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Jayantha Rajapakse

*The University Of Melbourne, j.rajapakse@pgrad.unimelb.edu.au*

Peter B. Seddon

*The University Of Melbourne, peterbseddon@gmail.com*

Rens Scheepers

*The University Of Melbourne, r.sheepers@unimelb.edu.au*

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## Why ERP Systems Fail to Generate Intended Benefits in Developing-country Organisations

Jayantha Rajapakse  
Associate Prof Peter B Seddon  
Associate Prof Rens Scheepers

Department of Information Systems  
The University Of Melbourne  
Melbourne, Victoria, Australia

Email: [j.rajapakse@pgrad.unimelb.edu.au](mailto:j.rajapakse@pgrad.unimelb.edu.au), [p.seddon@unimelb.edu.au](mailto:p.seddon@unimelb.edu.au), [r.sheepers@unimelb.edu.au](mailto:r.sheepers@unimelb.edu.au)

### Abstract

*ERP adoptions in developing countries such as Sri Lanka have struggled to achieve intended benefits. To identify reasons for this problem, this paper begins by integrating ERP benefit-drivers models in developed countries, and Hayami's technology-transfer model, which argues that three factors retard adoption of imported technology in a developing country, namely, culture, institutions and resources. The model is tested using four in-depth case studies in Sri Lanka. The results suggest that Hayami's factors, culture, institutions and resources, are, indeed, key factors that make benefits from ERP systems difficult to achieve in Sri Lanka, and by inference, in other developing countries.*

### Key Words

ERP Benefit Drivers, Technology-transfer, Developing Countries, Culture, Institutions, Resources.

### INTRODUCTION

Enterprise Resource Planning (ERP) systems are packaged suites of business information software that allow an organization to "automate and integrate the majority of its business processes; share common data and practices across the entire enterprise; and produce and access information in a real-time environment" (Deloitte Consulting 1999). The past decade has seen the widespread adoption of ERP systems by large organizations in developed countries. Having observed the benefits of ERP systems, some large organisations in developing countries<sup>1</sup> are also beginning to adopt ERP solutions (Liang et al. 2004; Martinsons 2004; Arunthari and Hasan 2005; Pan et al. 2003). However, many organizations in developing countries, e.g., in China (Liang et al. 2004), have failed to achieve benefits using their western-developed ERP systems. In attempting to explain such problems Huang & Palvia (2001) argue that ERP adoptions face additional challenges in developing countries due to economic, cultural, and basic infrastructure issues. Since ERP adoptions in developing countries seem likely to increase due to various reasons: to support their growth beyond that which their previous in-house developed systems allowed, and to stay competitive (and link strategically) with other organizations globally, it is important to understand why the intended ERP benefits cannot be realised. Nevertheless, the limited extant ERP literature related to developing-country ERP adoptions (Pan et al. 2003, Zhang et al. 2003, Liang et al. 2004, Martinsons 2004, Arunthari and Hasan 2005, Xue et al. 2005, Zhang et al. 2005, Yusuf et al. 2006) mainly investigates implementation-stage issues and lacks a comprehensive and fine-grained explanation for the difficulties faced by ERP-adopting organizations in realising benefits in developing-countries

Consistent with Liang et al.'s observations in China, organizations in Sri Lanka have struggled to derive benefits from their investments in ERP systems<sup>2</sup>. In this paper we ask:

*Why have organizations in developing countries, specifically Sri Lanka, experienced difficulties in realization of benefits from their ERP systems?*

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<sup>1</sup> There seems to be no generally accepted definition of the term "developing country". The World Bank (2006) has four categories of gross national income per capita per year (low-, lower-middle-, upper-middle-, and high-income), and in 2006 classifies Sri Lanka, with a 2004 GNI per capita of US\$1,010, as a lower-middle-income (i.e., developing) country.

<sup>2</sup> The first author estimates that only about 25 organizations in Sri Lanka have implemented western-developed ERP systems with at least three modules from vendors such as SAP, Oracle, IFS, and BAAN. Interviews conducted by the first author with managers in 14 of those organizations consistently report difficulties realizing expected benefits from those systems.

To answer the above question, we began by examining various models of factors that affect benefits from ERP systems in developed countries. We then asked how, if at all, cultural and institutional factors in developing countries might affect those factors. For example, functional fit has been shown to be important for achieving benefits when ERP systems from the mainstream vendors (e.g., SAP, Oracle, and IFS) are used in Western settings (Soh et al. 2003; Rosemann et al. 2004). Is it possible, we asked, that because of various cultural and institutional assumptions embedded in the western-developed software, functional fit might be lower in developing countries (which in turn, would lead to lower benefits?). To guide our thinking about which aspects of context in a developing country might be important to consider we turned to Hayami's (1997) technology-transfer model. Based on observations of agricultural technology transfer, Hayami argues that three factors retard adoption of an imported technology by a developing country, namely culture, institutions and resources.

In this paper, we combine insights from Hayami with lessons from the West, and propose a model where Hayami's three factors inhibit the achievement of positive outcomes for various benefit drivers that have shown to be important in achieving benefits from ERP systems in developed-country organizations. This model is then tested by examining four in-depth case studies of organizations in Sri Lanka, three locally-owned firms and one multinational company. Our conclusion is that the factors that Hayami identified do exert a strong inhibiting influence on achieving benefit drivers from the western-developed ERP benefits models. This, in turn, suggests that these same factors are likely to be important in other developing countries.

## THE MODEL

The model that resulted from examining the work of Davenport et al. (2002, 2004), Hong and Kim (2002), Shang and Seddon (2002), Seddon and Calvert (2005), Staehr et al. (2006), and integrating that with Hayami (1997) is shown in Figure 1. Starting from the right, our interest is in benefits from ERP system use that organizations in developing countries realize from their investment in ERP systems. Those benefits are similar to those discussed by Davenport et al. (2002), Shang and Seddon (2002), and Staehr et al. (2006).

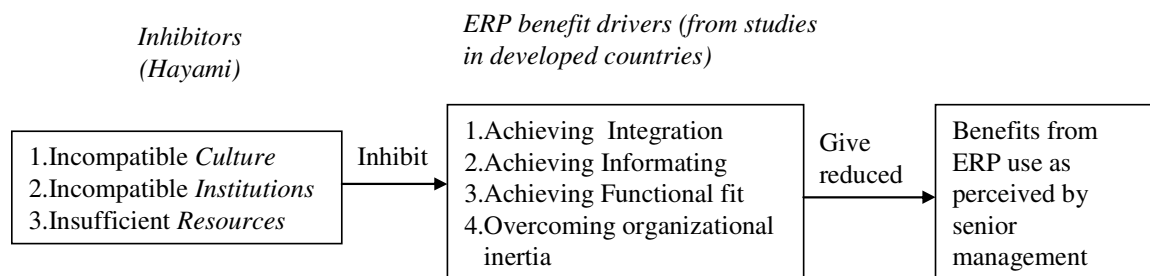


Figure 1: ERP Benefit-Inhibitors Model

Moving left in Figure 1, we argue that for the same reasons that all the factors in the middle box in Figure 1 are important drivers of benefits from ERP systems in organizations in the developed countries, they are also likely to be important in developing countries such as Sri Lanka. For example, Functional fit is important to organizations in both developed and developing countries because all organizations, we argue, invest in ERP software to help them run their businesses. Likewise, overcoming organization inertia is hard to achieve in both developed and developing countries because it seems to be human nature to prefer to go on doing things in ways that are familiar and which have worked in the past. Thus we hypothesize in Figure 1 that all four factors that drive benefits in the developed countries are also important in the developing countries.

However, moving to the extreme left in Figure 1, we also argue that in developing countries Hayami's three factors, i.e., cultural, institutional, and resource constraints, work together to inhibit achievement of strong positive outcomes of the various factors in the middle box, and so lead to lower levels of benefit realization in organizations in developing countries. As explained in more depth below, the reason that Hayami's inhibitors are likely to result in lower levels of ERP system benefit drivers is that Western-developed software embodies various assumptions about culture, institutions, and resource availability that do not match the developing country context. It is this misfit between the assumptions inscribed in the software and the situation facing organizations in the developing country that leads to reduced benefits. We now explain and justify the model in Figure 1 in more depth.

### Factors affecting realization of benefits from ERP systems in Developed Countries

The four key ERP benefit drivers in our theoretical model are defined in the Table 1. These four factors were identified from the ERP and enterprise systems (ES) literature. It is not argued that these four factors are the

only drivers of benefits from ERP systems, but all four feature prominently in many studies, e.g., those in the third column in Table 1.

| Key Benefit Drivers               | Description   | Key Literature Sources  |
|-----------------------------------|---|---|
| Integration                       | Unify and harmonise ERP, data and processes with an organisation's unique environment, and use the systems to better connect organisational units and processes, as well as customers and suppliers (Davenport et al. 2004).  | Davenport et al. 2004, Gattiker and Goodhue 2005, Robey et al. 2002, Soh et al 2003, Ross 1999, Ross & Vitale 2000, Markus & Tanis 2000 |
| Informate                         | In the context of an ERP, organisations informate by transforming ERP data into context-rich information and knowledge that supports the unique business analysis and decision-making needs of multiple work forces (Davenport et al. 2004).                            | Davenport et al. 2004, Staehr et al. 2006   |
| Functional fit                    | "Functional fit is the extent to which the functional capabilities embedded within an ES package match functionality that an organization needs to be able to operate effectively and efficiently." (Seddon and Calvert 2005)   | Hong & Kim 2002, Shang & Seddon 2002, Soh et al. 2003, Seddon & Calvert 2005  |
| Overcoming organizational inertia | "Overcoming organizational inertia is the extent to which members of the organization have been motivated to learn and use the new system. Considerable change management effort and training are needed to overcome organizational inertia." (Seddon and Calvert 2005) | Robey et al. 2002, Markus 2004, Seddon & Calvert 2005, Staehr et al. 2006   |

Table 1: Key ERP system benefit drivers in developed countries

### Hayami's technology-transfer model

The purpose of this section is to introduce economist Yujiro Hayami's (1997) widely-cited work on Development Economics and explain why the factors in his model are likely to be important in understanding the adoption of Western-developed technologies such as ERP systems in developing countries. The factors in this model are defined in Table 2. Hayami argues that the three factors in Table 2—namely, culture, institutions and resources—can inhibit adoption of imported technology in a developing country. Further, he says that the major impediment to "technology borrowing" is the lack of fit between the above three factors and the imported technology. The following quotation summarizes Hayami's thinking:

"A critical condition for the transfer of foreign technology is development of appropriate institutions. For new institutions to function effectively, they must be consistent with people's value system in the recipient economy." (Hayami and Godo 2005, p. 4)

| Factor       | Hayami's description   |
|--------------|--|
| Culture      | "Broadly defined, institutions as well as technology are a part of culture. However, culture is narrowly defined to imply the value system of people in the society." (Hayami and Godo 2005, p.11).  |
| Institutions | Institutions "are defined as 'rules sanctioned by the members of the society' including formally stipulated laws and informal conventions." (p.11). Institutions include market structure, industrial organisations, labour management and regulation, research, training, and education systems." (Hayami and Godo, 2005, p. 28). |
| Resources    | Resources are "broadly defined as 'factors of production', including natural resources, labour, and capital." (Hayami and Godo, 2005, p.9)   |

Table 2: Descriptions of Hayami's factors

Hayami and Godo argue that the cultural and institutional practices found in various countries around the world are the result of trial and error processes that have evolved over many centuries, and which continue to evolve. For example, they say that thousands of years ago when population pressures led to the development of agricultural practices, the institutional concept of "property ownership" (of land) became necessary to protect the interests of those who cultivated land and nurtured animals. Thus, through economic-Darwinist processes, culture and institutions evolve in different countries to match the available resources and prevailing technologies.

Hayami and Godo then go on to illustrate how introduction of new technologies such as new strains of rice or tractors can lead to increased economic living standards but also place strains on the existing cultural-institutional subsystem. Some existing institutions can support rapid economic growth, for example, the higher levels of education in Japan compared to Korea in the first half of the 20th century led to much more rapid economic growth in Japan than in Korea from 1950-1980 (p.178). In other cases, existing institutions and culture act to inhibit adoption of new technologies.

### **Inhibiting effects of Hayami's factors on the benefit drivers**

Hayami says that his three factors retard adoption of developed-country technologies by developing countries. In Figure 1, we go beyond Hayami's thinking by positing that the mechanism through which his factors lead to lower organizational benefits from ERP systems in developing countries is through the four factors labelled benefit drivers. (As mentioned earlier, prior studies have shown these benefit drivers to be important in explaining benefits in large developed-country organizations.) Specifically, we argue that the underlying cause of difficulties in reaping benefits from ERP in developing countries is that Hayami's factors inhibit the achievement of the four benefit drivers associated with such systems. The following section explains and justifies how each of Hayami's three factors affects the benefit drivers.

#### *Incompatible culture inhibits the benefit drivers:*

Hayami says that for a new technology to be successful, peoples' value systems (culture) need to be compatible with the technology. Cultural values are reflected through human behaviour. When the nature of the benefit drivers is analysed it is clear that human behaviour plays a key role in achieving positive outcomes for the four benefit drivers. For example, once modules of ERP solutions are integrated (a benefit driver) employees need to have good discipline and strict adherence to standardised processes (Robey et al. 2002). Lack of discipline, e.g., failure to enter transactions as they happen, can have unwanted implications for those downstream in a process (Soh et al. 2003, Reimers 2002, and Davenport 1998). Similarly, in order to overcome organizational inertia, employees need to be prepared to take on additional responsibilities and to accept the change (Soh, et al. 2003; Robey et al. 2002). From the above literature, it is clear that certain types of human behaviour are necessary to achieve positive outcomes for benefit drivers such as integration and overcoming organizational inertia.

Now let's see what is known about cultural values in Sri Lanka. Over 70% of the Sri Lankan population of 20 million people are Sinhalese, a culture where Buddhism forms the basis of most political, social and economic ideology. Another 20%, or so, are Tamils, with a mix of mainly Hindu-based, though some Muslim culture. In this predominantly Sinhalese society, family is the centre of most social structures. Family includes one's extended family, which can be very large. For many Sri Lankans, looking after one's children, parents, and family is more important than advancing one's own career. As a result, (i) in both society and the work place, older people are respected and listened to; (ii) work is viewed a means to that end, not something that is intrinsically valuable; and (iii) there are very few paid child-care or aged-care facilities in Sri Lanka. In short, in Hofstede's (2001) terms, Sri Lanka has a collectivistic society.

A study by Nanayakkara (1998) identifies seven cultural concepts in Sri Lankan society that he says work against adoption of western management practices. Table 3 shows those seven concepts and some example behavioural patterns associated with each of those concepts. Nanayakkara argues that these cultural norms and behaviours, which are inculcated and reinforced in individuals in Sri Lanka through pressures from family and school, mean that an individual in Sri Lanka is socialized to accept his or her place in society. According to Nanayakkara (1998), many people find their primary source of the meaning of life in socio-cultural values, beliefs and mysteries. However, by no means can these values be generalised to the entire Sri Lankan society. Cultural values are not homogeneous across the country. With the introduction of open economic policies in 1997, Sri Lanka has gone through a massive social change. Western influence has significantly increased. As such, urban areas of the Island have experienced some cultural shocks and western management practices are slowly, but painfully, beginning to be accepted, particularly in the larger business enterprises.

| <b>Concept</b>                | <b>Behaviours</b>  |
|-------------------------------|--|
| Dependence                    | Lack of change (lack of decision making)                                     |
| Lack of self confidence       | Reluctance to accept responsibilities  |
| Accepting the status quo      | Doing the minimum in order to survive (reluctance to accept additional work) |
| Work as means                 | Income and status as motivators  |
| Respect for authority         | Status, order and obedience as organizational culture                        |
| Lack of system and perfection | Ad-hoc and situational actions (lack of discipline)                          |
| Attitude toward opposite sex  | Role differentiation by sex  |

Table 3: Cultural concepts and related behaviours in Sri Lanka (Nanayakkara 1998)

Thus, the Sri Lankan behavioural patterns identified in Table 3, namely lack of decision making, reluctance to accept additional work and lack of discipline, are the opposite of the behavioural patterns identified in the ERP literature as conditions for integration and overcoming organisational inertia. Thus, Sri Lankan culture inhibits the achievement of some of the benefit drivers. In making this observation we are not passing any value judgment on different cultures; we are merely arguing that cultural contexts are different.

*Incompatible institutions inhibit the benefit drivers:*

For a new technology to be successful, prevailing institutions should also be compatible with the technology (Hayami 1997). Hayami defines institutions as 'rules sanctioned by the members of the society' including formally stipulated institutions and informal conventions. Formally stipulated institutions are labour laws, government regulations, training institutions, customer and supplier organisations etc. Informal conventions are deeply institutionalised practices such as labour market conventions and industry practices. In this section, we consider some examples of institutional factors that cause difficulties for ERP systems in Sri Lanka. First, Sri Lankan labour laws make it very difficult to retrench staff. When a job is a job for life there are few incentives to change work practices as is often required to make effective use of ERP systems. Second, Sri Lankan labour regulations provide very generous leave entitlements (27 public holidays) which make it difficult for Sri Lankans to find the time to take on the "additional work" necessary to educate themselves about their ERP system during normal working hours. Third, most Sri Lankan companies employ large numbers of low-wage employees. Training all these people therefore costs relatively more than in a western firm with comparable economic outputs. Finally, until very recently when an Indian firm started a training centre for ERP studies in Colombo, no Sri Lankan training facility provided any training programs on ERP systems. This has made it difficult to hire ERP-qualified staff in Sri Lanka.

Summarizing, the above examples show that Sri Lankan institutions, such as government regulations, labour market conventions (large numbers of employees), and lack of training centres can inhibit achievement of desired outcomes for benefit drivers such as integration, functional fit, and overcoming organizational inertia. Thus institutional factors can cause lower than expected benefits for Sri Lankan organizations that implement ERP systems.

*Insufficient resources inhibit the benefit drivers:*

ERP systems require knowledgeable workers at a variety of levels and a range of skills sets (Ross & Vitale 2000; Markus & Tanis 2000). This includes ERP configuration knowledge, product-specific knowledge (Robey et. al 2002), and skills for business process redesign (Davenport et al. 2004). Resources of these types are scarce in Sri Lanka (Greenberg et al. 2002). Such skilled people are necessary for integration – business process knowledge, functional fit – to configure and modify the software, and overcoming organisational inertia – to conduct training. As such, lack of such human resources inhibits achieving positive outcomes for the benefit drivers in Figure 1.

All the mainstream ERP solutions are also very expensive (Davenport 1998; Markus & Tanis 2000; Ross 1999). Many Sri Lankan organizations simply cannot afford the financial commitments associated with benefit drivers (e.g. customisation and configuration to achieve functional fit, consulting and training to overcome organisational inertia, etc.). Thus, lack of resources can inhibit positive benefit-driver outcomes in developing countries.

*Summary:*

The purpose of this section was to explain and justify the model of factors affecting organizational benefits from ERP systems in developing countries, shown in Figure 1. The model hypothesizes that (a) the four factors that have shown to be important ERP benefit drivers in large western organizations are also important benefit drivers in Sri Lanka, and (b) in Sri Lankan organizations, Hayami's three factors on the left of Figure 1 inhibit the achievement of positive outcomes for the four benefit drivers. The remainder of this paper tests this model.

## **RESEARCH METHOD**

A positivist case-study approach was adopted for testing the model (Yin 2003; Dube & Pare 2003). The case study method allows investigators to retain the holistic and meaningful characteristics of real-life events – such as organizational and managerial processes (Yin 2003).

Four case-study companies in Sri Lanka were used to test the model. Sri Lanka was selected due to close contacts between the first author and Sri Lankan companies. The following factors were considered when selecting the case organisations in Sri Lanka.

1. All organizations were using western-developed ERP solutions.

2. They had been using Western ERP solutions for more than five years. (That gave us an opportunity to explore the organisational problems in realising ERP benefits.)
3. The cases reflect different industries.
4. The cases reflect different ownership options available namely public, multinational and local privately owned traditional companies. Multi-national corporations (MNCs) in Sri Lanka usually have different, i.e., more western, business practices compared to local organisations.

At the time of this research, no public sector organisation in Sri Lanka had adopted mainstream ERP packages. As such, we did not include a public sector case in this study. Some details of the case organisations are given in Table 4. ApparelCo used SAP. To preserve anonymity, the software used by the other organizations is not revealed.

| Organisation | Ownership     | Local/<br>MNC | Turnover<br>(\$US<br>million) | ERP modules implemented   | Go-live<br>year |
|--------------|---------------|---------------|-------------------------------|---|-----------------|
| 1. ApparelCo | Private       | MNC           | 500                           | Finance, sales, purchasing,<br>inventory management,<br>manufacturing | 1998            |
| 2. RetailCo  | Public listed | Local         | 40                            | Finance, sales, purchasing,<br>inventory management                   | 1999            |
| 3. AgriCo    | Public listed | Local         | 25                            | Finance, purchasing, inventory<br>management                          | 2001            |
| 4. RubberCo  | Private       | Local         | 20                            | Finance, sales, purchasing,<br>inventory management,<br>manufacturing | 1999            |

Table 4: Summary of the case organisations (MNC means “multinational corporation”)

Data was collected during 2003-2006 by following various strategies namely, a) open/semi-structured interviews and informal interactions with key actors involved in the ERP adoption process, (b) comprehensive system-review studies, (c) examination of related documents such as project plans, user complaint statistics, project reports, budget data, and d) observations. Forty-one formal interviews were conducted using an interview guideline containing questions based on Hayami’s technology-transfer model and the various ERP benefit drivers. Key interviewees included CEOs, Directors, IT managers, Project Managers, Business Managers, Production Managers and operational users. On average, the duration of the interviews was around 45 minutes. Most interviews were in English, and most were tape recorded. Some statements from these interviews are presented in results section as quotes or near quotes. Some of the quotes have been translated into English.

## RESULTS

In this section, we first explore the dependent variable, benefits from ERP system use. Second, we test whether the benefit drivers from the literature on Western organizations also drive benefits in Sri Lanka. Third, we test whether Hayami’s factors cause poorer outcomes for the benefit drivers.

### Benefits

After six years of ERP use, two locally owned Sri Lankan companies, AgriCo and RubberCo, had managed to achieve main four main benefits from Shang and Seddon’s (2002) benefit framework: inventory cost reduction, more robust IT infrastructure, work-pattern improvements, and organisational learning. The third locally owned firm, RetailCo, realised some additional benefits such as improved decision making and quality improvements in some areas, though only to a limited extent. Finally, due to its more western outlook and management style, the multinational corporation, ApparelCo, had realised more benefits than locally-owned companies. No case organisation had managed to reduce its IT costs as a result of ERP adoption.

### Importance of the western benefit drivers in Sri Lanka

Next we examined whether the four drivers of benefits from the western-developed models were also benefit drivers in Sri Lanka. Here we found that only three of the four benefit drivers in Figure 1 were important in driving benefits from ERP systems in Sri Lanka. These were Integration, Functional fit and Overcoming organisational inertia. No Sri Lankan case company has yet achieved the maturity in ERP use required to make decisions extensively using ERP data.

First, though they found *Integration* has been hard to achieve, managers in the four case-study companies understand the importance of module *integration* for benefit realisation:

*“Once the integration is done those of us in top management can see information at any point. That is a main reason for implementing our ERP.” [Managing Director, RubberCo]*

Second, *Functional fit* was an important factor driving benefits. The case organisations tried to adopt ERP-provided functionality to a large degree. Despite this, however, AgriCo realised very little benefit from its ERP project. A key contributing factor was lack of functional fit.

*“Our ERP cannot track information relating to planting the crop. If I want to take a decision on a field assistant on his performance.... Assume we give 1600 hrs of labour every day for agriculture, 500 hrs for weeding, 300 hrs for planting and so on ... then we want to know whether we got the expected output, but the ERP can't give this ..... we don't get vital information from the ERP.” [The Financial Accountant, AgriCo]*

Due to limited financial resources, AgriCo was unable to customize the software to overcome this problem.

Third, with respect to *Overcoming organizational inertia*, the managers in these companies understood that significant organizational change was required to realise benefits.

*“.....When you want to introduce an ERP package, there is a lot of homework to be done..... The whole structure has to be modified and changed to accept an ERP package, there are many under-developed countries that doesn't have such environments.” [Managing Director, RubberCo]*

**The influence of Hayami’s factors on the benefit drivers: locally-owned firms**

Having established that three of the four developed-country benefit drivers in Figure 1 were also important in Sri Lanka, we then examined whether there is evidence to support causal relationships between Hayami’s inhibitors and the benefit drivers. Results from this analysis are presented in Table 5, where a “Yes” means that there was evidence in the case studies that the Hayami factor inhibited achieving desired levels for the benefit drivers. Further, due to differences between the two types of firm, in Table 5, the three locally owned firms have been distinguished from the multi-national corporation. Finally, due to space limitations, we only discuss two of the 3 x 4 = 12 possible paths in Figure 2. Those two relationships are numbered 1 and 2 in Figure 2 and highlighted in Table 5 with heavy-line boxes. Each of the two relationships shown in Figure 2 is now discussed in turn.

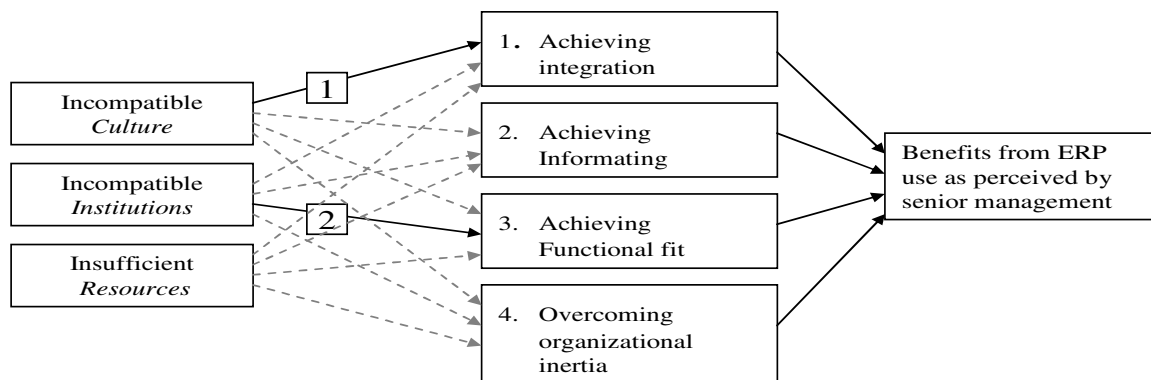


Figure 2: Some of the observed relationships between the inhibitors and the benefit drivers

| Inhibitors:                       | CULTURE |     | INSTITUTIONS |     | RESOURCES |     |
|-----------------------------------|---------|-----|--------------|-----|-----------|-----|
|                                   | Local   | MNC | Local        | MNC | Local     | MNC |
| Integration                       | Yes     | Yes | Yes          | Yes | Yes       | Yes |
| Informate                         |         |     |              |     |           |     |
| Functional fit                    | No      | No  | Yes          | Yes | Yes       | Yes |
| Overcoming organizational inertia | Yes     | Yes | Yes          | Yes | Yes       | Yes |

Key: Yes- relationship does exist, No - relationship does not exist. Blank – benefit driver not relevant in Sri Lanka.

Table 5: Relationships between Hayami’s inhibitors and the Benefit Drivers (The cells highlighted correspond to paths 1 and 2 in Figure 2.)

*Relationship 1: Incompatible culture inhibits integration*



Culturally-oriented behaviour patterns, particularly lack of discipline have created problems for integration in RetailCo, AgriCo and RubberCo.:

*“When you transfer goods from one location to another, they don’t send the system-generated transfer note. Instead they transfer the goods and later the transfer note is generated. These kinds of practices by staff make both integration and online processing meaningless. This is a discipline problem and it affects us everywhere.” [IT Manager of RubberCo]*

Even though certain modules are integrated with end-of-day processes, senior managers were often not aware of the complete picture due to some data entry being incomplete. The root cause for the lack of disciplined data entry is the cultural concept called “lack of system and perfection” (Nanayakkra 1998). This culturally-based lack of discipline is antithetical to the premises of western-developed ERP systems, e.g., SAP R/3, which assume that cross-functional organizational processes can be integrated by asking individuals executing steps in a process to enter details of transactions in real time, and so track movements of resources in the real world. Failure to enter these transactions in real time means that people executing subsequent steps in a process cannot rely on the state of affairs depicted in the ERP system. Thus, Sri Lankan culture inhibited the case companies from reaping benefits by integrating modules. Further, the absence of integrated information (due to incomplete data capture) meant, in turn, that the case organisations failed to realise the managerial benefits reported in western implementations of ERP systems.

In addition to lack of discipline, the Sri Lankan custom of deferring to senior managers was also a source of integration problems. In RubberCo, for example, at the time of creating an engineering item, Engineering Stores has to decide and enter a relevant account code. If they neglect to enter this code, the purchasing module will still allow the item to be purchased. But later, a Goods-Received note cannot be processed without an account code. Thus, the failure to make a decision at the starting point creates a ripple effect of problems down the line in an integrated process. This tendency towards lack of decision making follows from the cultural concept that Nanayakkara (1998) calls “dependence” Thus, Sri Lankan cultural norms again lead to failure to achieve the high levels of integration that have been shown in Western organizations to lead to greater benefits from ERP systems. For both these reasons, we have placed a “yes” in the Local-culture-integration cell in Table 5.

#### *Relationship 2: Incompatible institutions inhibit functional fit*

The following example illustrates how institutional arrangements such as government regulations, can conspire to make it harder to achieve functional fit in Sri Lanka.

RetailCo similarly reported that they needed some customisation of their ERP software in order to achieve functional fit. They use various workarounds to avoid customisations as much as possible, but lack of fit leads to reduced benefits. One institutional issue is the Sri Lankan tax system:

*“Our tax structures in Sri Lanka change frequently. Then there are the regulations: local government is different to the central government; central government is different to the provincial government. Since we have shops all over the country we have several tax systems..... These need customisations and become significant obstacles.”[The Business Development Manager, RetailCo]*

As illustrated above by the two examples, unique institutional requirements prevent Sri Lankan companies from reaping benefits by having good functional fit. For both these reasons, we have placed a “yes” in the Local-Institutions-functional-fit cell in Table 5.

#### **The influence of Hayami’s factors on the benefit drivers: the Multi-national firm**

ApparelCo, the MNC case, realised more benefits than the three locally owned companies. Additional benefits realised by the MNC, compared to those of local organisations, can be attributed to their ability to reduce the degree of impact of the inhibitors on the benefit drivers. For example, they invested heavily in training and other educational programs to change culture. At the same time they introduced company-wide transfer schemes to remove institutional barriers. Hence, they realised more operational benefits. However, although they started their ERP journey in 1998, they are still not at the stage where they can pursue benefits of informing. The difficulties MNC has experienced can be explained using Hyami’s inhibitors. Links 1 and 2 in Figure 2 are now discussed in turn.

#### *Relationship 1: Incompatible culture inhibits integration*

Knowing the impact of cultural on ERP adoptions, ApparelCo made significant investments to neutralise its effect. For example, they recruited many foreign expatriates and ERP consultants to dilute negative cultural effects. Nonetheless, MNC initially experienced discipline issues:

*“However much you train (them), our people always want to find short cuts .....it is a cultural barrier. Our people tend to forget learning, structures, and they do not see a need to consult the*

*manuals and do the right thing when they get stuck. We had a few instances with the initial implementation projects that affected the process. For example sometimes our merchandisers amend the order quantities on the order document but fail to update the system.” [ERP Project Manager, ApparelCo]*

The preceding quotation shows that even in a multinational corporation, culture can still have some inhibiting impact on integration. For this reason, we have placed a “Yes” in the MNC-Culture-Integration cell in Table 5.

*Relationship 2: Incompatible institutions inhibit functional fit*

Customs regulations (an institutional factor) at the Colombo port caused problems for ApparelCo:

*“Customs documentation,.. we have to send the documentation on what we are shipping by Wednesday. So for Friday’s shipment, we have to do the documentation on Wednesday. In the standard SAP process, what we would do is first confirm, then goods come to the stores, and then what comes to the stores can be packed. If we follow that process we can’t send the documents on Wednesday because documents can only be printed after packing.”[A Business Manager, ApparelCo]*

Thus, ApparelCo also faced some problems in achieving functional fit because of government regulations. For this reason, we have placed a “Yes” in the MNC-Institutions-Functional-fit cell in Table 5.

## CONCLUSION

Most ERP adoptions in Sri Lanka have failed to achieve expected benefits arising from their western-developed ERP systems. In an effort to explain why Sri Lankan companies are not realizing expected benefits from their ERP systems, we developed the model in Figure 1. The contribution of this paper is (a) this theoretical model, supported by (b) evidence of the model’s validity based on findings from four in-depth case studies in Sri Lanka. No prior study of difficulties with ERP benefits realization in developing countries has been based on Hayami’s model. The results from this study, summarized in Table 5, suggest strongly that Hayami’s factors, culture, institutions and resources, are, indeed, important factors that make benefits from ERP systems difficult to achieve in Sri Lanka. They do this, we argue, through their influence on the benefit drivers identified in Western-developed models. These problems were somewhat less pronounced in MNC because they invested heavily on training and other educational programs to change the behaviour patterns and skill levels of their staff members.

The results presented in this paper are based on observations in only four case-study organizations. How generalizable are they (a) to other Sri Lankan organizations, and (b) to other developing countries? With respect to question (a), we believe the results are generally applicable to ERP usage in similar Sri Lankan organizations. The fact that MNC has fewer problems than the locally owned firms shows that, with considerable effort, cultural problems can be partially overcome. With respect to question (b), the precise cultural and institutional situation that exists in Sri Lanka will not be replicated exactly in other developing countries. However, we believe that all three of Hayami’s factors are likely to be important in all developing countries because their cultural, institutional, and resource constraints are likely to lead to misfits in those countries as well.

The complex links revealed by this paper for the first time, are a significant contribution to the understanding of why developing countries experience problems with western-developed ERP systems. The comprehensive nature of the model in Figure 1 also provides essential insights for future research. First, the model can be viewed as the first step toward understanding the relationships among the three groups of constructs, namely inhibitors, benefit drivers, and benefits. Second, although not explored in this paper, the model invites researchers to analyse interrelationships among both the inhibitors and benefit drivers. For example, “How can culture affect institutions?”, “How can resources affect culture” and so on. Similarly, among benefit drivers, “How does integration affect organisational inertia?” and so on. Single-factor research prevents such insights. Third, future studies in different countries can test the applicability of, and expand the scope of, these constructs in other contexts.

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