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Information System Resources and Organizational Performance: Case of Apparel Sector in Sri Lanka

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Abstract: Identifying the business value of Information System (IS) resources has been a major concern of managers in Sri Lanka due to the large-scale investments they do for planting IS resources in firms. In the past decade, Sri Lankan organizations have increased their investments in IS significantly with the expectation that these investments will improve firm performance. So, understanding whether IS resources significantly contribute towards the growth of performance is critical at present and if the IS investments doesn't contribute in improving the firm performance it is useless to do heavy investments on IS resource. Thus, aim of this research is to identify the effects of IS resources on firm's performance in Sri Lankan context seeking evidence from the apparel industry. Findings of this research revealed that IS resources significantly contributing to improved organizational performance in Sri Lanka.

Keywords: Human Capital, Infrastructure Flexibility, Relationship Quality, Information System Resources.

1. Introduction

An information system (IS) could be stated to any organized system for the collection, organization, storage and communication of information. More specifically, it is the study of complementary networks of that individuals and organizations use to collect, filter, process, create and distribute data. Components of Information Systems includes resources of people (end users and IS specialists, system analyst, programmers, data administrators etc.), hardware (Physical computer equipment and associate device, machines and media), software (programs and procedures), data (data and knowledge bases), and networks (communications media and network support). In apparel industry, Information Technology (IT) with IS has become an integral part. Like service industries few departments of the apparel industry are fully depended on IT or Enterprise Resource Planning (ERP). There are so many recent cases in the world which provides us better evidence on how critical IT is in an apparel industry.

In Sri Lanka, few large-scale apparel industries are currently having their own IT solution firms which simply gives us evidence that how much does the Sri Lankan apparel industry rely on IT. Therefore, understanding whether and how IS resources have affected the firm performance is an important research area to carry out a study, as it would allow the management to know the value of their IS investments. Investment in IS remains a central strategic factor as firms try to gain competitive advantage in the increasingly dynamic environment, even though the impact on performance is not fully understood. Some empirical analyses indicate that marginal return from computer investments is higher than ROI (Return of Investment) in other industrial equipment Anderson *et al.* (2001).Some research studies that have been carried out so far posit a direct relationship between IS resources with firm performance, while others have questioned the direct-effect argument and emphasized that IS resources are likely to affect firm performance only when they are deployed to create unique complementarities with other firm resources.

Main objective of the research is to identify the impact of IS resources on organizational performance in apparel industry. In order to achieve the main objective, the following sub objectives need to be achieved.

- ✓ Analyzing the IS resources used in the apparel industry
- ✓ Analyzing the contributions of IS resources to the firm performance in apparel industry

2. Methodology

Performance would be changing after introducing the IS to an organization. So only these changes were measured to support the research. How much productive the ISs are to the firm, how supportive they are to meet the targets, all these were measured as how they are perceived by the users/employees of the firm. Ravichandran and Lertwongsatien (2005) results suggested that perceived measures are valid indicators of firm performance and Fabling *et al.* (2008) suggested that there is much commonality in the picture we see using either administrative or perceived survey data when measuring firm performance. So, this study was based on the perceived performance of the organization and measured the perceived performance of the organizations against the IS resources.

Through the extensive literature review a conceptual model has been developed to study the impact of IS resources on organizational performance in apparel industry. The conceptual model of this research includes variables such as IS human capital, IT infrastructure flexibility, and IS relationship quality to measure IS resources and Marketing, Operating and Finance variables to measure the perceived performance of apparel industry.

First category is Human Resources (HR) and is defined by IS human capital as an important input which relates to the skill level and proficiency of the IS staff to perform IT related functions. So here we focus on two key indicators of human capital; skills and specificity mainly. Skills pertain to the extent to which IS personnel have the requisite technical, managerial, business, problem solving skills, the required educational. Specificity related to the extent to which IS personnel have firm-specific knowledge such as an understanding of the culture and routines of the organization. Ganesh and Grover (2014) stated that IS activities are generally considered knowledge-intensive and requiring specific technical skills. So, they stated that appropriate business and interpersonal skills are needed to effectively deliver IS services to end users.

The second category adopted in this research for the conceptual model is IT infrastructure sophistication, it relates to the ability of IT to meet business requirements or adapt to strategic changes. Reference is made to the readiness of the IT platform to deliver a flexible infrastructure to allow the business to be nimble enough to take advantage of market opportunities. Another important characteristic that points to the sophistication of IT is the ability to deliver relevant information. IT infrastructure is the combination of three of the main components hardware, software, network resources. According to Broadbent *et al.* (1999) and Lertwongsatien *et al.* (2005) research IT infrastructure flexibility was measured by assessing network and platform sophistication and data and core application sophistication. They measured the connectivity, speed, capacity, and the extent of standardization of the networks and computer platforms in the organization. The items for the latter measured the shareability and reusability of the corporate data and application modules in core business applications.

So, the third category is the IS Relationship Quality dimension and this included both internal and external (vendor) related relationships. Internal alignment between the IS function and the different business units is critical in ensuring that IS providers understand the business imperatives to facilitate the core competencies of the organization. External vendor relationships also play a key role in securing expertise in domains that may not form part of the incumbent IS provider skill levels. The external vendors help to augment the internal IS function and thus provide a better service to the business jointly Lertwongsatien *et al.* (2005).

Table 1 provides the conceptual definition of the constructs and the indicators that are going to be used for each dependent and independent construct.

Table 1: Conceptual definition of the Constructs and the Indicators

Constructs	Indicators
IS Human Resource Capital **Ross *et al.* (1996), Wade *et al.* (2004) and Lertwongsatien *et al.* (2005)**	**IS Personnel Skills** Lertwongsatien *et al.* (2005), Barney (1991), Bharadwaj (2000) and Ganesh *et al.* (2014) ✓ Managerial skills ✓ Technical skills ✓ Problem solving skills ✓ Training
	IS Human Resource Specificity Lertwongsatien *et al.* (2005) and Ganesh *et al.* (2014). ✓ Firm-specific knowledge ✓ Understanding of the organization's products and services ✓ Extent of their acquaintanceship with people in the organization
IT Infrastructure Flexibility **Bharadwaj *et al.* (1999) and Wade *et al.* (2004)**	**Network and Platform Sophistication** Lertwongsatien *et al.* (2005) ✓ The extent of standardization of the networks and computer platforms in the organization ✓ Connectivity, Speed, Capacity
	Application Sophistication Broadbent *et al.* (1999) and Lertwongsatien *et al.* (2005) ✓ Shareability ✓ Reusability of the corporate data and application modules in core business applications
IS relationship quality **Wade *et al.* (2004) and Ross *et al.* (1996)**	**Internal relationship** Lertwongsatien *et al.* (2005), Wade *et al.* (2004) and Liang *et al.* (2010) ✓ Relationships between the IS department and other business units/ Relationships between IS and line managers (extent to which the relationship between IS and line management reflects benefits and risk sharing, trust, communication, and coordination)
	External relationship Sambamurthy *et al.* (2003), Lertwongsatien *et al.* (2005) and Palmer *et al.* (2000) ✓ Relationships between IS department and the vendors, IS department and IT service providers (extent to which relationships with key IT vendors and service providers reflect communication, trust, and cooperation, and the extent to which conflicts between vendors and the IS department are resolved through mutual dialog and not through litigation)
Firm Performance **Financial and Operating performance** **Liang *et al.* (2010), Mahmood *et al.* (1993), Li *et al.* (1998), Hitt *et al.* (1996), Anderson *et al.* (2001) and Rai *et al.* (2006)**	**1.Profitability** ✓ Return on investment ✓ Return on assets ✓ Return on equity ✓ Operating margin Operations excellence ✓ Adjusted net income **2. Productivity** ✓ Labour productivity **3. Market based performance** ✓ Entering new markets ✓ Customer relationships ✓ Return on sales ✓ Sales by

2.1 Data Collection Technique – Questionnaire

There are a number of data collection techniques for the qualitative research approach, such as questionnaire survey, interview, case study, and observation. Questionnaires are a good way to obtain information from a large number of people and/or people who may not have the time to attend an interview. They enable people to take their time, think about it and come back to the questionnaire later. Participants can state their views or feelings privately without worrying about the possible reaction of the researcher.

This study focuses on questionnaire format, because to address a large gathering, it is the most suitable way. Many of the researches have done in questionnaire basis in order to collect data. A deep study was carried out in order to identify the main dimensions of IS resources which would have an impact on firm performance before the preparation of questionnaires. The developed questionnaire has main three sub sections as follows.

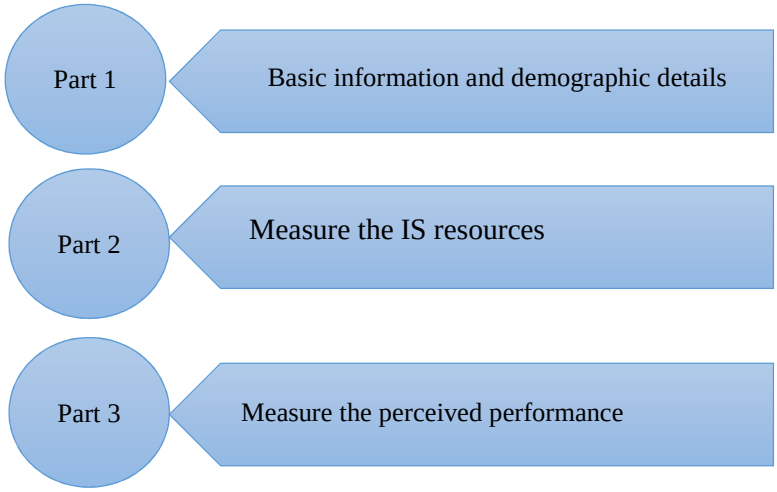


Figure 1: Sections of the questionnaire

2.2 Data analysis techniques

The collected data was analyzed using SPSS statistical package for windows. SPSS is a widely used program for statistical analysis in social science. To make sure that this study is truly measuring what it set out to measure and to provide assurance that the findings reflect an accurate measure, information regarding validity and reliability were considered. Further the statistical calculations such as correlation and regression were conducted in order to address the research questions.

2.3 Data Collection

A survey questionnaire was mailed to the identified IT and business executives, business analysts and managers from the companies as they are likely to be the most informed about the strategic issues pertaining IT use in the organization. The Likert Scale survey method was selected because primary data was required for this research. The questionnaire was based on the constructs provided in table above.

2.4 Population and Sampling

The population definition for this study includes Sri Lankan Apparel Industry. The survey focused on the senior and executive level managers from both business and IT. Population-Textile and apparel industries in Sri Lanka (There are 10 main large-scale apparel industries and nearly 100 registered medium scale apparel industries (www, 2018)). Sampling-Stratified and Random Sampling was used.

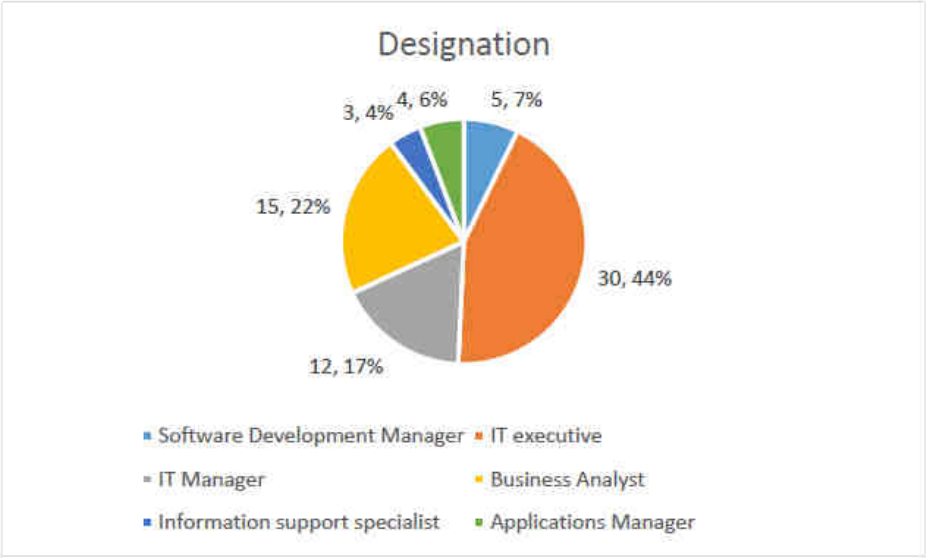
3. Results

3.1 Analysis of Demographic Information

- Designation of the respondents

The designation of the respondents was asked as a question in-order to make sure the responses were taken from people those who eligible to answer the questions and who have an understanding about the as they are likely to

be the most informed about the strategic issues pertaining IT use in the organization. Below figure 2 shows a chart of the designations of the responses received. Most of the respondents are IT-Executives and IT managers.



- Level of education of the respondents

Out of the whole sample 70% of the respondents are holding Bachelor's Degree while 23% respondents have Master's Degree and only 7% have diplomas.

- Level of experience

A question was asked to get the level of experience of the respondents. This is required in order to make sure that the respondents who fill the questionnaire had a proper background about the firm and a considerable level of experience to answer about performance and the other addressed areas in the questionnaire. Since this questionnaire was completely based on the firm's knowledge each individual responses of experience level in the specific firm was important. In any industry with higher level of experience can expect higher knowledge about the industry.

Out of the whole sample 35.5% of the respondents have 1 to 5 years of industry experience while 25.36% of the respondents have 5 to 10 years of experience and the 9% of the respondents pertain more than 10 years of industry experience. So, it can be concluded that the experience level of the responses received are from the people who have a considerable level of experience in the industry.

- Software Development Strategy of the firm

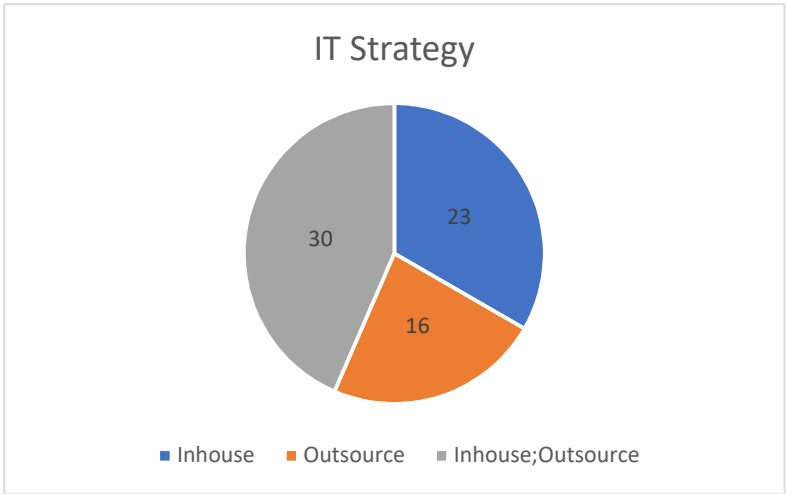


Figure 3: Software Development Strategy of the firm

Since some of the apparel firms in Sri Lanka do in-house IT development while others do complete outsourcing or either use both, it is important to know whether there is any effect for the deployment of IS in the firm and to the performance of the firm on this. So, the software development strategy was checked for each firm included in the sample.

3.2 Statistical Analysis for all the Responded Companies as a whole

- Reliability test

Cronbach's alpha is the most common measure of internal consistency ("reliability"). It is used when a multiple Likert questions in a survey/questionnaire that form a scale are there in the questionnaire used for data gathering, to determine if the scale is reliable. So, the reliability test was conducted for all the variables separately and as a whole. In this questionnaire overall Cronbach's Alpha value of 0.981 based on standardized items has been obtained. Since it is greater than 0.7 it has been concluded that the scale has obtained a higher level of internal consistency.

Table 2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.981	.983

- Relationship of IS resource to firm performance

SPEARMAN'S coefficient of rank correlation describes the relationship between sets of rank data. Since the data collected are ordinal and ranked data, SPEARMAN'S coefficient of rank correlation was used as the test statistic. Thus, following alternative hypotheses were proposed in order to identify the relationships between the IS resources and the firm's performance.

H1: Human Capital has an impact on Firm's Performance.
H2: Infrastructure Flexibility has an impact on Firm's Performance.
H3: Relationship Quality has an impact on Firm's Performance.

Table 3: Pearson Analysis Summary

Factor	Coefficient	p-Value	Relationship
Human Capital	0.629	0.000	Strong Positive
Infrastructure Flexibility	0.621	0.000	Strong Positive
Relationship Quality	0.509	0.000	Strong Positive

So, from the above correlation table all the 3 independent variables human capital, infrastructure flexibility and relationship quality show a strong positive association with the firm performance. This means that changes in the independent variables are strongly correlated with changes in the dependent variable; firm performance.

A multiple regression was run to predict firm's performance from human capital, infrastructure flexibility and relationship quality. The assumptions of linearity, multicollinearity, independence of errors, homoscedasticity, unusual points and normality of residuals were met.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.732a	.536	.507	3.308

R of 0.732 reveals the quality of the prediction of the dependent variable and since the R^2 is 0.536 it can be stated that the model explains 53.6% of the variance in firm performance through the relationship with the IS resources deployed in the firm.

Statistical Significance of the Independent Variables:

The statistical significance of each of the independent variables is tested to identify whether the unstandardized (or standardized) coefficients are equal to 0 in the population. If $p < 0.05$, can conclude that the coefficients are statistically significantly different to 0. Based on the results it could be concluded independent variables such as human capital, infrastructure flexibility and relationship quality are statistically significant.

Estimated Model Coefficients:

The general form of the equation to predict firm's performance from workforce focus, operations focus and measurement, analysis and knowledge management is:

*Firm performance = 11.481+ (0.937 * Human capital) +(0.987 *Infrastructure flexibility) + (0.899 Relationship quality)*

Table 5: Analysis of companies' IT Strategy with regard to IS resources and Firm's performance

Relationship	**Coefficient**			**p-Value**		
	Inhouse	Outsource	Both	Inhouse	Outsource	Both
IS Resources	0.976	0.482	0.934	0.00	0.02	0.00

Dependent Variable: Firm's Performance

From the results above it shows that the companies who pertain only the in-house IT strategy is more likely to have very strong positive relationships with the IS resources and firm's performance. Hence, this makes a good point that it is good to have in-house IT strategy for a better deployment of IS resources. When considering only the companies who outsource IT, it is visible that the correlation coefficient values are relatively smaller than the other companies who has in house IT strategy and who has in house and outsource both strategies. This should be exactly because outsourcing companies don't have much IT resources compared to others, they only use systems developed by vendors.

4. Discussion

In the past decade, organizations have increased their investments in IS significantly with the expectation that these investments will improve firm performance. However, some organizations continue to be able to garner better value from IS than others. So, this study has been undertaken to find out whether there exists a relationship between IS resources on firm performance in Sri Lanka. The study was done using a sample from apparel industry and found out that IS resources measured by human capital, infrastructure flexibility and relationship quality are positively associated with the organizational performance.

From the results it was found that in apparel industry, the firms IT strategy that is used have an impact on the firm performance. Results show that the firms who have in house IT development are more likely to increase firm performance using IS resources rather than the firms which outsource their IT. Other than having either in-house or outsourcing the results gives the strongest relationships for the firms which have both the strategies together. So, it can be concluded as a fact that it is better to have both outsourcing and in-housing in apparel industry to get the best contribution of IS resources to the firm performance. Moreover, this study extends IS performance research by providing a conceptual foundation to link IS resources to firm performance. It is hoped

that the theoretical model and the empirical results presented here provide a useful starting point for future empirical studies that examine the IS–firm performance relationship from a resource-based perspective.

5. Future Works

One of the limitations of this study was the ability to generalize the findings across industries and sectors. Future research is suggested to cover a larger size of sample as the comparison with results based on a larger sample would help to verify the validity of the results. Samples from various sectors should be included in future research to allow the detailed cross-sectorial comparisons. Due to the constraints of the questionnaire length, it is highly probable that some of the key measurement items for the constructs were omitted. Future researchers in this area could look at refining these variables which will be able to build and extend on the findings from this study.

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