

# Strategies, Contributions and Inhibitors of Information Systems to Organizational Competitiveness: an Empirical Analysis within the Caribbean

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## ABSTRACT

*The study examines the impact of Information Systems (IS) through a consideration of improved competitiveness within a multi-business Caribbean firm. The methodology draws on a participant-observer approach for data collection and compares the application of IS by three business units within each of three organizations. It is argued that while there is already a substantial amount of research on IS effectiveness its value in the context of developing countries such as those of the Caribbean will be most significant. In this context firms are perceived to face more constraints than in developed countries so there is a need to explicitly recognize the effects of 'inhibitors'.*

*The study finds that for two of these businesses IS can be shown to have contributed to improved competitiveness, while the third had a less satisfactory experience. Analysis of the data revealed that in the two business units where IS contributed the units had been able to improve specific business processes in pursuit of identified competitive strategies. In the unit that did not derive such advantages, limitations in the functionality of the core application combined with insufficient adjustment of business processes, led to the unsatisfactory results. It is also observed that the explanatory value of the empirical analysis is enhanced if we identify inhibitors of IS for competitive advantage and make their effects more explicit.*

## INTRODUCTION

This research investigates how Information Systems (IS) may be managed to determine specific contributions to an organization's competitive position. It is evident that there is little discussion about how such an advantage manifests itself (Barney, 1991; Fedorowicz, Gogan & Ray, 2004; Evans & Morton, 2004). King and Teo (1996) identified *facilitators* and *inhibitors* of strategic application of IS within business firms. Facilitators are defined as factors that positively influence the ability of an organization to exploit information resources or that positively influence an organization's decision to use IS applications for strategic purposes, while inhibitors are factors that negatively influence this ability. A deeper understanding of factors that reduce the ability of IS to make expected contributions to competitiveness would be useful. Therefore, the concept of *inhibitors* will be used explicitly in the analysis of the data to identify specific

reasons that the firm is not deriving the benefits that it could from its IS resources. Barney-(1991) states that “resources” can be considered as “strengths” in the language of traditional strategic analysis. It can therefore be argued that inhibitors can be considered as “weaknesses”. However, while King and Teo, treat inhibitors as the inverse of the facilitators, we will explicitly identify inhibitors as factors that reduce the ability of the resources to contribute to competitiveness. The methodology for the empirical data collection and analysis followed a participant-observation approach (Atkinson & Hammersly,1998).

*ABC Home Store* imports and sells building materials, hardware and household items. *ABC Drugstore* imports and sells pharmaceuticals and other convenience items. *ABC General Insurance* is an insurance company that underwrites typical general insurance coverage including automobile, homeowners and commercial. For simplicity, the business units will be referred to as “Home Store”, “Drugstore” and “Insurance” throughout the paper.

Figure 1 illustrates, from data provided by the Chief Executive Officer (CEO), the approximate contribution to total Group revenue for each of these selected units. The approximate percentage of IS-related expenditure budgeted for the current financial year for each of the units also noted. (Note that this represents each unit’s IS expenditure as a percentage of its total expenditure).

**Figure 1: Contribution of Business Units to Revenue and Expenditure on IS.**

Business Unit	Contribution to Group revenue	IS as % of expenditure
Drugstore	9.6	4.2
Home Store	22.5	3.8
Insurance	5.1	16.0

During the study, formal interviews were conducted with a total of 16 executives. The research also included a review of e-mail messages and meeting notes pertaining to the selection of the systems. Through use of a participant-observer approach the research also included attendance at meetings discussing both strategic and operational IS issues, and informal discussions with managers and staff, including some who were not involved in the formal interviews.

#### *Interviews were conducted at two levels*

- “*Business Unit*” Level. Formal interviews were conducted with the two most senior managers within each business unit..
- “*Corporate*” Level. Formal interviews were conducted with the three most senior persons at the Head Office who were directly involved in IT decision-making at both the Head Office and business unit levels. These were the Chief Executive Officer (CEO), the Group Financial Director (GFD), and the IS Manager. The CEO and GFD are both members of the Group’s Board of Directors.

There was general consensus among the interviewees at both the Business Unit and Head Office level on the key characteristics of the competitive environment – in particular, on what and who

represented the main competition for each of the businesses and on the environment becoming more competitive. The CEO further elaborated that “margins were becoming tighter”, making it even more important to reduce or contain the cost of doing business. The CEO and GFD both believed that the threat of external competition was greater for the Insurance business than for the retail businesses because Insurance was a service industry. According to the GFD, this meant that starting up a local operation did not require a significant capital investment and therefore meant the Insurance business would be a more attractive target for competitors than the retail business units. While these executives believed that the ABC Group was a stronger than its competitors, the GFD conceded that because the other competitors were in a single or few types of business, the management was more focused:

These observations were consistent with the view expressed by respondents that management – at both the corporate and business unit levels, were supportive of IS and were willing to invest. Both the responses in the formal interviews and the other observations indicated that within the Group, there was the expectation that improved use of IS was necessary to support the Group’s growth. While the availability of financial resources was not a constraint in determining whether or not investments were made in IS, the spending decisions were cost sensitive. In particular, the company was obviously not willing to invest in new systems if it did not consider the cost to be financially justifiable. There was however no formal method used for determining the financial justification. This was typically based on the collective judgment of the IS Department and the management of the relevant business unit, subject to the approval of senior management.

There were cases where the company had delayed IS investments because it did not consider the cost of available options to be justified. One such case was in the purchase of the new Insurance application. The selection process has taken more than 2 years and the correspondence trail showed that while an alternative application had been identified earlier, it was rejected because of the cost. The perceptions of the nature of the competitive threat and the types of competitive responses required were generally consistent at the Corporate and Business Unit levels. However, the CEO elaborated on certain aspects of the competitive strategy that were not fully articulated by the business unit managers. In particular:

- Since, according to the CEO, “margins were becoming tighter”, there was an explicit focus on reducing operating costs. Thus one of the main expectations of the investment in IT was that it would lead to reduced costs, that would help profitability.
- In the case of the retail businesses, there was considerable emphasis on ensuring the availability of goods.

Thus, these can be deemed to be part of the strategies of the relevant business units. One of the uses of IS by Home Store that was observed during the study but not mentioned during the interview with the Operations Manager, was to gauge the effects of special promotions and “Sales” by the competition. Management had introduced the practice of using on-screen reports to do a quick analysis of sales for the day, at various times during the day. When a competitor was known to be running a special promotion, Home Store management, would determine how much impact this was having on their sales by comparing the current sales against what would

normally be expected. While this was not an “exact science”, managers used this information to decide whether a response, such as having a “today’s special” promotion, was required.

## EMPIRICAL OBSERVATIONS

### *Drugstore*

The Drugstore management as well as the corporate level managers interviewed deemed the Drugstore’s use of IS for improving competitiveness to be successful. This assessment was not contradicted by any of the observations made during the study.

The analysis above shows that Drugstore has been able to apply its IS resources directly to several of the identified strategies. Significant competitive benefits were being obtained by taking advantage of analytical information provided by the core application and using this in conjunction with unit’s business capabilities. This situation was also helped by a positive attitude towards IT among the management team that manifested itself in willingness of the management team to use the IS resources available. Drugstore had also made organizational changes that enhanced its ability to benefit from the capabilities of the application, in particular, delegating store management responsibilities to Store Managers and assigning specific responsibility ensuring that data quality was maintained. As noted however, the benefits were constrained by technical shortcomings in the application and underutilization by the staff. The lack of focus on the strategic benefits also limited the benefits that may have derived. Figure 2 illustrates a summary of strategies, resources and inhibitors for Drugstore.

**Figure 2: Strategies, Contributors and Inhibitors for Drugstore.**

Strategies	Contribution			Inhibitors
	Nature Contribution	IT Resource (T HIR)	Comp Org capabilities	
<ul style="list-style-type: none"> <li>• Offer wider product selection than competitors.</li> <li>• Offer products high quality, at low prices than that offered by the competitors</li> <li>• Target specific market segments, such as younger customers and visitors</li> <li>• Reach a larger segment of the local market than competitors, by having more branches in strategic locations</li> </ul>	Improved Purchasing decisions.	<ul style="list-style-type: none"> <li>• Analytical Information</li> </ul>	<ul style="list-style-type: none"> <li>• Purchasing and product selection capability</li> <li>• Sales analysis capabilities</li> <li>• Access to overseas suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Technical difficulties.</li> <li>• Lack of proactive use by staff.</li> <li>• No direct integration with accounting system.</li> <li>• Inadequate management focus on strategic benefits</li> </ul>
	Better management of product distribution.	<ul style="list-style-type: none"> <li>• Analytical Information</li> </ul>	<ul style="list-style-type: none"> <li>• Sales analysis capabilities</li> <li>• Store management capability</li> <li>• Inventory management capability</li> </ul>	
	Better in-store management.	<ul style="list-style-type: none"> <li>• Analytical information</li> <li>• Workstations for in-store access information</li> </ul>	<ul style="list-style-type: none"> <li>• New Organizational structure delegating responsibility to Store Managers</li> <li>• Retail management capability</li> </ul>	

Strategies	Contribution			Inhibitors
<ul style="list-style-type: none"> <li>• Ensure constant product availability</li> <li>• Improve Inventory Turnover and reduce Inventory Holding Costs</li> </ul>	Better management of inventory.	<ul style="list-style-type: none"> <li>• Analytical Information</li> <li>• Data management skill</li> </ul>	<ul style="list-style-type: none"> <li>• Organizational structure make IC responsible for data quality</li> <li>• Inventory management capability</li> </ul>	
	Better overall cost management.	<ul style="list-style-type: none"> <li>• Multi-site capability of IT system</li> </ul>	<ul style="list-style-type: none"> <li>• Retail management skill</li> </ul>	

### Insurance

From the interviews with corporate managers, it was clear that the Insurance core application had not so far met their expectations. The analysis above also points to a low level of success with regard to using IS to assist in gaining competitive advantage. IS was making relatively little contribution to the specific strategies that the business unit managers identified during the discussions. While some benefit is evident in the form of reduced operational costs and faster document preparation, the significant inhibitors seem to negate much of this. The technical shortcomings of the software featured prominently during the study. However, the mismatch between the existing business processes and the method of operation of the software seems to have contributed to the problems. This was further exacerbated by the apparent inability or unwillingness to adjust its business processes to take advantage of the application. Figure 3 illustrates a summary of strategies, resources and inhibitors for Insurance. The further analysis of the contributors shows the absence of strong integration of IS resources with complementary organizational resources.

**Figure 3: Strategies, Contributors and Inhibitors for Insurance.**

Strategies	Contribution			Inhibitors
	Nature Contribution	IT Resource (TIR & HIR)	Comp capabilities	
<ul style="list-style-type: none"> <li>• Attract and retain clients on the basis of a reputation for good service and reliability,</li> <li>• Aim to attract low-risk clients and minimize exposure to high risk business</li> <li>• Attract more business from brokers, particularly with regard to commercial clients</li> <li>• Reduce operating costs by automating as much of the “mechanical” aspects of the</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in mechanical processes</li> </ul>	<ul style="list-style-type: none"> <li>• IT application – document production feature</li> </ul>		<ul style="list-style-type: none"> <li>• Technical shortcomings</li> <li>• Limitations in functionality.</li> <li>• Mismatch with business processes.</li> <li>• Lack of focus on strategic benefits.</li> </ul>
	<ul style="list-style-type: none"> <li>• Improved service to brokers</li> </ul>	<ul style="list-style-type: none"> <li>• Document production feature</li> <li>• Quote generation feature</li> </ul>		
	<ul style="list-style-type: none"> <li>• Provision of reports to support decision-making</li> </ul>	<ul style="list-style-type: none"> <li>• Analytical reports</li> </ul>	<ul style="list-style-type: none"> <li>• Insurance management capability.</li> </ul>	

Strategies	Contribution			Inhibitors
business as much as possible. <ul style="list-style-type: none"> <li>In the future, provide additional options to clients for transacting business. This includes use of web-based transactions.</li> </ul>				

### Home Store

Despite the inhibitors identified, both the management of Home Store and corporate management appeared satisfied with the contribution of the core IS application to the performance of the business. IS can be deemed to have been successful in contributing to the competitiveness of the business. Several of the benefits derived by Home Store, like Drugstore, are based on the use of the analytical information that the system is able to provide. However, Home Store has been able to take advantage of some of the operational capabilities of the system, including the ability to initiate the Purchasing process by generating “suggested Purchase Orders” as well as using the ability to get near real-time sales and inventory information across all stores, to monitor the effects of competitors’ actions. Figure 4 illustrates a summary of strategies, resources and inhibitors for Home Store.

**Figure 4: Strategies, Contributors and Inhibitors for Home Store.**

Strategies	Contribution			Inhibitors
	Nature of Contribution	IT Resource (TIR & HIR)	Company Org capabilities	
<ul style="list-style-type: none"> <li>Offer wider range products in greater quantities than competitors</li> <li>Offer more convenient shopping experience &amp; better customer service</li> <li>Reduce cost of purchases compared to competitors by leveraging better buying power</li> <li>Improve customer service through faster processing of customer transactions</li> <li>Offer a wholesaling service to target retail and large customers</li> <li>Ensure constant product availability,</li> </ul>	<ul style="list-style-type: none"> <li>Improved Purchasing decisions and processes</li> </ul>	<ul style="list-style-type: none"> <li>Analytical Information</li> <li>Purchase Order suggestion function</li> <li>System configuration capability</li> </ul>	<ul style="list-style-type: none"> <li>Purchasing and product selection capability</li> </ul>	<ul style="list-style-type: none"> <li>Length of processing time for goods received</li> <li>Speed of customer service process.</li> <li>Absence of customer loyalty programme.</li> </ul>
	<ul style="list-style-type: none"> <li>Better management product distribution.</li> </ul>	<ul style="list-style-type: none"> <li>Analytical Information</li> </ul>	<ul style="list-style-type: none"> <li>Sales analysis capability</li> <li>Store management capability</li> <li>Inventory management capability</li> </ul>	
	<ul style="list-style-type: none"> <li>Better management pricing.</li> </ul>	<ul style="list-style-type: none"> <li>Price management feature of IT system</li> <li>Analytical Information</li> </ul>	<ul style="list-style-type: none"> <li>Retail management / marketing skill</li> </ul>	
	<ul style="list-style-type: none"> <li>Better management sales and inventory.</li> </ul>	<ul style="list-style-type: none"> <li>Analytical Information</li> </ul>	<ul style="list-style-type: none"> <li>Sales analysis capability</li> <li>Store management capability</li> <li>Inventory management capability</li> </ul>	
	<ul style="list-style-type: none"> <li>Better Customer Service.</li> </ul>	<ul style="list-style-type: none"> <li>Analytical Information</li> <li>Multi-site capability IS</li> </ul>	<ul style="list-style-type: none"> <li>Inventory management capability</li> </ul>	

Strategies	Contribution			Inhibitors
<ul style="list-style-type: none"> <li>• Improve Inventory Turnover and reduce Inventory Holding Costs</li> </ul>	<ul style="list-style-type: none"> <li>• Better overall client management.</li> </ul>	<ul style="list-style-type: none"> <li>• Multi-site capability IS</li> </ul>	<ul style="list-style-type: none"> <li>• Retail management skills</li> </ul>	

## DISCUSSION

The foregoing analysis confirms that in the areas where IS is impacting directly in improving the firms' competitive advantage, that the contribution is derived from the combination of the IS resources with the complementary organizational resources, or by synthesizing the IS capabilities with the business processes to improve these processes. This is an expected result and is consistent with what is widely reported in the literature. There are however a number of relevant issues raised by this analysis which are discussed below.

### *Competitive advantage vs sustained competitive advantage*

The analysis has focussed on how IS has assisted the firm in attaining competitive advantage. It has not however, explored whether the advantages can be sustained. Wade and Hulland (2004) argue that the productive use of firm resources that are rare, valuable and appropriable will lead to short-term competitive advantage, while productive use of those resources will lead to sustained competitive advantage over time if those resources also have *low substitutability*, *low mobility* and *low imitability*. Based on this reasoning, the potential for the competitive advantages described for the ABC Group to be sustained can be assessed by considering the mobility, imitability and substitutability of the resources. Since the IS technical resources such as the infrastructure and the software applications are not proprietary, it can reasonably be expected that these can be purchased, and thus by themselves, would not have any of the properties. Similarly, it would be possible for a competing firm to lure away key staff from the ABC Group, so the IS Human Resources are also unlikely to have these attributes. It follows therefore, that if IS is to contribute to the attainment of a sustainable competitive advantage for ABC Group business, the low substitutability, low mobility and low imitability attributes will have to be derived from the peculiar combination of IS resources, complementary organization resources and business processes (Braganza 2000).

### *Availability of IS resources*

The financial position of the organisation considered was such that it was able to afford the IS resources that it deemed worthwhile and justified. Despite this, the firm appears to have selected an unsuitable system for its Insurance business. Melville et al (2004) summarise the "received wisdom" of several IS value business models as follows:

"If the right IT is applied within the right business process, improved processes and organizational performance result, conditional upon appropriate complementary investments in workplace practices and organizational structure and shaped by the competitive environment." (p. 292)

The question that arises therefore is how does a firm come by "the right IT"? Makadok (2001) explains that one of the mechanisms firms use to create economic rents is *resource picking* –

being better than their rivals at selecting resources. In much of the RBV literature however, there is an implicit assumption that a firm can easily get the IT technical resources that it requires and there is generally little discussion about how firms can ensure that they have the right IS (Levitas & Ndofo, 2006; Caldeira & Ward, 2003; Lea, 2005). Such an assumption would be consistent with the “IT is a commodity” argument advanced by many authors, but perhaps most controversially by Carr (2003). The experience of ABC General Insurance shows that despite having the requisite human and financial resources, a firm may have difficulty acquiring and implementing an IT system that matches its requirements. Piccoli and Ives (2005) also argue that the documented high failure rate of IT projects casts doubts on the “easily replicable” hypothesis, referring in part, to Carr’s arguments.

The above suggests that the ability to select and implement IS is a capability that may not be as homogenous and widely available as implied by the literature, and as such, can contribute to the achievement of sustainable competitive advantage. The selection and implementation of an Insurance system may have been made more difficult by the limited availability of Insurance software within the Caribbean and the fact that a product developed for a different organizational and market context was selected. The Insurance system implemented for ABC General Insurance had been adapted from one developed for a specific segment of the UK insurance market. Some authors, including Avgerou (2001), Leidner and Kayworth (2006) and Walsham (2001), have suggested that assumptions about the cultural and organizational environment within which IT systems are developed are usually embedded in their method of operation, as such may pose difficulties when used in other environments.

On the other hand, the systems used by the retail stores were satisfactory. A possible explanation for the above is that the functions of retail software are more standardized, due to greater maturity. ABC Group also has had more experience in selecting and deploying software for retail and inventory management applications than for Insurance application. The data also indicated that the retail businesses were more willing to make organizational changes that would allow them to take advantage of the capabilities of the available IS resources.

### *Nature of contribution of IS*

Several of the contributions identified in the study are based on IS helping to improve operational management or to improve decision-making. While there are examples of IS being used to improve customer services, there are no examples of it being used to change the model of delivery of customer service, for example, via web-based or other electronic forms of service delivery. Also, the Customer Relationship Management (CRM) capabilities in the existing software were limited to maintaining contact details for customers and records of their purchase history. There was also relatively limited use of IS to facilitate the relationship with suppliers. Both Drugstore and Home Store submitted Purchase Orders to some suppliers via e-mail, but this was in effect electronic communication of a paper document. While there was evidence that several managers were aware of the potential for more advanced application of IS, these were not being currently being pursued, either because they were perceived as not being viable in current market conditions, or because the associated costs and technical hurdles were too great to make them worthwhile.

Within the IS value literature, the maintenance of direct links with suppliers to improve supply-chain management through *inter-organizational systems* (e.g. Kerns & Lederer, 2004; Powell & Dent-Micallef, 1997) and for CRM (Kohli & Deveraj, 2004; Piccoli & Ives, 2005; Ray et al., 2004) are considered to be among the ways IS contributes to competitive advantage. The absence of features such as those mentioned above, even for the business units where IS contributes to competitiveness, could possibly point to a relatively low level of *maturity* in IS implementation and use. Although the concept of maturity is often associated with early “stages of growth” models that are no longer widely used (see for example: Cerpa & Verner, 1998; Galliers & Sutherland, 1999; King & Kraemer, 1984; Larsen, 2003; Nolan, 1979), the concept is relevant in the context of this study as it could help explain differences between the nature of IT contributions in developed countries versus developing countries such as the those of the Caribbean.

### ***Effect of “inhibitors”***

While the concept of “inhibitors” has been used in the IS research literature (King & Teo, 1996), there is little indication that it has been used explicitly in the context of the RBV. As noted, inhibitors do play a role in determining the extent to which IS contributes to achieving competitive advantage. This study has focussed on the internal operation of the firm, and has for the most part ignored the effects of the external environment. It should be noted that managers did not necessarily explicitly factor in consideration of the firm’s external environment in making IS investment decisions. Regardless of whether the external considerations are factored in by the managers, the external environment can be expected to have an effect on the extent to which IS contributes to achievement of competitive advantage. Melville et al., (2004) attempt to model this by identifying three domains: the focal firm, the competitive environment and the macro environment. The model can be simplified however, by representing the competitive environment and macro environment by a single domain – the *external environment*.

Within this context, the external environment can impact both the availability of resources and the presence of inhibitors. The extents of the resources that are available to a firm are likely to be constrained by the environment. For example, Insurance was unable to find an application that was ideally suited to the way it conducted business. It is also reasonable to expect that the quality of technical IT skills available will be constrained by the environment in which the firm operates. While in theory the firm can recruit from outside of its place of operation, this is subject to legislation and other environmental factors such as attractiveness of the location and living conditions. While the inhibitors identified in this study are all internal to the firm, it can also be expected that firms will face environmentally influenced inhibitors, such as legislation or trade union policy that influences the extent to which IS can be used. The competitive environment also determines the extent to which specific strategies being pursued by the firm can be successful. Inhibitors reduce the value of the potential contribution from the combination of IS resources and complementary organizational capabilities. The dashed line – *actual contribution* - represents a reduced flow of value. Provided however, that the value of the potential contribution is greater than the negative effects of the inhibitors, and then there will be some residual value that will result in *business process performance* improvement.

Not all of the value derived from the business process improvements necessarily go towards improving the firm's competitive position. Some authors, including Melville et al., (2004), Ray et al., (2004) and Ravichandran and Lertwongsatien, (2005), point out that some of the value derived is *appropriated* by various stakeholders. For example, employees may demand increased compensation in light of the performance improvements or customers may demand better pricing or improved service (at the same price). Therefore, the line from business performance improvement to competitive advantage is also a dashed line, to reflect the potential loss.

## CONCLUSION

The research has demonstrated that the relationship between IS and business performance can be conducted at the firm level in a business environment, such as that which exists in the Caribbean, where "hard" data on performance is difficult to obtain. Despite not being able to obtain financial data for the target firm, the study was still able, through a combination of data collection methods to identify different levels of success in the implementation and use of IS within the current firm.

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