Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

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Acknowledgement

It has been five months totally since we began writing this master thesis which mainly aims at throwing light upon electronic procurement for MRO products in Bangladesh and China. And five-month intensive work has paid back, brought us a much deeper comprehension of the driving forces and hindering factors of electronic procurement specific for industrial MRO products in the comparison of GE aviation in China and BATA shoes in Bangladesh. However, it is never only our effort that can make this thesis so far, there are a number of people behind who gave firm support and constructive feedback, and hereby we would like to show our sincere appreciation to.

First of all, we would like to show our appreciation to our tutor, Peter Berling. Without his constantly constructive feedbacks, patient tutoring, feasible guidance, we would never have got improved. Moreover, we are very much grateful for our examiner, Dr. Helena Forslund, her thorough, helpful feedbacks and suggestions throughout all the seminars. Meanwhile, we would very much like to give particular thanks to our opponent group, their critical comments and useful suggestions have sharpened our thesis time by time to meet the degree requirements.

Last but not least; we would also like to show our appreciation to BATA shoes in Bangladesh’s plant engineer – Md. Arifur Rahman; warehouse manager – S.M.A. Mahfuz; Senior Merchandiser – Md. Julfekar Ali and GE aviation group in china’s purchasing engineer – Weihua Liu. It is because of your supportive interview feedback and precious questionnaire data that helps us achieve our scientific credibility and makes our thesis more academic.

Växjö, May 2012

Mahmudul Islam
Tan Zhu
Summary

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Keywords: e-procurement, MRO procurement, e-procurement implementation, driving forces of e-procurement, hindering factors of e-procurement

Title: Driving forces and hindering factors of e-procurement adoption for MRO products in Bangladesh and China.

Background: MRO (Maintenance, Repair and Operations procurement) materials, as time goes by, are now attracting more and more enterprises’ attentions due to their enormous varieties, large quantity and huge cost. The traditional MRO procurement method has the problem of lacking of centralized management, funds, and channels, short of products and information flow. Meanwhile, e-procurement (electronic procurement), due to its advance, has nowadays been introduced to more and more enterprises for procuring mainly MRO materials, which leads to much savings and efficiency.

Purpose: The purpose of this thesis is aiming at throwing light upon two cases: one is BATA shoes in Bangladesh and one is GE aviation group in China, the driving forces and hindrances of their electronic procurement for MRO goods. Thereafter the authors intend to compare both cases according to the empirical findings and draw some future suggestions.

Method: In this thesis, the authors will employ qualitative multiple case studies method in the combination of interview and questionnaires with both cases to create the deep understanding of e-procurement implementation of them.

Results, conclusion: First, the current status of e-procurement implementation for MRO materials will be explained in the within-case analysis. Then, the internal driving forces and hindrances of each case will be thoroughly analysed according to the four sections-perceived benefits, perceived critical success factors, future organizational performance and perceived barriers in the theoretical framework. Finally, the authors
will use cross-case analysis comparing both cases´ driving forces and hindrances according to the model, in order to draw systematic future suggestions for BATA shoes in Bangladesh with GE´s successful views.

**Future work:** The authors find it interesting that in the future if the seller firms´ perspective on e-procurement implementation for MRO materials could be studied. Also a quantitative study on e-procurement for MRO, its impact on organizational performance would be very interesting subject to focus on. Moreover, a study in the background of different countries, their cultural influences on e-procurement implementation would also be a suggestion.
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List of Abbreviations

MRO    Maintenance, Repair and Operations
ORM    Operating Resource Management
B2B    Business-to-Business
B2C    Business-to-Consumer
B2E    Business-to-Employee
B2G    Business-to-Government
EDI    Electronic Data Interchange
XML    Extensible Markup Language
ERP    Enterprise Resource Planning
MBUs   Meaningful Business Units
1 Introduction

MRO procurement plays a significant role in the company's cost control and profit, as Jin (2011) claimed, since MRO procurement of enterprises accounted for 26% or 63% plus of an average ratio of total procurement cost. However, according to Croom (2000), due to the low contribution to total purchasing turnover, MRO usually doesn't get more attention, therefore the MRO procurement usually ends up with uncoordinated and decentralized management and barely provide added value to the company.

Nowadays, Companies are starting to realize that purchases can contribute to sustainable competitive advantage with properly strategies (Baily et al. 2008). Purchase/procurement processes have become overpriced activities for business and it is natural for companies to want to shrink the costs by adopting the rapidly booming information technology, such as the Internet, that leads to electronic procurement (Abu-ELSamen et al., 2010). From the last few years, purchasing of indirect goods, such as office supplies, maintenance, repair and operations (MRO), through electronic tools has rapidly developed an effective and ever-growing reality (Lee et al., 2003; Puschmann and Alt, 2005, Caniato et al., 2010). According to Foroughi (2007), one area of supply chain where lies large potential cost savings and improved efficiency is the procurement of indirect materials.

According to Turban et al. (2006), e-procurement represents to the purchase of goods and services for organizations. As Parida and Sophonthummapharn (2010) discuss that e-procurement systems are commonly used for purchasing and selling maintenance, repair and operation (MRO) goods and it can simply be transformed into e-catalogue. Because of the emerging application of internet technologies, companies are forced to modification their operation from conventional way to a virtual e-business, e-procurement and e-supply chain philosophy and here one such technological application named e-procurement has guaranteed companies possibility of higher profitability (Parida and Sophonthummapharn, 2010). E-procurement has also enhanced the scope for innovation and flexibility in the purchasing function and has shaped a new way of purchasing products (van Weele, 2010).
Hence, different companies from different geographical locations may have different perspective on the implementation of e-procurement for MRO procurement. In our thesis we intend to compare two different companies from two different places where one is from Bangladesh, a developing country and another is from China, a developed country.

1.1 Background

1.1.1 MRO Procurement

MRO procurement, as defined by Gebauer and Segev (2000), is the indirect procurement activities concerning with all items and service that are not parts of the finished products. Neef (2001) claimed that the indirect procurement can be divided into two groups: ORM (e.g., office products and travel services) and MRO (e.g., replacement parts) materials. The term ORM stands for ‘Operating Resource Management’ which is used usually to indicate the many ordinary office products and services that organizations purchase day to day such as, office supplies, furniture, forms, travel services, computers, janitorial and maintenance services, light bulbs, extension cords, etc. Here Neef (2001) also stressed the distinction between ORM and MRO. He added that the office products (ORM) should not be confused with mission critical overhaul or maintenance items. Many researchers consider that MRO is the much more important than ORM (Neef, 2001). Compared with the direct procurement, MRO procurement is always more diverse. The items range broadly from simple office products to parts of maintenance, repair and operations such as lubricants or spare parts, or even to construction related items and various services. According to Jin (2011), MRO is the abbreviation of Maintenance, Repair and Operations, refers to the non-productive materials that plants or enterprises ensure the regular work of their production facilities, equipment maintenance and repair. These materials may be used for equipment maintenance and repair of spare parts. They ensure the normal operation of business related equipment, supplies and other materials.

Li and Yang (2011) claimed that domestic MRO procurement normally use the traditional procurement model where manufacturers find suitable suppliers, and then
by industrial enterprise or MRO suppliers to get contact with the right logistics service providers, provision of logistics services.

According to Li and Yang (2011), there are lots of differences between MRO procurement and direct materials procurement. The main difference would be compared with direct material procurement, MRO materials are in large quantities, the average value is low, many vendors, procurement and inefficient.

1.1.2 E-procurement

E-procurement as one element of B2B business: According to Gunasekaran et al. (2009), e-commerce nowadays is playing a major role in global market. And B2B E-commerce models among all the other models like B2B, B2C, B2E and B2G, has been the most successful due to the one element of it, which is E-procurement. E-procurement focuses on acquisition of resources, especially MRO items, which enormous cost savings and increased effectiveness can be achieved through the use of it according to Gunasekaran et al. (2009).

In most cases companies have adopted e-procurement systems to purchase indirect materials for operations, sales, maintenance and administration including things like supplies, computer equipment, cleaning solvents and office furniture according to Albrecht et al. (2005).

According to Gunasekaran and Ngai (2008), e-procurement works in such way that buyer software enables users to automate transactions and focus mostly on buying organizations activities such as order placement, catalogue management, payment, reporting and so on.

Muffatto and Payaro (2004) define E-business as a system in which internet technology is implemented to streamline the business processes of a company for better productivity and efficiency. This system is for improving integration of suppliers, buyers and customers. Also, Peleg et al. (2002) see the e-procurement as a powerful vehicle for reducing the company cost and improving productivity. E-procurement solutions, as Gunasekaran and Ngai (2008) said, are the internet technology platforms and services which make companies’ purchasing activities more efficient and cost
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Effective. Moon (2005) suggests e-procurement has several benefits like lowering transaction costs, increasing ordering speed, widening vendor’s choices and so on. However, same time Gunasekaran and Ngai (2008) also stated several adoption barriers. And in this paper, the authors will deepen the details of E-procurement on benefits, barriers and implementation processes.

**Background researches on E-procurement:** Concerning e-procurement field, Gunasekaran and Ngai (2008) focused on the adoption of e-procurement in Hong Kong, and set a model for the adoption of e-procurement. Hardy and Williams (2008) discuss the social and technical actors on how e-procurement constitutes and is constrained by a homogeneous network of human and technical actors in e-procurement policy implementation. Karjalaainen and Kemppainen (2008) studied the affection of the enterprise size, resource perceptions, and electronic systems on the involvement of small and medium sized enterprises in public procurement. Nurmiaskso (2008) did a research about how organizational and technological factors explain the adoption of e-business functions in 4570 European companies and the migration from EDI-based to XML-based e-business frameworks in 329 European companies. Meanwhile, numbers of empirical studies on e-procurement adoption have been published as well. Like Batenburg (2007) studied about country differences in adoption of e-procurement. Garrido et al. (2008) showed how the intensity of use of internet in procurement process affects firms from organizational and economical points of view.

**1.2 Problem discussion**

**1.2.1 Problems with traditional MRO procurement method**

According to Jin (2011), MRO procurement and management can have many problems as he concluded in the following:

1. MRO market is dispersed, small suppliers, fewer species, irregular management, lack of funds, few channels.
2. Manufacturers ignore the importance of MRO procurement which as a result leads a high procurement cost.
3. MRO procurement is often dispersing decentralized which will increase the procurement cost.

4. MRO has various types, small order quantity, and low consumption. Also, companies have not laid much emphasis on suppliers’ management, therefore their procurement is random, and the suppliers cannot be stable which increases the risk as well as the transaction cost.

5. Companies have limited equipment maintenance and business repair plans, so they are not very concerned with finding historical data and demand forecast which leads to the weak MRO management plan.

Also, according to Li and Yang (2011), due to the variety of MRO procurement materials, the procurement of the specific process will vary. For example, the office stuffs like printing paper, its procurement procedure is much simpler than the equipment part procurement, and there is not a strict procurement requirement. However, due to the unified procurement process, the procurement process for MRO is gaining more costs.

Moreover, another fact as Li and Yang (2011) explained, current domestic enterprises make MRO purchase mainly according to the dynamic factory inventory. Due to the traditional method of MRO procurement, many enterprises so far use the same direct procurement process for MRO materials which, compared with direct materials, are usually low-value consumable good and purchase of its kind complex variable. There is a large difference between these two kinds of procurement. However the ignorance and traditional MRO procurement is leading to more cost for enterprises.

As we have discussed that the MRO procurement has excessive process costs and Sheng (2002) claimed that the Internet-based procurement systems would support substantial cost improvements. Here e-procurement enables the power to control the typical routine work and repetitive tasks with a low unit value, high range of goods and services. While traditional MRO procurement takes excessive paper work and still done by telephone, the e-procurement systems allow employees to order materials directly from their PCs, either through an Intranet or a website (Sheng, 2002). Sheng (2002) also argued that e-procurement systems not only enable to make purchasing decisions
online, but also make linkage between the suppliers and the purchasing network. Thomson & Singh (2001) claimed that the increased adoption of the Internet for business uses, the procurement process is migrating from traditional paper-based processes to e-procurement.

According to Teo et al. (2009), e-procurement, as a system, has such benefits as reducing organization’s costs, permitting wider choice of buyers and suppliers, enabling volume purchases, leading better quality, improving delivery, reducing paperwork, and lowering administrative costs.

According to Meier & Stormer (2009), e-Procurement is the method which connects all the processes between companies and suppliers through electronic communication networks. E-Procurement focuses on strategic, tactical, as well as operational elements of the procurement process (Meier & Stormer, 2009). As we discussed earlier that MRO services occur the largest cost block for a company, so Meier & Stormer (2009) claimed that e-Procurement turns out to be important tool to procure MRO supplies more efficiently via communication networks.

As Neef (2001) discussed that e-procurement enhance the empowerment of individual employees and shift management’s focus toward horizontal processes. He claimed that previously the purchasing process was considered as a set of detached activities and functions, and was controlled centrally or departmentally. For indirect and MRO materials, e-procurement method permit a greater level of individual empowerment and a completely auditable purchasing is given to individual employees (Croom, 2001; Neef, 2001).

Neef (2001) also argued that e-procurement systems offer a great number of direct links to the company’s ERP procurement sections and, while procuring MRO inventory, e-procurement shows much integrity, higher accuracy and lower inventory handling costs because it exchanges the information of forecasts, purchases, inventory levels, and delivery status directly to and from the company’s database. E-procurement eliminates the intensive labor of employees and reduces the cycle time to procure MRO supplies (Neef, 2001).
Many articles have been found by authors in this field focusing on e-procurement’s benefits and barriers in general, however very few articles went in detail focusing on e-procurement implementation for MRO procurement industry as an advanced method for improving efficiency and lowering the costs. Therefore, considering relative blank of e-procurement for MRO products this field study, this thesis is motivated to throw light upon the e-procurement focusing on MRO products.

1.2.2 Problems with e-procurement adoption

Meanwhile there are questions with the adoption of e-procurement as Day et al. (2003) noted users’ reluctance in business processes as a major barrier to the implementation of e-procurement systems.

Yen and Ng (2002) discovered that on both buyer and seller sides there are following prohibitive and discouraging:

- Setting up online procurement systems, enabling these systems, and meeting workforce requirements of such systems require much cost and developing time,
- The lack of adequate security measures to protect data; and trust issues between buyers and sellers.

In the same study, managers of the seller firms also stated attitudinal resistance to Change stemming from a number of concerns: (Yen and Ng, 2002)

- It is uncertain to gain the expected return on investment to cover development costs;
- Business process needs to be reorganized and worker apprehensions about being replaced by automated procurement systems.

The adoption of e-procurement in Singapore was investigated by Kheng and Al-Hawandeh (2002) and several stumbling blocks were presented to this initiative from the point of view of Singaporean firms.

- It was a concern about security and privacy of procurement transaction data.
- Significant investments in hardware, software are required, and personnel training to participate in e-procurement are forbidden.
- The laws concerning e-procurement B2B commerce are still not mature. For example, questions about the role of electronic signatures, legality and force of e-mail contracts and application of copyright laws to electronically copied documents are still unresolved.
- Technical problems still occur like inefficiencies in locating information over the internet using search engines and the no common standards that can help easily integrate electronic catalogs from multiple suppliers.

Gunasekaran and Ngai (2008) stated the barriers in the system influence the successful adoption of e-procurement. Thus, identifying such barriers is critical in developing the right pathway for the adoption of e-procurement for the organizations. The barriers can be from infrastructure, strategy, people, culture, etc.

As Walker & Harland (2008) said, In order to explain differences in e-procurement adoption between organizations, There are five main types of factor that appear to influence the adoption of e-procurement which are organizational, readiness, supply, strategic and policy factors.

As we can see from the above discussion that many authors have identified some problems that may emerge when implementing an e-procurement solution. Also (Neef, 2001) state the problem with e-procurement adoption. Long-term, company-wide change management needs many of the long-term issues to result in a successful business transformation. Rethinking business processes, changing reporting structures, retraining and relocating procurement staff, and altering reward and incentive programs are the issues needed. It also means rethinking and renegotiating relationships with external partners—suppliers or buyers. Therefore, it is important to know what areas of procurement can be “reengineered,” at what time, in what order, and in what timeframe. As (Neef, 2001) said “The notion that a company can transform itself into an e-business by simply using a piece of software and adding it to its existing infrastructure is wrong and dangerous.” Jim Shepherd of AMR Research explained in a recent report that Companies must instead incorporate e-business
concepts into their overall business strategies. Extension of the enterprise to trading partners, the transformation of relationships with customers and suppliers, radical changes in the order fulfillment process, and the addition or replacement of entire sales channels are issues needed to be aware of.

Over the last several years, the implementation of e-procurement has experienced explosive growth in some organizations, while others have resisted its assimilation. And many articles concerning e-procurement have been found mostly focusing on the benefits, barriers, adoption drivers however little has touched the area of comparing two cases in both developed country and developing country their adoption status of implementing e-procurement for MRO products and the influencing factors.

As we have chosen two companies from China and Bangladesh, in our thesis, we will address the factors which are hindering to implement e-procurement for MRO procurement in Bangladesh and the factors which are facilitating to implement e-procurement for MRO procurement in China. Therefore using the successful case—GE aviation group in China as an example to guide the future e-procurement adoption for MRO area of Bangladesh companies if there is a need for them to move to e-procurement in the future.

Therefore, the authors come up with following research questions.

**1.3 Research question**

1. What are the driving forces and hindering factors to implement e-procurement for MRO procurement in both business cases in Bangladesh and China?

1. How can the successful e-MRO procurement implementing company exemplify the way to improve the traditional procurement implementing company based on its specific case?
1.4 Purpose
The purpose of this thesis is to get deep insight of the driving forces and hindering factors of e-procurement implementation for MRO procurement from two countries’ different cases in which one is a successful e-procurement implementer in the world while other one is not still using the traditional method for procuring MRO materials. At the same time, we will also focus on the traditional MRO procurement process. After getting the driving forces and hindering factors of two companies we will also compare them and our final aim is to conclude like why the similarities or differences exist and what action agenda can be drawn from the successful e-procurement implementer to the other one.

1.5 Delimitation
Due to the limited resources and time that authors are able to obtain, this thesis will mainly focus on MRO procurement process, e-procurement application and for e-procurement this thesis will discuss only from the buyers’ side and will not discuss from the seller side. And here other business processes like delivery process, customer relationship management, and so on will not be considered. And in this thesis, the authors will mainly focus on the industrial MRO procurement. Other indirect materials, like office supply will not be considered here.

1.6 Time plan

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2 Methodology

2.1 Research Philosophy

According to Saunders et al. (2009), the philosophy you adopt for the research contains critical assumptions about the way you view the world, which will underpin your research strategy and methods. Also, Johnson and Clark (2006) claimed the importance of business and management researchers being aware of philosophical commitments they make through the research strategy choice since it has great impact on helping them understand what they are investigating.

By referring Saunders, Lewis and Thornhill (2008)’s research “onion” model (see figure 1), Saunders et al. (2009) explained that understanding of our philosophical position is of practical use since only if we have this understanding, we can examine them in the contexts.
2.1.1 Implemented philosophy- Pragmatism

According to Saunders et al. (2009), Tashakkori and Teddlie (1998, p. 30) contend that “pragmatism is intuitively appealing, largely because it avoids the researcher engaging in what they see as rather pointless debates about such concepts as truth and reality. In their view you should ‘study what interests you and is of value to you, study in the different ways in which you deem appropriate, and use the results in ways that can bring about positive consequences within your value system’. For this paper, the authors think that the research questions are the most important determinant of epistemology, ontology and axiology, and they all to a degree suggest ambiguously that either a positivist or interpretive philosophy is adopted; therefore, according to Saunders et al. (2009) they are the criteria for using Pragmatism as the philosophy. And the paper’s philosophy idea is based on Saunders et al. (2009)’s explanation of Pragmatism in ontology, epistemology, axiology and data collection techniques positions as Table 1.

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<td><strong>Ontology: the researcher’s view of the nature of reality or being</strong></td>
<td>External, multiple, view chosen to best enable answering of research question</td>
</tr>
<tr>
<td><strong>Epistemology: the researcher’s view</strong></td>
<td>Either or both Observable phenomena and</td>
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2.2 Research strategy – survey, case study, and archival research

Research strategy which might be employed in a business research as Saunders et al. (2009) stated, are as follows: experiment, survey, case study, action research, grounded theory, ethnography, and archival research.

And each strategy can be used for exploratory, explanatory, and descriptive research stated by Yin (2003). None all of them is superior or inferior when it comes to the question of which to implement. The guide of choosing one suitable strategy as Saunders et al. (2009) explained, is whether it will help you answer your research questions and fulfil your objectives. It also depends on the extent of existing knowledge, the amount of time and other resources at hand as well as the philosophical underpinnings.

Choosing a strategy means that you have an idea of your views on truth and knowledge, social entities, what the research can and cannot achieve and how all this will affect the your processes according to Greener (2008).

Based on the Pragmatism as the philosophical underpinning, the authors are willing to choose external, multiple views to best enable answering the researching questions. Survey, and mixed methods are introduced.

2.3 Research method – qualitative method research

Saunders et al. (2009) threw light upon two main different research directions—quantitative method and qualitative method. As he explained, quantitative is applied to generate or use numerical data by implementing any data collection technique

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</tr>
<tr>
<td><strong>Axiology: the researcher’s view of the role of values in research</strong></td>
</tr>
<tr>
<td><strong>Data collection techniques most often used</strong></td>
</tr>
</tbody>
</table>

Table 1: Features of Pragmatism in management research (Adopted from Saunders et al., 2009, p.119)
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

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(such as questionnaire) or data analysis (such as graphs or statistics). While qualitative is applied for non-numerical data by implementing data collection technique (such as interview) or data analysis procedure (such as categorizing data).

Two types of research methods were introduced by Saunders et al. (2009) as mono method which indicates using a single data collection technique and corresponding analysis procedures and multiple methods which indicate using more than one data collection techniques and procedures to answer the research questions. However, for multiple methods, it is also categorized into two—multi-method, which uses more than one data collection techniques with associated analysis procedures within wither either a quantitative or qualitative research. While mixed methods approach indicates using both quantitative and qualitative data collection techniques and associated analysis procedures. (see figure 2)

![Figure 2: Research choices (Adopted from Saunders et al., 2009, p. 152)](image)

Considering that the research questions of this paper are mostly dependent on the participants’ points of views to solve, meanwhile are micro and need deep and rich data. Therefore, the authors are more willing to use the qualitative method research in order to generate and analyse data deeply and precisely.

2.4 Research approach—Deduction research

Saunders et al. (2009) claimed Deduction approach process as:

1. Deducing a hypothesis from the theory.
2. Expressing the hypothesis in a way that a relationship between two specific concepts or variables.
3. Testing the operational hypothesis.
4. Examining the operational hypothesis (which will either confirm the theory or modify the theory).
5. Modify the theory in light of findings.

According to the authors, this paper will focus mostly on getting deep insight of traditional MRO procurement model and finding out the probable changes after implementing e-procurement. Multiple case study will be used to collect data in order to testify and modify the hypothesis generated from the theory. Therefore, the idea is quite like what Saunders et al. (2009) claimed deduction research process above.

2.5 Time horizons – Cross-sectional research
According to Saunders et al. (2009) there are two time horizons, Cross-sectional, which means the “snapshot” time horizon (the study of particular phenomenon at a particular time), while longitudinal means the “diary” perspective (study of change and development over time). Considering the limitation and resources of the authors have, this paper will be focusing only on particular time; therefore it is a cross-sectional research study.

2.6 Research design
Saunders et al. (2009) states that the research design section provide a complete view of the chosen method and the reason behind the choice of the method. Saunders et al. (2009, p. 136) also described that research design will be the roadmap of how you the research questions will be answered.

2.6.1 Multiple case studies
Gillham, (2000) noted that a case can be single or multiple which investigates the case study to answer particular research questions. It also finds a variety of different kinds of evidence and the evidence needs to be abstracted and organized which will help to pursue the potential answers to the research questions. In case study research the qualitative methods is not solely concerned but it is primary method and here all evidence is gathered by collecting data (Gillham, 2000). As Robson (2002, p. 178) states that case study as ‘a strategy for doing research which involves an empirical
investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence’.

The case study method has some assumptions and the important assumptions are as follows (Kothari, 2004, p. 114):

I. The assumption of uniformity in the basic human nature in spite of the fact that human behaviour may vary according to situations.

II. The assumption of studying the natural history of the unit concerned.

III. The assumption of comprehensive study of the unit concerned.

Morris and Wood, (1991) said that, from Saunders et al., (2009), the case study strategy will be appropriate if one hope to gain rich understanding of the context of the research. Yin (2003) states that the case study strategy generates answers to the question ‘why?’, ‘what?’ and ‘how?’ questions. Some data collection techniques are used in case study strategy, for example, interviews, observation, documentary analysis questionnaires (Saunders et al., 2009). As Yin (2003) distinguishes case study strategy based on two dimensions: single case v. multiple case and holistic case v. embedded case and here in this thesis our choice is multiple case study strategy because it can validate the finding of the first case which occur in other cases and it helps to generalize these findings (Saunders et al., 2009). So far case study method has several advantages which are (Kothari, 2004):

I. Case study helps researcher to get a real and liberal record of personal experiences and it reveals man’s inner strivings, tensions and motivations which direct him to embrace a certain pattern of behaviour.

II. It helps to formulate relevant hypotheses along with data.

III. Case study has huge value in taking decisions regarding several management problems.

Case study also got some limitations and despite all the limitations, we found that case study method is the suitable method for our thesis.
2.6.2 Sample selection

Sample selection is the most important part of the thesis and sample selection technique and sample size is dependent on the research questions and objectives (Patton, 2002, from Saunders et al., 2009).

Sampling selection of this Thesis

Two cases from different geographical locations, Bangladesh and China, have been selected for this thesis in order to be able to respond to the research questions. Our criteria of choosing companies are one of them is precisely known having been implementing electronic procurement successfully and the other one is still using traditional procurement method. Therefore first case we chose is GE aviation group in China, which is located in China, an American multinational conglomerate organization formed by Edison general electric company and Thomson-houston electric company in 1892, which mostly focuses on four segments: energy, technology infrastructure, capital finance and consumer industrial. The other is BATA shoe Company (Bangladesh) Limited, which is a shoe manufacturing company. We have chosen these two company because GE mainly has centralized industrial MRO materials procurement especially for aviation group and by reading their annual report and website resources authors found out they are implementing e-procurement method for aviation MRO materials like aircraft engine manufacturing machines and different kinds of tools, which can be categorised as a MRO buyer using e-procurement method and BATA has been selected because it is a manufacturing company and it must need MRO supplies. And for BATA case we want to find out the factors that are hindering them or facilitating them to implement e-procurement for procuring MRO supplies.

The reason and motivation of choosing these quite distinct companies in different industries are simply because GE aviation in China is pretty much like BATA in Bangladesh both as international companies in developing countries however implementing totally different procurement method which makes it quite interesting. What’s the internal reason of the phenomenon? What can the one who is not implementing e-procurement learn actually from the one who is one of the most successful e-business strategy user in the world? However the only obvious difference
between the two cases as said are the industry difference. But the authors consider mostly the MRO products two companies are similar since they are all producing machines and tools which take large amount of company whole procuring items. Therefore, the authors are very much interested in comparing these seemingly different industry company however procuring same MRO items and in a way reveal what the successful case of using e-procurement method can exemplify to the other case. And these are the main facts that motivate authors’ study of the two quite distinctive cases.

2.7 Data collection
The sources for data of this master thesis are interviews, relevant literatures and documents provided by the two selected company. According to Kothari, (2004) there are two types of data primary and secondary. ‘The primary data are those which are collected for the first time and the secondary data are those which have already been collected by someone else and which have already been passed through statistical processes’ (Kothari, 2004, p. 95).

2.7.1 Collection of primary data
There are several methods of collecting primary data especially in surveys and descriptive researches (Kothari, 2004). As Kothari (2004) describes these are: observation method, interview method, through questionnaires, through schedules, using mechanical devices, through projective techniques, depth interviews and content analysis. Lee and Lings (2008) also states that “There are four methods associated with qualitative research. These are observation, focus groups, reviewing documentary sources of data and interviewing.” In this thesis the authors use reviewing documentary sources of data and interviewing.

2.7.2 Interview
According to Yin (2003) there are three types of interviews. These are unstructured interviews, semi-structured interviews and structured interviews. The un-structured interview is also known as open-ended interview. In this type of interviews, the interviewer terms a general subject area or theme to the respondent. Here the
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interviewer is accountable for assisting discussion, providing remainders according to issues already expressed by the interviewee. The semi-structured interview is almost same like open-ended interviews. The difference between a semi-structured interview and an open-ended interview is that in semi-structured interview there is a structure guide and it consists of a list of questions which has been derived from the theory facilitating the research. The last type of interview is called a structured interview or formal survey involving more structured questions which is more commonly used to produce quantitative data.

In this thesis, the authors use semi-structured interview. Unstructured and the semi-structured interview are two main types of interview associated with qualitative research (Bryman & Bell, 2007). So, we need to differentiate between these two approaches in order to select the suitable one to conduct the interview. An unstructured interview is being done without a pre-determined list of specific questions. On Contrary, small number of questions, sometimes only one, is asked. A semi-structured interview, nevertheless, starts out with objectively specific topics followed by a list of questions. This approach is suitable for our study because it not only permitted us to have control over the interviewing process but also provided the interviewees with the possibility to contribute their understanding and perceptions.

Subsequently, our aim is to gather knowledge on traditional MRO procurement and the factor which are hindering and facilitating to implement e-procurement for MRO procurement, it is expected that a semi-structured interview would facilitate the understanding of our purpose.

2.7.3 Interview Guide

Before interviewing, it is important to prepare key questions and Greener, (2008) suggests that semi-structured interviews should be based on a question guide. Here ‘the interviewee is allowed to go where they want with the questions and to divert to other things which interest them’ (Greener, 2008).

Some questions have been formulated in an open format. This preference can be explained by the advantages of open questions over closed ones.
2.7.4 Collection of secondary data

According to Kothari, (2004, p. 111), ‘secondary data may either be published data or unpublished data’. As Kothari (2004) added that published data are obtainable in: (a) several publications of the central, state are local governments; (b) various publications of foreign governments or of international bodies and their subsidiary organisations; (c) technical and trade journals; (d) books, magazines and newspapers; (e) reports and publications of various associations connected with business and industry, banks, stock exchanges, etc.; (f) reports prepared by research scholars, universities, economists, etc. in different fields; and (g) public records and statistics, historical documents, and other sources of published evidence. The unpublished data can be found in diaries, letters, unpublished biographies and autobiographies. It may also be available with scholars and research workers, trade associations, labour bureaus and other public/private individuals and groups.

Kothari, (2004) emphasised on the carefulness of using secondary data because secondary data may be unsuitable or may be inadequate in the context of the problem. He also noted that the secondary data needs to fulfil the criteria of reliability, suitability and adequacy. While collecting secondary data we used scientific research databases as search engines which we find to satisfy the criterion of both accuracy and availability.

In this thesis, the authors will use secondary data by reading annual report of companies as well as companies’ websites, and data from the procurement department and logistics department. In the meantime, we will use the other secondary data, like relevant journals, articles, and text books etc. The key searching words in literature study were MRO, MRO procurement and e-procurement. The key words directed us to finding relevant information however a selection was sometimes necessary when there were too many results. Most of the articles have been found from Emerald, Elsevier Science Direct, Willy online library, sage, EBSCO, Taylor & Francis, E-brary and Google Scholar. The Linnaeus University Library database was also used in order to find relevant text books about our subject. The sources were in
English. At the end of our thesis the reader will find a reference list from which it is possible to find all the sources of information.

Data collection of this thesis

In this thesis both primary and secondary sources of data were collected. For interviewing, we made a detailed questionnaire (see appendix 1) and we interviewed them according to the questionnaire. The interview questions were structured in such a way to that would trigger respondent to provide detailed opinion. The interview questions were designed to find out the company’s current status of the method of MRO procurement, if using tradition MRO procurement method then how it is done, if they are using e-procurement for MRO procurement then what are the hindering and facilitating factors to implement e-procurement. Also the questions would reveal what are the critical success factors and perceived organisational performance of e-procurement.

For BATA case in Bangladesh, different key personnel of the company were interviewed face-to-face by Mahmudul Islam to get a rich theoretical framework. The interview with BATA Shoe Company (Bangladesh) Limited about two hours where Mahmudul Islam interviewed Md. Julfekar Ali, S.M.A. Mahfuz, and Md. Arifur Rahman. Questions about areas not clear were mailed to them and response clarifying those areas was sent back. During the interview session, we made a recording of all our conversations to further clarify areas that needed more clarification. Secondary data for this thesis were also collected from the case company’s websites and other organizational materials.

For GE in China, we interviewed Weihua Liu, the purchasing engineer of GE aviation Group in China and interviewed her according to the questionnaire. Secondary data were collected from the case company’s websites and other organizational materials like annual report.

The interviewer name along with their position and the date the interview was conducted is shown in the table below.
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2.8 Data analysis

According to Yin (2003, p. 109), ‘data analysis consists of examining, categorizing, tabulating, testing, or otherwise recombining both quantitative and qualitative evidence to address the initial propositions of a study’. There are three types of qualitative analysis processes which are: summarising (condensation) of meanings, categorisation (grouping) of meanings, and structuring (ordering) of meanings using narrative (Saunders et al., 2009).

As we are using solely qualitative method, we need to figure out the differences between qualitative and quantitative and for distinguishing this we adopt the below table from Greener, 2008.

<table>
<thead>
<tr>
<th>Company</th>
<th>Interviewees</th>
<th>Position</th>
<th>Date of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BATA Shoe Company (Bangladesh)</strong></td>
<td>Md. Arifur Rahman</td>
<td>Plant Engineer</td>
<td>2012/03/27</td>
</tr>
<tr>
<td></td>
<td>S.M.A. Mahfuz</td>
<td>Warehouse Manager</td>
<td>2012/03/27</td>
</tr>
<tr>
<td></td>
<td>Md. Julfe kar Ali</td>
<td>Senior Merchandiser</td>
<td>2012/03/27</td>
</tr>
<tr>
<td><strong>General Electric (China)</strong></td>
<td>Weihua Liu</td>
<td>Purchasing engineer</td>
<td>2012/06/03</td>
</tr>
</tbody>
</table>

Table 2: Interview conducted at the different case companies

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers</td>
<td>Words</td>
</tr>
<tr>
<td>Point of view of researcher</td>
<td>Points of view of participants</td>
</tr>
<tr>
<td>Researcher distant</td>
<td>Researcher close</td>
</tr>
<tr>
<td>Theory testing</td>
<td>Theory emergent</td>
</tr>
<tr>
<td>Static</td>
<td>Process</td>
</tr>
<tr>
<td>Structured</td>
<td>Unstructured</td>
</tr>
<tr>
<td>Generalisation</td>
<td>Contextual understanding</td>
</tr>
<tr>
<td>Hard reliable data</td>
<td>Rich deep data</td>
</tr>
<tr>
<td>Macro</td>
<td>Micro</td>
</tr>
<tr>
<td>Behaviour</td>
<td>Meaning</td>
</tr>
<tr>
<td>Artificial setting</td>
<td>Natural setting</td>
</tr>
</tbody>
</table>

Table 3: Differences between qualitative and quantitative (Adopted from Greener, 2008)
There are five specific techniques for analysing case studies which are pattern matching, explanation building, time-series analysis, logic models, and cross-case synthesis (Yin, 2003). Under deductive approach, for developing a theoretical or descriptive framework it needs to classify the main variables, components, themes and issues in the research project and the projected or assumed relationships between them (Yin, 2003).

In the thesis, based on collected data from empirical study and literature and also from interviews with-in case analysis will be applied. And then by comparing the data between the two case companies and also with the theory, they are presented and the analysis of with-in case analysis, a cross case analysis is made to double confirm the results. The results of the research questions will be presented after the analysis.

2.9 The credibility of research findings
Reliability and validity are two most acknowledged criteria which are used for testing and assessing the measurements of variables and quality of data for both quantitative and qualitative research. According to Saunders et al. (2009), it needs to be emphasized on research design: reliability and validity.

2.9.1 Reliability
According to Easterby-Smith et al. (2008), taken from Saunders et al. (2009, p. 156), ‘reliability denotes to the extent to which the data collection techniques or analysis procedures will yield consistent findings’. According to Greener (2008) reliability is the term used for consistency or repeatability over time. Robson (2002) showed four threats to reliability which are: subject or participant error, subject or participant bias, observer error, and observer bias. Mitchell (1996), taken from Saunders et al. (2009, p. 373), noted three approaches of assessing reliability for comparing the collected data with other data from different sources and these are test re-test, internal consistency, and alternative form.

Reliability of this thesis

In this thesis, for assuring the high reliability, we use the same interview guide for getting data. The interview conversation is recorded by the voice recording equipment...
which can be used for further research. We also take hand notes. Case study protocol is established which consists of all the actions taken during conducting the case study.

2.9.2 Validity

According to Greener (2008), there are three main ways of categorizing validity in research studies which are ‘face validity’, ‘construct validity’ and ‘internal validity’. Here face validity lead the non-researcher or lay person to see that this is valid method of researching this question and it makes sense of a method. It is important to inspire participant in surveys and interviews or research design.

While construct validity is a multifarious idea and it direct that the method must be actually measure what the researcher think it measures (Greener, 2008). It is important particularly in questionnaires which are not interviewed face-to-face and done by post, email. Here there is no chance to clarify the meaning of the question and for this sometimes respondents can misunderstand a question and can be answered in a different way which was not desired (Greener, 2008).

And finally internal validity refers to causality which means that is there any association of two different factors (Greener, 2008). According to Greener (2008), ‘in business research it is easy to make assumptions about a factor (or ‘independent variable’) causing an effect (or ‘dependent variable’). Here the researcher needs to ask are other factors affecting this outcome (Greener, 2008).

One other kind of validity is discussed sometimes and it is external validity or generalizability which can generalise the results of the study to other context (Greener, 2008).

**Validity of this thesis**

In this thesis, the authors use numerous sources of evidence to collect data, like interviews, books and websites and the MRO procurement data in both China and Bangladesh. Finally, both data are joined together to construct the empirical findings. Key informants review draft case study report is also used to support the construct validity of this paper. The construct validity is supported by piloting many interviews.
with employees in different positions of the company. We have conducted personal interviews and for the advantage of face-to-face interview, the probability of correct information and the understanding was increased. Here some generalizations have been done by doing multiple-case study analysis. Besides that, the generalizations of this paper can also be realized by refer to and confirm the earlier theory within the MRO procurement.

2.10 Methodology model
According to the research methodology explained above, the authors conclude paper’s methodology model using the model template “the research onion” from Saunders et al., 2008 as follows:

![Figure 3: Methodological model of the thesis](image-url)
3 Theoretical Framework

This theory chapter will present the relevant theory to answer the research question. Before writing the theory we first introduce the relationship between the research questions and the theory which is shown in table below.

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Relevant Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. What are the driving forces and hindering factors to implement e-procurement for MRO procurement in both business cases in Bangladesh and China?</strong></td>
<td>MRO procurement, Traditional MRO Procurement model, Problems of traditional MRO procurement process, e-procurement, e-procurement model, e-procurement implementation effects, implementation of e-procurement for MRO procurement Drivers of e-procurement implementation for MRO procurement, Hindering factors of e-procurement implementation for MRO procurement</td>
</tr>
<tr>
<td><strong>2. How can the successful e-MRO procurement implementing company exemplify the way to improve the traditional procurement implementing company based on its specific case?</strong></td>
<td></td>
</tr>
</tbody>
</table>

3.1 MRO Procurement

3.1.1 Definition

Before defining MRO procurement, at first comes ‘MRO’. While we are trying to define MRO we have taken the definition of Gelderman et al., (2008) as a more comprehensive definition of MRO, which is presented below.

“Supplies that are consumed by a firm rather than used to form part of its output are commonly known as MRO supplies, indirect goods or non-production goods”.

MRO (Maintenance, Repair and Operations) indicates to the non-productive materials which are used by the plants or enterprise to ensure regular work of their production facilities, equipment maintenance and repair (Jin (2011; Meier & Stormer, 2009). These materials are used for equipment maintenance and repair of spare parts and these MRO materials guarantee the daily operation of business related equipment, supplies and other materials (Jin, 2011).) These may include fuels required for the production process, utility goods and tangible assets, services, etc.
The term ‘MRO procurement’ is loosely defined in the literature. According to Gelderman et al. (2008), the purchasing and handling of MRO items are normally linked with inefficient and ineffective procurement processes and sometimes done by non-purchasing experts (Gebauer and Segev, 2000). Gelderman et al. (2008) further noted that MRO procurement is connected with a substantial waste of money, time and personal capacity where the availability of suppliers are limited when needed, it holds excessive stocks and the unsatisfied internal customers.

According to Neef (2001), the procurement of MRO supplies are tends to be complex for some reasons, where he identified MRO procurement or industrial procurement as blue collar procurement. MRO materials are time or mission-critical and are often sourced from single supplier, purchased in limited quantities, and are very important to escape from the shutdown of production lines (Neef, 2001). He added that the purchasing and maintenance employees sometimes need to take an examination or interview of suppliers to apprehend which vendors will be trustworthy. From the buyers’ perspective, MRO buyers normally look for high levels of quality control and technical support from their respective suppliers which will ensure a quick replacement of parts, often within an hours’ notice (Neef, 2001).

MRO procurement plays an important role in enterprise to maintain the normal operations and to control cost and profit (Jin, 2011). The procurement costs of MRO items increase rapidly because there is no strict control (Li and Yang, 2011). A recent U.S. survey on MRO procurement reveals that MRO procurement accounts for the overall procurement costs an average rate of 26%, 63% or even higher (Li and Yang, 2011). As Neef, (2001) says, there are two key cost areas in indirect or MRO procurement. First one is the straightforward inefficiency and labor-intensity of the process itself and the second one is the cost. In most companies, the centralized purchasing function is traditionally responsible for procuring a bulk portion of all indirect, non-production goods (Gebauer and Segev, 2000) and this process is often repetitive and it is one of the most labor-intensive areas of modern business (Neef, 2001). One study about Greek government purchasing (Panayiotou et al., 2004) discloses that there lies a substantial delay in the MRO procurement cycle because of
the mistakes in procurement requisitions, unnecessary and repetitive steps in the procurement process, a large number of controls, checking and authorization, and same data entry into different applications (From Gelderman et al., 2008).

While compared with direct production material, MRO procurement of supplies in large quantities, the average value is low, too many vendors, and inefficient (Li and Yang, 2011). A comparison between MRO materials and productive materials are shown in the table below.

<table>
<thead>
<tr>
<th>Comparison item</th>
<th>Materials categories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Productive materials</td>
</tr>
<tr>
<td>Electronic management tools</td>
<td>ERP system</td>
</tr>
<tr>
<td>Demand forecasting</td>
<td>Yes</td>
</tr>
<tr>
<td>Demand forecasting difficulty</td>
<td>Little</td>
</tr>
<tr>
<td>Order type</td>
<td>Electronic</td>
</tr>
<tr>
<td>Order frequency</td>
<td>Regular</td>
</tr>
<tr>
<td>Average value</td>
<td>&gt;5000 $</td>
</tr>
<tr>
<td>Price stability</td>
<td>Remained stable during a particular period of time</td>
</tr>
<tr>
<td>Difficulty of negotiated price</td>
<td>Low degree of difficulty</td>
</tr>
<tr>
<td>Number of suppliers</td>
<td>Long-term, Limited, Integrated</td>
</tr>
<tr>
<td>The proportion of total corporate procurement</td>
<td>&gt;90%</td>
</tr>
<tr>
<td>The proportion of total corporate workload</td>
<td>&gt;40%</td>
</tr>
<tr>
<td>Proportion of the total cost of procurement costs</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

Table 4: Comparison between MRO materials and productive materials (Adopted from Li and Yang, 2011)

3.1.2 Traditional MRO procurement model
Keen and McDonald (2000) illustrated the view of traditional MRO procurement process as the requestor submits the purchasing request to the purchasing department which will then send out a request proposal to locate a supplier. Various suppliers then compete by bidding to be the final supplier. The purchasing department then issues a purchase order to supplier which will afterwards ship the goods (see figure 4).
Michaelides et al. (2003) identified the MRO procurement model and they define that the model involves dyadic relationship between the company and its suppliers. Here the company makes MRO procurement by assigning orders with a number of suppliers and this is done through internal documentation, such as purchase requisitions, purchase orders from the company’s own procurement system/department. The number of suppliers can vary for procure the diverse ranges of products required.

According to Li and Yang (2011), the basic processes for MRO supplies in industrial enterprise are showed below.

However, Li and Yang (2011) claimed that the procurement of MRO can be varied due to a wide range of MRO kind of materials for diverse uses of MRO kind of materials.
3.1.3 Problems with traditional MRO procurement processes

Bevington (2003) pointed out ten reasons enterprises fail to control MRO spending which are as follows:

1. MRO is tactical, not strategic
2. Poor performance data available
3. Wide diversity of sourcing skills required
4. Too many vendors, too small order volume
5. Poorly understood measurement processes
6. Heavy reliance on personal relationship
7. Priority on fast delivery, not best price
8. Spotty support from purchasing
9. Inadequate information systems
10. Few online suppliers

According to Dolmetsch (2000), during the traditional MRO procurement process, the following problems can happen (From Meier & Stormer, 2009):

1. High process costs with MRO goods. Purchasing operations take too much time and routine administrative work. Lack of automation, manual explanation and the need to get approval affects the process costs.
2. Bypassing purchasing. Maverick which means the procurement of MRO goods by circumventing the purchasing department, such as the procurement office material at the stationery shop around the corner happens due to the overburdening of purchasing departments and long procurement times.
3. Problems with printed catalogues and manual orders. Printed catalogues are not available for certain kinds of products, therefore purchase managers have to inquire a lot which will increase the expenditure.
4. Manual carried out order or delivery can be delayed or have wrong delivery.
5. Lack of automation of repetitive purchase.

Therefore, it was concluded by Meier & Stormer (2009) that MRO procurement process has two challenges: the first is the MRO procurement process should be
optimally structured. And the information and communication technologies must be utilized for the procurement.

3.2 E-procurement

3.2.1 Definition

According to Gunasekaran and Ngai (2008), e-procurement is not new. Traditionally, the procurement already has involved a number of communication mediums to support procurement processes between the different parties like the use of mail, phone, fax, EDI and more recently, email and the internet. As Hawking et al. (2004) claimed, e-procurement has involved the use of electronic technologies to streamline and enable the organizations procurement activities. There is no universal definition for e-procurement as Gunasekaran and Ngai (2008) claimed. Therefore the authors have chosen some from the literature as follows:

Moon (2005) stated that e-procurement is a described as a comprehensive process in which IT system has been used to establish agreements for the acquisition of products or services (contracting) or purchase products or services in exchange of payment(purchasing). E-procurement has various elements like electronic ordering, internet bidding, purchasing cards, reverse auctions and integrated automatic procurement systems.

Oliveira and Amorim (2001) defined e-procurement as the process of electronically purchasing the goods and services needed for an organization’s operation. A real-time platform for business deal is offered to provide great opportunity to cut costs increase organizational efficiency, and improve customer service.

Davila et al. (2003) defined e-procurement technology as any technology designed to support the organizational acquisition of goods over the internet. It includes e-procurement software, B2B market exchanges and purchasing consortia—is focused on automating workflows, consolidating and leveraging organizational spending power, and identifying new sourcing opportunities through the internet.

Raghavan and Prabhu (2004, P. 732) referred to the CIPS’s definition of e-procurement as the “electronic acquisition of goods and services including all processes from the
identification of a need to purchase of products, to the payment for these purchases including post-contract/payment activities such as contract management, supplier management and development”.

E-procurement can cover many ways of using the Internet, including (Cater, 2001):
1. Company web sites with catalogs of products, perhaps with online purchase;
2. Aid agency web sites with tenders inviting company bids via online forms or emails;
3. Web “portals” or exchanges that create markets by bringing buyers, sellers or both together;
4. Circulating information by email to potential buyers or suppliers.

Moreover, Tatsis et al. (2006) established a model presenting various definitions so as to contrast and compare their commonalities and differences as follows:
<table>
<thead>
<tr>
<th>Source</th>
<th>Definition</th>
<th>Electronic tool</th>
<th>Web-based/Internet based</th>
<th>Technology</th>
<th>Process</th>
<th>Supply chain integration</th>
<th>Procurement management</th>
<th>Procurement automation</th>
<th>Procurement optimization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaniz and Roberts (1999)</td>
<td>“E-procurement refers to internet solutions that facilitate corporate purchasing”</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Morris et al. (2000)</td>
<td>“E-procurement is a series of steps – from the formulation of the purchasing corporate strategy to the actual implementation of an internet-based purchasing system”</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Aberdeen Group (2001)</td>
<td>“E-procurement is the creation of private, web-based procurement markets that automate communications, transactions and collaboration between supply chain partners. It is about enhancing collaborations, streamlining processes, controlling costs, and enhancing information exchange within and across organization boundaries”</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chaffey (2002)</td>
<td>“E-procurement should be directed at improving performance for each of the ‘five rights’ of purchasing, which are sourcing items: at the right place, delivered at the right time, are of the right quality, are of the right quantity, from the right source”</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 5: Definition of e-procurement (Adopted from Tatsis et al., 2006)
3.2.2 E-procurement model

According to Davila et al. (2003), there are four specific models of e-procurement technologies which are e-procurement software, market exchange, B2B auctions and purchasing consortia.

**E-procurement software**

Any software application basing on the internet that enables staffs to purchase goods from approved electronic catalogues in accordance with company buying rules, while capturing necessary purchasing data in the process. It is automatically routed by the necessary approval processes and protocols that employee select a good for purchase from a supplier catalogue. This software investment may have several forms like purchase of a software package from a third party technology provider (e.g., CommerceOne), use of an e-procurement system included in an internet market exchange, subscription to e-procurement software hosted and supported by an ASP—application service provider or development of a proprietary in-house system.

**Internet market exchanges**

A website which acts like a platform bringing multiple buyers and sellers all together in one central virtual market space and make it possible for them to deal with each other at a dynamic price determined in accordance with the rules of the exchanges.

**Internet B2B auctions**

Events in which multiple buyers can place bids for purchasing goods or services at a website. There are several forms of e-auctions like the most popular two are the Dutch auction (where the sellers control the minimum bid and prices move upward from the mini- mum bid) and the reverse auction (where buyers post ‘requests for quotations’ and sellers bid the price down). A major benefit of auctions is that they enable organizational buyers to identify the best offer from an expanded base of potential suppliers from around the world. Sellers benefit by obtaining access to bid for business on a level playing field rather than attempting to obtain business based on networks of
personal relationships. Auctions also provide sellers with a ready market for the anonymous sale of excess inventory. Web sites such as freemarkets.com, purchasepro.com, fastparts.com, and sorcity.com, among others, can enable the e-auction process.

**Internet purchasing consortia**

It is an internet service which helps get many buyers together negotiates more aggressively with sellers to get discounts. Some organizations aggregate buying power for manufacturing inputs such as (FOB.com), while others work similarly for indirect goods such as (BizBuyer.com).

### 3.2.3 E-procurement implementation effects

There are five main themes of effects that e-procurement implementation can bring to an organization according to Croom and Brandon-Jones (2007):

1. Changes to total acquisition costs
2. Changes to organizational characteristics
3. Changes to governance structures
4. System specification
5. Implementation management

#### Changes to total acquisition costs

Many literatures have claimed that e-procurement contribute to reducing total purchasing costs. These benefits are basically due to lower prices from suppliers and reduced costs in the ‘requisition-to-payment’ process according to (Croom, 2000; de Boer et al., 2002; Wyld, 2002; Kameshwaran and Narahari, 2007; Mishra et al., 2007).

Yen and Ng (2003) carried out a case study investigation of textile and apparel e-commerce implementation in Hong Kong. They provided a meaningful comparison of pre and post e-procurement process performance. Their case evidence described some changes to the procurement process and supported the claims from prior literature that such changes lead to significant efficiencies. They highlight the
reduction in costs arising as a result of ‘digitizing’ catalogues, fewer errors in order transmission, reductions in inventory, and minimizing suppliers’ marketing costs.

**Changes to organizational characteristics**

It has also been examined by recent literatures that the nature of behavioral and relational changes to organizations and their supply chains are as a result of adoption. The general disposition of the organization strongly influences the extent to which e-procurement is used and developed as a whole. The relationship between user perceptions and the level of compliance has been noted by a number of authors as (de Boer et al., 2002; Croom and Johnston, 2003; Interfaces, 2006)

**Changes to governance structures**

The influence of improved information transmission and user access to the procurement process through e-procurement implementation leads to a significant impact on the configuration and structure of supply chains. Croom (2001) have noted that the literature posits two opposing schools of thought on the subject.

1. As Croom and Brandon-Jones (2007) concluded, on one side, e-procurement may increase the tendency towards market transactions as the barriers to participate in electronic transactions diminish.
2. On the other side, it has been posited that the proprietary nature of some inter-organizational systems may in fact serve to tie in customers and suppliers into virtual hierarchies (Konsynski and McFarlan, 1990).

As for how e-procurement will impact on buyer-seller relationships, both Croom (2001) and Kumar and Qian (2006) support the idea that increased use of e-procurement and inter-organizational systems will enhance more effective customer–supplier relationships over time.

**System specification**

Subramaniam and Shaw (2002) said it is a major causal determinant of the efficiency
and effectiveness of an e-procurement system how much extent an e-procurement system is able to integrate effectively with other information systems, particularly production planning & control and finance systems. Rajkumar (2001) also identifies system integration as a critical success factor for e-procurement implementation, both with the customer’s information infrastructure and in its links to suppliers.

**Implementation management**

By examining the rate of e-procurement implementation in the US public sector, McManus (2002) remarked that motivation for implementation was based on expectations of lower purchase prices, reduced transaction costs, and increased speed. She also noted that the implementation of e-procurement had led to increased debate about some of the fundamental principles behind public sector procurement, including ‘lowest bid wins’, separation of vendor and user, preference for fixed price/ fixed term contracts, and transparency of public accountability.

Therefore, Croom and Brandon-Jones (2007) designed out an impacts model of e-procurement as follows:

Figure 6: A priori model of e-procurement effects (Adopted from Croom and Brandon-Jones, 2007)
3.3 Implementation of e-procurement for MRO procurement

3.3.1 The one-step e-procurement model for MRO industrial supplies

As Li and Yang (2011) stated, the traditional MRO industrial model is too complicated and results in great cost, therefore a one-step procurement platform model is recommended by them in order to manage MRO industrial supplies as follows:

![Diagram](image)

Figure 7: The one-step purchasing platform for MRO based on e-business (Source: Li and Yang, 2011)

It is indicated, according to Li and Yang (2011) that the one step e-business platform includes e-sourcing, e-procurement processes, electronic logistics management processes of basic modules, and can even expand the e-vendor alliance management and e-customer relationship management.

**E-searching goods:** E-business platform helps enterprises break the regions or countries restricts for searching goods online, therefore expand the market for more business. It also helps to strengthen cooperation between enterprises, increases the company’s competitiveness.
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

3.3.2 Driving forces and hindering factors of e-procurement implementation for MRO procurement

According to Teo et al. (2009), there are seven factors which are considered to have association with the implementation of e-procurement in organizations. These factors are: (1) perceived direct benefits; (2) perceived indirect benefits, (3) perceived costs, (4) firm size, (5) top management support, (6) information sharing culture, and (7) business partner influence.

Gunasekaran and Ngai (2008) developed a framework for the adoption of e-procurement in an organization which is based on a literature survey and some reported cases and empirical studies. As they discussed the implementation blocks of e-procurement are: (1) perceived benefits of e-procurement, (2) perceived barriers of e-procurement, (3) critical success factors of e-procurement adoption, and (4) perceived organizational performance with e-procurement.
However, in our thesis, the original model for e-procurement adoption suggested by Gunasekaran and Ngai (2008) has been modified herein into two aspects—the driving forces which include the company’s perceived benefits, critical success factors and the organizational future performance with e-procurement and the hindering factors which include the company’s perceived barriers to e-procurement implementation to fit the research questions (see figure 9).

Figure 8: Theoretical framework for the implementation of e-procurement (Source: Gunasekaran and Ngai, 2008)
Perceived drivers (benefits) of e-procurement

According to Gunasekaran and Ngai (2008), the real benefits of e-procurement, in many cases, include strategic impact, intangibles, and non-financial outcomes, which are not spelt out, and lead to companies not recognizing the genuine value of e-procurement.
Companies always want to save costs and this is the main motivation to implement e-procurement (Parida et al., 2006). Davila et al, (2003) claimed that the cost per transaction can be reduced by 65% compared with traditional transaction. Parida et al., (2006) also argued that reductions in labour costs in the purchasing process leads to increase the volume of the purchase, and it leads to better price from supplier side and better negotiation, for example, suppliers may set to reduce the price while they get the assurance of transaction from the buying company. E-procurement empowers companies to decentralize operational procurement processes and leads to build centralize strategic procurement processes which finally help to achieve higher supply chain transparency (Farzin and Nezhad, 2010).

According to Croom and Johnston, (2003) by implementing e-procurement system reliability can be improved up to a great extent on improved efficiency parameters like on-time delivery and speed of response from request to order (process time).

Caniato et al., (2010) stated e-procurement brings organizations benefits in five areas as: (1) Control – e-procurement supports control of real-time internal spending, (2) Transparency – e-procurement supports maximum transparency inside company and outside between company and suppliers, (3) Maverick-buying – e-procurement allows only purchasing department or certain staff to purchase only from the suppliers in the contract, (4) Decentralization – It allows users order items across the organization within a pre-negotiated contract, (5) Supply base rationalization – It reduces the supplier base and consolidates the spending.

According to Quayle (2005), e-procurement solution offers the company to reduce direct cost through more efficiency in the process as because less staff time spent in searching and ordering products. According to Chaffey (2002) argued that companies can make savings by reducing inventory level because faster purchase cycle time can be achieved through e-procurement and it consequently reduce the need for more material in stock.

As Gunasekaran and Ngai (2008) indicated that Peleg et al. (2002) claimed, there are three strategies caused by e-procurement a company might choose to follow which
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

Attaran (2001) however according to Gunasekaran and Ngai (2008), categorized e-procurement benefits into three different kinds: (1) Strategic, which means organizational changes and market advantages, (2) Opportunity, related to newly explored or present relationship with suppliers. (3) Operational, which means more efficient purchasing processes.

In order to cover every aspect of the perceived benefits of e-procurement model, we have adopted the 14 factors that Gunasekaran and Ngai (2008) came up with according to Attaran (2001)’s three categories in details as:

<table>
<thead>
<tr>
<th>Categories</th>
<th>Drivers(Perceived benefits) of e-procurement for MRO procurement</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Strategic</td>
<td>Better utilization of staff</td>
<td>Hawking et al., 2004</td>
</tr>
<tr>
<td></td>
<td>Efficiencies increment</td>
<td>Panayiotou et al., 2004; Roche, 2001; Subramaniam and Shaw, 2004; Rajkumar, 2001</td>
</tr>
<tr>
<td></td>
<td>Help to achieve supply chain management</td>
<td>Roche, 2001; Panayiotou et al., 2004; Farzin and Nezhad, 2010; Caniato et.al, 2010</td>
</tr>
<tr>
<td></td>
<td>Improved existing markets</td>
<td>Hawking et al., 2004</td>
</tr>
<tr>
<td></td>
<td>Increased market share</td>
<td>Hawking et al., 2004</td>
</tr>
<tr>
<td></td>
<td>Support for environmental issues</td>
<td>Roche, 2001</td>
</tr>
<tr>
<td>2. High leverage opportunity</td>
<td>Improved relationships with partners and suppliers</td>
<td>Peleg et al., 2002; Bartizzaghi and Ronchi, 2003; Panayiotou et al., 2004; Tatsis et al., 2006</td>
</tr>
<tr>
<td></td>
<td>Increased customer service levels</td>
<td>Panayiotou et al., 2004</td>
</tr>
<tr>
<td></td>
<td>Increased customer satisfaction</td>
<td>Panayiotou et al., 2004</td>
</tr>
<tr>
<td>3. Operational advantages</td>
<td>Reduction in operational tasks</td>
<td>Panayiotou et al., 2004</td>
</tr>
<tr>
<td></td>
<td>Reduction in processing time</td>
<td>Croom and Johnston, 2003; Panayiotou et al., 2004; Subramaniam and Shaw, 2004; Davila et al., 2003</td>
</tr>
</tbody>
</table>
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

Perceived drivers (Critical success factors) of e-procurement

As Panayiotou et al. (2004) concluded e-procurement critical success factors as: (1) efficient processes without excessive idle times, (2) existence of monitoring and evaluation systems that permit the continuous improvement of the process, (3) adequate training of the employees in order to enable them take advantage of the new system.

According to Angeles and Nath (2007), e-procurement success factors according to their literature review can be concluded as 12 factors: (1) deploy a balanced catalogue selection strategy (i.e. choosing from buyer-managed, seller-managed and electronic marketplace-managed catalogues); (2) analyse purchasing behaviour of end users; (3) consolidate suppliers and contracts; (4) involve preferred and strategic suppliers in planning for e-procurement; (5) select e-procurement software and services following the development of a solid business case; (6) reduce the number of suppliers; (7) understand preferred supplier technology plans and their ability to support e-procurement initiatives to enforce on-contract buying with preferred suppliers; (9) re-engineer all affected business applications effectively; (10) centralize control of contracts, product data, catalogues and price updates for indirect procurement; (11) implement and maintain computerized rules governing procurement; and (12) give individual and unit spending a lot of visibility.

Also, e-procurement will require changes, updates, replacements, and adaptations throughout the infrastructure as Kim and Shunk (2004) stated that e-procurement
cannot be instantly and easily implemented.

Meanwhile, in Gunasekaran et al.’s (2009) paper of studying e-procurement adoption in the small medium sized enterprises, it was suggested by them that the critical success factors of e-procurement adoption can be appropriate strategies, tactics and operational policies need to be developed.

From extensive literature review, we have adopted 11 factors which are perceived to drive the implementation of e-procurement, which are as follows:

<table>
<thead>
<tr>
<th>Critical success factors to implement e-procurement for MRO procurement</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Centralized control and management of e-procurement initiatives</td>
<td>Davila et al., 2003; Orr, 2002; Kyte, 2000; Bartels, 2004; Hope-Ross et al., 2000; Subramaniam and Shaw, 2002; Croom, 2000</td>
</tr>
<tr>
<td>2. Communication between participants</td>
<td>Panayiotou et al., 2004</td>
</tr>
<tr>
<td>3. Clear and achievable implementation phase</td>
<td>Kim and Shunk, 2004</td>
</tr>
<tr>
<td>4. Clear accountability with purchasing and organizing structural change</td>
<td>Fu et al., 2004; Hope-Ross et al., 2000; Bushell, 2004; Kanakamedala et al., 2003</td>
</tr>
<tr>
<td>5. Close collaboration with suppliers</td>
<td>Roth, 2001; Hope-Ross and Reilly, 2000; Kanakamedala et al., 2003</td>
</tr>
<tr>
<td>6. Content management</td>
<td>Fu et al., 2004; Davila et al., 2003; Orr, 2002; Kyte, 2000</td>
</tr>
<tr>
<td>7. Information systems specialists with skills in the internet</td>
<td>Fu et al., 2004</td>
</tr>
<tr>
<td>8. Involvement of stakeholders</td>
<td>Fu et al., 2004</td>
</tr>
<tr>
<td>9. Streamlined approval and workflow systems</td>
<td>Hope-Ross, 2001; Rajkumar, 2001</td>
</tr>
<tr>
<td>11. Top management involvement and support</td>
<td>Fu et al., 2004</td>
</tr>
</tbody>
</table>

Table 7: Perceived driving forces/critical success factors to implement e-procurement of MRO procurement (Source: own work by finding literature)

**Perceived drivers (organizational performance) of e-procurement**

As Gunasekaran and Ngai (2008) said, it is very critical for enterprise to have optimum organization performance. Therefore, it is supposed that any change in the process or
technology should have a positive impact on the company’s performance. And it has been addressed by them the more important thing with the organizational improvement due to e-procurement is, how it affects the organizational performance in both financial and non-financial terms.

Croom (2001) identified three tentative conclusions about the impact of e-procurement on MRO procurement by conducting empirical analysis and then he also noted that the results reflect the expectations of early adopters in terms of the future influence of their e-procurement systems. These are as follows:

1. E-procurement offers major likely cost savings in the procedure of search, order and payment for MRO procurement. Hence, the internal procurement process will become ‘leaner’.
2. Under e-procurement, more information will be available and the increased information for the customer will lead to increased rate of outsourcing for MRO requirements. By this, firms will concentrate more on their core capabilities.
3. And the future potential to adopt a more strategic approach to MRO procurement will possibly decrease the supply base in some categories (such as stationery) whereas in other situations removing existing links in the supply chain (such as travel agents).

Fu et al. (2004) presented an organizational performance of e-procurement, and got the critical performance as follows: (1) feasible measures, (2) step by step transformation, (3) promotion incentives, (4) government support, (5) commitment of top management, and (6) system operation and maintenance mechanisms. Once the general strategy is clearly set up, the management team mapped out an adoption plan and a set of measures.

Rahghavan and Prabhu (2004) stated the e-procurement has such performance advantages as: (1) reduce overall procurement costs, (2) shorter-order processing and fulfillment cycles, (3) reduction in administrative costs, (4) improved strategic sourcing, and (5) reduced inventory costs.

From extensive literature review, we have adopted 5 factors as the future
organizational performance with e-procurement which is perceived to drive the implementation of e-procurement as follows:

<table>
<thead>
<tr>
<th>Drivers (organizational performance) to implement e-procurement for MRO procurement</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful e-procurement adoption can improve short-term organizational performance</td>
<td>Gunasekaran and Ngai, 2008; Gunasekaran et al., 2009</td>
</tr>
<tr>
<td>Successful e-procurement adoption can improve long-term organizational performance</td>
<td>Gunasekaran and Ngai, 2008; Gunasekaran et al., 2009</td>
</tr>
<tr>
<td>Successful e-procurement adoption can improve cost performance in an organization</td>
<td>Gunasekaran and Ngai, 2008; Gunasekaran et al., 2009</td>
</tr>
<tr>
<td>Successful e-procurement adoption can improve an organization’s competitiveness</td>
<td>Gunasekaran and Ngai, 2008; Gunasekaran et al., 2009</td>
</tr>
<tr>
<td>Successful e-procurement adoption can improve strategic alliances and networking.</td>
<td>Gunasekaran and Ngai, 2008; Gunasekaran et al., 2009</td>
</tr>
</tbody>
</table>

Table 8: Driving forces/perceived organizational performance with implementation of e-procurement of MRO procurement (Source: own work by finding literature)

**Perceived hindering factors (barriers) of e-procurement**

Foroughi (2007) stated a series of e-procurement implementation challenges as “paper based purchasing is still the norm in the maintenance world”. There exist also problems with integration to backend systems. Meanwhile, Foroughi (2007) also stressed the end user resisting using e-procurement since it is a self-service tool. Also, as maintenance needs a wider supplier base than other business functions, however many suppliers especially small ones lack the IT infrastructure for the e-procurement integration. Foroughi (2007) also said MRO e-procurement is still a fragmented market with lots of different solutions offered therefore causing some companies hesitant to rely on it. Moreover, e-procurement involves content management which means maintaining products and price data updated available for employees. And e-procurement must integrate with the enterprise resource planning (ERP) system for inventory management, accounting, payment, and so on.

As Gunasekaran and Ngai (2008) said it is the barriers present in the system that decides the success of e-procurement adoption. Thus it is the major managerial
function in properly implementing e-procurement whether the barriers themselves can be identified. And the barriers can be from infrastructure, strategy, people, culture, etc.

Angeles and Nath (2007) say that during the passage of implementing e-purchasing initiatives, the buyers have to deal with the technological immaturity and unpreparedness from the supplier’s side.

Croom (2005) identified five impediments to implement e-procurement which are development costs are a barrier to adoption of e-procurement, system integration is a barrier to e-procurement implementation, culture is a barrier to e-procurement adoption, development time is a barrier to e-procurement adoption, and security issues are an important concern in e-procurement adoption.

Hawking et al. (2004) indicated the barriers to the e-procurement implementation as follows: (1) security of transactions, (2) lack of supplier E-procurement solutions, (3) high cost of technology, (4) lack of a legal framework, (5) lack of technical expertise, (6) lack of e-procurement knowledge, (7) no real business benefits identified, (8) lack of data exchange standards, and (9) lack of business relationships with suppliers.

According to Liao et al. (2003), the problems associated with the procurement are: incorrect floor prices, improper alteration supplements, improper procedures in awarding contracts, information leaks, bribes taking, and improper benefits for some favoured companies, and careless supervision and resource distribution.

A study of Tatsis et al. (2006) identified the four most important impediments to e-procurement implementation which are the traditional nature of the industry, the lack of infrastructure and resources by the suppliers, the general satisfaction with current procurement systems and the uncertainty about the profitability of this type of ventures. A survey was done by Gunasekaran and Ngai (2008) shows that the majority of the companies believe that barriers are insufficient financial support, lack of interoperability and standards with traditional communication, lack of skill and knowledge in e-procurement, lack of top management support and commitment, and lack of top priority of the company and security concerns.
According to Kaplan and Sawhney (2000), “spot transactions rarely involve long-term or ongoing relationship with the supplier”. So, it can be argued that those who are using spot-buying they do not favour long-term relationship.

From extensive literature review, we have adopted 17 factors which are perceived to hindering the implementation of e-procurement, which are as follows:

<table>
<thead>
<tr>
<th>Hindering Factors to implement e-procurement for MRO procurement</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Supplier integration issues (Commitment, systems compatibility)</td>
<td>Hawking et al., 2004; Talluri et al., 2005; Tatsis et al., 2006; Davila et al., 2003</td>
</tr>
<tr>
<td>2. Fear to change into a new system</td>
<td>Parida et al., 2006</td>
</tr>
<tr>
<td>3. Immaturity of technology</td>
<td>Hawking et al., 2004; Davila et al., 2003</td>
</tr>
<tr>
<td>4. Incompatibility with ERP systems</td>
<td>Neef, 2001</td>
</tr>
<tr>
<td>5. Insufficient financial support</td>
<td>Gunasekaran and Ngai, 2008</td>
</tr>
<tr>
<td>7. Lack of skill and knowledge in E-procurement</td>
<td>Hawking et al., 2004; Gunasekaran and Ngai, 2008</td>
</tr>
<tr>
<td>8. Lack of top management support and commitment</td>
<td>Kheng and Al-Hawandeh, 2002; Gunasekaran and Ngai, 2008</td>
</tr>
<tr>
<td>9. Costs of developing and maintaining systems</td>
<td>Croom, 2005; Hawking et al., 2004</td>
</tr>
<tr>
<td>10. Concerns about fraud and confidentiality</td>
<td>Bingi et al., 2000; Croom, 2005; Gunasekaran and Ngai, 2008</td>
</tr>
<tr>
<td>11. Inability to justify Costs/ Benefits</td>
<td>Hawking et al., 2004; Tatsis et al., 2006</td>
</tr>
<tr>
<td>12. Do not favour long-term relationship</td>
<td>Kaplan and Sawhney, 2000</td>
</tr>
<tr>
<td>13. Internal integration issues (e.g. compliance with existing financial system, ERP)</td>
<td>Parida et al., 2006</td>
</tr>
<tr>
<td>14. Insufficient skilled staff</td>
<td>Harland et al., 2007</td>
</tr>
<tr>
<td>15. Reluctance to change</td>
<td>Davila et al., 2003; Day et al., 2003</td>
</tr>
<tr>
<td>16. Trust issues (e.g. lack of faith in trading partners)</td>
<td>Porter, 2001; Hawking et al., 2004; Yen and Ng, 2002</td>
</tr>
<tr>
<td>17. Legal uncertainties (e.g. cross country legal differences)</td>
<td>Hawking et al., 2004</td>
</tr>
</tbody>
</table>

Table 9: Hindering factors to implement e-procurement for MRO procurement (Source: Own work by finding literature)
### 3.4 Summary of theoretical framework

To grasp the theoretical framework more clearly, here the authors come up with following table which shows the most important discussed theories.

<table>
<thead>
<tr>
<th>Headings</th>
<th>Theoretical aspects</th>
<th>Important theories discussed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.1 MRO Procurement</strong></td>
<td><strong>3.1.1 Definition</strong></td>
<td>Indirect goods/non-production goods procurement like spare parts, fuels, utility goods. MRO procurement of supplies in large quantities, the average value is low, too many vendors, and inefficient.</td>
</tr>
</tbody>
</table>
|                                 | **3.1.2 Traditional MRO Procurement model** | ▪ Requestor submits the purchasing request to the purchasing department  
▪ A request proposal to locate a supplier  
▪ Suppliers then compete by bidding to be the final supplier  
▪ Purchasing department then issues a purchase order  
▪ Ship the goods |
|                                 | **3.1.3 Problems with traditional MRO procurement processes** | ▪ MRO is tactical, not strategic  
▪ Poor performance data available  
▪ Wide diversity of sourcing skills required  
▪ Too many vendors, too small order volume  
▪ Poorly understood measurement processes  
▪ Heavy reliance on personal relationship  
▪ Priority on fast delivery, not best price  
▪ Spotty support from purchasing  
▪ Inadequate information systems  
▪ Few online suppliers  
▪ High process costs with MRO goods.  
▪ Purchasing operations take too much time  
▪ Bypassing purchasing (Maverick buying)  
▪ Problems with printed catalogues and manual orders  
▪ Manually carried out order or delivery can be delayed or have wrong delivery.  
▪ Lack of automation of repetitive purchase. |
| **3.2 E-procurement**           | **3.2.1 Definition** | Electronic tool  
▪ Web-based/Internet based  
▪ Technology  
▪ A process  
▪ Supply chain integration  
▪ Procurement management  
▪ Procurement automation  
▪ Procurement optimization |
|                                 | **3.2.2 E-procurement model** | E-procurement software  
▪ Internet market exchange  
▪ Internet B2B auctions  
▪ Internet purchasing consortia |
|                                 | **3.2.3 E-procurement implementation effects** | Changes to total acquisition costs  
▪ Changes to organizational characteristics  
▪ Changes to governance structures  
▪ System specification  
▪ Implementation management |
| **3.3 Implementation of e-**    | **3.3.1 The one-step e-procurement model for MRO industrial supplies** | E-searching goods  
▪ E-purchasing  
▪ E-logistics management  
▪ Establish e-union of suppliers |
### 3.3.2 Drivers and hindering factors of e-procurement implementation for MRO procurement

#### Perceived drivers (benefits) of e-procurement

<table>
<thead>
<tr>
<th>Strategic</th>
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<tbody>
<tr>
<td>1. Better utilization of staff</td>
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<td>2. Efficiencies increment</td>
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<tr>
<td>3. Help to achieve supply chain management</td>
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<tr>
<td>4. Improved existing markets</td>
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<tr>
<td>5. Increased market share</td>
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<tr>
<td>6. Support for environmental issues</td>
</tr>
</tbody>
</table>

#### High leverage opportunity

- Improved relationships with partners and suppliers
- Increased customer service levels
- Increased customer satisfaction

#### Operational advantages

- Reduction in operational tasks
- Reduction in processing time
- Reduction in inventory
- Reduction in maverick (non-contractual) buying
- Reduction in transaction costs

#### Perceived drivers (critical success factors) of e-procurement

| 1. Centralized control and management of e-procurement initiatives |
| 2. Communication between participants |
| 3. clear and achievable implementation phase |
| 4. Clear accountability with purchasing and organizing structural change |
| 5. Close collaboration with suppliers |
| 6. Content management |
| 7. Information systems specialists with skills in the internet |
| 8. Involvement of stakeholders |
| 9. Streamlined approval and workflow systems |
| 10. The use of prototype |
| 11. Top management involvement and support |

#### Perceived drivers (organizational performance) of e-procurement

| 1. Successful e-procurement adoption can improve short-term organizational performance |
| 2. Successful e-procurement adoption can improve long-term organizational performance |
| 3. Successful e-procurement adoption can improve cost performance in an organization |
| 4. Successful e-procurement adoption can improve an organization’s competitiveness |
| 5. Successful e-procurement adoption can improve strategic alliances and networking. |

#### Perceived hindering factors (barriers) of e-procurement

<p>| 1. Supplier integration issues (Commitment, systems compatibility) |
| 2. Fear to change into a new system |
| 3. Immaturity of technology |
| 4. Incompatibility with ERP systems |
| 5. Insufficient financial support |
| 6. Lack of interoperability and standards with traditional Communication |
| 7. Lack of skill and knowledge in E-procurement |</p>
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<tr>
<td>8.</td>
<td>Lack of top management support and commitment</td>
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<td>9.</td>
<td>Costs of developing and maintaining systems</td>
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<td>10.</td>
<td>Concerns about fraud and confidentiality</td>
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<td>11.</td>
<td>Inability to justify Costs/ Benefits</td>
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<td>12.</td>
<td>Do not favour long-term relationship</td>
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<td>13.</td>
<td>Internal integration issues (e.g. compliance with existing financial system, ERP)</td>
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<td>14.</td>
<td>Insufficient skilled staff</td>
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<tr>
<td>15.</td>
<td>Reluctance to change</td>
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<td>16.</td>
<td>Trust issues (e.g. lack of faith in trading partners)</td>
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<td>17.</td>
<td>Legal uncertainties (e.g. cross country legal differences)</td>
</tr>
</tbody>
</table>

Table 10: Summary of theoretical framework (Source: Own Illustration)
4 Empirical findings

4.1 Case company 1- BATA Shoe Company (Bangladesh) Limited

4.1.1 Company presentation
In 1884, the T. & A. BATA Shoe Company is registered in Zlin, Czechoslovakia by the siblings Tomas, Anna and Antonin BATA. Innovative from the beginning it departs from century old traditions of the one-man cobblers’ workshop. In 1885, Antonin leaves the Company to join the army, his sister Anna follows shortly after to get married. Tomas BATA takes over the company leadership alone.

**BATA today**

BATA has worldwide reach, with operations across 5 continents managed by 4 regional meaningful business units (MBUs). Each unit benefits from synergies specific to their environment, such as product development, sourcing or marketing support. Each MBU is entrepreneurial in nature, and can quickly adapt to changes in the market place and seize potential growth opportunities.

BATA's strength lies in its worldwide presence. While local companies are self-governing, each one benefits from its link to the international organization for back-office systems, product innovations, and sourcing.

<table>
<thead>
<tr>
<th>BATA today...</th>
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<tbody>
<tr>
<td>Serves 1 million customers per day</td>
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<tr>
<td>Employs more than 50,000 people</td>
</tr>
<tr>
<td>Operates 5000 retail stores</td>
</tr>
<tr>
<td>Manages a retail presence in over 70 countries</td>
</tr>
<tr>
<td>Runs 27 production facilities across 20 countries</td>
</tr>
</tbody>
</table>

Source: www.BATAbd.com

<table>
<thead>
<tr>
<th>BATA’s 4 Business Units</th>
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</thead>
<tbody>
<tr>
<td>BATA Europe, Switzerland</td>
</tr>
<tr>
<td>BATA Asia Pacific-Africa, Singapore</td>
</tr>
<tr>
<td>BATA Latin America, Mexico</td>
</tr>
<tr>
<td>BATA North America, Canada</td>
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</table>

Source: www.BATAbd.com
BATA Bangladesh is affiliated with the BATA Shoe Organization. This is the world’s largest footwear manufacturing and marketing organization, started operation in Bangladesh in 1962, Incorporation in Bangladesh in 1972.

Currently, BATA Bangladesh operates 2 manufacturing plant Tongi and Dhamrai, BATA Bangladesh is producing around 110,000 pairs of shoes daily. It has a modern tannery with the latest technological facilities to process 5 million square feet of leather yearly. The Tannery is equipped with a high-tech effluent treatment plant ensuring a pollution free environment for both workers and locality where we operate. BATA Bangladesh sells all kinds of footwear, which are classified in alignment with market sectors as follows:

**Domestic market:** Under the trademarks of “BATA”, “Power”, “Weinbrenner” Bubblegummers”, and “Marie Claire”, through a countywide distribution network comprising retail stores, DSPs and independent dealers.

**Overseas market:** Under the trademarks of its own brands to sister Companies in the Middle East.

**Mission:** To satisfy our customers’ desire to look good by providing commercial fashion footwear and accessories, at superior value and quality, in a unique retail format served by competence sales associates.

**Objectives:** Identifying the performance results the organization intends to achieve

There are Marketing and Financial objectives:

- Marketing objectives range from a clear definition of the customer target group, market share goals, store concepts, products, and pricing.

- Financial objectives include achieving the desired gross profit and expenses levels in order to be profitable.

**Strategies:** Specific course of actions describing precisely how to reach objectives

Likewise, there are marketing and financial strategies:
Marketing strategies focus on marketing variables that have a direct impact on the customer’s response to the organization’s offer against the competitors’ offer. Key variables include products, price, customer service, visual merchandising and store atmosphere.

Financial strategies indicate how the organization intends to monitor its financial variables to achieve its financial objectives such as turnover, expenses, assets, liabilities, and profits.

**Organogram of BATA Shoe Company (Bangladesh) Limited**

![Organogram of BATA Shoe Company (Bangladesh) Limited](image)

*Figure 10: Organogram of BATA Shoe Company (Bangladesh) Limited (Source: From face-to-face interview)*
Products line of BATA

BATA has three products line. These are:

Men’s collection

Ladies’ collection

Children’s collection

Source: www.batabd.com

Market share

The company possesses the largest distribution network in the country controlling the largest market share in the footwear market. The retail footwear market size is approximately USD 214bn and estimated to be expanding at 20% per year, according to newspaper reports. BATA currently enjoys around 30% of the market share with net revenue of USD 65.7bn.¹ In Bangladesh, some renowned shoe manufacturer companies are offering same quality of products at a same price what BATA offers. These are Appex-adelchi, Bay Tanneries, Jenny’s, and other local manufacturers.

As we see in the figure 11, comparing with BATA, Appex-adelchi is a booming power and Bay Tanneries in terms of price range and quality. More recently, the competition has intensified among the rivalries rebates, suitable financing, and longevity of products have helped to lure the customers. However, BATA is still in the suitable position of its market because of its demographic allocation of stores. BATA’s point of view is that not all shoe retailers are their direct competitors. They believe that direct competitors may be defined as those offering the same price/value product like them, regardless of store format, location and customer service.

**Sourcing policy of BATA**

BATA does sourcing in three ways; from their own production two-production plant were one is located in Tongi and another is in Dhamrai, supply from local producer, and import especially from China. In case of local producer, they buy final product from Small and Medium Enterprises (SMEs) with their required quality & condition. These SMEs has little or no market share. They can even manufacture only for BATA. Obviously, BATA wins over their supplier and no problem with Chinese supplier as want to supply as much as they can.
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

Tan Zhu and Mahmudul Islam

Figure 12: Production planning information flow (Source: from face-to-face interview)

Sourcing MRO products of BATA

According to the interviewee, when it comes to the shoes manufacturing processes, huge amounts of investment every year will be spent on the shoes manufacturing machines and their maintenance.
There are several major processes considering manufacturing shoes:

1. **Trimming**: Once the shoe model shape has been cut, then a machine called a skiving machine thins the edge so the various pieces are easier to sew together.  
2. **Upper**: The top half of the shoe is called “the upper”, the pieces are sewn together first, then flattened out to give it a smooth finish.  
3. **Finishing**: Machines smooth out the excess materials hanging over the insole by tucking it back in underneath the shoe.

Therefore, some extremely important while costly manufacturing machines are needed by Bata Shoes, which are:

- **Sewing machine**: which is for the trimming process of shoe making.
- **Skiving machine**: which is also for sewing shoes materials together.
Rubber cutting machine, which is for cutting raw rubber for the shoe models.

Polishing machine, which is for the finish shoe making period.

Buffing machine, which is for finishing color, brightness of the shoe making.
4.1.2 BATA Shoe Company questionnaire data

Information of MRO procurement of BATA

By taking interview face-to-face we came to know that BATA Bangladesh has a specific division who are responsible to procure MRO materials, named ‘Engineering Department’. This department makes decision by itself and the ‘Plant Manager’ is doing the job of MRO procurement.

For maintaining and repairing the machineries, which are used in production purpose, they have their own repair team and they do maintenance process whenever needed. If they need to set up a new machine, then regional headquarter mange it from global supplier and service provider. After the installation process, in future if any breakdown happens, they don’t call the service provider because they know how to do that. They have their own repair team, who are very skilled and efficient.

For procuring MRO materials they don’t use any forecasting method and they do in a traditional way like spot buying where some supplier come directly to the office and if the price and time to delivery fulfill their requirements they occasionally use those suppliers. Normally they ask quotations from selected suppliers and if their criteria fulfills, they make an order by phone or physically. Here for procuring all MRO items like lubricants, nuts, bolts, machinery parts, they use local suppliers. Sometimes BATA use third party logistics service providers. Basically the order decision depends on the price and delivery facility. If the supplier can supply on time and can give deliver to the plant, they usually hire them even the price bit higher. This process is actually used for bulk items purchasing.

Driving forces of e-procurement implementation for MRO Procurement on BATA

Perceived benefits (driving forces) of e-procurement implementation for MRO materials in BATA
BATA Bangladesh is not currently using e-procurement method and their current view about the benefits of e-procurement of MRO procurement is neutral. They were asked to indicate the importance of the facilitating factors or will facilitate in future to implement e-procurement on a 5 point scale – from very important to very unimportant. The following table is showing the summary of the response.

<table>
<thead>
<tr>
<th>Benefits from implementing e-procurement for MRO procurement</th>
<th>Very unimportant 1</th>
<th>Unimportant 2</th>
<th>Fairly important 3</th>
<th>Important 4</th>
<th>Very important 5</th>
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<tbody>
<tr>
<td>Better utilization of staff</td>
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<td>Efficiencies increment</td>
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<td>Support for environmental issues</td>
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<tr>
<td>Improved relationships with partners and suppliers</td>
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<td>Increased customer service levels</td>
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<tr>
<td>Increased customer satisfaction</td>
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<td>Reduction in operational tasks</td>
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<td>Reduction in processing time</td>
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<tr>
<td>Reduction in inventory</td>
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<tr>
<td>Reduction in maverick (non-contractual) buying</td>
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<tr>
<td>Reduction in transaction costs</td>
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</table>

After answering the questionnaire by the respondents, we again contacted with them and asked for the explanation of the importance of the beneficial factors. Their answer was:

“......so far we are not using e-procurement method, so the efficiencies increment is unimportant to us. After using the solution we can get better understanding of the efficiencies increment. To us better utilization of staff, increased customer satisfaction and reduction in inventory are fairly important as because we believe e-procurement will utilize the staff in a good way by using their abilities and if we
give them training, in future they will turn out to be an asset of the company. We also believe that or can predict that e-procurement will definitely reduce the paper works which will reduce in operational tasks. We are using moderate inventory management and the engineering department is doing the job of MRO procurement, they use lower inventory level of the MRO items, like lubricants, nuts, bolts, other machinery parts. We think e-procurement will have impact on inventory reduction and in our case there is less opportunity to improve, so it is fairly important us. .........we currently have 30% of total market share and we are proud to say that we are the market pioneer in shoe industries in Bangladesh, so lees chance to improve existing markets and increase the market share. .........we have suppliers both from china and local. Currently we have direct relationship with local suppliers....suppose we need some specific parts or lubricants, we can directly call them and ask for price quotation. We have a supplier list and normally we use those suppliers. Supplier form outside Bangladesh and other suppliers we don’t have direct contact with them and a team needs to go there to get the required materials. It is time consuming and sometimes we are reluctant to do that. So, sometimes we have to purchase the materials in a higher price. In that sense our view is that e-procurement will improve the relationships with the partners and suppliers at the same time will reduce the processing time, reduce the transaction costs as well. ......though inside corporate business we are one of the most in Bangladesh, we sometimes use non-contractual supply from suppliers who are not listed with our database. It is very important in our sense because e-procurement can simply reduce this process.”

Critical success factors (driving forces) in e-procurement for MRO materials in BATA

While we asked the critical success factors that influence the adoption of e-procurement for MRO products, they stressed more on centralized control and management of e-procurement initiatives, clear accountability for buying in organizational structure, close collaboration with suppliers, information systems specialists with internet skills and top management involvement and support.

Organizational performance (driving forces) with e-procurement in BATA

As the data showed, e-procurement for MRO products in BATA Bangladesh is definitely influencing organization’s performance in a good way which are: short-term organizational performance improvement, long-term organizational performance improvement, cost-performance in organization improvement, organizational competitiveness improvement, strategic alliance and networking improvement.
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

Perceived hindrance (barriers) of e-procurement implementation for MRO materials in BATA

They were asked to indicate the importance of the inhibiting factors to implement e-procurement solution for MRO procurement on a 5 point scale – from very important to very unimportant. The following table is showing the summary of the response.

<table>
<thead>
<tr>
<th>Hindrance to implement e-procurement for MRO procurement</th>
<th>Very unimportant 1</th>
<th>Unimportant 2</th>
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<th>Important 4</th>
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<tbody>
<tr>
<td>Supplier integration issues (Commitment, systems compatibility)</td>
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<tr>
<td>Fear to change into a new system</td>
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<td>Immaturity of technology</td>
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<td>Incompatibility with ERP systems</td>
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<tr>
<td>Insufficient financial support</td>
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<tr>
<td>Lack of skill and knowledge in E-procurement</td>
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<tr>
<td>Lack of top management support and commitment</td>
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<tr>
<td>Costs of developing and maintaining systems</td>
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<td>Concerns about fraud and confidentiality</td>
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<td>Do not favour long-term relationship</td>
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<td>Insufficient skilled staff</td>
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After again asked respondents for the explanation of the importance of the hindering factors. Their answer was:
“......as you know Bangladesh is a developing country and as a Bangladeshi you can also see that the internet is not a widespread tool yet, however we using internet and we are running our retail stores with PQS and it is connected to the head office database through internet.........however, we are not yet blessed by the recent technological advancement. Our supplier, for most of them, they don’t yet have their own website and internal database, from suppliers’ side it is still far away to build their own database, normally they have limited financial support and finally the immaturity of technology leads us to the traditional paper-based work, like most of the procurement orders done by phone either physical contact. We do not have expertise on e-procurement and there is lack of top management support to adopt e-procurement because of the described situation before. Supplier integration issues like commitment of suppliers, system compatibility is very important to us as well because now here it is the main problem to integrate all the suppliers under a single platform......

.....yes, we fear to change into a new system because we do not have skilled staff who can manage. It is fairly important to us. While comes the question of incompatibility issues with ERP systems and said before e-procurement is now incompatible with current ERP system. But for building the whole system, of course need a good amount of money and here the question of financial support is unimportant to us because as corporate business we have financial support and if you see the turnover rate you will get the answer.

The trust issues are the one of the big hindrance because of the authentication of identity. We need to be sure and to trust the partner(s) with whom we are going to deal, and we also need to be sure that our messages and the information will not been intercepted or corrupted in other way. Questions concerning the legality and force of e-mail contracts, the role of electronic signatures, and application of copyright laws to electronically copied documents are still unsettled. We have technical difficulties related to information and data exchange. At present, the IT Act in Bangladesh is weak and a sound legal framework is essential for the implementation of e-procurement. So these are the main hindrance to us concerning e-procurement implementation for MRO materials.”
4.2 Case Company 2 – General Electric in China

4.2.1 Company presentation

Generally speaking, General electric (GE) is an American multinational conglomerate organization formed by Edison general electric company and Thomson-houston electric company in 1892, which mostly focuses on four segments: energy, technology infrastructure, capital finance and consumer industrial. Company has been 3rd largest in the world among Forbes Global 2000, and No. 19 most innovative company.

GE today

GE’s divisions include GE Capital, GE Energy, GE Technology Infrastructure and GE Home& Business Solutions. Through these businesses, GE takes part in a big amount of markets segments which contain generation, transmission and distribution of electricity, lighting, industrial automation, medical imaging equipment, motors, railway locomotives, aircraft jet engines, and aviation services.

According to the interviewee, GE has various business areas which expands over the world concerning from finance to energy solutions, from technology infrastructure to consumer & industrial. And GE’s 13 products and service areas are: Appliance, Aviation, Consumer Electronics, Electrical Distribution, Energy, Finance-business, Finance- Consumer, Health care, Lighting, Oil & Gas, Rail, Software& Service and Water as the figure below shows:
China as the biggest emerging and manufacturing market in the world, as time went by, has become the most important market of GE over the world according to the interviewee. And GE in China thereby is the main manufacturing base of GE. Actually, in the early 1900s, GE already started trading with China, was one of the most influential foreign company in China. In 1908, GE established the first night bulb factory in China, then in 1991 the first GE aviation and medical business corporation was built in China. Among all the GE business areas in China, aviation manufacturing is...
the most important one. In 2009 GE cooperated with the French company Snecma company developed the jet engine LEAP-X1C, and it got chosen as the engine for Chinese C919. Thereafter GE has been manufacturing some portion of Chinese aviation engines in China as well as for other countries among the world.

When it comes to the aviation manufacturing, the interviewee introduced GE aviation in China is playing the role of manufacturing jet engines mostly as well as its components and also being a world leading aviation supplier. GE aviation’s base is set up in ShuZhou in China, which has about 380 employees and thirty thousand square meter factory which occupies for manufacturing advanced jet engines and the components.

Sourcing MRO products of GE aviation In China

According to the interviewee-purchasing engineer of GE aviation in China, it is an enormous cost for GE to purchase the MRO products which mainly includes the engine manufacturing machines and tools.

The aircraft engine manufacturing needs extremely precise cutting operation for manufacturing the perfect blades and vanes. Also the central disks which hold the vanes and blades must be highly precised machined. And for some tools like the cutting tools can only be used once, and have to be purchased quite big amount at an incredible high investment. Therefore, MRO procurement is amazingly important for GE to control the product quality as well as saving capitals.

As for relevant MRO products, machines like following are purchased by GE in China:
VTC 60 with turning diameter of 60” and rail height of 60”, machine was built for the aircraft engine industry.

Gear Gashing machine, cutting heads designed for OD gears, ID gears or both.
airfoil turbine blade mills, which is used for milling the engines’ turbine blades for precision operation.

These are some of the main cutting tools for different cutting use applied to aviation component cutting. For example, the yellow cutter is for cutting 3/16” wire rope or cable or aircraft component, the red cutter is for aviation left shears cutting. All these sorts of cutters offer accurate cutting, with a slightly serrated blade to avoid risk of slippage. And GE in China has a huge need of them because they can only be used once or limited times.

**E-procurement for MRO products of GE in China**

As the purchasing engineer Weihua Liu explained, GE is one of the most successful e-business strategy implementing enterprises in the world. Most of GE’s success is due to the effectiveness of its electronic business strategy. e-procurement system as well as the whole e-business, which GE started implementing in January 1999 in the whole world. She interpreted that e-procurement system has brought GE tremendous advantages and changes.

For example, before, GE aviation engineering group had to send inquiry application to the purchase department for many low cost machine parts every day in the past. The process of manual purchasing needs 7 days and it is very complex and wasting time.

However, after GE has implemented e-procurement such changes happened:
For GE aviation’s e-procurement for MRO products which have been introduced above, GE has its own online purchasing system called (TPN post) for electronic purchasing. GE has its own Approved Vendor List, which GE has chosen before via series of qualifications.

For suppliers on the approve vendor list, GE will not need to examine and verify, it only needs bid online, the supplier who offers lower price will get the bid. Sometimes it may happen that for the sole supplier, due to the contract both sides have signed, GE will only procure component from the sole suppliers.

For procurement from those suppliers who are not on the approve vendor list, GE will send people to the suppliers’ factories to examine the standards of products, which include production capacity, inspection capability, production schedule, environment, safety, health, process. If they pass all standards, GE will sign Vendor Managed Inventory contract with them.

Therefore, the general process of GE’s e-procurement for MRO products are: the customers release purchasing requisition to GE procurement department, then GE procurement will use the TPN post system search the sources and send RFQ to
suppliers, then within 2 hours all suppliers over the world will receive purchasing requisite via Email, fax or EDI and have 7 days prepare and send back the bid reply. As soon as GE receives the bid reply, it can select the right supplier online. The whole process is all done via the integrated TPN post system between GE and its suppliers all over the world.

![Diagram](image)

**Figure 14:** GE aviation in china’s e-procurement for MRO products process

### 4.2.2 General Electric questionnaire data

**Current status of e-procurement for MRO products in General Electric**

In this section, by indication of questionnaire data, we aim at exhibiting the current status of GE aviation’s e-procurement for MRO products in China.

Among answers in section 1 “general questions about maintenance, repair and
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

Tan Zhu and Mahmudul Islam

operations (MRO) management”, questions 12 and 14 (See appendix 1) as respondent answered, GE communicates with MRO suppliers by all means of electronic means. And it uses e-procurement as the efforts to standardize the MRO materials procurement.

Meanwhile, the other answered questions from GE senior logistics manager in appendix give a general description that GE has its own MRO products procurement department, and pays very much attention to the supplier lead time, routine meetings for coordination with procurement department.

Driving forces of e-procurement implementation for MRO Procurement in General Electric

General Electric’ perceived benefits (driving forces) of e-procurement for MRO products

As shown in the appendix 1, the interviewee held a very positive view about the benefits that electronic procurement brought to GE for procuring aviation MRO materials like machines, machines components and tools.

They were asked to indicate the importance of the facilitating factors or will facilitate in future to implement e-procurement on a 5 point scale – from very important to very unimportant. The following table is showing the summary of the response.

<table>
<thead>
<tr>
<th>Benefits from implementing e-procurement for MRO procurement</th>
<th>Very unimportant 1</th>
<th>Unimportant 2</th>
<th>Fairly important 3</th>
<th>Important 4</th>
<th>Very important 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better utilization of staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Efficiencies increment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Help to achieve supply chain management</td>
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<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Improved existing markets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Increased market share</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Support for environmental issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Improved relationships with partners and suppliers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>
Among all the perceived benefits in three different categories, GE aviation’s purchasing engineer gave the indication that “better utilization of stuffs, efficient increment, help to achieve supply chain management, increasing customer service level and customer satisfaction, reduction in processing time, inventory and maverick buying” are the most perceived benefits in GE’s case.

**General Electric’s critical success factors (driving forces) in e-procurement for MRO products**

From the filled in blank of questionnaire, it is obvious that centralized control and management of e-procurement initiatives and communication between participants, are the two mostly perceived critical success factors by the MRO purchasing engineer.

According to the respondent’s answer, the most important critical success factor is the general data information flow within the company. The internal communication is extremely important when it comes to the e-procurement adoption. And their way of dealing with this problem is the advanced IT and logistics solutions, the optimal integration of the whole supply chain system with business system.

**General Electric’s organization performance (driving forces) with e-procurement**

When it comes to the future organizational performance with the impact of e-procurement adoption, the interviewee gave the answers, according to the
questionnaire are quite positive. It includes e-procurement implementation can improve the long-term organizational performance, successful e-procurement implementation can improve cost performance in organization, e-procurement implementation can improve organizational competiveness, e-procurement implementation can improve strategic alliance and networking.

**General Electric’s perceived hindering factors (barriers) of e-procurement for MRO products**

The interviewee was asked to indicate the importance of the inhibiting factors to implement e-procurement solution for MRO procurement on a 5 point scale – from very important to very unimportant. The following table is showing the summary of the response.

<table>
<thead>
<tr>
<th>Hindrance to implement e-procurement for MRO procurement</th>
<th>Very unimportant 1</th>
<th>Unimportant 2</th>
<th>Fairly important 3</th>
<th>Important 4</th>
<th>Very important 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier integration issues (Commitment, systems compatibility)</td>
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<tr>
<td>Fear to change into a new system</td>
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<tr>
<td>Immaturity of technology</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Incompatibility with ERP systems</td>
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<tr>
<td>Insufficient financial support</td>
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<td></td>
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<tr>
<td>Lack of interoperability and standards with traditional Communication</td>
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<td></td>
<td></td>
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<tr>
<td>Lack of skill and knowledge in E-procurement</td>
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<td></td>
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<tr>
<td>Lack of top management support and commitment</td>
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<td></td>
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<tr>
<td>Costs of developing and maintaining systems</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concerns about fraud and confidentiality</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Inability to justify Costs/ Benefits</td>
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<td></td>
</tr>
<tr>
<td>Do not favour long-term relationship</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Internal integration issues (e.g. compliance with existing financial system, ERP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Insufficient skilled staff & ✓ 
Reluctance to change & ✓ 
Trust issues (e.g. lack of faith in trading partners) & ✓ 
Legal uncertainties (e.g. cross country legal differences) & ✓

As the questionnaire shows, the most important perceived barriers as GE consider when it comes to implement successful e-procurement would be the internal integration issues (e.g. compliance with existing financial system, ERP).
5 Analysis

In this chapter, the analysis of the empirical evidence which is collected from 2 case companies will be presented. The framework below shows better the relation of the research questions with the theory and empirical findings; and the structure of the analysis section.

![Diagram](image.png)

**Figure 15: Relations between research question to the theory and analysis (Own illustration)**
5.1 Within case analysis

In this part, within case analysis of BATA and GE will be made. From buyers’ perspective, the implementation of e-procurement for MRO procurement, the cases will be analyzed.

5.1.1 Analysis of case 1– ‘BATA Shoe Company (BD) LTD.‘

In this part, the authors will analyze the current status of E-procurement implementation status for MRO products of BATA Shoe Company (BD) LTD., and how BATA Shoe Company (BD) LTD. views the importance of each e-procurement implementation driving factors and meanwhile what are the hindering factors. The analysis will be in details according BATA Shoe Company (BD) LTD.’s empirical questionnaire perceptions, secondary data combined with the theories used before.

General environment of MRO procurement inside BATA

After analyzing 4.1.2, BATA shoe company questionnaire data and also from the company website data, BATA shoe Bangladesh is procuring most of its MRO materials in a traditional way. From the theory section 3.1.2, it says about the traditional way to procure MRO materials. According to the theory noted by Keen & McDonald (2000) and Michaelides et al. (2003), traditional MRO procurement process is done in a way where the requestor submits the purchasing request to the purchasing department which will then send out a request proposal to locate a supplier and where many suppliers compete by bidding to be the final supplier. Various suppliers then compete by bidding to be the final supplier and finally the purchasing department then issues a purchase order to supplier which will afterwards ship the goods. From the empirical section 4.1.2, we can clearly determine that BATA Bangladesh is using traditional MRO procurement model. From the traditional model of Li and Yang (2011), we can also see that sometimes company uses third party logistics service providers. They empirical show that sometimes BATA uses third party logistics service providers as well. So, it also strengthens the idea that BATA uses traditional MRO procurement model to procure MRO materials.

Meanwhile, BATA has no forecasting procedure to procure MRO materials and they
use spot buying or maverick buying. We can also see that they have some criteria to select the supplier where the most important criteria are the lower price, lower delivery time, transportation facility to the plant.

Driving forces of e-procurement implementation for MRO Procurement in BATA

Perceived benefits (driving forces) of E-procurement for MRO products

Among all 14 benefits according to theory part 3.3.2, they are divided into three categories: strategy, opportunity and operational. Among each aspect, the authors analyze with BATA’s perceived important factor with its company characters.

I. Strategic benefits factor:

Among all other strategic beneficial factors, BATA believes that ‘help to achieve supply chain management and support for environmental issues’ are relatively important.

In the theory, Farzin and Nezhad, (2010); Caniato et al., (2010) claims that e-procurement can decentralize operational procurement processes to a centralized strategic procurement processes which finally help to achieve higher supply chain transparency. Here in BATA case they find high importance of the factor ‘help to achieve supply chain management’ along with the theory.

‘Thinking green’ is BATA’s endeavor to preserve the environment. In BATA’s Environmental Mission Statement, it is written that they will protect people, customers, and communities and will protect natural environment in order to help sustain human development. In the implementation of this mission, international guidelines have been developed in the areas of environment. BATA companies have long-standing relationships with groups that have helped several generations of young people become more aware of the need for protection of the natural environment. Therefore, BATA sees ‘support for environmental issues’ as a major beneficial factor.
II. High leverage opportunity factors

From high leverage opportunity factors, BATA thinks improved relationship with partners and suppliers’ factor is relatively most important and increased customer service level is fairly important.

Most of the recent literature on supply chain management emphases more on manufacturers’ attempts to integrate all the processes and make alliances with suppliers in order to manage the purchasing and supply function more efficiently and effectively. In theory chapter Peleg et al., (2002) noted that companies should make strategic partnership with their suppliers and it helps the company to form long-term relationship with a single supplier so that the future prices are known ahead. Here two things involved. Long term relationship with suppliers and future know price. From BATA perspective, they strive to develop long-term partnership with its suppliers and business associates.

BATA’s commitment is to continue customer service to this day, from the designer’s sketchbook through to the customer’s foot. BATA companies strive to supply the right products, at the right time, at the right price, and in a manner, that fulfills their service commitments to both retail and wholesale customers. Their view to their supplier as likes this as we can see they strive for long term relationships.

III. Operational benefits

From among 5 operational beneficial factors the respondent of BATA rated reduction in processing time, reduction in maverick buying, reduction in transaction costs are most important.

In theory, Croom and Johnston, (2003) said that e-procurement system can improved improve on-time delivery and speed up the response from request to order (process time). In BATA case they find this factor also very important.

As Davila et al, (2003) claimed that the cost per transaction can be reduced by 65% compared with traditional transaction by implementing e-procurement, which reduces
labour costs in the purchasing process and supplier in response offer a better price from and better negotiation (Parida et al., 2006). Here, for this factor BATA also finds it a major important factor.

E-procurement allows purchasing department or certain staff to purchase only from the suppliers in the contract, which reduces the maverick buying or non-contractual buying claimed by Caniato et al., (2010). As BATA are suffering with this problem, so they believe they might have facilitated by implementing e-procurement for MRO procurement.

**Critical success factors (driving forces) in e-procurement for MRO products**

From the empirical, we can see that they stressed more on centralized control and management of e-procurement initiatives, clear accountability for buying in organizational structure, close collaboration with suppliers, information systems specialists with internet skills and top management involvement and support.

From theory section 3.1.3, we know that there are some major problems for traditional MRO procurement like heavy reliance on personal relationship instead of formal official relationship, poor performance data available, poorly understood measurement processes, inadequate information systems and so on. These problems make the process cost of MRO goods higher. As we know stated by Jin (2011) that MRO procurement is often managed in a decentralized way which increases the procurement cost, so there needs a centralized control that do not use e-procurement, for example, our case company BATA. Under MRO procurement companies often do not pay much attention on suppliers’ management and the suppliers cannot be stable with them. It increases the risk as well as transaction. Therefore, BATA believe that close collaboration with suppliers is a critical factor to implement e-procurement. From empirical, we can also see that BATA do not possess skilled e-procurement experts and they often feel that more top management support could have helped them to achieve organizational goal more efficiently.
Organizational performance (driving forces) with e-procurement

Empirical shows that BATA is having a very positive attitude on e-procurement actual impacts on organizational future performance. According to the theory, as we know that successful implementation of e-procurement can improve short-term as well as long-term organizational performance. Meanwhile, cost performance, strategically alliance and organizational competiveness will also be improved (Gunasekaran and Ngai, 2008; Gunasekaran et al., 2009). BATA does not using e-procurement currently. However, they believe that in future after implementing e-procurement for procure MRO materials, the organization performance will improve. They seem optimistic in that matter.

Perceived hindering factors (barriers) of E-procurement for MRO products

Relatively more important barriers compared with the other barrier factors that are hindering BATA Bangladesh to adopt e-procurement are supplier integration issues (commitment, systems compatibility), immaturity of technology, lack of skill and knowledge in e-procurement, lack of top management support and commitment, concerns about fraud and confidentiality, trust issues and legal uncertainties.

Supplier integration issues (commitment, systems compatibility): As many authors (Hawking et al., 2004; Talluri et al., 2005; Tatsis et al., 2006; Davila et al., 2003) noted that supplier integration issues like commitment and systems compatibility are the major hindrance to implement e-procurement. As it is common that when a new software system is introduced, it becomes the most important task to control the transfer of data and keeping standards as the data becomes incompatible with the new software. BATA Bangladesh also finds it as a major hindrance. In future, when BATA will adopt e-procurement, and then should at first develop their own e-platform and they also need to convince all their suppliers to connect with the platform. They may need to invest on the suppliers’ integration framework even though some
suppliers are not convincing or need to make trust on each other the suppliers need to make believe that in that way they are not going to lose any confidential data.

**Imaturity of technology and Lack of skill and knowledge in e-procurement:** According to Angeles and Nath (2007), for buyers’ perspective, the implementation procedure could be hindered due to the technological immaturity and unpreparedness from the supplier’s side. As we know, Bangladesh is a developing country and the maturity of technological advancement is not very high level compared to China. BATA finds immaturity of technology as a major barrier along with lack of skill and knowledge in e-procurement.

**Lack of top management support and commitment:** The respondent of BATA rated this factor as a drawback to implement e-procurement. It is indeed essential the higher management approval for a company to adopt something new. From employee’s perspective, they just work for the company and they cannot decide solely even they think it will help the company to reduce cost and time. They need to convince the top–level manager and have to describe the current hindering factors to procure MRO materials.

**Concerns about fraud and confidentiality; and trust issues:** The literature showed that security concerns and lack of faith in trading partners are the most significant factors holding back e-procurement, BATA also finds these most important factors which holding them back to implement, specially where the culture is one important barriers suggested by literature. If a firm does not have any formal relationship with a supplier, there comes the question of security and confidentiality.

**Legal uncertainties:** The literature showed that legal uncertainties can occur due to the geographical and cultural differences. In Bangladesh, BATA feel this factor as one of the important barrier where in other countries it may not exists. Government and local authorities’ initiatives can mitigate the problem. It is suggested that authorities can make awareness-raising programs, information seminars, audit and advisory services, managerial trainings programmes which will help the companies to demystify
some complex technological concepts and the cost and benefit associated with e-procurement.

**Other Factors:** In the meantime, BATA also thinks ‘fear to change into new system, incompatibility with ERP systems, costs of developing and maintaining systems, and inability to justify costs/benefits’ are fairly important to them. Adopting companies should always do an unbiased analysis of the possible return on investment of such solutions to get the precise view of what is closely involved behind these costs. There always a mistaken belief that their business is not suitable for doing business by using e-procurement method.

### 5.1.2 Analysis of case 2– GE aviation Group in china

In this part, the authors will analyze the current status of E-procurement implementation status for MRO products of GE in China, and how GE views the importance of each e-procurement implementation driving factors and meanwhile what are the hindering factors. The analysis will be in details according to GE’s empirical questionnaire perceptions, secondary data combined with the theories used before.

**General environment of MRO procurement in GE aviation in China**

According to GE’s questionnaire empirical data and interviewee’s interpretation, GE aviation in China nowadays is procuring MRO materials from all over the world via its e-business system TPN post and also by means of phone, email, fax and so on. It is implementing E-sourcing goods instead of the traditional MRO procurement model, so in this way it can reach the best domestic and international MRO supplier by the internet platform.

GE is one of the most successful e-procurement implementing enterprises over the world according to the interviewee, and its e-procurement system-TPN post is according to Li and Yang (2011) the modern one step e-business system which helps
Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

Tan Zhu and Mahmudul Islam

Driving forces of e-procurement implementation for MRO Procurement in GE aviation in China

Perceived benefits (driving forces) of E-procurement for MRO products

Among all 14 benefits according to theory part 3.3.2, they are divided into three categories: strategy, opportunity and operational. And among each aspect, the authors analyze with GE´s perceived important factor with its company characters.

I. Strategic benefits factors: better utilization of staff, efficient increment and help to achieve supply chain management

From GE´s view, the biggest strategic benefit factor which drives its adoption of e-procurement for aviation MRO materials is the better utilization of suppliers via its TPN post system in which there will be very complete, detailed marking of every supplier according to GE´s standard such as supplier capability, developing trend an so on. Therefore supplier will be better utilized and it is what BATA needs to learn from.

Also, another factors drives GE implement e-procurement for MRO machines, tools are the efficient increment and help to achieve supply chain management. according to Quayle (2005), e-procurement solution offers the company to reduce direct cost through more efficiency in the process as because less staff time spent in searching and ordering products, this is very true in GE´s e-procurement as interviewee said, 60%
of the previous purchasing staffs got released and arranged for other more work. And also large number of paper will be saved due to the electronic replacement. Meanwhile, the bid online strategy connects every supplier information together, therefore gets GE make a decision in no time and efficiency is increased in the meantime as E-procurement empowers companies to decentralize operational procurement processes and leads to build centralize strategic procurement processes which finally help to achieve higher supply chain transparency (Farzin and Nezhad, 2010).

II. **High leverage opportunity factors: increased customer service and satisfaction**

It is obvious that increased customer service and satisfaction. Through the thorough TPN post system, GE can verify accurately the right supplier with good products. Not only the sample should be perfect, but all products are needed to be verified. Moreover, according to Croom and Johnston, (2003) by implementing e-procurement system reliability can be improved up to a great extent on improved efficiency parameters like on-time delivery and speed of response from request to order (process time). Due to the increase in efficiency, the lead time will be reduced largely, meanwhile the price will be lower than procuring via traditional way. Meanwhile, integration is regarded as the key aspect of creating efficient value chain by GE. Only by integrating the suppliers, customers with the group’s system, can GE create continuously more efficient information and product flows. By recalling the theory regarding established e-customer relationship management, the electronic customer relationship management can help company process large numbers of suppliers’ and customers’ data into information and knowledge, so as to aid business decision-making. Through this e-procurement network, GE will improve customer satisfaction and business competitiveness. Therefore, GE considers customer service and satisfaction incensement as the most important beneficial driver of e-procurement for MRO products.

III. **Operational benefits: reduction in processing time , reduction in inventory and reduction in maverick buying**
As analyzed above that GE´s TPN post system in a large degree decreases the processing time that every month at least 6-8 days can be spared out for other work like research, before it needs 18-23 days to confirm the bid and bargain with suppliers nowadays it is reduced to only 9-11 days according to interviewee´s statements.

Meanwhile, According to Chaffey (2002) argued that companies can make savings by reducing inventory level because faster purchase cycle time can be achieved through e-procurement and it consequently reduce the need for more material in stock. the large reduction in inventory is due to the VMI( vendor managed inventory) contract, that only when GE needs the material they will be delivered to GE , otherwise saved at suppliers´ place. In this way reduction in inventory can be the driver.

Also, According to Dolmetsch (2000), Bypassing purchasing. Maverick which means the procurement of MRO goods by circumventing the purchasing department, such as the procurement office material at the stationery shop around the corner happens due to the overburdening of purchasing departments and long procurement times happens all the time during MRO purchasing. However, e-procurement implementation helps GE reduce maverick buying by centralized control of management. All the MRO purchasing has to be via the management supervision.

Critical success factors (driving forces) in e-procurement for MRO products

According to the respondent´s answers, centralized control and management of e-procurement initiatives, communication between participant are regarded as the critical success factors of e-procurement adoption for MRO products in GE´ case. By recalling theory part 3.1.3, there are some serious problems for traditional MRO procurement like poor performance data available, poorly understood measurement processes, inadequate information systems and so on. All these problems will in the end result in bypassing purchasing which are due to the lack of communication between participants, clear accountability for buying in and content management, so the maverick happens. That is to say, if all these three critical success factors can be
well overcome, more efficient information and product flow will be achieved, cost can to a large degree be saved.

In GE’s case, the company although applies a highly decentralized business responsibility, when it comes to infrastructure, the group’s service and IT unites are all integrated and centralized, which means there is better control of the purchasing from top management also. Meanwhile, the adapted system, which as GE claimed carried out in three stages to integrate the whole group’s business system, also play the extremely important role since it standardizes the internal work, strengthen the internal communication, clear the accountability of organizational procurement and of course improve the content management.

**Organizational performance (driving forces) with e-procurement**

As respondent’s answer shows, GE is having a very positive attitude on e-procurement actual impacts on organizational future performance. The MRO products purchasing engineer agrees with all the perceived e-procurement impacts but e-procurement influences company’s performance in a short-run. Meanwhile, cost performance, strategically alliance and organizational competiveness will also be improved. And as the theory stated before, most companies which have not implemented e-procurement nowadays because of being unable to realize the potential impacts of it on future organizational performance. Therefore, we can see GE, in this case, is having a total optimism about the e-procurement impacts on organizational performance.

**Perceived hindering factors (barriers) of E-procurement for MRO products**

The relative more important barriers compared with the rest barriers factors that might have hindered GE’ e-procurement adoption according to the respondent’s answers are issues with internal integration and integration with suppliers, insufficient financial support, lack of top management support and commitment, reluctance to change and legal uncertainties.
Internal integration issues (e.g. compliance with existing financial system, ERP) and supplier integration: The ERP system integration is the biggest problem which might hinder GE since some companies are using multiple ERPs, which may not be compatible. The e-procurement systems customers are using can vary, and suppliers need to be able to deal with this. Therefore, it is perceived as the biggest potential hindrance for GE since the compatibility influences its whole TPN post system works. Supplier system integration with GE’s TPN post system is also the biggest hindrance which requires having many suppliers supporting advanced integrated system.

Insufficient financial support: Development costs as stated in 3.3.2 as one of the five impediments to e-procurement adoption is also considered by GE as one of the main hindering factors. GE aviation in China, as one of the most successful e-procurement implementing companies also perceives it as the very crucial factor that can hinder a traditional procurement adopter company to switch because the problem associated with e-procurement adoption is that the company needs to on a large scale integrate every supplier, customer, every procurement procedure with the whole system, in which the incorrect floor process, improper alteration supplements, improper procedures in awarding contracts, information leaks, bribes taking, improper benefits for some favored companies, careless supervision and so on might cause a lot.

Lack of top management support and commitment and reluctance to change: as respondent rated, these two barriers are perceived by her as the very important factors which might hinder GE successfully implement e-procurement. There are lots of uncertainties about the profitability of e-procurement ventures; most enterprises nowadays are still using the traditional procurement method for MRO products because of the temporary customer satisfaction. They did not see the potential advantages. However, GE’s success in e-business including e-procurement is because it had the economic base to fulfill it and first of all foresee the great benefits that electronic system and other electronic can bring to the business.

Trust issues and legal uncertainties: when it comes to implementing e-procurement the trust issues and legal uncertainties can occur due to the geographical and cultural differences. GE is doing an excellent job by setting up series of policies wen it comes to
the supplier selection. GE’s way is to always guarantee quality first, their purchasing departments always verify suppliers by its own standards. For the supplier not on the vendor list yet, GE will online testify their production capacity, inspection capability, production schedule, Environment, Safety, Health, Process, even if one point is not qualified, the supplier is ticked out. All these procedures online make the trust issues and legal uncertainties quite transparent, therefore it is a good way for other companies to learn from also.

5.1.3 Summary of within case analysis

<table>
<thead>
<tr>
<th>Categories</th>
<th>BATA Shoe Company (BD) LTD.</th>
<th>GE aviation group in China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsible department to procure MRO products</td>
<td>Engineering Department</td>
<td>Purchasing Department</td>
</tr>
<tr>
<td>Responsible person’s post</td>
<td>Plant Manager</td>
<td>Purchasing engineer</td>
</tr>
<tr>
<td>For MRO services</td>
<td>Own repair team</td>
<td></td>
</tr>
<tr>
<td>Use of forecasting method to procure MRO materials</td>
<td>Use no forecasting method</td>
<td>Use forecasting methods</td>
</tr>
<tr>
<td>Used method to procure MRO materials</td>
<td>Traditional MRO procurement</td>
<td>E-procurement</td>
</tr>
<tr>
<td>Order placement medium</td>
<td>Phone or physical contact</td>
<td>e-procurement TPN post system, Phone, email, fax and other kinds of electronic devices</td>
</tr>
<tr>
<td></td>
<td>2. support for environmental issues</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. improved relationship with partners and suppliers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. reduction in transaction costs, maverick buying and processing time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perceived critical success factors: centralized control, management of e-procurement initiatives, clear accountability for buying in organizational structure, close collaboration with suppliers, information systems specialists with internet skills</td>
<td>Perceived critical success factors: communication between participants, centralized control and management of e-procurement initiatives</td>
</tr>
</tbody>
</table>
and top management involvement and support

**Perceived organizational performances:** improve the short term and long term organizational performance, improve the cost-performance and organizational competitiveness, improve the strategic alliance and networking

**Important hindering factors**

**Perceived barriers:** Supplier integration issues (commitment, systems compatibility, Immaturity of technology and Lack of skill and knowledge in e-procurement, Lack of top management support and commitment, Concerns about fraud and confidentiality; and trust issues, Legal uncertainties.

**Perceived barriers:** international integration issues, supplier integration issues, Insufficient financial support, Lack of top management support and commitment and reluctance to change, Trust issues and legal uncertainties.

Table 11: Summary of the within case analysis (source: own work)
5.2 Cross case analysis—‘BATA and GE aviation group in China”

As 5.1 within case analysis stated the detailed views of BATA shoes and GE perceived driving forces/facilitating factors and hindering factors when it comes to the e-procurement adoption for MRO products. In this section we will examine the similarities and differences of two case companies’ e-procurement adoptions driving forces and hindrances in order to draw some helpful theoretical suggestion. However, due to the limitation of time and space, the authors hereby will only focus on the comparison of the most perceived factors of each case.

5.2.1 Comparison between the driving forces of e-procurement implementation for MRO Procurement between two business cases

*Comparison of the Perceived benefits of e-procurement implementation for MRO materials between two companies*

Here the authors generate the following 360° spider model in order to give readers a clear view on the similarities and differences of these two cases’ perceptions and accordingly thorough comparisons based on 5.1 will be analyzed.
Figure 16: 360° spider model of the difference of the perceived benefits of e-procurement for MRO procurement between BATA Shoe Company (Bangladesh) LTD. and General Electric (Source: Own illustration)
Similariies of the perceived benefits between two cases

Help to achieve supply chain management: as shown in the model above, this is the factor that both companies agree on its important driving force to its implementation. BATA is so far not using e-procurement, instead it is mainly using traditional spot buying, and acquiring information and product flow by suppliers’ direct visit. However, GE aviation in China, as stated in 5.1, has done a super job with its electronic commerce integration within its whole business system. Difference between these two cases are, GE mostly produces for aviation, medical companies, therefore the products require extreme precisely qualified. Even a bit mistake of supply chain management, will lead to unbelievable bad result and e-procurement online with every procedure transparent and efficiently fast solve this problem. However, BATA in the shoes manufacturing area doesn’t require quality in such a standard, but still as customers getting more and more picky with quality, a more efficient supply chain management equipped with e-procurement is needed.

Reduction in operational tasks: as shown in the model above, it is another factor that both BATA and GE rated as an important driving force. Unlike GE, BATA is still using the traditional method of MRO procurement which is that first requestor sends requisition to purchasing department, then after suppliers get the request from purchasing department, they bid for the price delivery facility. The purchaser will give bid to the supplier who fulfills the request. All the operational tasks will be quite tedious and take a long time. However in GE’s case, due to the integration of procurement system with the suppliers over world, the procurement staff in China just needs a simple click to get all procedures done from consolidated suppliers online, a series of operations like e-goods searching, e-logistics management will be easily executed online.

Suggestion: Efficient supply chain management can be only achieved by efficient information and product flow. In this area, GE is setting a good example for BATA in Bangladesh. BATA therefore is suggested to improve the supply chain efficiency by considering business platform integration. Like GE, it has its own e-procurement system TPN post for integrating within and outside companies. BATA should also consider invest capitals for switching to this system in the future.
Differences of the perceived benefits between two cases

Increased customer service level and satisfaction VS Reduction in transaction cost, maverick buying, processing time and improved relationship with partners and suppliers: According to both cases respondents’ answers, GE perceives increased customer satisfaction and customer service as the most important driving forces that initiated GE adoption of e-procurement for MRO products while BATA’s best options of the e-procurement driving forces are reduction transaction costs, maverick buying, processing time and improved relationship with partners and suppliers even though itself is not using e-procurement for its MRO products buying yet. What are the factors that result in these two companies’ distinct choices and can BATA Bangladesh learn some good tips from GE’s situation that is the question.

In GE case, the empirical shows that it focuses mostly on the reduction of cost and time which is the short term beneficial driver of electronic procurement for MRO products. Unlike GE in china, BATA is taking the biggest market share 33% of the shoe industry in Bangladesh while the second one Appex-adelchi is however taking only 13%. The competition is not obviously fierce. Also, BATA is not having any problem with its traditional MRO procurement so far. The respondent in interview indicated that they just hire no matter which supplier in bid as long as they supply MRO materials on time can deliver to the plant even the price is bit higher. Also respondent worried if they implement e-procurement for the MRO products procurement, there will be reluctance among the end users since e-procurement is a self-service tool, employees or suppliers’ reluctance will influence the successful implementation. Therefore, it seems that BATA is still having a reluctant and short-term view about the potential benefit that e-procurement can bring in the future.

Suggestion: GE has its own e-business strategy, and top management regards it as the top strategy for company to be competitive. The core of strategy is to ensure every single GE group is integrated and has transferred procurement and suppliers information in the system in order to increase the efficiency and lower the cost. While BATA, without the experience of e-procurement and conservative with the traditional
procurement method, is seemingly seeing e-procurement just on the short-term benefit view, therefore it perceived it not to be greatly beneficial. Bata therefore is suggested to reconsider the importance of e-procurement, first set up an e-procurement strategy like GE.

**Comparison of the critical success factors (driving forces) of e-procurement implementation for MRO materials between two companies**

According to GE’s respondents’ rate, communication between participants, clear accountability for buying in organizational structure and content management are the perceived critical success factors.

However, it is centralized control, management of e-procurement initiatives, clear accountability for buying in organizational structure, close collaboration with suppliers, information systems specialists with internet skills and top management involvement and support that BATA emphasized on.

In GE’s case, the internal communication, and content management is emphasized on. As theory part mentioned, the content management is about maintaining product and price data in the suppliers’ catalog in company’s enterprise system and keep employees updated about the data. Also Communication between participants and accountability for buying in organization structure are also indicating GE paying very much attention on the data management for MRO products buying as to fulfill their final goal, the customer needs—efficient flow of information and products.

Meanwhile, in BATA case, they seem to pay much attention to a wide range of key factors from technical issues to managerial issues that influence the e-procurement implementation which if they will implement. In authors’ idea, it is because BATA has not adopted electronic method for MRO products procurement yet, that makes it unfamiliar with every factor that might influence the result. As a future possible new
comer, it has lots of critical drivers to drive the successful e-procurement implementation.

**Finding:** Due to the inexperience of e-procurement for MRO products, BATA has wide range of critical success factors that will drive its future successful e-procurement implementation. And from GE, the inspiration is data management and internal communication is extremely important when it comes to the e-procurement implementation for MRO products.

**Comparison of the future organizational performance (driving forces) of e-procurement implementation for MRO materials between two companies**

According to BATA and GE’s questionnaire, they both perceive all the impact of e-procurement for MRO products on the future organizational performance as it will improve the short term and long term organizational performance, it will improve the cost-performance and organizational competitiveness, it will also improve the strategic alliance and networking. That is to say, Both BATA and GE perceive the full future benefits at the same level which demonstrates an equal optimistic attitude of the two companies on the implementation of e-procurement for MRO products.

5.2.2 **Comparison of the perceived hindrance (barriers) of e-procurement implementation for MRO materials between two companies**

Here the authors generate the following 360° spider model of the hindering factors in order to give readers a clear view on the similarities and differences of these two cases’ perceptions.
Figure 17: 360° spider model of the difference of the perceived barriers of e-procurement for MRO procurement between BATA Shoe Company (Bangladesh) LTD. and General Electric (Source: Own illustration)
Similarities of the perceived barriers between two cases

Fear to change into a new system and insufficient skilled staff: From empirical we can see that BATA fear to change into a new system as because they have some drawbacks like lack of skilled staff who can handle e-procurement solution, lack of widespread internet facility.

On the other hand, GE has well-structured e-procurement solutions. They have an efficient system for getting all kinds of purchasing information and it always strives for improvement and while renovation is being done there lies some basic problems. In that sense, they find this factor as fairly important. GE, as an e-business expert, is also integrating the employees with the company in an efficient manner. The company encourages employees to develop and try new roles in a way get the best use of employees.

Both cases perceived fear to change and lacking of skilled IT staff as very important barriers. However, what BATA can learn from GE in this case is, BATA doesn’t foresee the importance of implementing integrating purchasing system with suppliers and whole enterprise, therefore didn’t put effort for training employees to be IT adapted for purchasing online. And traditional purchasing mind roots in the company in Bangladesh. Therefore, BATA should, like GE in China, hire local employees and start training them for adapting to e-purchasing skills.

Costs of developing and maintaining systems & inability to justify costs/benefit: Both companies see these two factors as fairly important. Recently BATA possess 30% of total market share with net revenue of USD 65.7 billion and it claims the market pioneer in Bangladeshi foot industries. It is common that every company wants to reduce cost and wants to save. For GE this perception is also same. When a company plans to move on a new procedure or system or plan to implement a new system, they need to predict the related costs and return on investment. The whole success of actually depends on it. For cultural barriers different companies, which are located geographically in different places, have different procedure and sometimes many companies fail to calculate the related costs and the benefits as well where. The failure
happens for different uncertainties like legal uncertainty, natural calamities, political unrest, etc. Therefore, both companies find it as a fairly important barrier because who knows the future.

**Differences of the perceived barriers between two cases**

**Supplier integration issues, immaturity of technology, lack of skill and knowledge in e-procurement & lack of top management support, commitment**: If we observe the above 360° spider model, we can see that for the factors supplier integration issues, immaturity of technology, lack of skill and knowledge in e-procurement and top management support, commitment; BATA find those most important hindering factors. However, GE finds those factors as fairly important, fairly important, fairly important and important respectively.

Empirical shows that for BATA case, they are not yet blessed by the recent technological advancement. Most of their suppliers are local and some are from China. BATA maintains a supplier list and normally they use those suppliers who are in their list. Supplier form outside Bangladesh they do not have direct contact with them and a team needs to go there to inspect the price and quality and to make an ordering contract. It kills their valuable time and occasionally they are reluctant to do that. Therefore, sometimes they purchase the required materials at a higher price. We can assume that if they have an e-procurement platform, they could have inspected the price list of required materials and the suppliers by a single click. For most of their suppliers, they don’t yet have their own website and internal database. If we look from the suppliers’ side, we can clearly assume that and BATA also claimed that their suppliers are still far away to build their own database or e-platform. As their suppliers have limited financial support and finally the immaturity of technology leads BATA to the traditional paper-based work. While the rest world has advancing so quickly, BATA still put procurement orders done by phone either physical contact. BATA also claims that they do not have expertise on e-procurement and there is lack of top management support to adopt e-procurement because of the current situation. Supplier integration issues like commitment of suppliers, system compatibility is very
important to them. While comes the question of incompatibility issues with ERP systems, they answered that if new system is improved it will be definitely incompatible with current ERP system. However, they are ready to move on to new system and they have that kind of financial support but the main problem is to integrate all the suppliers under a single platform while the supplier do not have the ability and technical support.

For GE, as we all know that GE is an internationally leading company which has been using all recent IT discoveries in broad way. In GE’s case, the company’s infrastructure, the group’s service, logistics and IT units are all integrated and centralized, which means there is better control of the purchasing from top management and also the support. Empirical also shows that GE gets great support from the top management because its faith is that only by building more efficient common business IT system, an entire world of integration opportunities will be open.

**Insufficient financial support:** From BATA’s perspective, insufficient financial support is unimportant to them and they also claimed that they have the ability to introduce a new system like e-procurement. We also discussed what is behind their financial support and it clearly shows that are able to implement e-procurement for MRO procurement while the supplier integration issues lagging behind.

In GE case, they face financial support as a drawback even they are one of the leading e-business companies.

**Concerns about fraud and confidentiality, trust issues & legal uncertainties:** For the factor ‘concerns about fraud and confidentiality, trust issues & legal uncertainties’ while BATA rated these most important hindering factors, comparing to BATA, GE find those factors as fairly important, important and important respectively.

Empirical shows that occasionally BATA procures by no-contractual supplies form different suppliers who are not listed in their database as a supplier. The literature also shows that if a firm does not have any formal relationship with a supplier, there comes the question of security and confidentiality. That is the reason that BATA find it as a most important barrier. For GE’s case, as they are currently using e-procurement for
purchasing aviation MRO products and the system as described in the empirical part, GE has two groups of suppliers. One group is on the vendor lists, it is quite secure to purchase products from them because of the contracts. The other one is the ones not on the vendors list however GE will still examine them and verify the qualified one for cooperation. GE has a series of very strict standards when it comes to procurement from suppliers.

Therefore, what BATA can learn from GE in this case, is that BATA is suggested to set up cooperation secured by contracts with some suppliers, meanwhile also establish series of own standards for choosing new suppliers for better price competition.

**Do not favour long-term relationship:** For BATA Case, this factor is very unimportant to them. They strive for long-term relationship with suppliers and still they have good relationship with the suppliers except some maverick-buying. As from the literature we can see that those who are using spot-buying, they do not favour long-term relationship. However, they find this factor as very unimportant which contradicts the theory. In that sense, they may think that as they possess high relationship framework, so it will not affect them to implement e-procurement for MRO materials. However, GE finds this factor as fairly important.

### 5.2.3 Summary of cross-case analysis

According to the authors´ idea, how GE aviation in china and BATA shoes in Bangladesh perceive the driving forces and hindrance of e-procurement adoption for MRO will directly reflect what are the successful experience, factors of GE aviation in China that can be studied as an example as well as what are the shortages of BATA that can be improved in the future e-procurement adoption. By comparing the similarities and differences of the perceptions, the authors came up with the conclusive ideas as follows:

**Perceived benefits:** GE aviation in China has the general base of advanced infrastructure and skilled people and most important—a thorough understanding of the potential impact of the electronic procurement´s benefits both in a short term and
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long run. GE has been one of the best and earliest e-business implementer in the world, company has lots of business areas and e-business help integrate information, increase efficiency in a long run. Company top management understood this and set up e-strategy especially e-procurement. When it comes MRO products, company also understands the meaning and procedure of using e-procurement in the right way. However, BATA’s current view of the e-procurement for its large quantity machinery and tools procurement are still limited for the short-term revenue instead of seeing it on its strategic impact on organizational performance, increased customer service and satisfaction and in turn business growth and new opportunities.

Critical success factors: After the comparison, it seems that BATA, in the future e-procurement adoption, the most important is a fully employed business process integration, not only a whole information system through the entire enterprise for fluent information and products flow where maverick buying can be reduced and content management can be achieved, but also needs suppliers’ side full integration. Also, well trained and educated IT personnel, skilled IT people, a centralized control management, clear accounting system, encouraged communication with participants, top management involvement and support are needed.

Organizational performance: By comparing both cases, even though they both perceive e-procurements as potential, BATA is still recommended, in the future adoption of e-procurement, to focus on the long term performance of e-procurement by offering suitable performance measurement for both financial and non-financial factors.

Perceived barriers: Even though BATA shoe has lots of perceived barriers for implementing e-procurement for MRO. Comparing GE’s views and its way of resolving barriers can lay an emphasis on the priority and guide BATA how to reduce the barriers. Both of them consider the legal uncertainties and trust issues as very important because of GE has a very complete and thorough secure system when it comes to deal with different suppliers, contracts secured by law is the choice, And BATA’s procurement is in a relatively unstable procuring environment in Bangladesh. Meanwhile, BATA needs to focus on reduce the barriers of incompatibility of e-
procurement with ERP system and requiring more financial support through strategic alliances. A sufficient top management support, according to GE’s case is also important for BATA.

6 Conclusion

In this thesis, the authors are studying two companies—BATA shoes and GE aviation in China in different geographical areas and industries however having the same MRO materials procurement aim even though BATA shoes in Bangladesh is not using e-procurement yet while GE aviation in China is. On the purpose of seeking the right driving forces and hindering factors of e-procurement of each case, and the inner reasons as well, the authors compared both cases in a way that thorough analysis on how BATA shoes in Bangladesh can learn the successful experience from GE’s successful e-procurement for aviation MRO materials. And below are detailed conclusions according to the research questions.

6.1 Answers of research questions

RQ 1: What are the driving forces and hindering factors to implement e-procurement for MRO procurement in both business cases in Bangladesh and China?

It has been found out that in BATA shoes in Bangladesh, which even though is still using traditional MRO procurement method due to different kinds of issues like infrastructure, integration problem, management support, lack of understanding and so on, however has the future potential of implementing e-procurement according to their respondent. The driving forces were mostly perceived benefits of e-procurement for MRO materials: reduction in transaction costs, maverick buying, processing time and improved relationship with suppliers and partners; perceived critical success factors: centralized control, management of e-procurement initiatives, clear accountability for buying in organizational structure, close collaboration with suppliers, information systems specialists with internet skills and top management involvement and support; and the perceived future organizational performance: improved short term and long term organizational performance, improved cost-performance and organizational competitiveness, as well as improved strategic alliance and networking.
However the hindering factors are the perceived barriers: supplier integration issues (commitment, systems compatibility), immaturity of technology and Lack of skill and knowledge in e-procurement, Lack of top management support and commitment, Concerns about fraud and confidentiality; trust issues and Legal uncertainties and other factors.

While in GE aviation in China case, the driving forces are mostly perceived benefits: increased customer service level and satisfaction; the perceived critical factors which are: communication between participants, centralized control and management of e-procurement initiatives are the perceived critical success factors; the future e-procurement organizational performance: improved long term organizational performance, improved cost-performance and organizational competitiveness, as well as improved strategic alliance and networking. However the hindering factors are the perceived barriers: internal integration issues and integration with suppliers, insufficient financial support, lack of top management support and commitment and reluctance to change and trust issues and legal uncertainties.

**RQ 2: How can the successful e-MRO procurement implementing company exemplify the way to improve the traditional procurement implementing company based on its specific case?**

By comparing both cases’ e-procurement implementation for MRO materials driving forces and hindering factors, the authors found out that GE’s successful adoption of electronic procurement of MRO materials form suppliers in China is due to its own company’s international e-business strategy which is to emphasize the integrating use of e-procurement, its top management financial support, advanced IT solution, highly focused integration and internal communication of the organization, closed strategic alliance with suppliers. In the meantime, BATA shoes have all relevant problems in the future e-procurement adoption. Therefore, the authors suggest the following action agenda after comparing BATA shoes with GE in China according to the theoretical framework as follows.
6.2 Suggestion for BATA shoe Company in Bangladesh

It may seem to be quite irrelevant case studies between GE aviation in China and BATA shoes (a shoe manufacturing company in Bangladesh in great needs of tools and machinery). However, by comparing them, setting GE aviation as a successful e-procurement for MRO materials buyer, in order to analyze what BATA shoe in Bangladesh can learn from it when it comes to e-procurement for MRO products, this study makes sense.

Both cases even though on the same buyer side, procure the same machinery materials; however have totally different method and resources. Aiming at seeking out what are the driving forces (which include perceived benefits, critical success factors and future organizational performance) and the hindrance (which are the perceived barriers) of e-procurement adoption for MRO materials, and what e-procurement adoption suggestion for BATA in the future can be drawn, the authors compared both cases and generate the action suggestion model as follows:

<table>
<thead>
<tr>
<th>Driving forces and hindeance of e-procurement adoption of BATA for MRO materials</th>
<th>Action suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived benefits</td>
<td>Change the reluctant, short-run view on e-procurement and generate a better full understanding through the whole enterprise of e-procurement’s potential benefits in a long run on company’s strategy, vision, and increased customer service level and customer satisfaction. Enhanced partnership with supplier, better communication within enterprise and therefore a more efficient whole supply chain.</td>
</tr>
<tr>
<td>Perceived critical success factors</td>
<td>Integrate e-procurement platform with ERP system and whole enterprise supply chain as well as suppliers side information; employ skilled IT people; provide top management support; improve internal communication within the enterprise; Streamline work flow, data management, accounting management; employ strategic alliance and close cooperation with suppliers.</td>
</tr>
</tbody>
</table>
Perceived organizational performance | Adopt both short-term and long-term performance measurement (both financial and non-financial); 
Employ metrics that can measure the enterprise procurement management in strategic, tactical and operational level.

Perceived barriers | Establish strategic alliance relationship with qualitative suppliers who have also advanced electronic system; 
Solve the problem of incompatibility of e-procurement system with ERP system; 
Encourage government, lawful support for e-procurement for MRO materials systems; 
Provide technological support, financial support from top management.

Table 12: Action suggestions for BATA Shoe Company (Bangladesh) LTD. To implement e-procurement for MRO procurement (Source: Own work)

6.3 Theoretical contribution
According to Eisenhardt and Graebner (2007) theoretical contribution includes developing concepts, theoretical constructs, conceptual framework, propositions, or a mid-range theory which reveal an unusual phenomenon, reproduce or counter the repetition of findings in other cases, eliminate alternative explanations and elaborate emergent theory.

The main findings and contribution of this thesis to the existing literature is about the driving forces and hindering factors of the implementation of e-procurement for MRO procurement in two different companies from two different geographical locations. Previous work has also done in this field. However, we can see that the driving forces and hindering factors vary according to the culture, country situation, legal issues. The thesis also validates the previous researchers works. In this thesis, we build our own model of the driving forces (includes benefits, critical success factors, and organizational performance) and hindering factors of e-procurement implementation for MRO procurement to better.

However, below areas those are in conflict or have similarities with existing literature about the driving forces and hindering factors of e-procurement implementation for
MRO procurement. The areas in conflict or harmony are discussed below.

‘Efficiencies increment’, the benefit (driving force) of e-procurement discussed in the literature (Panayiotou et al., 2004; Roche, 2001; Subramaniam and Shaw, 2004; Rajkumar, 2001) as an important benefit of e-procurement for MRO procurement. However, in developing country is factor is regarded as an unimportant one.

The benefit (driving force), ‘improved existing market’, discussed in the literature by Hawking et al., (2004) also viewed as an unimportant driving force in the developing country.

The other driving forces (other benefits, critical success factors and organizational performance) which are discussed in the literature and according to the empirical these are validating the existing theories.

The hindering factors ‘insufficient financial support’ and ‘lack of interoperability and standards with traditional communication’ discussed in the literature by Gunasekaran and Ngai, (2008) as the important hindrance to implement e-procurement for MRO materials. However, our findings shows that in developing countries perspective it seems unimportant to them especially those who have financial stability. It may vary due to the size of the company.

The hindering factor ‘internal integration issues (e.g. compliance with existing financial system, ERP)’ discussed by Parida et al., (2006) as an important hindrance as well. However, in developing country perspective it is viewed as an unimportant one.

6.4 Implication for future research

This thesis contributes to the literature by structuring the past theoretical and empirical studies with two firms from two different locations. This thesis also unlocks the window for further research in this area. It can be considered that each of the door limitations of this thesis is an opening area of new research.

Some thought-provoking propositions for future research in the field of e-procurement
for MRO procurement are noted below:

First, from the seller firms’ perspective the study could be explored. Second, the study can be done by doing extensive survey among different companies from different countries and culture. Third, a quantitative study in e-procurement would be interesting area which will make the research more distinctive. Fourth, from developing countries perspective is e-procurement a beneficial tool.
7 References

7.1 Books


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Greener, Dr. S., (2008), Business research methods, Dr. Sue Greener & Ventus Publishing ApS.


7.2 Articles


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### 7.3 Electronic references


www.batabd.com

www.bb.se

http://investors.bb.se/annual2010-2011en/20110705/
8 Appendix

8.1 Appendix 1

Questionnaire

This questionnaire is based on Gunasekaran and Ngai (2008)'s theoretical model of the e-procurement implementation, aims at exploring what are the barriers and drivers that influence e-procurement adoption of MRO products in both Sweden and Bangladesh in practical business cases. Therefore the questionnaire is divided into four sections according to the model below:

Theoretical model of the e-procurement implementation, Gasekaran and Ngai (2008)

General questions about Maintenance, Repair and Operations (MRO) Procurement

1. Do have any different division inside your company to procure MRO materials?
   [ ] Yes,
   [ ] No,
   [ ] If yes, name of the department

2. Is there any planned maintenance process?
   [ ] After a week,  [ ] 15 days,  [ ] Monthly,  [ ] Others

3. Use of criticality ranking of MRO items:
Based on downtime implications,

Time to repair,

Supplier lead-time

4. Extent of outsourcing of MRO items (in $):

5. Co-ordination with procurement department:
   - Occasional meetings,
   - Routine Meetings,
   - Different MRO department to procure MRO items

6. Do you use forecasting for MRO procurement?
   - Yes,    No

7. Use of on-site supplier representative:
   - Yes,    No

8. For purchasing MRO products, do you use spot-buying?
   - Yes,    No

9. For procuring MRO products, do you use any third party logistics service provider?

10. How you procure MRO materials?
    - From local suppliers,
    - From global suppliers,
    - Use e-procurement,

11. Do you have any own maintenance and repair team, if any machine breaks down?
    - Yes,    No
12. Means of communication/coordination with MRO suppliers
   □ Phone, □ Fax, □ Email, □ All of them

13. Supplier selection criteria (for multiple answers, you can tick more than one)
   □ On-time delivery,
   □ Quality,
   □ Cost,
   □ Transportation facility

14. Efforts to standardize MRO procurement
   □ Use of e-procurement
   □ Use of e-catalogue,
   □ Use of e-MRO

15. Centralize versus decentralized decision making:
   □ Centralized, □ Decentralized

16. Budget spend in managing maintenance and repair activities:


Perceived benefits of E-procurement for MRO products

1. How much do you perceive e-procurement as beneficial to your company’s MRO products procurement?
   □ Not at all, □ Not much, □ Neutral, □ a bit, □ very much
2. How important do you consider the following factors that are facilitating or might facilitate your company to implement e-procurement?

<table>
<thead>
<tr>
<th>Strategic:</th>
<th>Very Important</th>
<th>Important</th>
<th>Fairly Important</th>
<th>Unimportant</th>
<th>Very Unimportant</th>
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<tbody>
<tr>
<td>Better utilization of staff</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Efficiencies increment</td>
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<td></td>
<td></td>
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<tr>
<td>Help to achieve supply chain management</td>
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<td>Improved existing markets</td>
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<td>Increased market share</td>
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<td>Support for environmental issues</td>
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<table>
<thead>
<tr>
<th>High leverage opportunity:</th>
<th>Very Important</th>
<th>Important</th>
<th>Fairly Important</th>
<th>Unimportant</th>
<th>Very Unimportant</th>
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<tbody>
<tr>
<td>Improved relationships with partners and suppliers</td>
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<td>Increased customer service levels</td>
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<td>Increased customer satisfaction</td>
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<thead>
<tr>
<th>Operational advantages:</th>
<th>Very Important</th>
<th>Important</th>
<th>Fairly Important</th>
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<th>Very Unimportant</th>
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<tbody>
<tr>
<td>Reduction in operational tasks</td>
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<td>Reduction in processing time</td>
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<td>Reduction in inventory</td>
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Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China

Tan Zhu and Mahmudul Islam

1. How important do you consider the following factors inhibiting the adoption of e-procurement solutions for MRO procurement?

- Supplier integration issues (Commitment, systems compatibility)
- Fear to change into a new system
- Immaturity of technology
- Incompatibility with ERP systems
- Insufficient financial support
- Lack of interoperability and standards with traditional Communication

2. Why do you consider implementing e-procurement is beneficial to your company’s current situation or why not? Please give some simple reasons.

3. Perceived barriers of E-procurement for MRO products
<table>
<thead>
<tr>
<th>Driving forces and hindering factors of e-procurement adoption for MRO Products in Bangladesh and China</th>
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</thead>
<tbody>
<tr>
<td><strong>Lack of skill and knowledge in E-procurement</strong></td>
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<tr>
<td><strong>Lack of top management support and commitment</strong></td>
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<tr>
<td><strong>Costs of developing and maintaining systems</strong></td>
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<tr>
<td><strong>Concerns about fraud and confidentiality</strong></td>
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<td><strong>Inability to justify Costs/ Benefits</strong></td>
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<tr>
<td><strong>Do not favour long-term relationship</strong></td>
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<tr>
<td><strong>Internal integration issues (e.g. compliance with existing financial system, ERP)</strong></td>
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<tr>
<td><strong>Insufficient skilled staff</strong></td>
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<tr>
<td><strong>Reluctance to change</strong></td>
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<tr>
<td><strong>Trust issues (e.g. lack of faith in trading partners)</strong></td>
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<tr>
<td><strong>Legal uncertainties (e.g. cross country legal differences)</strong></td>
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<tr>
<td><strong>Other:_______________</strong></td>
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</table>
Critical success factors in e-procurement for MRO products

1. What are the critical success factors that influence the adoption of e-procurement for MRO products in your company?

☐ Centralized control and management of E-procurement initiatives
☐ Communication between participants
☐ Clear and achievable implementation phase
☐ Clear accountability for buying in organizational structure
☐ Close collaboration with suppliers
☐ Content management
☐ Information systems specialists with internet skills
☐ Involvement of stakeholders h. Streamlined approvals and workflow
☐ The use of prototype
☐ Top management involvement and support
☐ If you think other critical success factors, please specify:

2. What is the most important critical success factor? How does your company manage the critical success factor?


Organizational performance with e-procurement

1. Do you agree with the following statements:

- Successful e-procurement implementation can improve Short-term organizational performance
  [ ] Yes, [ ] No
- Successful e-procurement implementation can improve Long-term organizational performance
  [ ] Yes, [ ] No
- Successful e-procurement implementation can improve cost performance in organization
  [ ] Yes, [ ] No
- Successful e-procurement implementation can improve Organizational competitiveness
  [ ] Yes, [ ] No
- Successful e-procurement implementation can improve Strategic alliance and networking
  [ ] Yes, [ ] No

Many thanks for your valuable time and participation