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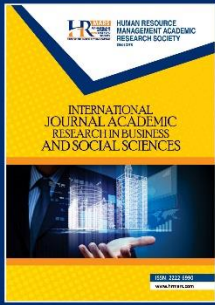
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## A Model for Building AIS Capabilities in Co-operatives

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### Abstract

Studies examining the link between information systems (IS) resources and organisation capabilities are extensive. However, limited studies were conducted to examine the influence of IS resources on AIS capabilities particularly in co-operatives. Based on a comprehensive review of accounting and IS literature, this paper proposes a model to assess the link between IS resources and accounting information systems (AIS) capabilities, and its potential impact on co-operatives performance. The model is based on the resource-based view (RBV) that is used to define various dimensions of IS resources. This paper proposes seven IS resources that include external relationships; IS infrastructure; IS technical skills; business knowledge; internal relationships; IS planning and change management; and last but not least IS development. Apart from establishing a model for AIS capabilities building, this paper contributes to the literature by providing a better understanding on the roles of IS resources in AIS capability-building. This paper further contributes in extending IS research by exploring the AIS implementation within co-operatives environment.

*Keywords: Accounting information systems, information systems resources, AIS capabilities, resource-based view, co-operative*

### Introduction

A model for building accounting information systems<sup>1</sup> (AIS) capabilities<sup>2</sup> is essential if organisations, particularly co-operatives, are to plan effectively their AIS implementation. In a highly competitive business environment, relevant and timely accounting information is crucial

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<sup>1</sup> AIS are defined as computer-based systems that capture and process financial data (i.e. daily transactions) into useful information for decision making (Nicolau, 2000).

<sup>2</sup> AIS capabilities refer to the ability of AIS to fulfil the users' information requirements (Boulianne, 2007).

for co-operatives' management to make sound and effective decisions. Indeed, the accounting function is becoming increasingly challenging due financial opportunism, rationalization for fraud and the complex nature of business transactions (i.e. e-business transactions) (Prasad & Green, 2015). This situation suggests that co-operatives' AIS and related systems need to have the capability to accommodate these engagements. That said, a model which allows co-operatives to better understanding of AIS functions as information provider together with the roles of IS resources as the drivers for building AIS capabilities can be powerful tools of improving the effectiveness of AIS, and ultimately enhance co-operatives' performance.

Despite the importance of AIS capabilities to businesses, not much known on the drivers for building such capabilities. In exception of Karimi, Somers, and Bhattacharjee (2007); and Prasad and Green (2015), lack of studies is exploring the factors influencing AIS capabilities. In addition, past studies were conducted within public listed companies and small and medium enterprises (SMEs) (i.e. Bhatt and Grover, 2005; Chen, 2012; Gu and Jung, 2013; Ravichandran and Lertwongsatien, 2005). We are not aware of any study was conducted within co-operative environment.

The main aim of this paper is to propose a model for AIS capabilities building in the specific context of co-operatives. The model is draw upon a resource base view (RBV) theory. The RBV regards organisations as bundles of organisational resources that include assets, capabilities, processes, firm attributes, information, and knowledge (Barney, 1991; Helfat & Peteraf, 2003). Organisations those are more effective than their rivals in selecting and deploying resources to build capabilities are more likely to gain competitive advantage (Makadok, 2001). Instead of exploring organisational resources in a broad sense, this paper has a more restricted view of information systems (IS) resources, which is essential in building AIS capabilities.

There are two compelling reasons that justify the selection of co-operatives for this paper. Firstly, co-operatives are regarded as important business organisation for their significant economic and social contribution (Harun & Mahmood, 2012). They also have been highlighted by social philosophers and economists around the world as an essential mechanism for growth and development (Othman & Kari, 2008). As such, cooperatives are now established in most part of the world. They can be found not only in developed countries of Canada, the United States and Europe, but also in the developing countries such as Asia, Africa and South America. The International Co-operatives Alliances (ICA)<sup>3</sup> has reported that the total memberships of more than one billion people worldwide (ICA, 2013). In fact, there are several countries that recorded the memberships of more than forty per cent of their population. These countries include Ireland, Finland, Austria Singapore, Switzerland, Sweden and Norway (Jha, 2012). Similarly in Malaysia, a total memberships of more than seven million were recorded which represent approximately 25% of the population (MCSC, 2013). These figures indirectly indicate the support and confidence from world communities to the co-operative movement.

Secondly, there is a paucity of studies on AIS implementation in co-operative environment, either locally or internationally. While there have been many studies that look into AIS implementation, most of those studies were limited to SMEs and listed companies (i.e. Ismail & King, 2005; Karimi et al., 2007; Kharuddin, Ashhari, & Nassir, 2010; Kouser, Rana, & Shahzad, 2011; Salehi, Abedini, & Rasouli, 2012; Soudani, 2012). It appears that very limited attempts by the IS researchers

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<sup>3</sup> The ICA is the apex organisation for co-operatives worldwide.

focusing on co-operatives environment. Indeed, cooperatives have not been a very popular research area as compared to SMEs and listed companies (Othman, Kari, Jani, & Hamdan, 2012). This paper contributes significantly in establishing the AIS capability-building model of co-operatives. Considering AIS potential in assisting management function of co-operatives, the AIS capability-building model is useful for co-operatives' stakeholders either during AIS development or implementation stage. We are not aware of any such model that has been developed thus far for co-operatives in particular. Also this paper contributes to the body of knowledge of IS research by exploring the roles of IS resources in capability-building of AIS. This paper further contributes in extending IS research in co-operatives domain. Since most studies in IS/AIS were conducted among SMEs and listed companies, this paper aims to fill the gap by exploring the AIS implementation within co-operatives environment in Malaysia.

The paper begins with a definition of co-operatives, followed by explanation on RBV and IS resources. It then presents the prior studies of IS-RBV and AIS capabilities related studies. A model for AIS capabilities building in co-operatives is then proposed. The model explains the links between IS resources and AIS capabilities, and the impact of AIS capabilities on co-operatives' performance. A conclusion ends this paper.

## **Literature Review**

### *Co-operatives*

A co-operative is defined by the ICA as "...an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise" (ICA, 2014). To further describing co-operatives, Othman & Kari (2008) underlined three main characteristics of a co-operative. Firstly, a co-operative has to be a self-governing non-government organization. Secondly, a co-operative need to be owned and controlled by the members themselves; and lastly, its objectives are to improve economic and social development of its members. These characteristics are respectively referred to by Katz (1998) as user-control and democratic principle; user-owner principle and user-benefit principle. The user-control and democratic principle stresses on the equal rights and eligibility of members to take part in the co-operatives' self-autonomy. The user-owner principle emphasize on the members responsibility to provide equity to co-operatives while being the co-operatives' suppliers or customers at the same time. Meanwhile, the user-benefit principle requires co-operatives to sustain economic efficiency and profitability or the social interests of the members.

### *The Resource Based View Theory*

The RBV, which was originated from strategic management literatures, has been used to understand how organisations achieve sustainable competitive advantages (Barney, 1991; Bharadwaj, 2000). Firms are known to have various resources however, not all resources hold the potential of sustained competitive advantage. The RBV postulates that a resource which is valuable, rare, imperfectly imitable and non-substitutable has the potential as the source of competitive advantage (Barney, 1991).

Barney (1991) describes that a resource is considered as valuable when it can assist firm in formulating and implementing strategies to become more effective and efficient. A resource is rare when it is scarce and not available to other competitor firm. Meanwhile, a resource that is imperfectly imitable when it is impossible for other competitor firms to acquire. On the other

hand, a non-substitutable resource refers to a resource that is difficult to replicate and exchanged with other alternatives. That said, firms that possess valuable and rare resources could obtain short-term competitive advantage. Meanwhile, to sustain a long-term competitive advantage, firms must be able to safeguard their resources from replication, transfer, or substitution (Wade & Hulland, 2004).

In general, resources refer to all assets, capabilities, processes, firm attributes, information, and knowledge that are possessed by a firm that are useful to detect and respond to market opportunities and threats (Barney, 1991; Wade & Hulland, 2004). In the context of IS, IS resources refer to the combination of IT assets and IT capabilities (Aral & Weill, 2007). When it concerns IT assets, Aral and Weill (2007) categorised these assets as infrastructure, transactional, informational, and strategic assets. IT infrastructure serves as the platform of shared IT services used by multiple IT applications that includes servers, networks, laptops, helpdesk, application development etc. Transactional assets intended to automate processes, reduce costs, or increase productivity (i.e. order processing, point of sale processing, bank cash withdrawal and other repetitive transaction processing functions). Meanwhile, informational assets provide information for managing, accounting, reporting, and communicating internally and with customers, suppliers, and regulators. Strategic assets reposition firms in the marketplace by supporting entry into a new market or the development of new products, services, or business processes.

IT capabilities, on the other hand, refer to a firm's capacity to deploy resources using organizational processes (Ravichandran & Lertwongsatien, 2005). This includes technical and management skills such as programming, system analysis and design, system development and integration, budgeting and costing, and project management (Wade & Hulland, 2004).

#### *Prior Studies of IS-RBV*

The RBV started to draw attention of the IS researchers in mid-90s (Wade & Hulland, 2004). Since then, numerous studies employing the RBV were conducted. Among the issue being investigated is the link between IS resources and firm performance. A review of IS-RBV literature shows that there are two types of relationships were being studied namely direct and indirect relationships between IS resources and firm performance.

When it concerns the former, IS researchers attempted to establish the direct effect of IS resources on firm performance. The researchers argued that IS resources which are valuable, rare, imperfectly imitable and non-substitutable are most likely contribute to superior performance (Bharadwaj, 2000). For instance, Bhatt and Grover (2005) investigated the effect of IT infrastructure, IT business knowledge and internal partnership on competitive advantage. They found that IT business knowledge and internal partnership have a positive effect on competitive advantage. Lu and Ramamurthy (2011) examined the relationship between IS resources (i.e. IT infrastructure, IT business spanning and IT proactive stance) and organisational agility. They found that the three IS resources have significant influence on organisational agility. Meanwhile, Bharadwaj (2000) examined the link between IT capability and firm performance. She found that firms with superior IT capability show better performance than the firms that do not. The study of Bharadwaj (2000) was later extended by Santhanam and Hartono (2003), Masli, Richardson, Sanchez, and Smith (2011) and Chae, Koh, and Prybutok (2014) using similar methodology. In

exception of Chae et al. (2014)'s study who found contradicting findings, Santhanam and Hartono (2003) and Masli et al. (2011) findings were consistent with Bharadwaj (2000).

With regards to the latter, IS researchers examined the indirect performance impact of IS resources (Zhang, 2007). The researchers claimed that IS resources may not be able to create sustained firm performance by themselves and may need to go through some other factors to create the performance impact (Liang, You, & Liu, 2010). These factors include resource complementary<sup>4</sup> and organisational capabilities<sup>5</sup>. The researchers whom embraced the resource complementary attempted to answer to whether IS alone can lead to competitive advantage or they must work in conjunction with other organizational resources in order to provide strategic benefits. They contended that IS resources complemented by certain organisational resources may lead to competitive advantage and superior performance (Wade & Hulland, 2004).

On the other hand, the researchers employing organisation capabilities submitted that resources are raw materials in the development of capabilities. Therefore, examination of the relationships between IS resources and organisation capabilities can provide a better understanding of how IS resources could be deployed to develop such capabilities (Ravichandran & Lertwongsatien, 2005). Such studies employed organisational capabilities as the mediating variable that mediates the relationship between IS resources and firm performance. The reason is that the RBV is incapable of explaining the relationship between IS resources and firm performance due to the distance between the cause and effect weakens their relationship (Gu & Jung, 2013).

There are numerous studies that investigated the indirect effect of IS resources on firm performance. For example, Zhang (2007) investigated the complementary effect of IS resources and organisational resources on firm performance. They found that the performance impacts of IS resources arose from their interactions with organisational resources (i.e. firm-specific knowledge, information, vertical integration and related diversification). In the earlier study, Ravichandran and Lertwongsatien (2005) investigated the effect of IS resources on IS capabilities and its subsequent effect on IT support for core competencies and firm performance. They found that IS resources have significant effect on IS capabilities. Also, they found that IS capabilities have influence on firm performance through IT support for core competencies. In another study, Gu and Jung (2013) employed IS capabilities and business process performance as mediating variables to examine the effect of IS resources on firm performance. They found that IS resources and complementary organizational resources influence IS capabilities. In turn, IS capabilities directly influence business process performance.

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<sup>4</sup> Resource complementary refers to how one resource may influence another, and how the relationship between them can generate synergy that can lead to better performance (Melville, Kraemer, & Gurbaxani, 2004; Wade & Hulland, 2004).

<sup>5</sup> Organisational capabilities refer to the ability that an organization assembles, integrates, and deploys its valued resources to build unique competencies (Teece, Pisano, & Shuen, 1997).

*AIS Capabilities Related Studies*

A review of literature shows that there is lack of studies (study of Karimi et al., 2007; and Prasad and Green, 2015 are notably excluded) investigating the relationship between IS resources and AIS capabilities. Karimi et al. (2007) investigated the effect of IS resources (i.e. knowledge, relationship and infrastructure) on ERP capabilities and its complementary effects on business process outcomes. They found that only relationship resource has direct effect on ERP capabilities. They also found that ERP capabilities have positive association with business process outcomes. Furthermore, they found that the association of building ERP capabilities with business process outcomes is contingent on the co-presence of IS resources.

In another study, Prasad and Green (2015) used dynamic capabilities framework to investigate the link between organisational competencies (i.e. flexible AIS, business intelligence system, and technical IT skills of accounting professionals) and AIS dynamic capability. They further examined the effect of AIS dynamic capability on accounting process performance and firm performance. They found that the three resources have significant influence on AIS dynamic capability. Also, they found that AIS dynamic capability has positive impact on firm performance through accounting process performance.

This study however differs from Karimi et al. (2007) based on two aspects. First, Karimi et al. (2007) focused on specialised AIS (i.e. ERP system) which are intended for large firms whereas the current study is focusing on generic AIS. Second, the Karimi et al. (2007) concentrated on large firms (IOFs) whereas this study is focusing on co-operatives which are dissimilar in terms of its structure and objectives. Meanwhile, the current study is dissimilar from Prasad and Green (2015) in terms of the underpinning theory applied. The former uses the RBV as the underpinning theory whereas the latter uses dynamic capabilities framework.

**Model**

In view of the previous discussion, despite extensive studies had addressed the issues of IS resources and its impact on IS/AIS capabilities and performance, there is limited studies that investigate the key drivers of AIS capabilities building, particularly in co-operatives. Indeed, there is a need to understand more on the IS resources and its impact on AIS capabilities.

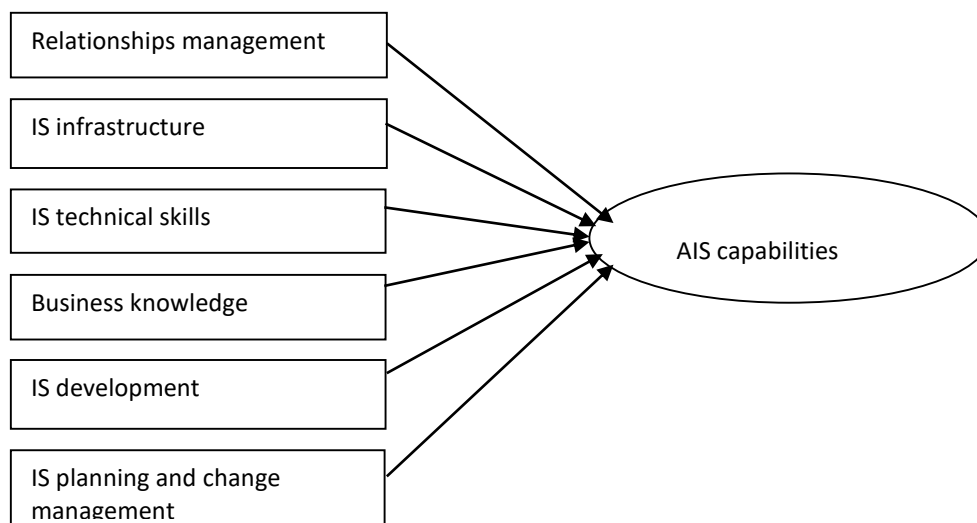


Figure 1: AIS Capabilities Building Model

The initial process of this study is to categorise the IS resources that are related to co-operatives. Prior studies have classified IS resources into several categories. For example, Ross, Beath, and Goodhue (1996) and Ravichandran and Lertwongsatien (2005) identified three categories of IS resources namely human capital, technology and partnerships. Bhatt and Grover (2005) and Karimi et al., (2007) proposed three IS resources which include knowledge, relationship and IT infrastructure. In recent study, Chen (2012) identified two IS resources namely human IT resources and technological IT resource. Lu and Ramamurthy (2011) classified IS resource into IT infrastructure capability, IT business spanning capability, and IT proactive stance. Additionally, Gu and Jung (2013) categorised IS resources into five categories namely internal partnerships, external partnership, business knowledge, technical competencies and infrastructure sophistication. Meanwhile, Wade and Hulland (2004) suggest eight categories of IS resources namely external partnerships, internal partnerships, market responsiveness, IS planning and change management, IS infrastructure, IS technical skills, IS development, and cost effective IS operation.

Based on the previous studies, this paper proposes six IS resources that are expected to affect AIS capability. These include relationships management; IS infrastructure; IS technical skills; business knowledge; IS planning and change management; and last but not least IS development. The proposed model of AIS capabilities building in co-operatives is illustrated in Figure 1 and will be explicated in the sections that follow.

### ***Relationships Management***

Relationships management is defined as the quality of internal and external relationships. Internal relationship refers to the relationship between the IS unit of co-operatives and other business units (Ravichandran and Lertwongsatien, 2005). Meanwhile, external relationship refers to the relationship between the IS unit of co-operatives and the IS service providers (Gu & Jung, 2013).

The internal relationship includes benefits and risk sharing; mutual understanding; trust; coordination; less conflict; and conflict resolution. Prior studies have acknowledged the importance of internal relationships between the IS unit and other business units within the firm. In fact, internal relationships are found to have a significant effect on IS/AIS capabilities (Gu & Jung, 2013; Karimi et al., 2007; Ravichandran & Lertwongsatien, 2005). Building AIS capabilities demands involvement from every units or department within the organisation. Such involvement strengthens the relationships among staffs across the organisation. This helps to reduce the barriers that traditionally exist between units or departments resulting in superior competitive position and firm performance (Wade & Hulland, 2004).

On the other hand, external relationship reflects less conflict, conflict resolution, communication, trust, cooperation, and long-term partnerships (Gu & Jung, 2013; Ravichandran & Lertwongsatien, 2005). Co-operatives intending to develop strong AIS capabilities will have to develop effective partnerships with vendors. This is because they have limited financial and human resources (Othman et al., 2012). Hence, they have to find ways to reduce IT expenditure without compromising the quality of IS or particularly AIS. To overcome such limitation, co-operatives could outsourced a substantial part of their AIS work to external vendors and/or service providers (Wade & Hulland, 2004). That said, good co-ordination and co-operation between both parties is vital to achieve the projected outcome (Wade & Hulland, 2004).



***IS infrastructure***

IS infrastructure is defined as co-operatives' shared IS assets that include hardware, software, databases, networks, and data centres (Karimi et al., 2007). Such infrastructure is vital in building IS capabilities by supporting system implementation, simplifying system integration and reducing cost of system maintenance (Ravichandran & Lertwongsatien, 2005). In achieving the purpose of AIS, which is to process data into information and disseminate them to stakeholders, co-operative need to possess appropriate IS infrastructure. Sufficient and proper hardware and software can process data speedily. Meanwhile, reliable network infrastructure can disseminate information securely and efficiently. Having said that, co-operatives with sufficient IS infrastructures are expected to have strong AIS capabilities.

***IS technical skills***

IS technical skills refer to co-operative's IS staffs technical and managerial IT skills (Bharadwaj, 2000; Chen, 2012; Wade & Hulland, 2004). These skills include IS design and development; IS installation and maintenance; IS functions management and project co-ordination; and knowledge on business and IT requirements (Chen, 2012). IS or AIS activities in particular are generally considered as knowledge-intensive process that require specific technical skills (Ravichandran & Lertwongsatien, 2005). This is because the persons in charge of AIS are responsible to ensure AIS process remain relevant to the real-world environment. They are required to engage with the AIS and determine ways to reorganize the AIS. This is to ensure that the AIS is able to meet the business transaction input, processing, output, and reporting requirements. Persons with sufficient IS technical skills are known to be well-informed on the current technology and capable to utilise and manage the knowledge. These skills are sophisticated and complex which are difficult to replicate (Wade & Hulland, 2004). In fact, several studies have found a significant effect of IS technical skills on IS capabilities (Gu & Jung, 2013; Ravichandran & Lertwongsatien, 2005) and firm performance (Bharadwaj, 2000). Therefore, co-operatives' IS staff with sufficient IS technical skills are expected to positively influence AIS capabilities.

***Business Knowledge***

Business knowledge refers to the knowledge that the IS staffs had on various aspects of organisation which includes business strategy, business processes, products/services, culture (core values), and business opportunities (Gu & Jung, 2013). With such knowledge, the persons in charge of AIS are able to conduct precise requirement analysis, data and process integration and system monitoring effectively (Karimi et al., 2007). Furthermore, deep understanding of the organisation's culture and norms is necessary to develop routines that fit the organisational context in which AIS activities have to be carried out (Ravichandran & Lertwongsatien, 2005). Prior studies show that business knowledge is found to have significant effect on IS capabilities (Gu & Jung, 2013; Ravichandran & Lertwongsatien, 2005). Therefore, it is reasonable to propose that co-operatives' IS staff with good business knowledge are better positioned to develop strong AIS capabilities than those that do not.

***IS planning and change management***

IS planning and change management refer to the capability of co-operatives to plan, manages, and utilise suitable IT infrastructure through the changes process (Wade & Hulland, 2004). Such capabilities are essential for co-operatives due to a rapid change of IS technologies. Key aspects of this resource include the ability to anticipate future changes and growth, to choose platforms (including hardware, network, and software standards) that can accommodate this change, and to effectively manage the resulting technology change and growth (Wade & Hulland, 2004). Co-operatives, with proper IS planning, would be able to anticipate relevant changes due to advancement in IT and the opportunities generated by emerging technologies. In addition, prior studies have found that IS planning and change management capabilities have positive effects on organizational agility (Lu & Ramamurthy, 2011) and IT support for core competencies (Ravichandran & Lertwongsatien, 2005). Hence, co-operatives with proper IS planning and change management are expected to develop a strong AIS capabilities.

***IS development***

IS development, in this study, refers to the co-operative's ability to anticipate, assess and utilise new technology to support and enhance business objectives (Wade & Hulland, 2004). In the context of co-operatives, staffs with such capabilities (i.e. experience in managing systems development) are able to provide constructive input and feedback on the development of AIS. They can act as the link between systems users and developer in ensuring the new AIS fulfils user requirements. On the other hand, the ability to anticipate, assess and utilise new technology would assist management in acquiring technology that suits the requirements of respective co-operatives. Furthermore, prior studies found that IS development capability has a significant effect on IT support for core competencies and organization agility (see i.e. Lu & Ramamurthy, 2011). Hence, it is expected that co-operatives with good IS development capabilities will have strong AIS capabilities.

***AIS Capabilities***

AIS capability refer to the ability of AIS to fulfil the users' information requirements for decision-making (Boulianne, 2007). The characteristics of accounting information can be classified into four dimensions, namely, scope, aggregation, integration, and timeliness (Chenhall & Morris, 1986; Ismail & King, 2005). The scope of AIS refers to the focus, quantification, and time horizon of information. The aggregation of information refers to the various forms of aggregation ranging from provision of basic raw, unprocessed data to a variety of aggregations around periods of time or areas of interest such as responsibility centres or functional areas. Integration refers to the coordination of the various segments within the organisation. Timeliness refers to the provision of information on request and the frequency of reporting systematically collected information. Accounting information is important in assisting management to make effective decision. High quality accounting information along with other relevant information could help businesses to achieve business strategic objectives and improve performance (Ismail & King, 2005; Kallunki, Laitinen, & Silvola, 2011; Prasad & Green, 2015). This can be made possible if firm's AIS have the capability to fulfil the information requirements of the management (Ismail & King, 2005).

## Conclusion

A comprehensive review of literature shows that lack of studies have been conducted to investigate the effect of IS resources on AIS capabilities, particularly in co-operative domain. In an attempt to fill this gap, this paper proposes a model to assessing the link between IS resources and AIS capabilities and its impact on co-operatives' performance. The model focuses on the IS resources available in the co-operatives and their link to AIS capabilities building and performance. The theory of RBV discussed in this paper may provide understanding on the characteristics of IS resources that are likely to have impact on AIS capabilities building. The paper also highlighted seven IS resources as the key drivers of AIS capabilities building and discussed their impacts on AIS capabilities. The IS resources include external relationships; IS infrastructure; IS technical skills; business knowledge; internal relationships; IS planning and change management; IS development. Whilst the model offers new insights into potential factors that influence AIS capabilities and ultimately co-operatives performance, an empirical study is still needed to validate the model.

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