īyah

(Jubail Industrial City). The 2005 Census Report for Jubail Industrial City estimates the resident population at 224,430 (Wikipedia, Jubail, 2014). Jubail Industrial City focuses on hydrocarbons and is home to most of the kingdom's heavy industry. Located in the Eastern Province, the city hosts petrochemicals and fertilizer plants, oil refineries and steel works. (MEED.COM, 2014,). The Royal Commission for Jubail & Yanbu (RCJ&Y) runs the city, which accounts for 70 per cent of the kingdom's non-petroleum exports. Large companies, such as Saudi Basic Industries Corporation (Sabic) and Saudi Aramco, dominated the city (MEED.COM, 2014).

3. Literature review

3.1. Outsourcing

Outsourcing definitions: Outsourcing is a contractual agreement between the customer and one or more suppliers to provide services or processes that the customer is currently providing internally.

Outsourcing means more than just the purchase of raw materials and standardized intermediate goods. It can be defined as a long-term, results oriented relationship of a company with an external provider for activities that would otherwise have been performed in-house. The opposing concept is "insourcing".

Outsourcing thus involves a "make-or-buy" decision by the firm. This can refer either to an outside company's provision of the products or services previously carried out within the company or to contracting out the provision of new products or services that could have been implemented in-house. When the activity was previously insourced. Outsourcing sometimes leads to a transfer of IT infrastructures, staff processes or applications to the external provider.

We can differentiate two types of outsourcing that follow two different logics: onshore outsourcing (within the same country), and offshore outsourcing (in a foreign country). Offshore outsourcing, also called international outsourcing, is the practice of hiring an external organization to perform some or all business functions in a country other than the one where the product or service will be sold or consumed. It generally refers to the delegation of administrative, engineering, research, development, or technical support processes to a third-party vendor in a lower-cost location for each business process, for each product and for each service, every company thus has to make a decision between four alternatives: onshore insourcing, onshore outsourcing, offshore insourcing and offshore outsourcing.

In (Wisegeek, 2014), it was mentioned four types of outsourcing services: professional, manufacturing, process-specific and operational. Each of these services have grown in popularity as more businesses look to reduce their overhead costs while maintaining the same level of output or support. There are risks and benefits to outsourcing that must be considered when looking at different types of outsourcing services. The greatest benefit typically is cost reduction, because the company saves in both equipment and labor costs. The largest risks are related to quality and control.

- Professional outsourcing services include accounting, legal, purchasing, information technology support and other specialized services. This is the most common area for these types of services, because of the potential cost savings associated with this type of arrangement. The business has access to high quality resources while paying only for services actually provided. This substantially reduces the organization's overhead costs. The highly and raped growth of technology and swift changes due to the globalization strongly pushes the companies to the outsourcing since it is very difficult and costly for the company to be always modernized. Moreover, Outsourcing of such socialized work to external vendors allows organizations to access high-level talent and niche expertise that does not exist within the firm. Likewise, the specialized services is one of the most important areas that need talented, specialized and trained people. On the other hand, in the field of maintenance management, some of the systems and equipment need to be maintained by experts and specialized engineers. As an example, ARRAZI Company is outsourcing the maintenance of the environmental monitoring system, which is very complicated system shall have high availability and need to be maintained and calibrated by certified engineer. The company decided to outsource the system maintenance to ensure the system availability and to avoid the high cost of the meeting the requirement the environmental regulations.
- Manufacturer outsourcing services usually are quite industry-specific. For example, an automobile manufacturer can have an outsourcing arrangement for the creation and installation of windows in all of their models. This arrangement will have huge implications on the operations but can result in significant cost savings and reduced assembly time. The primary risks with this type of arrangement are related to interruption of the production line and quality issues.
- Process-specific: Other outsourcing services can be specific to a unique process or internal procedure. In many cases, it is more cost-effective to have different parts or components manufactured by other companies. This simplifies the assembly process, reducing costs and the total amount of time required to create a complete unit. This type of outsourcing also is found in other industries. In the service industry, it is quite common to outsource specific aspects of the operation to other companies that specialize in that service. For example, a bakery can outsource the delivery of the final product to a courier company.

This contract can provide details on delivery time lines, customer contacts and costs. This type of business arrangement allows each company to focus on its respective strength and improves customer service.

- Outsourcing services for operational activities are more common in the manufacturing sector than in other industries. The nature of manufacturing creates opportunities for very specific operational activities to be delegated to outside companies. Machine maintenance and equipment repair can be obtained from outsourcing services that specialize in the specific equipment. Other types of operational activities include cleaning, landscaping, facilities maintenance and property management.

In 2013 Outsourcing in Europe report, it has been highlighted that cost-efficiency remains the main driver for consideration and implementation of outsourcing initiatives, with 42% of respondents listing cost reduction among their top three reasons for outsourcing. Cost is the key driver for first generation outsourcing initiatives. In Northern Europe (Sweden, Norway and the UK), access to specific knowledge, expertise and tools are also key drivers.

Moreover, it is stated that With cost reduction, efficiency and quality improvements being listed as the top three objectives when outsourcing, it is surprising to note that services are transitioned to an external outsourcer on an as-is basis, with no transformation of the service. (Graeme, Magnus, Stefan, 2013).

The most significant advantages of outsourcing are focus on core activities, cost savings, access to experience, improving performance, and flexibility. Main disadvantages of outsourcing are loss of managerial control over outsourced operations, threat to security and confidentiality, quality problems, hidden costs and reallocation of existing teams. (Gulzhanat Tayauova, 2012).

Better service, lower costs, more innovation, and more flexibility are the most expected benefits for outsourcing the maintenance. On the other hand, there are also risks connected to performance-based outsourcing of maintenance: the use of the wrong performance requirements, strategic behavior of the contractor, and a lack of knowledge and experience of the principal. (R. Schoenmaker, J. A. de Bruijn, P. M. Herder, 31 Jul 2013).

Benefits like Increase focus on core Functions, Access to skills and Talent and Cost saving are among the main benefits. Risks such as Dependence on the service provider, Poor contract or poor selection of partner, unrealized savings or hidden costs and Supplier problems were identified as the main risks. (Majid Nili, Ahmadreza Shekarchizadeh and Reza shojaey 2012).

Outsourcing reduces the cost of assets, facilitates core competencies to reduce production costs, leads to strategic flexibility and reduces administrative and overhead costs. Some of the reasons why companies are against outsourcing include integration challenges, sacrificing their competitive base, opportunistic behaviour, rising transaction and coordination costs, limited innovation, and higher procurement costs. Despite these shortcomings, outsourcing will continue to play an important role in enhancing organizational competitiveness. (Angappa, Zahir, King-Lun, Lionel, Thanos, 2015).

“For enterprises located in or near business centers, with established services available in the market, outsourcing decisions for noncore activities or processes may not be simple, but they usually involve straightforward considerations. Economics usually plays a major role, along with performance and quality management”, (By Grauman & Kevin, July 2000)

About 50 percent of executives state that reducing costs is the top reason for outsourcing. In most cases, the cost savings are in the 10 to 20 percent range, but can be much higher depending on how large the gap is between the company's current cost of operations and the cost it will be paying the outside provider. (NCHRP REPORT 692, 2011).

Very few business tools have the power to fundamentally transform an organization outsourcing is one of them. It allows companies to simultaneously reengineer their existing operations, create a more flexible and adaptable organizational structure, and tap he best minds in the world to create an innovation explosion. (Williamson, O. (1975)).

Aj.O.G.P.C generally value the importance of the strategic factors when making outsourcing decisions. The most important Expected outsourcing benefits were identified as” Freeing resources for core activities ” and The most important Potential risks were identified as” Dependence on the service provider”. It was shown that the Potential risks is greater than the Expected outsourcing benefits. (Majid Nili, Ahmadreza Shekarchizadeh and Reza shojaey 2013).

Outsourcing is considered from the point of view of transaction cost theory by some researchers. The transaction cost view of the firm, developed by (Kakabadse and Kakabadse, 2000), argues that decisions are made by analyzing two types of costs: (a) production costs, or the costs of capital, labor, and materials; (b) and transaction costs, or the costs of monitoring, controlling, and managing transactions. Williamson mentioned that outsourcing providers achieved the lower cost because of low wage rates on the offshore facility and by economies of scale by providing similar services to many clients.

From a strategic perspective, a sourcing decision can be made by taking into account both the scope

and the purpose of sourcing (Tsang, A. (2002)). Outsourcing allows an organization to expand its capabilities, performances and competitiveness without the need to expand its workforce. It involves procuring "contracts for service" for contractors' time and effort to deliver a specific end product/service without relying on the Client's core resources. These contracts are typically referred to as service contracts.

DiRomualdo and Gurbaxani (1998) argue that firms use outsourcing commonly based on the following three strategies: business improvement (cost reduction and enhancement of efficiency), business impact (improving contribution to companies' performance within existing lines of business), and commercial exploitation (focus on leveraging technology-related assets). Examples of outsourcing such as design, manufacture, distribution, asset maintenance, information systems, and human resources can be found in Huber (1993), Campbell (1995), McIvor (2000), and Polo and Piattini (2002).

The outsourcing enables a company's resources and capabilities to be improved by achieving better quality services and better performance (Espino- Rodrigez and Padron-Robania, 2004). While outsourcing improves the performance of areas of the business that do not provide a unique competitive differentiation, it also frees needed capital and resources for investment in those areas that provide competitive advantage. It reduces both direct costs and opportunity costs (Corbett,2004).

In this increasingly competitive environment, many manufacturers heavily depend on the advanced manufacturing technologies and just-in-time philosophy in order to improve the product's performance (Swanson, L., 1999).

The outsourcing initiative becomes strategic when it is aligned with the organization's long term strategies. (Greaver, 1999; Bettis et al.1992; Shy and Stenbacka, 2003).

With the redefinition of Greaver (1999), strategic outsourcing takes outsourcing to a higher level by asking fundamental questions about outsourcing relevance to the organization and its vision of its future, current and future core competencies/structure/costs/performance and its competitive advantages.

So, like any strategic decision, outsourcing must be assessed for its effects on competitive advantage and its congruence with decisions, (Rumelt et al, 1994).

Outsourcing brings new opportunities and new risks for companies sourcing or providing critical services such as information technology, finance and accounting, human resources, facilities management, analytics and other critical non-core functions (Brad L. Peterson Nov. 10, 2014).

With exponential growth and a competitive telecom environment, Bharti looks for ways to better manage its capital expenditures for telecommunications and information technology. One option is to hand over management of its telecom and IT networks to its vendors. Explores the pros and cons of such an outsourcing arrangement for a company in an industry where technological superiority is considered an essential element in competitive strategy (Francisco de Asis Martinez-Jerez, V.G. Narayanan and Michele Jurgens, 2007)

One of the hottest topics of the past ten years within facility management has been outsourcing. When companies are willing to contract out their accounting department, for example, it is not surprising that the facility department is a candidate for outsourcing. If you are not core business, you had better perform your own analysis of the costs and benefits of contracting out, because, if you don't, someone else will do it for you. We are unabashed advocates of outsourcing to the maximum and have done so in our own practice.

The reasons most often given for outsourcing are:

- Outsourcing saves money, particularly if in-house staff have high benefits.
- A contracted workforce can better adjust to fluctuations in work.
- Contractor personnel provide better access to higher-quality skills.
- Large contractors can use their size to get price breaks on supplies and services.
- Outsourcing allows the company to concentrate on its core business.
- The number of employees is greatly reduced.
- Particularly in the public sector, you save authorized personnel spaces.
- With outsourcing, the company can provide services or a level of service that in-house personnel cannot.

Most of the objections to outsourcing are concerned with loss of control or that the workforce will be less loyal to management if contracted. Certainly, a judgment needs to be made by every organization when considering outsourcing, but our observation is that facility managers tend to be too conservative when outsourcing. Pressed to cut costs and personnel spaces, we would use our limited resources for top-flight contract managers and planners while outsourcing the technical work and supervision (David G. CottsKathy O. RoperRichard P. Payant, 2010).

Outsourcing is not a new concept. Automatic Data Processing (ADP) pioneered the outsourcing movement in 1949, when it began providing payroll, benefits, and tax functions, eliminating the need for corporate payroll departments. (Debbie Hauser, Principal, Best Impressions, 2001). Broadly speaking, the reasons to outsource include:

- Saving money

- The need for special expertise
- A valuable network and An outside opinion
- Accomplish a project faster
- Insufficient in-house resources and Staff freer to focus on core business

The probability of outsourcing is generally increasing in volatility for high-skill process and decreasing in volatility for low-skill processes. Earlier work has found that the hysteresis band is increasing in volatility, which is interpreted as an indicator of increasing organizational inertia. We also find that the hysteresis band is increasing in volatility, but interestingly for the case of high-skill processes, organizational inertia tends to be decreasing in volatility. (Michel Benaroch, Scott Webster & Burak Kazaz, 2012)

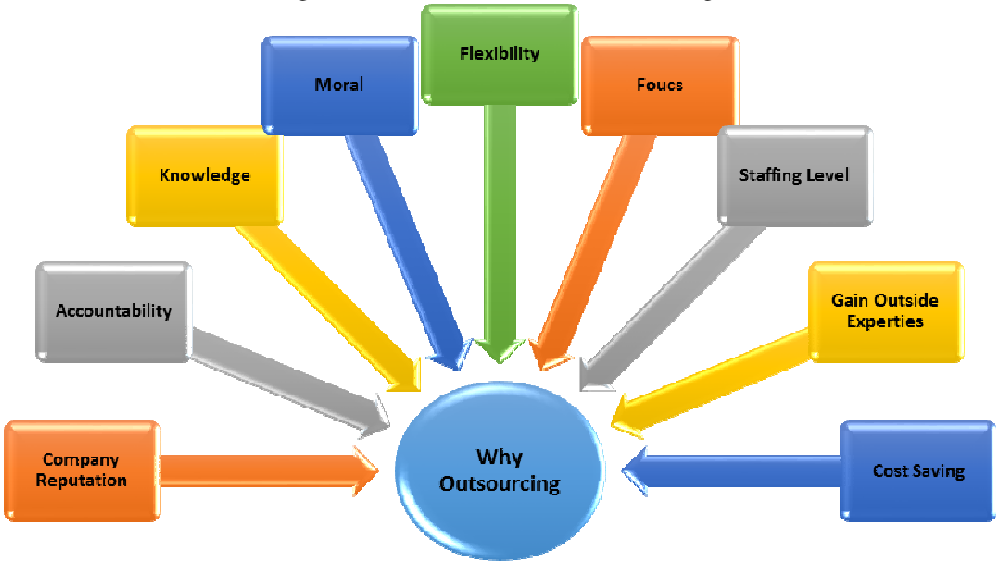
"Firms employing offshore outsourcing strategies may face both exchange rate and demand uncertainties. In this paper, we show that the firms may benefit from operational option to switch production by keeping capacities with both domestic and foreign suppliers. The value of the operational option increases as the exchange rate uncertainty or demand uncertainty increases. In addition, when the firms become risk-averse, they may use domestic capacity to hedge against offshore capacity. As a result, the firms may choose to hold local capacity even if it exhibits negative marginal contribution to the profit. Furthermore, risk-averse firms may keep more total capacity than risk-neutral firms". (Shanling Li and Letian Wang, 2010)

The objective of this paper is to study learning effects on maintenance outsourcing. We consider a situation in which a manufacturer offers a short-term outsourcing contract to an external contractor who is responsible for scheduling and performing preventive maintenance and carrying out minimal repairs when the process fails. The manufacturer's payment to the contractor consists of a fixed amount along with cost subsidization for each maintenance operation performed. We assume learning occurs when the contractor performs preventive maintenance that reduces both time and cost. Two types of learning are considered: natural learning and learning by costly efforts. We demonstrate that a well-designed payment scheme can induce the contractor to adopt the maintenance schedule that maximizes the manufacturer's profit. (Hakan Tarakcia, , Kwei Tangb, Sunantha Teyarachakul, 2009)

The increasing prevalence of outsourcing has led to it being considered central to the strategic development of many organizations. Outsourcing is increasingly employed to achieve performance improvements across the entire business. The outsourcing decision can often be a major influence on the profitability and competitive position of the organization. However, many organizations possess a limited understanding of outsourcing and in particular the potential benefits and risks and how they should be managed. (Cambridge University Press, 2005).

Many industrial companies do not have the expertise, experience, or in-house analytical instrumentation to conduct routine laboratory testing. As such, selecting a contract analytical services provider is a common task. Outsourcing is a cost-effective alternative that can allow companies to increase analytical information available for timely decisions regarding product development and production (Marie C. Vicéns, 2012).

Fig.5: Common Reasons for Outsourcing.



Source: Developed by the author (Ahmed Al-Mutairi)

Based on the above literature reviews, Fig. 5. Was developed to illustrate the most common reasons for outsourcing. Whereas, the reasons for not outsourcing were demonstrated in Fig.6.

Fig.6: Top Reasons for not Outsourcing.

Source: Developed by the author (Ahmed Al-Mutairi).

3.2. Maintenance

- Definition of Maintenance: Maintenance is all activities involved in keeping a system's equipment in working order.
- The role of maintenance function in the manufacturing organization:

The maintenance function is critical to a manufacturing organization's ability to maintain its competitiveness. Without well-maintained equipment, a plant will be at a disadvantage in a market that requires low-cost products of high quality to be delivered quickly. Properly maintained equipment will have higher availability and longer life. Poorly maintained equipment will fail frequently and need to be replaced sooner. Additionally, poorly maintained equipment is less likely to produce products of consistent quality. (Laura Swanson, 2003).

The need for a continuous flow forces industry to improve constantly in terms of product quality, operation efficiency, and production capacity optimization. To reach these goals, companies have been actively looking at various ways of outsourcing maintenance activities (Campbell, 1995).

Due to the changing organizational role of maintenance, and the increasing complexity of manufacturing technologies, maintenance related costs have been on the increase in recent years (Parida & Kumar, 2006).

In manufacturing organizations, maintenance related costs are estimated to twenty-five percent of overall operating cost (Cross, 1988a; Komonen, 2002).

In some industries, such as petrochemical, electrical power, and mining, maintenance related costs might surpass operational cost (Raouf, 1993; De Groote, 1995; Eti, Ogaji, & Probert, 2005; Parida & Kumar, 2006).

As such, close attention should be paid to maintenance performance measures, measurement and management, in order to utilize the scarce maintenance resources more effectively, and in the process, improve organizational efficiency and effectiveness.

Maintenance organizations seldom implement training programs to enhance maintenance staff capabilities. Staff learn on the go, and as they approach retirement age, these senior staff are frequently on their own, without junior staff to learn the skills necessary to work on the equipment and move into the retiree's position – it is just too expensive for most companies to justify.

When developing contracts for outsourcing maintenance, the area most overlooked by purchasing departments is material costs. The general rule is that 50-60% of the cost of a repair is related to materials. This number may actually triple when outsourcing maintenance during the first year because of staff education about the type of equipment. Outsourcing contracts should include a provision to lock in the maximum amount of material costs per year, with the contractor, as well as required employee training for a designated amount of hours annually. The contract should also include root cause analysis reports for every item over a certain dollar amount or hours of labor to repair.

Going back to our initial questions: does it make sense for industrial maintenance departments to outsource maintenance? And, if so, is it profitable or value-added? Companies should maintain 25% of the internal staffing level for hi-tech repairs and history development. The remaining staffing can be outsourced to

meet OEE levels and production variations. Outsourced contractors should be required to provide monthly matrix reports encompassing how and what they are doing to improve OEE and root cause analysis reports to the internal maintenance manager.

Outsourcing is a key tool for reducing enterprise expenses – typically by 20%. Companies need an internal manager to oversee the results provided by the contractor(s), not manage the maintenance staff. This allows the maintenance manager to oversee other areas like the Tool room, Parts Storage, and areas the contractors provide, thus spreading the strategy across every indirect department. Yes, outsourcing is profitable and will improve the overall every-day service if properly management by a maintenance supervisor (Steve Krone, 2014).

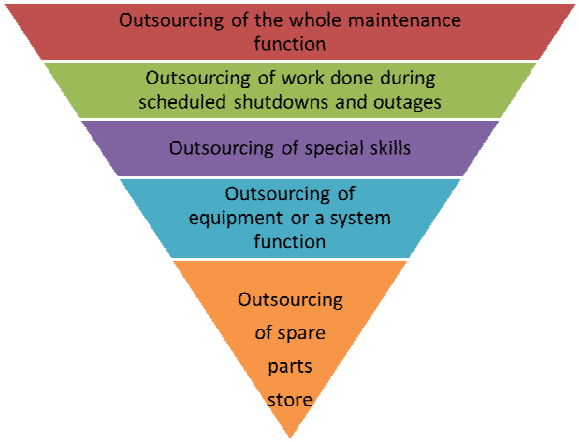
- **General objectives for maintenance:**
  a) To ensure the availability of the item for the required function, often at optimum costs;
  b) To consider the safety requirements associated with the item for both maintenance and user personnel, and, where necessary, any impact on the environment;
  c) To support the durability of the item and/or the quality of the product or service provided considering, where necessary, costs.
- **Recommended maintenance strategic approaches:**
  a. Preventive maintenance approach
  b. Scheduled maintenance
  c. Predetermined maintenance
  d. Condition based maintenance
  e. Predictive maintenance
  f. Corrective maintenance approach
  g. Immediate maintenance
  h. Deferred maintenance

These maintenance strategic approaches are usually implemented through a well-designed set of tasks, which include inspection, monitoring, test, check, routine operation, repair, general revision, reconstruction, temporary repair, lubrication, cleaning, diagnosis, malfunction troubleshooting, improvement, adjustment, registration and modification.

There are many levels of outsourcing maintenance work (Christer Idhammar, 2014). The most common include:

- Outsourcing of the whole maintenance function. This is often done by forming a separate maintenance company. This company will provide reliability and/or services to the manufacturing organization.
- Outsourcing of work done during scheduled shutdowns and outages. This is very common in the pulp and paper industry. It is not cost effective to not bring in extra resources during peak loads.
- Outsourcing of special skills. Special skills that are not often used in your maintenance organization can be good to outsource, as it otherwise is difficult to keep up with new technology and maintain skills. A maintenance organization with fewer than 1,500 bearings in their vibration analyses program can be an example of where outsourcing of this work can be cost effective.
- Outsourcing of equipment or a system function. Some companies offer to sell a guaranteed function at a fixed cost including operations and maintenance. Guarantee includes reliability performance. An example is pumps, compressors and mobile equipment.
- Outsourcing of spare parts store. You could sell your store and outsource this service to a company specializing in this area.

Fig 7. Levels of Outsourcing Maintenance Work



Source: Developed by the author (Ahmed Al-Mutairi)

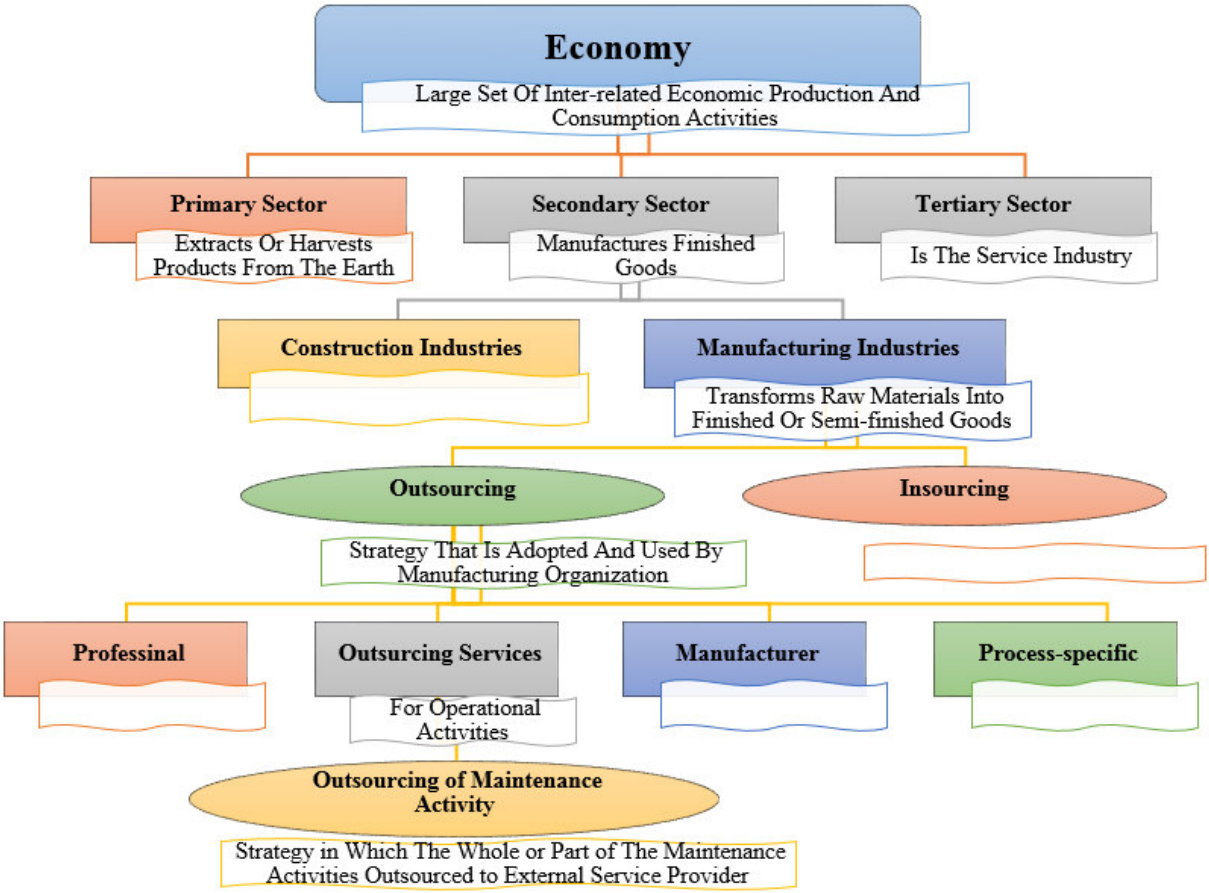
4. Summary

It can be summarized that the economic generally divided into three main sectors, Primary Sector which is extracts or harvests products from the earth, Secondary Sector that includes all of manufacturing, processing, and construction activities. Tertiary Sector which is the service industry such as retail, transportation and distribution. Manufacturing industries are playing a significant role in the economy since it is part of the secondary sector of the economy. Moreover Manufacturing industry is major contributor to the Kingdom's economy as seen in the fig.3 (Key sectors in the Kingdom's economy). Jubail is the largest industrial city in the Middle East. It also home to the Middle East's largest and world's fourth largest petrochemical company.

The maintenance function is critical to a manufacturing organization's ability to maintain its competitiveness. Without well-maintained equipment, a plant will be at a disadvantage in a market that requires low-cost products of high quality to be delivered quickly. Properly maintained equipment will have higher availability and longer life. Poorly maintained equipment will fail frequently and need to be replaced sooner. Additional to that, poorly maintained equipment is less likely to produce products of consistent quality.

Finally, the part of the research highlighted the importance of the maintenance strategy to the success of the manufacturing companies as well as to the economic growth and study particularly the maintenance outsourcing in the manufacturing industries in Jubail industrial city.

Fig. 8: Outsourcing of Maintenance as an Economic Factor



Source: Developed by the author (Ahmed Al-Mutairi), the figure illustrate how the outsourcing of the maintenance can be considered as economic factor.

5. Research methodology

To fulfill the goals of this study, the authors have carried out several research activities, which includes the following:

Go through the framework and current collected works in the areas economic sectors, outsourcing strategies and practices and maintenance management to achieve a thorough understanding of the issues involved, and identify the potential risks and anticipated outsourcing benefits affecting the outsourcing decision of maintenance services.

Developing a questionnaire survey to assess each benefits (advantages) and risks (disadvantages) influencing the decision to outsource the maintenance services in the petrochemical industry in KSA.

The developed questioner were discussed with Saudi Council Chairman Mr. Hamad Al-Shagawi and Chairman of Instrumentation Chapter in Jubail branch Mr. Houmod Al-Houmod for consultation purposes.

A dry run will be undertaken for the established survey through distributing the survey to selected portion of the targeted population, this will provide feedback and clarity for the questionnaire.

Procuring responses on the developed questionnaire survey from managers and engineers of petrochemical industry whom are considered as subject matter experts in the fields of outsourcing practices in maintenance management field.

The data obtain from the questionnaire survey were analyzed to classify the level of significance of each benefits (advantages) and risks (disadvantages).

The respondents of the questionnaire survey were classify the recognized benefits (advantages) and risks (disadvantages) conferring to its seeming significance.

Assessment of the hypothesis of more or likely disadvantages to advantages of maintenance outsourcing with Paired-Samples T-Test procedure by SPSS 22.

5.1. Data Collection

Secondary data were collected through review of several resources in Arabic and English and during the group discussion with the members of Saudi Council Engineers. Based on the information collected during the literature review and reference to the objectives of the study, primary data was collected using online and offline survey by developing a questionnaire to assess each advantages and disadvantages influencing the decision to outsource the maintenance services in the manufacturing sector within the Jubail Industrial Area.

5.2. Population and Sample Size

The study was conducted in Jubail Industrial Area, therefore, the targeted population is the engineers and managers or any equivalent position that considered as matter expert in the failed of maintenance among manufacturing organization.

The sample being used to answer the survey were 150 persons, and being approached using the data based provided by Saudi council of engineers Jubail branch. Moreover, feedback were collected through the offline during the monthly gathering of Saudi council of engineers in Jubail Industrial city.

5.3. Survey Questionnaire design

The research project is intended to provide understanding on outsourcing, weighing the significant benefits (advantages) and potential risks (disadvantages) associated with-in specially in manufacturing maintenance. According to the objective of the study and based on the literature review, the author has developed several draft of the survey after looking to several templet of survey questionnaires in the same field of study.

Questions were discussed with the supervisor and provided several supportive inputs for the study. The author has likewise managed numerous exploration group discussions for this research study with group of expert engineers and managers being met through Saudi council of engineers. Prior to formally launch the survey, pilot test or a dry run has been done to initially grasp the actual survey through group of engineers and managers. There were many revisions being developed and discussed before achieving the final copy of this research study. Consultations also were made thru Eng. Hamad Al-Shagawi, Chairman of the Saudi Council of Engineer

Questionnaires were distributed accordingly based on the population as mentioned before, to selected professionals and managers whom are mostly representing or practicing maintenance outsourcing in Jubail area. Surveys were developed by the author and uploaded in the web thru circulated online and offline. The survey is composed of 3 parts; Part 1 – main questions for the respondents on the key subjects which are the benefits, risks of maintenance outsourcing; Part 2 – opinion, suggestion and feedback of the participants and Part 3 – Personal information of the respondents.

5.4. Statistical Procedures

The collected data through the survey feedback, were scrutinized carefully in order to ensure the accuracy and all the answers that considered as a bias, misleading, not completed or others bad answers were eliminated.

Statistical Package for the Social Sciences (SPSS), was used to do the hypothesis testing. Frequency Tables were used for assessment of the advantages and disadvantages to identify the level of importance for each of the risks and benefits. The number of responses for each evaluation term were multiplied by the corresponding weight of that evaluation term.

The number of persons responding to the questionnaire survey were divide by the sum of the products of multiplication from above step. The perceived rates of importance for each of the identified potential disadvantages and expected outsourcing advantages are included in table 7 and table 8.

T-Test was used to study the differences between the advantages and disadvantages. Confidence level

that was considered is 95%, α = 0.05 level of significance.

6. Discussion of the results

Overall view, most of the industry has generally recognized the practice of outsourcing the maintenance in manufacturing industries (refer to fig. 9 summary of the survey study). Further detailed results can be found in the appendix.

Out of the four most implemented type of outsourcing in the manufacturing companies, the Service has obtained the highest rating which is 3.85. Process specific is the 2nd for about 3.06, whereas Administrative has succeeded next. The last most type of outsourcing in the manufacturing companies is the Operation, we'll of course due to the sensitivity of the work in the operation as shown in Fig. 9.

As stated, the most outsourced maintenance type for manufacturing industries are the Corrective (3.41) and Scheduled Maintenance (3.31). Majority of companies requires outsourcing additional manpower during STA in which most of the jobs are not routine. Immediate Maintenance (3.04) is typically practice the immediate maintenance wherein where in the job is highly urgent and requires special skills and quick attention. Other maintenance type such as Predictive Maintenance (2.89), Predetermine Maintenance (2.88), Conditioned Based (2.84) and Preventive maintenance (2.69) are also being practice but somehow not potently since the job are mostly likely routine and being handle by regular in-staff employees as can be seen Fig. 9.

It is very obvious that the most practice level of outsourcing maintenance in a company is the Work done during scheduled shutdowns and outages (3.80) since usually, necessity of utilizing huge manpower is inevitable. Special Skills (3.51) is succeeding the latter wherein resources for some exceptional task are not available in the company resources. The equipment or system function being outsource (3.10) ranks third while providing contractor for the spare parts store jobs (2.57) in cases like warehouse comes fourth. As expected, providing an outsource manpower for the whole maintenance function (2.40) is the last as it can be seen in Fig. 9.

The most important reasons for outsourcing maintenance in manufacturing companies is the Access to skills and talent (3.76).This is a recognizable result since there are certain jobs that requires specialized skills. The Staffing levels (3.42) presides the next important reasons while Focus on core activities (3.40) is the third reason why manufacturing companies do outsourcing is because manufacturing companies wants to focus on their core activities just like letting your employees to focus on mechanical routine maintenance while you outsource for the workshops and fabrications. Other practical reasons are for the knowledge (3.39) in which some aspects for maintenance requires especial know how and facts from a third party which are not readily available in the company. Succeeding to the reasons are Cost effectiveness (3.37), Increased in Speed (3.24), Accountability (3.03), Get Rid of the problem functions (3.01), Greater Flexibility (3.01), Company reputation and Goodwill (2.90), Increase in safety (2.78) and Employee Morale this is as shown in Fig. 9.

On the opposing side, some of the company are hesitant to outsource maintenance activities although they are practicing part of it. The most important reason why not to outsource maintenance in manufacturing companies is due to dependency on service provider (3.53). Quality Control (3.39) list the second reason for not outsourcing maintenance since most of the company are not confident to outsource because they are afraid that the quality of the job might not be competitive as to be expected. The unrealized savings or hidden cost (3.35) is the third reason that a company is somehow hesitant to outsource maintenance. Outsourcing maintenance might also put the company at risk especially the security and confidentiality (3.24) hence sometimes the management are hesitant for this practice.

Other less important reasons include the impact of employees (2.83), difficult relationship to the management (2.83) and the impact to client (2.74), Fig. 9.

The most significant aspects that could be achieved through outsourcing in manufacturing companies is the asset performance and availability (3.62). Majority of the management and staff objective is provide the customers an assurance for the equipment readiness and performance. Succeeding to this goal is the Product quality (3.27) and most management staff believes and consider also the customer's satisfaction and demand (3.17). Unfortunately and while it's logical, Safety and environment necessities (3.03) is the less likely to be achieved in doing the outsourcing. The majority of manufacturing industries most likely embrace and recommend outsourcing for the maintenance. Hence, organizations pay for only the services they need and when they need them, Fig. 9. The top four important reason for outsourcing maintenance activities was Access to skills and talent, increased speed, cost saving staffing level as represented in Fig. 9. As mention from the NCHRP Report 692, (2011) from the literature review, cost savings can be 10 to 20 percent range, but can be much higher. The above result is in line with most of the reviewed literatures, as an example on MARC J.SHCNIEDERJANS, outsourcing and insourcing in an international context and Majid Nili, Ahmadreza Shekarchizadeh and Reza shojaey (2013). Outsourcing of Maintenance Activities. Finally, as per the survey result 80 percent of the participants were recommending the outsourcing maintenance activities in the manufacturing companies. Moreover, 85 percent mentioned that there companies practicing the outsourcing in

the maintenance field.

6.1. Hypothesis Testing

This hypothesis is to test whether advantages of outsourcing maintenance in manufacturing companies are more than Expected disadvantages.

H_0: The expected disadvantages associated with outsourcing of maintenance are more than or likely to the anticipated advantages. (Disadvantages ≥ advantages).

H_A: the anticipated advantages of outsourcing of maintenance are more than the expected disadvantages. (Disadvantages < advantages).

The test is based on significance value (α) of 0.05.

T-Test

Table 1:Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Advantages	3.37	145	1.060	.088
	Disadvantages	2.98	145	1.003	.083

Table 2:Paired Sample Correlations

		N	Correlation	Sig.
Pair 1	Advantages & Disadvantages	145	-.619-	.000

Table 3:Paired Sample Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Advantages - Disadvantages	.393	1.857	.154	.088	.698	2.549	144	.012

The statistical analysis in Table 3 shows the observed significance level is 0.006 (based on one-tailed test) which is less than α (0.05). Since the test result is highly significant, H_0 is rejected and there is no reason not to accept H_A. Therefore, the hypothesis test states that the anticipated advantages of outsourcing of maintenance are more than the expected disadvantages. The author agrees with this conclusion because it seems that Outsourcing of maintenance activities that took place in manufacturing companies very important for the production continuation. Corrective maintenance is mandatory to be outsourced since most of the heavy and complicated equipment needs to be maintained by special expert engineers. Moreover, the maintenance work done during scheduled shutdowns and outages have to be outsourced because of the staffing level, tight schedule time and special equipment are needed. Based on the literature review, there are not much studies benchmarks the advantages and disadvantages of the maintenance outsourcing except one study done on a particular oil company (Aj.O.G.P.C, 2013). However, the study concluded that the Potential risks is greater than the Expected outsourcing benefits which is not in line with the findings in our study.

Fig: 9: Summary of the Survey Study

	Item	*Average Rating*
Most implemented type of outsourcing		
1	Administrative	3.85
2	Operation	3.06
3	Process-Specific	2.58
4	Services	2.40
Mostly outsourced maintenance type		
1	Corrective maintenance	3.41
2	Scheduled maintenance	3.31
3	Immediate maintenance	3.04
4	Predictive maintenance	2.89
5	Predetermined maintenance	2.88
6	Condition based maintenance	2.84
7	Preventive maintenance	2.69
Most practiced level of outsourcing maintenance		
1	Work done during scheduled shutdowns and o	3.80
2	Special skills	3.51
3	Equipment or a system function	3.10
4	Spare parts store	2.57
5	Whole maintenance function	2.40
Most important reasons for outsourcing maintenance		
1	Access to skills and talent	3.76
2	Staffing levels	3.42
3	Focus on core activities	3.40
4	Knowledge	3.39
5	Cost effectiveness	3.37
6	Increased speed	3.24
7	Accountability	3.03
8	Get rid of problem functions	3.01
9	Greater Flexibility	3.01
10	Company reputation and goodwill	2.90
11	Increased safety	2.78
12	Employees morale	2.52
Most important reasons for not outsourcing maintenance		
1	Dependency on a service provider	3.53
2	Quality control	3.39
3	Unrealized saving or Hidden cost	3.35
4	Security and Confidentiality	3.24
5	Impact on employees	2.83
6	Difficult relationship management.	2.83
7	Impact on Client	2.74
Most important maintenance objective that could be achieved		
1	Asset performance and availability	3.62
2	Product quality	3.27
3	Demand and customer satisfaction	3.17
4	Safety and environment requirements	3.03

7. Conclusion

The foremost objectives of this research are to elaborate the potential disadvantages and expected maintenance outsourcing advantages and rank them according to their perceived level of importance by managers and maintenance engineers. Moreover, it was intended to test the hypothesis whether advantages of outsourcing maintenance in manufacturing companies are more than Expected disadvantages. The author has reached to develop several models based on the literature review such as fig. 2: manufacturing industries as secondary sector of economic, fig. 3: key sectors in the kingdom's economy, fig.5: top reasons for outsourcing, fig.6: top reasons for not outsourcing and fig. 8: outsourcing of maintenance as an economic factor. The research study result is transpiring to the writings about outsourcing wherein data collection from the survey has been abridged into in the table (see fig: 9: summary of the survey study), which provides overall summary of the survey results. The most important advantages are access to skills and talent, to meet the staffing levels and Focus on core activities. On the other hand, the most important disadvantages are Dependency on a service provider, Quality control and unrealized saving or Hidden cost.

The study also shows that the most important maintenance objective to be achieved through outsourcing is to improve the asset performance and availability. Moreover, Work done during scheduled shutdowns and outages is the most outsourced maintenance level and it is rear to outsource the whole maintenance function..

The outcome of the study has transpired that outsourcing maintenance has been one of the backbone of manufacturing industries in Jubail and it has been around for some time long ago from every part of the world. It has knowingly got the attention of professional individuals and managers how significant is outsourcing to their company. The study has opened the window for everyone who are involved in outsourcing maintenance to the advantages and disadvantages of outsourcing providing them smart decision making. Despite the cost and other burdens compelled with outsourcing, it's a prodigious view that majority of manufacturing industries most likely embrace and recommend outsourcing for the maintenance in Jubail Industrial City.

Focusing on companies' core activities and practicing outsourcing provides more leverage rather than utilizing in house for a specialized job that is normally done very seldom or usually once per year. Contracting out certain processes, or sub processes, of the organization that do not directly contribute to the organization's core business wherein operations or tasks in which the organization wishes not to engage is cost efficient and effective. Outsourcing is subjective to Managers decision wherein he must determine whether outsourcing the secondary work tasks improves mechanical maintenance or reduces costs. Other potential areas for business process reviews and potential outsourcing include highly sophisticated jobs where equipment costs and utilization cannot be justified. At some point, an organization is likely to utilized outsourcing. Immediate steps to consider is to find out which function in a department is a candidate for out- sourcing

More complicated areas for outsourcing are those that require more specialized knowledge of how your company operates or that involve functions that deal with sensitive or confidential areas as discussed in the review of literature of outsourcing. Not only will it take additional time to outsource these areas but many companies get nervous about having some of the functions outside of their own control. Outsourcing generally doesn't eliminate headaches, it often only swaps one type of headache for another. Instead of the headaches of managing that function directly, you now have the headache of managing the outsourcer to say nothing of handling the negative PR. It is not unheard of for large outsourcing deals to take 6-12 months or longer to be evaluated and put in place. However, armed with all this information, a company should be able to start doing benefits analysis to determine if outsourcing makes sense and what the risks and benefits are. Finally, the statistical analysis (T test) in Table 3 shows that the expected advantages are more than the maintenance outsourcing disadvantages

Aforementioned to the main objective of the research "main hypothesis", it has been concluded that projected advantages of outsourcing of maintenance are more than the expected disadvantages.

8. Recommendations

This breakthrough study of outsourcing is the pillar for the outsourcing maintenance strategy of professional and managers in Jubail. The study and the results will greatly impact the decision makers for manpower and it can be game changer for the professionals and managers. This will open a gate for a more sophisticated or advance study on outsourcing maintenance. The research study will also be the starting point and reference for future expanded studies interrelated with outsourcing and maintenance for Academics. Managers could refer to this research to maximize and effectively decide on their plans for outsourcing. The outsourcing is very important strategy and can play a significant role in the company success; therefore, it has to be studied carefully by evaluating the advantages, disadvantages and the proper implementation requirement. It is recommended to implement outsourcing of work done during scheduled shutdowns and outages, which is very helpful to minimize the outages period. Moreover, it is very expensive to hire talent and highly skilled and expert people to do some of the special and critical maintenance activities that mostly have a low frequency so as it is mandatory

to outsource such type of maintenance tasks. It is highly endorsed to have services to be outsource, while it is not commended to apply operation job especially on manufacturing industries due to the sensitivity of the work since they have direct access to the operation.

It is relevant to consider outsourcing for the functions that require minimal, or absolutely no, knowledge of your company's industry and/or operations. When these functions are outsourced, not only are you freeing up your internal staff for those tasks that require specialized knowledge of your industry and organization, but you may also be delivering a higher level of service, as the outsourcer is well versed in that. Although there are number of factors to contemplate when determining whether to outsource, as a general rule, defining if it makes business sense is the overriding concern.

Business consideration on how will outsourcing will benefit the company should always be deliberated. It should lead to cost saving and must provide better service execution, quicker turnaround or better quality. The manager should make it sure that in dealing outsourcing it will somehow improve the company's image. Hence, careful evaluation and judgment shall be taken into account when implementing outsourcing. Carefully articulate to the contractor as much detail about their background and performance history. Benchmark them from the other contractor and obtain feedback from their clients. It is recommended to refer to the Classification of contractors that is done by the government based on the predetermined criterial which can ensure the contractor qualification. It is recommended to determine your own costs for currently executing functions, otherwise it will be difficult to know if outsourcing will save you money. Understand the specifics of the outsourcers' term and conditions. It is recommended and wise to make sure the company should factor in the effort to transition to an outsourcer, as well as what's involve in the ending arrangement either at contract's end or earlier. Generally, the maintenance outsourcing is very accommodating for the organizations to achieve the targeted objectives.

9. Future Prospect of the study

This study is if the first time conducted in field of maintenance outsourcing among all GCC countries hence, it is a good bases for further studies such as:

- Further comparison study is recommended to identify and distinguish which type of the maintenance that good to be outsourced and which type to be insourced. The study can be extended to cover the service providers, and do discuss the factors that may leads to outsourcing failures. More focus study is suggested to discuss particular outsourcing cases and evaluate the real output. Moreover, Trend analysis can be included in some of the future studies and it can be extended to cover wider area not only Jubail Industrial Area.
- Outsourcing continues to grow in the industry and it is important to understand the weaknesses and strength of it and this studies provides a lot of information which a company can take advantage.
- Over the past years we have seen that companies outsource when it comes to business process, not only for the low prices but also because access to a group of freelancers with competitive talent with highly qualified graduates more ambitious and they could perform as well or better. This study will provides sufficient feedback to manufacturing industries and gain them efficient selection and managing outsourcing.
- Since outsourcing is now expanding its horizons in different markets to exploit the latest technological innovations, there are no geographical or linguistic boundaries. Video conferencing, instant messaging, email, and social networks have facilitated communication and principals working with staffing firms that can now focus on core business areas of their businesses.

10. AUTHORS BIOGRAPHY

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