

# MODEL FOR ANALYSING THE DRIVERS AND BARRIERS OF E-PROCUREMENT ADOPTION TO ENHANCE THE PERFORMANCE OF PROCUREMENT SYSTEM IN SRI LANKA

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## ABSTRACT

*The growing need and competitive nature of firms in the modern world have been directed the organisations in discovering new solution to improve their business value and performance. E-procurement (EP) system is realised as an innovative technique by most of the practitioners and rate of adaptation is intensely increasing around the world. However, key literature findings revealed that organisations are struggling with EP system due to the lack of knowledge on factors influencing the successful implementation. This situation is similar to the Sri Lankan context as well. In this context, it has become a timely requirement to develop a mechanism for analysing such factors to facilitate a successful implementation. Therefore, this study attempts to develop a model for analysing the drivers and barriers of EP adoption to enhance the performance of procurement system in Sri Lanka. A qualitative approach was followed in which multiple case study was selected as an appropriate method for the research which allows to analyse within each setting and the evidence created from this type of study is considered robust and reliable. Accordingly, semi-structured interviews were conducted among the selected three respondents from each case to collect the data. Captured data was structured and analysed by using manual content analysis method with the support of NVivo software. Empirical investigation validated twenty-four drivers and seventeen barriers which are influencing the successful EP adoption. The research findings further disclosed six strategies to strengthen the drivers and weaken the barriers of EP adoption. Finally, a model was developed based on the research findings in order to facilitate the adoption of EP system in Sri Lankan context.*

**Keywords:** Barriers; Drivers; Electronic Procurement (EP) System; Strategies.

## 1. INTRODUCTION

In the recent years, the internet has had revolutionary effects on corporate purchasing practices, in both direct and indirect purchases (Puschmann and Alt, 2005). They further specified that diffusion of new e-business technologies in the late 1990s has created new working practices and new business models for corporate business functions. According to Brown (2005), business models and expectations of people for the quality and efficiency of information system and service delivery has dramatically changed by the practice of innovation in Information Communication Technologies - ICT (Brown, 2005). Well defined ICT facilitates the application of alliances which are used by an organisation for the integration of Information Technology (IT) infrastructure and supply chain activities are known as EP system.

Though EP brings vast benefits to the organisations, number of complications are failing the successful adoption of EP system. Unless having the knowledge on influencing factors, it is difficult to adopt the EP system by any organisation. In this context, it is clear that there is a need of understanding the factors influencing EP adoption. Therefore, this study intended to develop a model for analysing the drivers and barriers of EP adoption to direct the industrial practitioners to move towards EP system by knowing the concept.

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The research paper commenced with the comprehensive literature review which focused on theoretical status of EP and drivers and barriers of EP system. The next section presents the method of study followed by findings and analysis of study. Finally, this paper presents conclusions and recommendation provided in the research study.

## 2. INTRODUCTION TO E-PROCUREMENT

E-procurement (EP) is one of the key tool to electronically acquire goods and or services which is still novel concept to many organisations nevertheless it is diffused around the world as the result of many businesses are starting to realise the importance of its adoption (Shale, 2014). According to the study by Subramani (2004), an enormous opportunity for companies has been created using e-business to reinforce their procurement processes and opened new efficient means of managing business functions which allows to make the pertinent procurement decisions of engineering items, goods and or services (Shale, 2014).

There is no any standard definition founded for EP system (Gunasekaran and Ngai, 2008). Researchers and practitioners have been using the concept based on the context where they applied it. Accordingly, working definition is developed for this study by referring previous studies, which is;

*“a process of using internet-based platform to acquire goods and services in terms of need identification, supplier selection, communication, price negotiation, ordering and evaluation of customer satisfaction in order to maximize the organisational efficiency and minimise the operational cost of acquisition”.*

EP just not only the mean of online purchasing but also it connects the wide range of suppliers and buying organisations within the procurement network which take up the EP programs that would be combined purchasing process across the multi-functional departments without eliminating individual control and allow to obtain a product or service at the best quality and price from multiple suppliers in the e-market (Shale, 2014). It helps to enhance the efficiency of an organisation and enables overall process of procurement system to become simple and faster (Chau, 2006).

### 2.1. APPLICATIONS OF E-PROCUREMENT SYSTEM

EP is simply aspects of the procurement function which support by various forms of electronic communication system (Knudsen, 2002). It is not only single application, but it comprises of various tools were addressed and described by de Boer, Harink, and Heijboer (2001). The study by Harink (2003) specified that there are six form of EP system including e-sourcing, e-tendering, e-reverse auctioning, e-contracting, e-ordering and web-based Enterprise Resource Planning (ERP). Following applications of EP system have been adapted based on the study by Harink (2003) and those tools are placed on the procurement process as shown in Figure 1.

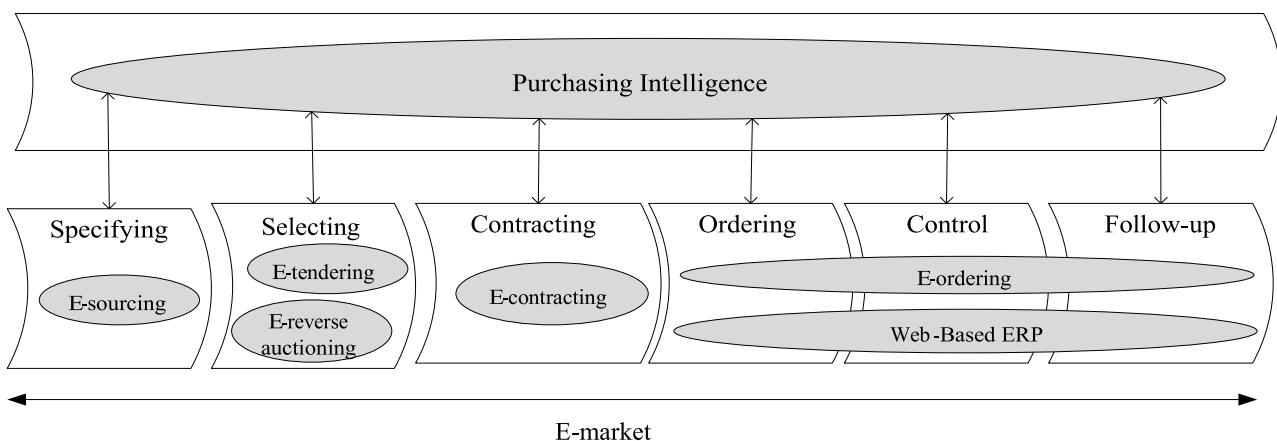


Figure 1: Applications of EP system

Source: Adapted from Harink (2003)

Above figure shows the way of EP applications flow through the procurement process. This process usually involves sub-processes such as specifying, selecting, contracting, ordering, control and follow-up. In general, procurement processes are varying between organisation to organisation based on the process time and supplier relationship (Trkman and McCormack, 2010). However, basic process of procurement is start from the forecast planning and coordination of procurement to end with settlement of outstanding balances.

## 2.2. DRIVERS OF E-PROCUREMENT ADOPTION

According to the Eadie *et al.* (2007), drivers for the adoption of EP system have been identified by number of authors. The primary enabler of adopting EP technology is reduction in overall cost and efficiencies. According to the argument of Gonzalez *et al.* (2004), use of EP solutions have been positively affect the performance and practice of procurement system in an organisation which leads to facilitates the continuous improvement in procurement process and performance. As well as adopting e-solutions will absolutely contribute to the improvements in efficiency, productivity and profitability over the supply chain (Smart, 2010).

Several researchers have identified various enablers of EP system in their studies (Eadie *et al.*, 2007; Farzin and Nezhad, 2010; Hawking *et al.*, 2004; Matunga *et al.*, 2013; Smart, 2010; Uddin, 2015). However, there is no any common classification for the drivers of EP adoption. Therefore, drivers were identified through literature which was characterised under five categories based on the nature of factors. Such categories include; Cost factors, Transparency factors, Time factors, Managerial factors and other general factors. Figure 2 shows the list of drivers identified under each category.

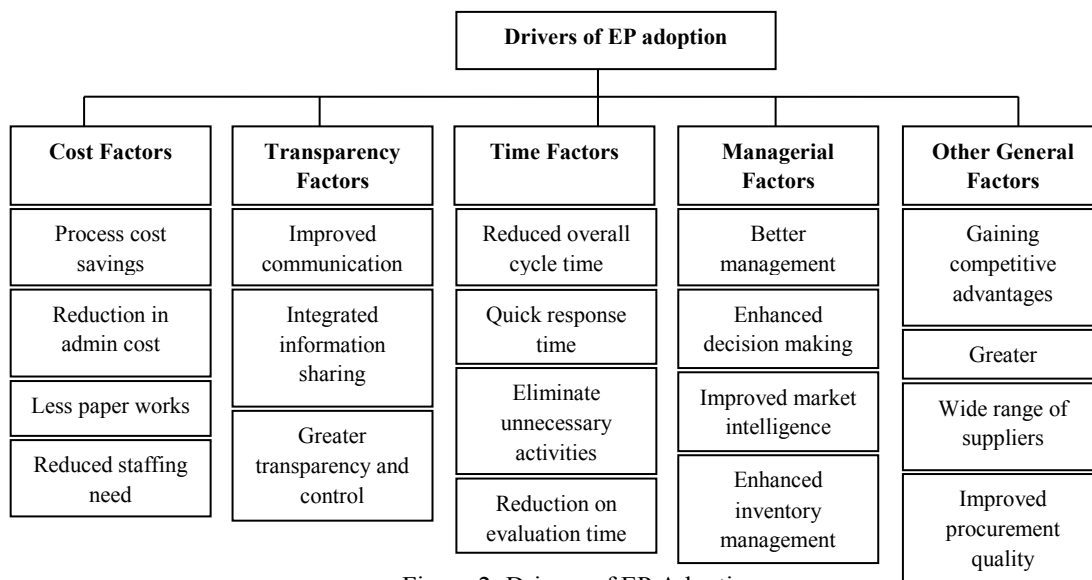


Figure 2: Drivers of EP Adoption

Cost factors mainly cover the driving factors which are directly relating to achieve the cost benefits to the organisation. It includes process cost savings, reduction in administration cost, lesser paper works, and reduced staffing need to facilitate the process (Matunga *et al.*, 2013). When it comes to the transparency factor, its scope focused on bringing out the transparency in EP system by making the procurement visible to all the relevant parties internally and externally. This category comprises factors which are enable the transparency in EP process i.e. improved communication, integrated information sharing and greater transparency and control (Smart, 2010). The third category is time factors where it deals with the time-based benefits achieved through the EP adoption in an organisation. This category consists reduced overall procurement cycle time, quick response time, eliminated unnecessary activities and reduction in evaluation time (Uddin, 2015).

Considering about the managerial factors, its scope relies on the management related returns attained through the adoption of EP system. Thus, it specially enables the management to have reliable system to compare the amount spend for purchasing with their allocated budget (Hawking *et al.*, 2004). Better management, enhanced decision making, improved market intelligence and enhanced inventory management are fallen under this category (Hawking *et al.*, 2004). The last categorisation is named as other general factors; include all the factors that are not fallen under aforementioned groups of driving forces. It comprises the sub factors i.e.

gaining competitive advantage, greater efficiency, wide range of suppliers and improved procurement quality as the other general factors of EP adoption (Farzin & Nezhad, 2010).

### 2.3. BARRIERS OF E-PROCUREMENT ADOPTION

Although transition to EP system brings together variety of benefits to the organisation, it has not been taken place as great as expected which argued by Davila *et al.*(2002). These deficiencies would be affected by numerous factors which are recognised by several authors (Davila *et al.*, 2002; Eadie *et al.*, 2007; Farzin & Nezhad, 2010; Matunga *et al.*, 2013). Barriers are discouraging the organisations to adopt the EP system and become the obstacles to achieve the benefits from the EP system. According to the Davila *et.al* (2002), a list of barriers has been depicted under four broad category i.e. Internal risks, External risks, Technology risk and EP process related risk. The same categorisation is followed in this study. Figure 3 shows the sub factors comes under each category.

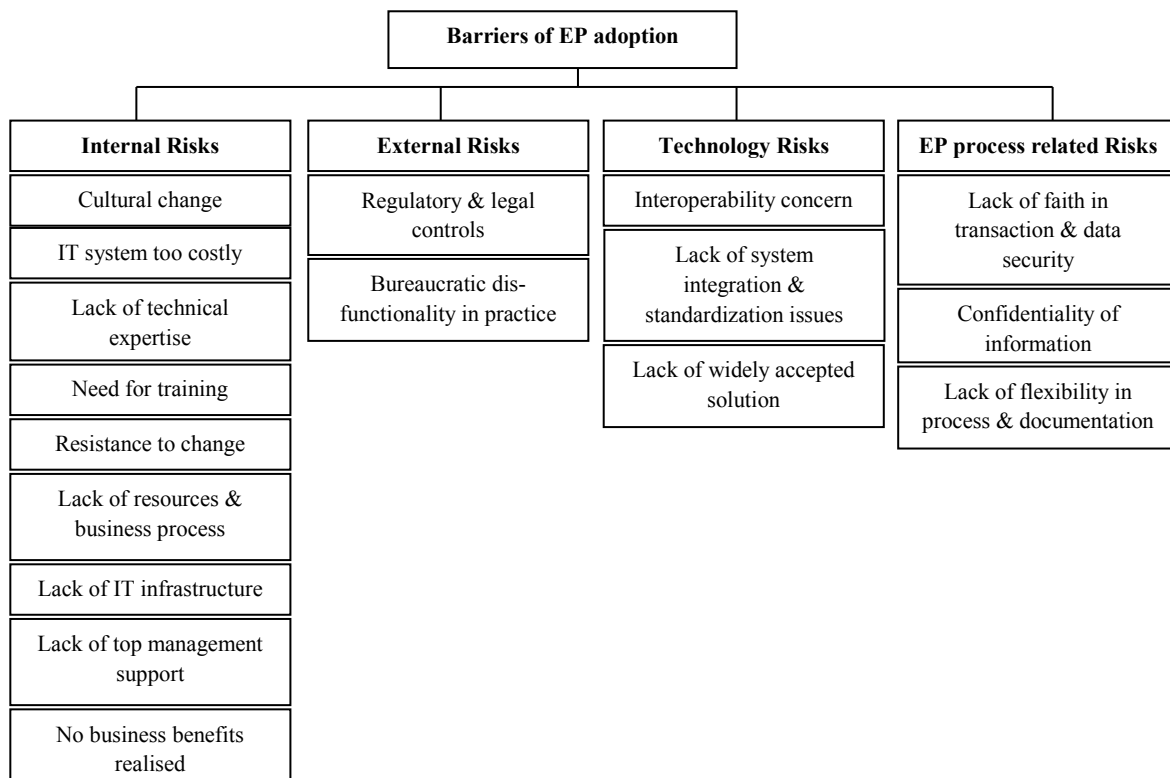


Figure 3: Barriers of EP adoption

Internal risks are the first category of barriers in EP adoption. According to Davila *et.al* (2002), integration of EP technologies with other business application such as accounting, human resources, accounts payable and cash management should give high concentration. Most of the companies have already implemented other business applications and the integration of EP should practice efficiently, otherwise it can be affect the trustworthiness of the information of the organisation (Davila *et.al*. 2002). It includes cultural change, IT system too costly, lack of technical expertise, lack of knowledge, need for training requirement, resistance to change, lack of resources and business process, lack of IT infrastructure, lack of top management support and no business benefits realised (Eadie *et al.*, 2007). The second categorisation is the external risks which focused on solutions of EP need to be able to collaborate with supplier's IT infrastructure. Suppliers must be accessible through the internet and provide catalogues to satisfy the needs of their customers for EP solution to be successful. In order to provide the assurance to the buyers, organisations needed to develop a mechanism which helps the suppliers to meet the buyers' expectations with quality of services and delivery capability. It covers regulatory and legal control and bureaucratic dis-functionality in practice (Farzin and Nezhad, 2010).

Technology risks are the third categorisation (Davila *et al.*, 2002). Most of the companies have uncertainty in the best suitable EP solution for the specific need. The integration of various EP solution is disrupted by the shortage of generally accepted standards. According to illustration of researchers, implementation of EP

technology without broadly accepted standard for coding, technical, and process specifications will lead to slow and failure to obtain benefits i.e. interoperability concern, lack of system integration and standardization issues and lack of widely accepted solution (Matunga *et al.*, 2013). The last categorisation is the EP process related risks. This category consists the risk of security and control of the EP process itself such as issues related to security and fraud (Davila *et.al.* 2002). Lack of faith in transaction and data security, confidentiality of information and lack of flexibility in process and documentation are depicted as the EP process-related risks (Farzin and Nezhad, 2010).

### 3. RESEARCH METHODOLOGY

The research design is a plan which should identify that particular task to be carried out by whom, when and how in order to complete the research process (Polonsky and Walker, 2011). This study was commenced with background study to identify the research problem and establish aim, objective, scope and limitation of the research. Then the literature review was carried out to identify the theoretical status of EP including nature of EP system, forms of EP applications, process re-engineering and identifying drivers and barriers of EP adoption. Having identified the research gap, researcher formulated the research question as “How drivers and barriers of EP adoption could be analysed to enhance the performance of procurement system in Sri Lanka?”.

A qualitative approach followed to achieve the aim of research study in which case study approach was selected as research strategy. This is because, it allows the researcher to develop an in-depth analysis of a case, often a program, event, activity, process, or one or more individuals (Creswell, 2014) and analyse within each setting and the evidence created from this type of study is considered robust and reliable (Yin, 2003). The study was limited to four cases due to time constrains and limited information on EP practices in Sri Lankan context (Refer Table 1). Accordingly, twelve semi-structured interviews were conducted to collect the data in order to validate the drivers and barriers of EP adoption which were addressed through literature and to propose the strategies to strengthen the drivers and weaken the barriers of EP adoption. Three respondents from each case, who have involved in the procurement process, were interviewed (Refer Table 1)

Table 1: Profile of Organisation and Interviewee

Overview of Selected Cases				
Description	Case A	Case B	Case C	Case D
Nature of business	Telecommunication	Information technology	Health care	Banking
Ownership of the organisation	Semi government	Private company (Pvt)	Semi government	Private company (Pvt)
Location	Western province	Western province	Western province	Western province
Interviewees' profile				
Designation and interviewee code	Senior Procurement Manager - A1	Senior Manager Facilities - B1	Assistant General Manager - C1	Senior Operation Manager - D1
	Assistant Manager - A2	Associate Manager Facilities - B2	Mechanical Engineer - C2	Assistant Manager - D2
	Finance Manager - A3	Associate Consultant - B3	Finance Manager - C3	Finance Manager - D3
No of years' experience in the industry	A1 - 15	B1 - 12	C1 - 16	D1 - 10
	A2 - 10	B2 - 9	C2 - 13	D2 - 10
	A3 - 12	B3 - 3	C3 - 11	D3 - 5

Since the research contained four case studies of qualitative research, cross-case analysis used as it is the most preferable method of analysing multiple cases (Yin, 2003). The QSR.NVivo version 11.0 produced by QSR (Qualitative Solutions and Research Private Limited); computer software was used on this purpose. Finally, a model was developed for analysing the drivers and barriers of EP adoption based on the empirical findings.

## 4. RESEARCH FINDINGS AND DISCUSSION

The findings from four case studies were discussed under several sub-headings (refer Figure 4). Those heading includes divers of EP adoption, barriers of EP adoption and strategies to strengthen the drivers and weaken the barriers of EP adoption. Those will be the basis for following discussion.

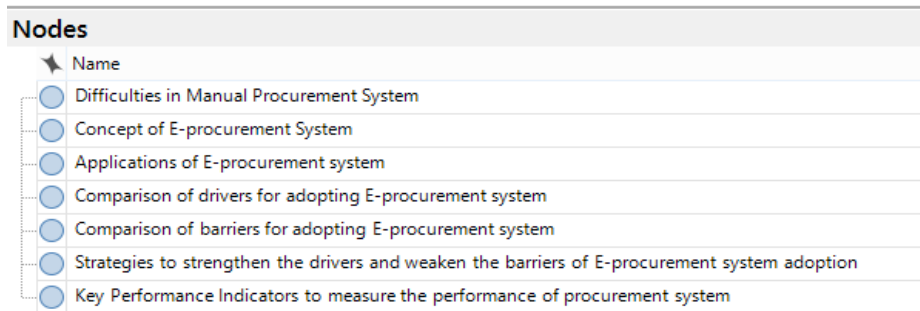


Figure 4: Structure of Study

### 4.1. DRIVERS OF EP ADOPTION

Empirical research findings manifested that factors which triggered the EP adoption vary from organisation to organisation based on the nature of the business and it further validated the literature findings. The below Table 2 shows the respondents' responses regarding the acceptance of identified drivers from the literature.

Table 2: Responses on Drivers of EP Adoption

Category	Drivers	Cases				Total
		A	B	C	D	
Cost Factors	Process cost saving	2/3	3/3	2/3	3/3	10/12
	Reduction in administration cost	2/3	3/3	2/3	3/3	10/12
	Less paper work	3/3	3/3	3/3	3/3	12/12
	Reduced staffing need to facilitate the process	3/3	3/3	2/3		8/12
	<b>Reduced spacing cost*</b>	3/3	2/3	3/3	2/3	10/12
Transparency Factors	Improved communication	2/3	3/3	3/3	2/3	10/12
	Integrated information sharing	3/3	3/3	3/3	3/3	12/12
	Greater transparency and control	3/3	3/3	3/3	3/3	12/12
	<b>Improved contract compliance*</b>	<b>3/3</b>	<b>2/3</b>	<b>2/3</b>	<b>1/3</b>	<b>8/12</b>
Time Factors	Reduced overall procurement cycle time	3/3	3/3	3/3	3/3	12/12
	Quick response time	2/3	2/3	2/3	2/3	8/12
	Eliminated unnecessary or wasted activities	2/3	2/3	2/3	2/3	8/12
	Reduction in evaluation time	2/3	2/3	2/3	2/3	8/12
	<b>Short approval time*</b>	<b>1/3</b>	<b>1/3</b>	<b>2/3</b>	<b>1/3</b>	<b>5/12</b>
Managerial Factors	Better management	3/3	2/3	2/3	2/3	9/12
	Enhanced decision making	2/3	2/3	3/3	2/3	9/12
	Improved market intelligence	3/3	2/3	2/3	2/3	9/12
	Enhanced inventory management	2/3	2/3			4/12
	<b>Top management support*</b>	<b>3/3</b>	<b>3/3</b>	<b>3/3</b>	<b>3/3</b>	<b>12/12</b>
	<b>Operational level user's recommendation*</b>	<b>1/3</b>				<b>1/12</b>
Other General Factors	Gaining competitive advantages	1/3	1/3	1/3	1/3	4/12
	Greater efficiency	2/3	1/3	1/3	1/3	5/12
	Wide range of suppliers	3/3	3/3	3/3	3/3	12/12
	Improved procurement quality	1/3	1/3	1/3	1/3	4/12

\*Additions to the literature findings

(E.g: 2/3 shows that three out of two respondents from the case were agree the factor. There are twelve respondents selected in which three from each case was interviewed)

In addition to the drivers identified from the literature, five more drivers of EP adoption namely ‘**reduced spacing cost**’, ‘**improved contract compliance**’, ‘**less approval time**’, ‘**top management support**’, and ‘**operational level user’s recommendation**’ were outlined through the case study findings are indicated Grey colour in Table 2. Among that top management support is mainly revealed by all the respondents from the selected cases though it was identified as a barrier in literature (refer Section 2.3). And the factor named as operational level users’ recommendation was only asserted by Respondent A2 whereas all the others oppose the factor in because people at operation level do not like to change and they wish to work within their comfort zone.

#### 4.2. BARRIERS OF EP ADOPTION

Even though the adoption of EP system is applicable in the industries, there are some factors which have become the challenge in applying the system in the organisations. Based on the empirical findings, seventeen barriers were finalised in total. These barriers were thoroughly analysed to propose the strategies to overcome the challenges and enhance the adaptability of EP system in Sri Lanka. Responses regarding barriers of EP system depicted in Table 3.

Table 3: Responses on Barriers of EP Adoption

\* Additions to the literature findings

Category	Barriers	Cases				Total
		A	B	C	D	
Internal risks	Cultural change	3/3	3/3	3/3	3/3	12/12
	IT system too costly	3/3		3/3	3/3	9/12
	Lack of technical expertise	3/3		3/3	3/3	9/12
	Lack of knowledge	3/3		3/3	3/3	9/12
	Need for training requirements	3/3	3/3	3/3	3/3	12/12
	Resistance to change	3/3		3/3	3/3	9/12
	Lack of resources and business process to develop, implement and maintain	3/3		3/3	3/3	9/12
	Lack of IT infrastructure	3/3		3/3	3/3	9/12
	Lack of top management support**					
	No business benefits realised**					
External risks	Regulatory and legal control	2/3	2/3	1/3	2/3	7/12
	Bureaucratic dis-functionalities in practice			3/3	3/3	6/12
	Lack of suppliers’ readiness*	3/3		3/3	3/3	9/12
Technology risks	Interoperability concern	2/3		1/3	2/3	5/12
	Lack of system integration and standardization issues	3/3		2/3	2/3	7/12
	Lack of widely – accepted solution	2/3		2/3	1/3	5/12
EP process related risks	Lack of flexibility in process and documentation	2/3	2/3	2/3	2/3	8/12
	Lack of faith in transaction and data security	3/3		3/3	3/3	9/12
	Confidentiality of information	3/3		3/3	3/3	9/12

\*\* Eliminations from literature findings

(Ex: 2/3 shows that three out of two respondents from the case were agree the factor. There are twelve respondents selected in which three from each case was interviewed.)

According to respondents’ responses, a new barrier shown in Grey colour which named as ‘**lack of suppliers’ readiness**’ was added, and two existing barriers shown in Black colour such as ‘**lack of top management support**’ and ‘**no business benefits realised**’ were eliminated from the list. In which lack of top management support was highlighted as a driver by interviewees. This is because, strategic decision to adopt new application taken by top management in the modern world (refer Section 4.1). Based on the opinion of respondents, strategies taken to strengthen the drivers and weaken the barriers of EP adoption were listed in Table 4.

Table 4: Strategies to Strengthen the Drivers and Weaken the Barriers of EP Adoption

Strategies	Description
Appoint a dedicated project team	<ul style="list-style-type: none"> <li>▪ For selecting, planning, implementing, controlling and reviewing EP system.</li> <li>▪ It assists successful adoption and continuous operation.</li> </ul>
Continuously provide training for internal staff	<ul style="list-style-type: none"> <li>▪ Conducting training programs to educate the people regarding EP system and its applicability to familiar with the new system.</li> </ul>
Conduct real time testing	<ul style="list-style-type: none"> <li>▪ Ensure the success of EP adoption through monitoring the difficulties in existing system and actions taken to resolve it.</li> <li>▪ Undertake User Acceptance Test (UAT) to ensure the acceptability of user in the organisation.</li> </ul>
Periodically conduct progress meeting	<ul style="list-style-type: none"> <li>▪ At managerial level to share experience on problem encountered and solution taken to overcome.</li> </ul>
Assign a consultant to manage the system	<ul style="list-style-type: none"> <li>▪ From the service provider of EP software to solve the issue regarding coding and process specification.</li> </ul>
Provide awareness program for suppliers	<ul style="list-style-type: none"> <li>▪ To increase their knowledge on the system and its necessity and enhance their willingness to provide sufficient resources to move towards new techniques</li> </ul>

## 5. A MODEL FOR ANALYSING THE DRIVERS AND BARRIERS OF E-PROCUREMENT ADOPTION

A model was developed finally incorporating findings of the study which will facilitate the successful adoption EP system in Sri Lankan organisations. The model includes both drivers and barriers which impact to the EP adoption as well as strategies to strengthen the drivers and weaken the barriers. Further applications of EP system and recommendations to improve the practice of all applications in Sri Lankan context are also depicted in the model (refer Figure 4). This model gives a clear tactic to the organisation to adopt the EP system by analysing the drivers and barriers to EP adoption in Sri Lanka. Thus, it assists the organisations to successfully implement the EP system to enhance the performance and efficiency of procurement system and the strategies founded in the research also insisting the organisations to adopt EP system by strengthen the drivers and weaken the barriers of EP system.

## 6. CONCLUSIONS

The increasing need and competitive nature of industries in the modern world have been forced the organisations to discover new solution or practice in adding the value to the businesses and enhancing the performance of procurement function. Most of the researchers were highlighted that EP is one of the innovative solutions which practiced by plenty of organisation all around the world to make the procurement process more efficient and they are questing new techniques to improve the use of EP system. However, the practice of the world is dramatically increasing, it is still in the initial stage in Sri Lanka due to the poor understanding on EP system and the factors influencing to successful adoption. Thus, this research attempts to develop a model for analysing the drivers and barriers of EP adoption.

This study was formulated four sequential objectives to achieve the ultimate aim of research consistently. In this empirical investigation, four cases who have adopt EP system in western province in Sri Lanka were selected on the purpose of analysing the drivers and barriers of EP adoption and seeking the strategies to strengthen drivers and weaken barriers of EP adoption in each case and compare them across the selected cases on how they impact on the successful adoption of EP system in their respective facilities. Finally, a model was developed based on the findings in order to facilitate the adoption of EP system in Sri Lankan context. The developed model will direct the organisations to increase the practice of EP system towards to enhance the procurement performance by presenting a comprehensive view of factors influencing to EP adoption.



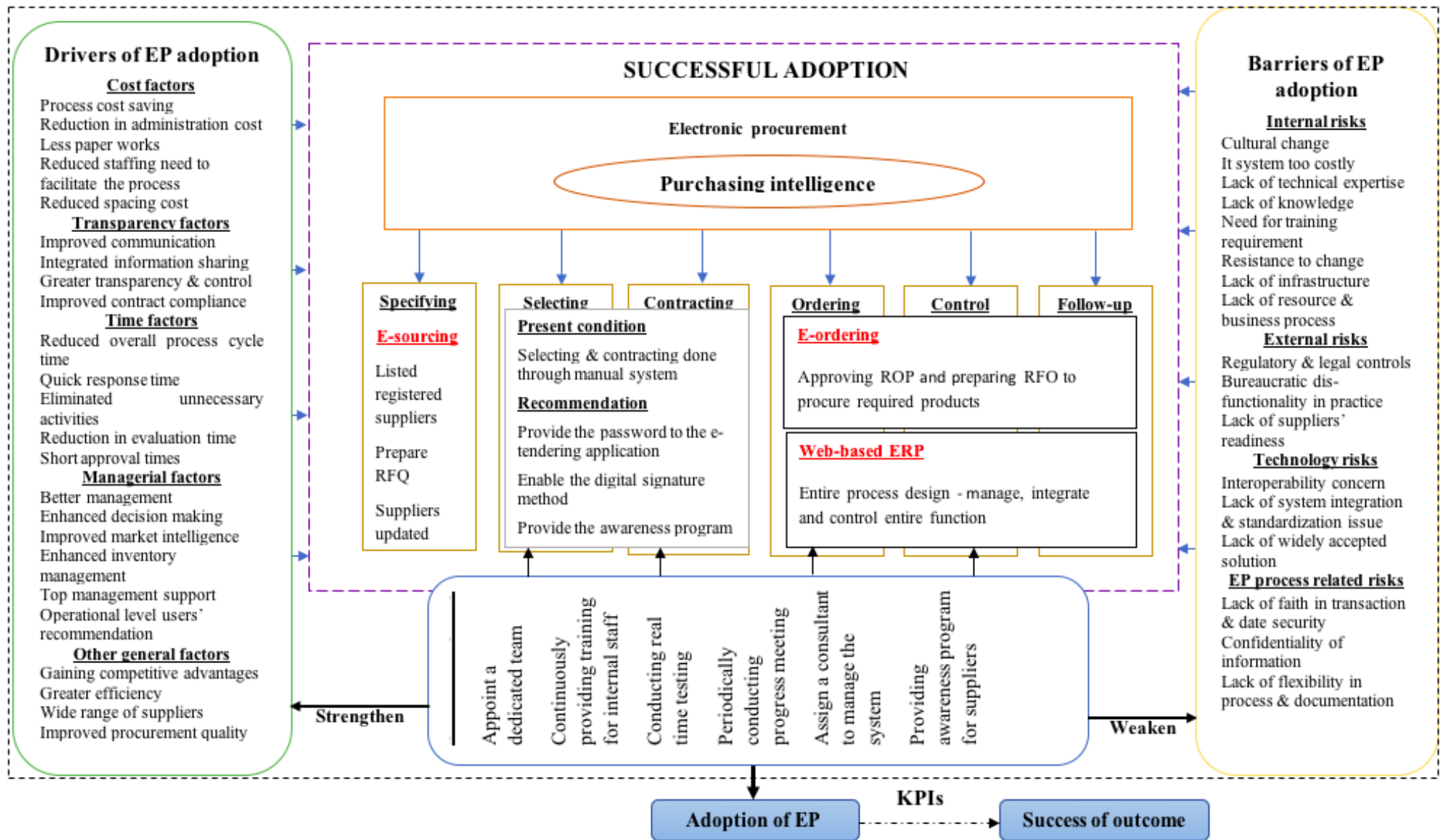


Figure 5: Model for Analysing the Drivers and Barriers of EP Adoption

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