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## **COMPETENCY AND CAPABILITY DEVELOPMENT PROCESS: AN SME ENTERPRISE SYSTEM UPGRADE AND IMPLEMENTATION**

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### **ABSTRACT**

To date, the low rate of adoption of Enterprise Systems (ES) in small and medium enterprises (SMEs), together with the relatively high failure rates of ES utilization, has triggered the need for further research in this area. This paper presents a unique view how SMEs might develop competencies and capabilities in the context of a resource-scarce environment, to ensure successful ES upgrade and implementation. This study is based on theory drawn from the ES implementation literature, the resource-based view, and competency and capability development theories. A longitudinal case study was conducted with Singapore SME LC (Anonymous), a company which has successfully faced the challenge of limited resources in developing strategic ES upgrade and implementation. Based on the findings, a competency and capability development model is proposed which constitutes a structured approach to leveraging existing organizational competencies and capabilities to drive ES upgrade and implementation. This study contributes to four research areas, in particular the limited literature on competencies, and proposes on the existence of strong relationships between organizational practices, competency and capabilities worthy of further investigation. For practitioners, three important managerial lessons are identified concerning future strategy development on SME system upgrade and implementation.

**Keywords:** Enterprise Systems (ES), small and medium enterprises (SMEs), resource-based view (RBV), competency and capability, case study.

### **INTRODUCTION**

In many countries, small and medium enterprises (SMEs) comprise over 95% of all businesses (Kotelnikov, 36), ranging from service, to trade, to agriculture and manufacturing. For this reason, SMEs are recognized as being the driver of economic growth and are crucial in fostering competitiveness (Levy & Powell, 39). However, to continually perform well in a complex and competitive environment businesses need to improve their planning over their restricted resources, limited capacities (Blinn et al., 11) with the use of appropriate Information and Communication Technologies (Fulantelli & Allegra, 29).

Recently, several studies have investigated the adoption of enterprise systems (ES) in SMEs (Mathrani &

Viehland, 41). Issues such as a lack of strategic planning, lack of resources required for information systems implementation (Cragg & Zinatelli, 19; Levy & Powell, 38) and a shortage of initial set-up capital (Schubert, 60; Schubert & Leimenstoll, 61) remain the primary concerns for SMEs (Sawers, Pretorius & Oerlemans, 59; Buonanno et al., 15; Thong, Yap & Raman, 68; Delone, 21). The low ES adoption rates (Buonanno et al., 15) and the high failure rates for ES utilization in SMEs (Sun, Yazdani & Overend, 63) have inspired this researcher to examine these problems with ES adoption in light of the ES implementation literature, the resource-based view (RBV), and competency and capability development theories.

In addition, a lack of clarity around the roles and responsibilities of staff (Dutta & Evrard, 25); weak organizational culture or unstructured business processes

(Buonanno et al., 15); inadequate management systems for ES implementation (Chen et al., 18; Thong, Yap & Raman, 68) and the challenges of ES transformation have compounded the situation for SMEs. Furthermore, few studies have investigated the ES experience in terms of systems upgrade (Devadoss & Pan, 22; Brehm, Heinzl & Markus, 13), especially among SMEs, thus pointing to the need for further research in this area.

This research examines ES upgrade and implementation in light of the limited literature on competencies (Ashurst, Doherty & Peppard, 6) and organizational capability development processes (Ulrich, 69; Pan et al., 51). The study builds on the knowledge gained from competency studies (Pavlou & El Sawy, 53; Ashurst, Doherty & Peppard, 6), the capability development literature (Teece, Pisano & Shuen, 65; Montealegre, 45; Zollo & Winter, 79; Pavlou & El Sawy, 53; Wang & Ahmed, 73) and the ES experience cycle model (Markus & Tanis, 40).

An overview of the literature is presented below, followed by an outline of the case study methodology. Analysis of the findings is then presented, based on the case study company, LC—which was at the time of writing the best performing SME accounting firm in Singapore. Finally, highlights of the research findings are discussed, followed by the conclusion which draws attention to the theoretical and managerial contributions of this research.

## LITERATURE REVIEW

### Enterprise Systems Cycle

Various models of ES cycles have been proposed by researchers. For example, since 1998 two models have

been suggested that comprise five stages of ES transition (Bancroft, Seip & Sprengel, 7; Ross & Vitale, 58), while a third consists of four stages (Markus & Tanis, 40). In general, most ES projects share the same implementation process (Robey, Ross & Boudreau, 57; Pan & Pan, 49), while the key distinctions between these ES cycles are the different implementation procedures, which have been subdivided by IS researchers (Teoh, Tng & Pan, 66).

Of the various ES cycle models, which of Markus and Tanis (40) has been chosen for use in this study (refer to Figure 1). The rationale for this choice is that this framework enables researchers to systematically identify and understand an organization’s capabilities developed through patterns of organizational practices and the internal competencies it utilizes to attain its ES goals. Although this model was based on a large firm, we argue that it is also relevant for smaller organizations because during the implementation stages the magnitude of change, costs and risks involved for SMEs is not less than those faced by large firms. Indeed, implementation could be even more challenging and complicated for SMEs that have limited resources (Chen et al., 18). Employing this framework allows for the identification of crucial organizational competencies and capabilities developed at each stage of the implementation cycle. This will in turn enable one to mitigate or resolve problems before they are carried into the next implementation stage. Adopting the lens of process theories, the researcher can identify the sequences of organizational practices to explain how and why particular outcomes occur over time (Mohr, 43). Process theories also allow practitioners to better support the competencies and capabilities involved, and to facilitate successful completion of system upgrade and implementation in SMEs.

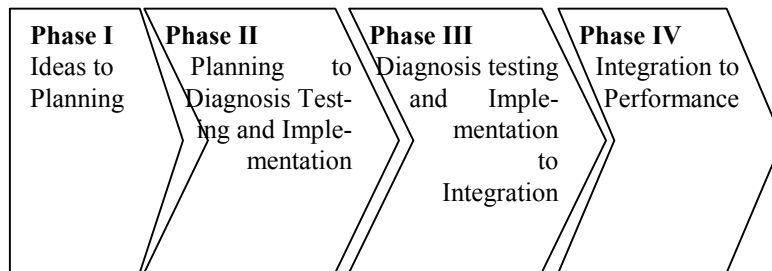


Figure 1: SME’s Enterprise System Upgrade and Implementation

The chronological and expansive nature of the chosen framework provides a robust and systematic model with which to document the entire experience of the ES upgrade and implementation at LC.

At Phase I of the ES experience cycle, the key organizational activities include arriving at a strong business case on new functionality in ES upgrade and implementation (Beatty & Williams, 9), selecting an ES package and setting a budget for the project (Markus & Tanis, 40). In this regard it is important that an organization treat this project as entirely new rather than merely as technical maintenance or the extension of an IT project (Beatty & Williams, 9) in order to fully explore its rationale and expectations (Markus & Tanis, 40). In Phase II the focus is on the diagnostic testing and implementation of the ES project, which includes configuration and testing of the system and staff training in how to use it (Markus & Tanis, 40). As the organization proceeds into Phase III of the ES upgrade, it must focus on integrating the systems with its business processes, requiring activities such as bug-fixing and fine-tuning of the new system. To ensure that all systems are properly synchronized, system testing is a critical success factor (Beatty & Williams, 9) in this phase. Phase IV is the final phase of implementation, key activities of which include the measurement of both tangible and intangible benefits of implementation and the identification of features for use in future IT projects (Markus & Tanis, 40). In short, this ES experience cycle (Figure 1) provides a robust and systematic method of documenting the experience of the system upgrade and implementation in LC.

### **Resource-Based View (RBV), Competencies and Capabilities**

The resource-based view (RBV) offers a valuable theoretical contribution (Barney, 8) to both the academic literature and managerial practice in relation to business strategy (Pan et al., 51). It examines the potential of a firm's capabilities and the strategies used to exploit its specific assets (Montealegre, 45) so as to achieve competitive and sustainable long-term performance (Pan, Pan & Hsieh, 50; Wu, 76; Wade & Hulland, 70; Wernerfelt, 74). In this context, the term 'resources' refers to specific assets and skills used by firms to develop and implement strategies (Montealegre, 45) to achieve their goals or performance targets (Bryson, Ackermann & Eden, 14). However, there is a growing recognition that resources alone

do not create value (Ashurst, Doherty & Peppard, 6). Rather, value is created by an organization's ability to manage and organize its resources to achieve a desired outcome (Ashurst, Doherty & Peppard, 6; Amit & Schoemaker, 4).

As outlined in the limited competency literature (Ashurst, Doherty & Peppard, 6), competency has the ability to generate unanticipated output (Pralhad & Hamel, 54). Based on recent research, organizational competency refers to organizational practices enacted to achieve a desired end, which is underpinned by employees' skills and knowledge of specific organizational processes and resources (Amit & Schoemaker, 4; McGrath, MacMillan & Venkatraman, 42; Ashurst, Doherty & Peppard, 6). In other words, competency is built from a set of valuable resources (Bryson, Ackermann & Eden, 14) that allows an organization to organization (Bowman & Ambrosini, 12).

Based on their competencies, and application of these competencies, organization can develop certain capabilities (Teece, Pisano & Shuen, 65; Moingeon et al., 44). However, to clarify the meaning of competency, more research is needed (Teece, Pisano & Shuen, 65; Moingeon et al., 44; Ashurst, Doherty & Peppard, 6). In this regard, it would be interesting to examine in greater depth the embedded key competencies engaged at each phase of ES upgrade and implementation, and how these enable certain capabilities (Teece, Pisano & Shuen, 65). Such knowledge could assist in mitigating problems or resolving issues at each stage of implementation (Markus & Tanis, 40).

Capabilities refer to a firm's capacity to deploy resources through a series of key actions (Montealegre, 45), usually in combination, and encapsulate both explicit processes and tacit elements/resources (such as leadership and organizational culture) embedded in these processes (Wang & Ahmed, 73). Hence, capabilities are often firm specific and are reinforced and redeveloped over time through complex interactions between the firm's resources and its key practices (Montealegre, 45). The identification of capabilities is frequently seen as a logical way to analyse the organizational of IT investments (Ashurst, Doherty & Peppard, 6); however, it would also be valuable to understand the constructs that underpin it.

The conceptual framework of competencies and capabilities used for this study, based in part on the findings of the literature review, is shown in Figure 2 below.

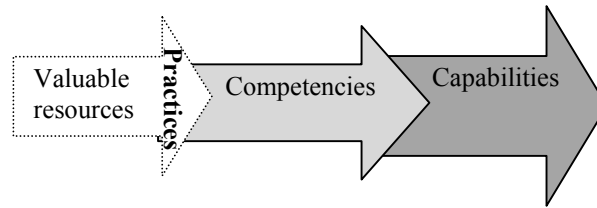


Figure 2: Competency and Capabilities Development Process

**METHODOLOGY**

An interpretivist case study approach was adopted in this research. This research explored how the existing capabilities at each implementation phase were effectively leveraged to propel successful ES upgrading at LC. This company previously successfully upgraded and implemented ES, in around two years, to become one of the biggest accounting firms among SMEs in Singapore. This high level of performance fits the profile of the theory-driven case selection proposed by Akkermans and Helden (1).

The scarcity of research in this area means that a qualitative research method is particularly appropriate. This method enables IS researchers to understand the relation between thoughts and practices in an organizational social context, and the embedded social meanings which can be used to explain human behavior (Gibbons, 31). Thus develops an ‘insider’s view’ (Yin, 78) of the case study organization, on which the researcher can base his/her organizational on of the phenomena under study. Most importantly, the case study approach is one of the most commonly used and well organization (Walsham, 71, 72) methodological approaches in IS research (Klein & Myers, 35) as it tends more towards practicality than quantitative rigour (Murphy & Simon, 46). For this reason the qualitative methodology was deemed most relevant to this research topic.

**Data Collection**

Over a 12-month period, a total of 16 formal face-to-face interviews were conducted (Table 1) with a total of nine informants involved in ES upgrade and implementation. The informants included one senior manager, two middle managers, two IT consultants and four departmental staff. The selection of informants was suggested by the general manager based on the relevance of their experience to the aims of the case study. Most of the informants held influential positions in the organization.

Each interview session varied in length from one to two-and-a-half hours, and the informants’ periods of tenure ranged from 2 to 11 years. The interview questions were prepared prior to the interview sessions taking place, and specific questions were selected during the interviews dependent on the background of each informant. All interviews were tape-recorded and transcribed in full by the researchers, and coupled with photos and additional notes taken during the interviews.

Table 1: Number of Informants and Interviews

Informants	Interview	Follow-ups	Total
Managing Director	1	4	5
Project Manager	1	1	2
IT Consultants	2	2	4
User manager	1	-	1
User	4	-	4
	9	7	16

To ensure the academic rigor and consistency of the information gathered, the primary data of the case study was collected mainly through the different sets of pre-structured interview questions generated from various literature reviews, together with several follow-up interviews and emails to clarify responses. This data collection covered the four phases (refer to Figure 1 of the ES upgrade and implementation) undertaken at LC and was aimed at identifying the experiences of system upgrading across all levels of the organization. To ensure the quality and reliability of the research results, and to facilitate interpretation of informants’ practices and statements to reveal their underlying intentions, the information was triangulated with other resources for validation. Other resources to which the researchers referred included two direct observations, 35 emails, and approximately 350 documents and archival records.

**Data Analysis**

To analyze the data, hermeneutics analysis was chosen because it provides a practical means of understanding the textual data (Myers, 47). This method generates fundamental ontological insights into human behavior and enables understanding of the various forms of social activities (Butler, 16). It also provides rich insights into the competency and capability development process (Pan, Pan & Hsieh, 50). This study focused on how LC develops competencies and capabilities to support ES upgrade and implementation. Thematic analysis guided the organizational of the data to correspond to practices, competencies and capabilities. To interpret the case write-up, this study crafted typologies (or themes) into tables with quotes (refer to Tables 2 to 5) (Pratt, 55). The researcher then used logical reasoning and data triangulation (Klein & Myers, 35) to formulate a new conceptual model—the competency and capability development model.

**CASE STUDY**

Although faced with limited resources, LC (anonymous) has steadfastly sought to provide quality

business solutions by adopting structured and consistent business strategies, such as its ‘Local Expertise, Global Presence’ strategy. For the past decade, LC has been operating its business based on the older version of the Sage Accpac system, until the older system was no longer able to support its business and projected growth. To survive in this fast-growing industry without losing the organization’s key asset—a number of young, dynamic employees—the General Manager convinced senior management and partners to embark on a costly ES upgrade.

**Phase I: Ideas to Planning**

After the call for upgrade, LC took the opportunity to assess its organizational structure and technology, and the needs of its employees. Their approach (refer to organizational practices in Table 2) allowed management to explore all options, providing a rationale for ES upgrading. The Managing Director supported the need for an upgrade by using Singapore’s recession and the cooling off trend for ES implementation as rationales for negotiating a generous bank loan and an attractive ES package from the vendor (refer to organizational practices in Table 2).

Table 2: Phase I: Organizational Practices, Competency and Capability

<b>Organizational Practices</b>	
Internal assessment initiatives	<ul style="list-style-type: none"> <li>• “With support from my subordinate, we quantify the potential benefits of the new upgrade system into figures to convince our board of directors.” Managing Director</li> <li>• “We also conducted an internal audit as we don’t believe in using international market research feedback from SAP or Gartner Consulting Group as those guidelines and findings are unrealistic for SMEs like us. We are more concerned about the practicality and deliverables of the system that are specific to our organization’s needs and performance.” User Manager</li> </ul>
<b>Organizational Competency</b>	
Aligning resources with organizational strategies	<ul style="list-style-type: none"> <li>• “It is good that our management is very open and willing to embrace new technology if they can see the investment is in line with the organization’s aim....” Managing Director</li> <li>• “We got support from all managers as they are willing to work around their limited resources by allowing their experienced employees to participate in this IT project.” Project Manager</li> <li>• “I remembered clearly that she did a lot of buy-ins and front-end exercises. She talked to her key people and let them understand the rationale for the upgrade. I think this is very important. She tried to influence in a way that was beneficial to the company... Thanks to our good company culture we were strongly supported by most employees....” Managing Director</li> </ul>
<b>Organizational Capability</b>	
Capability to envisage opportunity	<ul style="list-style-type: none"> <li>• “I took advantage of the economic downturn to negotiate a good deal with the bank and our vendors ... the timing has to be right for SMEs like us as we have to operate with fairly limited resources.” Managing Director</li> </ul>

Senior management projected a 30% reduction in administrative workloads after the Accpac upgrade, which would streamline or eliminate repetitive tasks from the workflow within the Sage Accpac DOS (refer to organizational competency, Table 2). The company would then better position its strategies to meet future challenges.

The key benefits of the upgrade included providing greater integrity and efficiency in services to customers with a lower administrative workload, and better flexibility in IT expansion to support organizational growth. Once these were communicated to senior management and partners (the organization’s key investors), a SGD\$1 million proposal was approved within a week.

A group of experienced Sage Accpac consultants from LC were deployed to implement the internal upgrade across the organization with the key aim of improving work efficacy for employees across the various companies in the LC group. News of the system implementation and upgrade approval spread rapidly throughout the company and most employees were thrilled with the decision.

Such positive support from employees was also partly attributable to the high quality of the preparation

undertaken by the Head of IT Department. The General Manager explained that, overall, the company culture was such that management was always keen to elicit feedback from various stakeholders regarding their receptiveness to upgrade initiatives because such knowledge was seen as a company asset. The General Manager also emphasized the importance during this stage of obtaining the cooperation of management and IT consultants to ‘sell’ the benefits of system upgrading to the stakeholders (refer to organizational capability in Table 2).

**Phase II: Planning to Diagnosis Testing and Implementation**

Prior to the Proof of Concept (POC) session, the IT consultants conducted feasibility studies by conducting interviews and observing the workflow of the end-users. To ensure the IT consultants would gain an understanding of the unique workflows and styles of each department, considerable time was spent streamlining workflows with the support of the user representatives (refer to organizational practices in Table 3 below).

Table 3: Phase II: Organizational Practices, Competency and Capability

<b>Organizational Practices</b>	
Diagnosis activities	<ul style="list-style-type: none"> <li>• <i>“Interviews have been conducted. Wish lists have been given to us so that [the] IT team could collect what we need, and then they will try to incorporate the feedback as much as possible....”</i> System user</li> <li>• <i>“It takes lots of effort to assist our users in sharing their requirements, in many incidences we have to draw diagrams to help them understand the concept and logic of this new system.”</i> IT consultant</li> <li>• <i>“From an earlier system study, we have already walked through a certain workflow with the key users... We tailor the training down to the individual group of users and follow them through the workflow. Apart from that we also provide hands-on training where they get to organizational and experience the working environment of Sage Accpac Windows.”</i> Project Manager</li> </ul>
<b>Organizational Competency</b>	
Provide appropriate resource attention	<ul style="list-style-type: none"> <li>• <i>“We have to be very systematic and things must be well planned otherwise we wouldn’t be able to pay appropriate attention to different activities in this phase... For example, failing to do so, our users might feel that their contributions in user requirements were not being appreciated ... as a good leader we have to be fairly sensitive....”</i> Project Manager</li> <li>• <i>“Everyone will be notified and work schedules were planned with assistance from the IT consultant to ensure there is no downtime during the installation.”</i> Project Manager</li> </ul>
<b>Organizational Capabilities</b>	
Capability to identify and manage embedded risks	<ul style="list-style-type: none"> <li>• <i>“Working in SMEs is a great challenge as we have to multitask well, for example, not only [do] I have to take care of the IT project implementation, I must also ensure that the daily accounting activities will not be affected by the change ... luckily with my accounting background plus IT knowledge it enables me to be on top of my work including being prudent and prepared for what might go wrong, therefore mindset are extremely important....”</i> Managing Director</li> </ul>

Identifying user requirements was a challenge, as the majority of the Sage Accpac users were not technically inclined. Considerable effort was required to elicit consistent user requirements to administer seamless information integration across departments. In addition, in order to achieve consistent implementation across the company, consultants had to group the issues and needs of various departments together for tighter integration of information across LC.

After determining the needs of users through feasibility studies and interviews (refer to organizational capability in Table 3), another challenge for the IT consultants was to foster a common understanding of the new system among employees. Once the POC sessions were complete, the team of consultants turned to the preparation of pre-implementation training sessions (refer to organizational practices in Table 3). All training sessions were provided by certified Sage Accpac trainers. Apart from the experienced trainers and comprehensive print-screen notes, the training materials were specifically tailored to suit the business functions performed by the end-users at LC.

Prior to the upgrade, the estimated work schedules were sent out to the respective departments to inform

them of the disruptions to their work which were to occur during the upgrade. These departments could then organize their own schedules and workflows to accommodate the Sage Accpac upgrade (refer to organizational competency in Table 3). During the installation of Sage Accpac Windows, both Sage Accpac DOS and Windows were run in parallel to avoid work interruption.

**Phase III: Diagnosis Testing and Implementation to Integration**

Despite plenty of preparatory work leading up to the system upgrade, LC still encountered some minor problems. Strong support from the IT team (refer to organizational practices, Table 4) was made possible by its well-nurtured organizational culture and values (refer to organizational competency, Table 4). After the rolling-out of the upgraded system, users were able to seek assistance from the trainers either via phone or in person. With timely and responsive support provided by the IT team (refer to organizational capability, Table 4), users were satisfied with the advice and assistance offered by the consultants.

Table 4: Phase III: Organizational Practices, Competency and Capability

<b>Organizational Practices</b>	
Attentive initiatives	<ul style="list-style-type: none"> <li>“Although we have conducted the system studies, there are some scenarios that have not surfaced at the time during the feasibility studies after ‘going live’. As such, we got to fine-tune some of the forms and reports.” Project Manager</li> <li>“They will just ask ‘How can this be done?’... ‘Can we solve these problems?’ Not that they are trying to find fault or anything, they just give feedback like if some things can be done faster, they will raise it up. They will not just do it as instructed.” Managing Director</li> </ul>
<b>Organizational Competency</b>	
Integrating resource changes and management	<ul style="list-style-type: none"> <li>“This augurs well for the mental preparation of the department. It is all about management change process.” Managing Director</li> </ul>
<b>Organizational Capability</b>	
Capability to reinforce organizational culture and values	<ul style="list-style-type: none"> <li>“It is our strength to accept criticism and be able to solve issues openly. This is important practice and I have been constantly reminding them ... we have to take criticism positively as this is the only way to improve....” Managing Director</li> </ul>

Based on both the formal and informal interviews conducted following the ‘go-live’ commission of the upgraded version, the feedback provided was predominantly positive.

**Phase IV: Integration to Performance**

Based on the feedback gathered from the survey and the results of interviews conducted by the consultants after the system implementation, most users were able to effectively use the new system, except for a few who were reluctant to accept change and challenges (refer to organizational practices in Table 5).

Table 5: Phase IV: Organizational Practices, Competency and Capability

<b>Organizational Practices</b>	
Knowledge management initiatives	<ul style="list-style-type: none"> <li>• <i>“Users will naturally compare DOS and Windows capability, but such behavior is understandable ... it is important for us to manage and update users with relevant skills....”</i> Project Manager</li> <li>• <i>“In fact extra training sessions were designed according to users’ IT background ... this is the only way for us to bridge users’ knowledge gap.”</i> IT consultant</li> </ul>
<b>Organizational Competency</b>	
Continuing organizational learning	<ul style="list-style-type: none"> <li>• <i>“We provide continual learning opportunities for users even after the implementation. Among the accounting staff we update them with the latest accounting practices ... among IT consultants we equip them with the latest technologies/software patches ... it is critical to have the initiative to learn as we may not have the luxury to hire consultants....”</i> Project Manager</li> </ul>
<b>Organizational Capability</b>	
Capability to conceptualize and establish future strategies	<ul style="list-style-type: none"> <li>• <i>“With the newly implemented system we tried our best in organizational the changes by providing similar support, which is the use of a set of standard procedures... this effort has significantly reduced the users’ resistance as we have figured out in advance what are the changes and what needs to be done for users ... many SMEs tend to forget about this stage or perhaps they do not have enough resources to stretch this far.”</i> Project Manager</li> </ul>

In familiarizing users with the new system, IT consultants made an effort to tailor-design a hands-on training program which could be easily understood by beginners (refer to organizational competency, Table 5). This activity highlights the importance of gaining the acceptance and confidence of users. This training session was conducted in a room that comfortably fit eight trainees, which ensured that all users were able to receive adequate attention and support from the trainer. After this training was completed, another survey was conducted to elicit users’ feedback. The IT consultants also documented the experiences communicated by the different stakeholders for future reference. A set of standard operating procedures was also introduced for systems users (refer to organizational capability, Table 5).

Based on the feedback gathered, not only were senior management staff happy with the system performance, but the results of the system assessments also showed that the company was now well equipped with a cutting-edge technology and system to compete effectively in the market.

## ANALYSIS

The proposed model (refer to Table 6) in this study presents a structured view of how an organization can effectively leverage existing competencies and capabilities to propel ES upgrade and implementation.

This case study reveals that competency and capability are developed throughout the ES upgrade process

and that implementation requires structured, systematic and careful planning (Montealegre, 45). The findings contribute to the limited literature on organizational competency (Ashurst, Doherty & Peppard, 6) by demonstrating that it evolves from the ability to use and manage valuable organizational resources through various practices aimed at achieving desired outcomes (Amit & Schoemaker, 4; McGrath, MacMillan & Venkatraman, 42; Ashurst, Doherty & Peppard, 6). Hence, this study disputes the assertion made by Prahalad and Hamel (54) that competency evolves only from the ability to generate unanticipated output.

Building on the competencies developed in each ES phase, potential capabilities can be organized (Teece, Pisano & Shuen, 65). The model presented in Table 6 depicts the process of attaining capabilities through organizational competencies that are supported by organizational practices (refer to Figure 2). In this account, each phase of the SME’s ES upgrade and implementation includes different organizational practices of using and organizing valuable resources to attain a preferred outcome—competency (Ashurst, Doherty & Peppard, 6; Amit & Schoemaker, 4). This outcome is eventually developed into a capability, enabling the successful ES upgrade and implementation. A detailed discussion on the key competencies and capabilities in this process is presented below, organized according to the four phases of SME’s ES upgrade and implementation (refer to Figure 1).



Table 6: Competency and Capability Development Model

Phases of SME's ES Experience Cycle	Phase I: Ideas to Planning	Phase II: Planning to Diagnosis testing and Implementation	Phase III: Diagnosis Testing and Implementation to Integration	Phase IV: Integration to Performance
<b>Organizational Practices</b>	<b>Project Assessment Practices</b> <ul style="list-style-type: none"> <li>▪ Introducing critical internal and external strategy reviews and aligning with the organization's aims</li> <li>▪ Understanding the scope and benefits of the system upgrade (technical &amp; business)</li> <li>▪ Promoting internal idea-selling</li> </ul>	<b>Diagnostic Practices</b> <ul style="list-style-type: none"> <li>▪ Engaging scenario-based affirmation</li> <li>▪ Clustering and organizational issues and recommendations</li> <li>▪ Providing pre-implementation training</li> </ul>	<b>Attentive Practices</b> <ul style="list-style-type: none"> <li>▪ Offering receptive feedback service</li> <li>▪ Providing responsive support</li> </ul>	<b>Knowledge Management Practices</b> <ul style="list-style-type: none"> <li>▪ Gathering and documenting knowledge and lessons learned</li> <li>▪ Introducing standard operating procedures</li> </ul>
<b>Organizational Competency</b>	Aligning resources with organizational strategies	Paying appropriate attention to resources	Integrating resource changes and management	Continuing organizational learning
<b>Organizational Capability</b>	Capability to envisage opportunities	Capability to identify and manage embedded risks	Capability to reinforce organizational culture and values	Capability to conceptualize and establish future strategies

**Phase I: Ideas to Planning**

*Competency: Aligning resources with organizational strategies.* Aligning the limited resources with strategies was crucial to ensuring LC was performing according to its strategic plan. Such alignment is paramount, especially for SMEs as they are often affected by a limit on resources (Chan, 17; Doukidis, Smithson & Lybereas, 23).

In this case, the company's strength appeared to lie in its unique human resource ability to effectively seize opportunities rather than depending on the advice of external consultants. Thus, this study reveals an interesting contradiction to the findings of Thong, Yap and Raman (68). Dependent on the unique human resources of LC, a series of project assessment practices was formulated. These include: (1) introducing an internal strategy review; (2) identifying the scope and benefits of the system upgrade (both technical and business-oriented); and (3) promoting internal idea-selling to promote investment during the economic crisis with the use of critical internal

(organizational resources) and external (competitors and opportunities for market growth) analyses (Barney, 8).

In SMEs, the greatest barrier to development and growth is to transform the mindset of the owner(s) or partner(s) (Yap, Soh & Raman, 77; Thong, Yap & Raman, 68), and to create an awareness of the value of exploring potentially beneficial opportunities. To overcome these barriers, the LC General Manager conducted internal assessments to convince senior management and partners that their SGD\$1 million investment was aligned with the organization's business strategy. In addition, selling the idea of system implementation and upgrade to stakeholders in a subliminal way was necessary to create a favorable platform (Garvin & Roberto, 30) from which to persuade them prior to the project being officially launched. Furthermore, demonstrating the need for technical change also effectively organize the fundamental source of resistance (Garvin & Roberto, 30), which was unwillingness to change daily routines (Pardo del Val & Fuentes, 52).

This managerial maneuver of *aligning resources with organizational strategies* is a rare resource (Ashford et al., 5), and is organized as one of the most critical

success factors in SMEs' ES implementation (Sun, Yazdani & Overend, 63). This resource empowered LC with the *capability to envisage opportunity* from investment ideas to dollars (Markus & Tanis, 40).

*Capability: Capability to envisage opportunities.*

It is a great challenge for any SME with limited resources to plan and execute an ES implementation and upgrade project (Thong, 67). To effectively face such challenges, capability to envisage opportunity can be developed through alignment of organizational resources (Alchian & Demsetz, 2) with organizational strategy. In this regard, LC management presented a comprehensive and rigorous business case to its partners, bank and vendors to negotiate the best deal by viewing the economic downturn as an opportunity to obtain a strategic million-dollar investment. Such capability is optimally developed with careful consideration of the requirements for business growth and the potential benefits of improving business efficiency and effectiveness (Ives & Learmonth, 33).

## Phase II: Planning to Diagnosis and Implementation

*Competency: Paying appropriate attention to resources.* Given that resources are limited in SMEs, the idea of *paying appropriate attention to resources* constitutes a crucial organizational competency that yields financial benefits from this IT investment.

At this stage of implementation, LC's managers began to search for options to prepare the company's resources for system configuration and rollout. To achieve the *competency of paying appropriate attention to resources*, a series of diagnostic tasks were undertaken: (1) engaging scenario-based affirmation; (2) clustering and organizing issues and recommendations; and (3) providing pre-implementation training to ensure the implementation and upgrade process ran smoothly. To effectively organize its resources, CLFS began with the prudent move of assessing risk, and seeking to organize potential risk, which might create future losses or jeopardize the success of the project (Wiegers, 75). This was based on a series of scenario-based affirmation activities. These were followed by the design of structured and systematic plans—the lack of which is often a key weakness of SMEs undergoing ES transformation (Proudlock et al., 56; Duplaga & Astani, 24; Buonanno et al., 15). LC also changed its standard operating procedures (SOP) to overcome organizational inertia and reduce conflicts that might arise from use of the upgraded system (Pan, Pan & Hsieh, 50). Finally, the company decided to channel its resources towards educating users through pre-implementation training—a practice that is critical for the success of ES implementation (Du-

plaga & Astani, 24). It was evident in this study that systematically *paying appropriate attention to resource allocation* has enabled LC to adapt to change with minimal errors or problems.

*Capability: Capability to identify and manage embedded risks.* During this phase, LC developed its capability to identify and manage embedded risks in systems configuration, integration, testing, data conversion, training and rollout (Markus & Tanis, 40; Scott & Vessey, 62). Unlike most SMEs, which suffer from a lack of IS strategic planning (Cragg & Zinatelli, 19; Levy & Powell, 38), LC took a systematic approach to planning for this implementation with a series of structured practices (described above) to identify the potential for embedded risks. Utilizing this capability, organizational resources were thus organized appropriately to transform dollars into assets during Phase II of the ES experience cycle (Markus & Tanis, 40).

## Phase III: Diagnosis and Implementation to Integration

*Competency: Integrating resources and managing change.* During this phase of the system upgrade, the findings of this research revealed that less effort was required for bug-fixing and fine-tuning. Instead, at this stage more attention needed to be given to *integrating resources and managing change* related to social issues.

LC's competency of *integrating resources and managing change* was supported by the adoption of certain attentive practices: (1) offering a receptive feedback service; (2) providing responsive support and fostering an environment which is conducive to key asset-users adapting to change. The IT implementation team was available to provide support to users who had the skills and proficiency relevant to using the upgraded system. Meetings were held weekly in which participants sought creative ideas on how to provide users with the optimal level of responsive support. Through these attentive practices, the commitment of end-users to the new system was enhanced (Levesque & Roberto, 37).

*Capability: Capability to reinforce organizational culture and values.* To institutionalize a new system with minimal impact, organization requires the ability to reinforce their organizational cultures and values. Unfortunately, such capability is lacking in most SMEs, which contributes to ES implementation problems (Beretta, 10). Unlike the majority of SMEs, by building on the competency developed in this phase, LC was able to reinforce its culture. For example, the IT team was able to embrace and respond effectively to criticism. This capability re-

vealed how social issues were managed during this transitional stage.

#### Phase IV: Integration to Performance

*Competency: Continuous organizational learning.* One key contributing factor that enables organization to perform well during this stage is learning from their unique histories (Barney, 8). *Continuous organizational learning* is a process developed through two knowledge management practices: (1) gathering and documenting knowledge and lessons learned; (2) introducing standard operating procedures by incorporating organizational routines (Zollo & Winter, 79); and developing competency for organizational to forecast resources required for future projects (Pan, Pan & Hsieh, 50).

This research revealed that the final phase not only enabled the organization to anticipate its future performance but also involved a trajectory projection from the system implementation and upgrade commencement until its completion (Markus & Tanis, 40). For successful ES implementation, *continuous organizational learning* is a necessary competency which addresses the concern raised by Markus and Tanis (40) that many SMEs have gaps in knowledge and skills related to ES upgrade and implementation. In this regard, through *continuous organizational learning* LC was able to incorporate more precise procedures into its standard operating procedures to promote cooperation and seamless collaboration among users (Buonanno et al., 15).

*Capability: Capability to conceptualize and establish future strategies.* In the final phase, LC developed the *capability to conceptualize and establish future strategies*, building on capabilities established in the previous phases (Teece, Pisano & Shuen, 65). Many SMEs suffer from a lack of tangible resources in IT knowledge and experience (Levy & Powell, 38; D'Amboise & Muldowney, 20; Kapp & Voora, 34), which is known as the key hindering factor for ES adoption (Buonanno et al., 15). To overcome this weakness, LC organizes the competency of *continuing organizational learning* (Grant, 32) to identify the knowledge and experience it needed to organize successful system transformation (Nicolaou, 48).

In summary, the experience of LC demonstrates the value of developing new competencies and capabilities to overcome the usual weaknesses faced by SMEs during ES transformation (Dutta & Evrard, 25; Buonanno et al., 15). The coordination and organization of organizational resources was the fundamental support factor behind LC's competencies and capabilities. The development of the company's competencies and capabilities could be traced to specific organizational practices under-

taken at each of the four phases of the ES experience cycle. Table 6 summarizes the competency and capability development process revealed in this case study.

## CONCLUSION

SMEs cannot adopt the same strategies for ES upgrade and implementation used by large companies (Buonanno et al., 15). In this regard, this study has critically examined how existing organizational competencies and capabilities can be leveraged effectively to propel ES upgrade and implementation through an SME ES implementation and upgrade framework. This framework consists of four phases: (1) Ideas to Planning; (2) Planning to Diagnosis and Implementation; (3) Diagnosis and Implementation to Integration; and (4) Integration to Performance. Based on the research, four key organizational practices and four key competencies and capabilities were identified, thus contributing to the theoretical field and managerial practice.

This study has made three theoretical contributions. Firstly, the study of competency development contributes to the limited literature on competencies (Ashurst, Doherty & Peppard, 6), especially from a process development perspective. The process of unveiling competency involves identifying how people can effectively source and manage resources (through a range of organizational practices) to achieve the desired outcome—competency (Ashurst, Doherty & Peppard, 6; Amit & Schoemaker, 4). In addition, the findings have extended understanding of IS strategic planning, such that capabilities are enabled through the support of competency. Secondly, this study furthers our understanding of the understudied capability development processes (Ulrich, 69; Pan et al., 51) by showing how an SME can develop, manage and deploy its competencies and capabilities to support the overall processes of strategy formation in ES upgrading and implementation. The four capabilities function as references for SMEs in achieving ES upgrade and implementation. Thirdly, this research ties a disparate set of key organizational practices, competencies and capabilities together and presents them in a structured and coherent model which can serve as the basis for further research. Fourthly, this study has extended research in the areas on strategic planning, and the experiences of ES system upgrade (Devadoss & Pan, 22; Brehm, Heinzl & Markus, 13) primarily from an SME perspective (Sawers, Pretorius & Oerlemans, 59; Buonanno et al., 15; Thong, Yap & Ramon, 68; Delone, 21).

From the managerial point of view, four important lessons can be learned from this study of Singapore's best-performing SME's system upgrade. The lessons iden-

tified allow practitioners to: (1) use this study as a reference for future SME system upgrade and implementation; (2) practice prudent and realistic resource planning with an opportunistic view; (3) leverage company resources to develop practices appropriate to the organization's specific culture and strengths; and (4) remain supportive by continually reinforcing and fostering company competencies and capabilities.

### Limitation and Future Studies

Although the findings presented here are based on one organization, LC, this model can be generalized to account for SMEs in similar contexts undergoing system implementation and upgrading. No claim is made that the conceptualization of organizational practices, competencies and capabilities presented in this paper is exhaustive. This study aims to explore competency and capability formation in SME system implementation and upgrade, with no intention of comparing the results to the experiences of large firms. However, it would be interesting to explore such differences between small and large firms in future studies. In addition, further research is clearly needed to test the applicability of the model in other contexts, such as consideration of the impact of external environmental factors on SME system upgrade and implementation, based on the tangible and intangible values and improvements that managers can deliver to ensure the success of their future IT system upgrade projects.

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