

GDW ENABLERS AND SUCCESS METRICS

MODULAR APPROACHES IN DISTRIBUTED WORK CONTEXTS: INSIGHTS FROM THE WORKINGS OF A CALL CENTER

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Modularity in organizations is shown to facilitate the creation of dynamic capabilities. While modular designs, systems and processes of product-based organizations are often thoroughly analysed in the literature, the increasing inclination towards modularity amongst organizations offering services such as Business Process Outsourcing (BPO) remains less well examined. Further, service-based organizations often grapple with a conflicting need to maintain both modular and integrated approaches. One area where the need for an integrated approach is particularly felt is organizational knowledge management (KM). Against this background, we present a case study of ASIASPEAK²⁵, a call center with operations in three cities. Findings from the case suggest that while modular processes and structures have given a fillip to ASIASPEAK's dynamic capabilities, they have also created new challenges for organization-wide knowledge sharing and transfer. ASIASPEAK's initiatives to meet these challenges are highlighted.

Keywords:

Modularity, Call center, Case study, Knowledge management

1. INTRODUCTION

Dynamic capabilities refer to the “organizational and strategic processes by which managers manipulate resources into new productive assets in the context of changing markets” (Galunic and Eisenhardt 2001). There is a danger that in hypercompetitive environments, resources that previously served as sources of competitive advantage could end up becoming liabilities (Johnson et al. 2006; Teece et al. 1997). In response, firms need to continuously develop capabilities to “acquire, develop and deploy” resources so that these capabilities offer “distinctive sources of advantage” (Montealegre 2002). In other words, only firms with such *dynamic capabilities* can adapt and thrive in hypercompetitive environments (Conner and Prahalad 1996; Helfat and Eisenhardt 2004; Karim 2006). Eisenhardt and Martin (2000) argue that dynamic capabilities’ “value for competitive advantage lies in their ability to alter the resource base: create, integrate, recombine, and release resources.” In short, dynamic capabilities contribute to the competitive advantage of firms by allowing them to develop better capabilities faster as well as improve their resource base positions (Teece et al. 1997).

One important approach that complements and helps build dynamic capabilities is the *modular* design of organizational systems (Hoetker 2006; Sinha and Van de Ven 2005). According to Schilling and Steensma (2001) “systems are said to have a high degree of modularity when their components can be disaggregated and recombined into new configurations – possibly with new components – with little loss of functionality.” Modularity, in offering a number of benefits such as strategic flexibility (Sanchez 1997), cycle time reduction (Ulrich and Eppinger 1999), opportunities for outsourcing (Baldwin and Clark 1997) and product innovation (Ethiraj and Levinthal 2004) makes it easier for the resources of a firm to be more easily integrated, built and reconfigured.

However, taking a modular approach also has disadvantages (Fleming and Sorenson 2001). Modularity potentially comes in the way of organizations’ efforts to improve ‘horizontal integration’ to achieve the benefits of co-ordination

²⁵ The organization’s identity is disguised

and sharing (Malhotra et al. 2005). In particular, a critical component of horizontal integration that could be affected is ‘intellectual integration’ or the ‘goal of KM’ (Ghoshal and Gratton 2002). Knowledge management (KM) is a “systemic and organizationally specified process for acquiring, organizing and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work” (Alavi and Leidner 1999). In constraining organizational efforts to integrate dispersed knowledge resources, modularity could indirectly pose a challenge to the development of dynamic capabilities.

While modular designs and systems of product-based organizations are often thoroughly analysed in the literature, the increasing inclination towards modularity amongst vendor organizations offering services such as IT outsourcing and business process outsourcing (BPO) remains less well examined. Interestingly, an effective KM strategy for such organizations seems imperative given the dispersed nature of their knowledge resources. Against this background, we present a case study of ASIASPEAK, a call centre with operations in three Asian cities. In particular, we address two questions in this paper. How does a modular approach to managing technology and operations facilitate the creation of dynamic capabilities? How can an organizational KM effort overcome the limitations of modularity?

2. MODULARITY AND DYNAMIC CAPABILITIES

Modularity is the efficient organization of complex products and processes through a partitioning of information into “visible design rules and hidden design parameters” (Baldwin and Clark 1997). Visible design rules (“visible information”) comprising of the architecture, interfaces and standards are design decisions which affect the ability to do modifications subsequently, while hidden design parameters (“hidden information”) do not affect design decisions and can be changed without informing those outside the modular design (Baldwin and Clark 1997). Further, “a complex system is said to exhibit *modularity in design* if its parts can be designed independently but will work together to support the whole” (Baldwin and Clark 2006). Modularity has been the focus of a number of studies across a variety of industries such as consumer electronics (Sanderson and Uzumeri 1996), computers (Quinn 2000), aircraft manufacturing (Sosa et al. 2004), software (Eisenhardt and Brown 1999; MacCormack et al. 2006) and car manufacturing (Cusumano and Nobeoka 1998).

Modularity promises to contribute towards an organization’s dynamic capabilities by offering a number of strategic benefits to an organization. Amongst others, these include allowing *strategic flexibility* or “the condition of having strategic options that are created through the combined effects of an organization’s coordination flexibility in acquiring and using flexible resources” (Sanchez 1997). In other words, modularity in giving a system greater flexibility makes it possible for its components to be recombined in different ways to provide different functions (Sanchez 1995; Shah 2006; Warren et al. 2002).

Modularity also allows firms the advantage of accelerated learning by enhancing learning at both component and architectural levels (Garud and Kumaraswamy 1995; Sanchez and Mahoney 1996). Shielded from changes in the architecture by the interface specifications, component-level learning is not disrupted unnecessarily (Brusoni and Prencipe 2006). In fact, an accelerated learning at the component levels can allow ‘localized adaptations’ to take place within hidden modules (Baldwin and Clark 2000) and may also reduce design and development time (Ulrich and Eppinger 1999). Further acceleration in learning is also possible by assigning several teams to work on different variations of the same component and making sure that the interface to the architecture remains constant (Langlois 2002). At the architectural-level too, learning is accelerated thanks to the *loose coupling* between the architecture and component learning processes (Sinha and Van de Ven 2005). In short, by separating learning processes at both levels via a modular approach, obstacles to learning and innovation at both component and architectural levels are removed, leading to acceleration in learning.

Further, modularity allows organizations to better adapt to changing market opportunities through *patching*, which is “the strategic process by which corporate executives routinely remap businesses to changing market opportunities”, and can involve “adding, splitting transferring, exiting, or combining chunks of businesses” (Eisenhardt and Brown 1999). For instance, by recombining or substituting one modular business with another, reuse of existing tools may be facilitated in a big way (Ethiraj and Levinthal 2004). Modularity also allows for *information hiding* (Parnas 1972) in which knowledge about the inner workings of one component need not be shared with the makers of other components. Choosing modular designs also allows organizations the strategic option of outsourcing modules (Miozzo and Grimshaw 2005). While there have been much analyses of modularity in organizational processes, forms and systems, almost exclusively, these tend to use product-based organizations as examples (Brusoni and Prencipe 2001; Tu et al. 2004). Service-based organizations, on the other hand, barring a few exceptions have been rarely scrutinized and analysed

for modularity.

Although adopting a modular management approach brings many advantages, modularity also brings some difficulties. Over-using modularity can lead to a lack of true breakthrough innovations (Fleming and Sorenson 2003) with only incremental improvements occurring at the component level. Modularity causes knowledge resources to be distributed across the various organizational units with relatively fewer opportunities for their integration (Brusoni 2005).

In summary, resources and capabilities form sources of competitive advantage for organizations (Barney 1991; Peteraf 1993). The dynamic capabilities of an organization alter its resource base, enabling it to compete effectively in changing business environments. Adopting a modular design for products and processes can lead to benefits such as strategic flexibility (Sanchez 1997), accelerated learning (Sanchez and Mahoney 1996) and improved adaptation to changing market opportunities (Eisenhardt and Brown 1999) thereby facilitating the creation of dynamic capabilities. On the other hand, modularity might also pose vital challenges for organizational KM thereby posing a stumbling block for the creation of dynamic capabilities. We believe that this seemingly paradoxical situation makes our study very relevant and timely. Further, given that much of the existing literature on modularity has focused on product-based firms (e.g., Gershenson et al. 2003), it is clear that useful purpose will be served by examining modularity in service-based firms, a good example of which is a call center. In this case study of an Asian call center, we examine how a modular approach facilitates the creation of dynamic capabilities and also look at how the concomitant problems of modularity can be counteracted.

3. RESEARCH METHODS

One of the authors conducted fieldwork at ASIASPEAK, a leading call center based in Asia. According to the Call Centre Association (1999), a call center is “a physical or virtual operation within an organization in which a managed group of people spend most of their time doing business by telephone, usually working in a computer-automated environment” (Gilmore 2001). The business roles of call centers varies greatly, for call centers can take on many functions, including customer service, telemarketing, order taking, and emergency response services (Gans et al. 2003).

Generally, a call center can be categorized by the type of traffic it handles. Inbound call centers handle incoming calls initiated by people calling in to a center, and typically provide functions such as customer support, help-desk services, order-taking or reservation and sales support (Gans et al. 2003). Conversely, outbound call centers handle outgoing calls initiated from within the call center, usually for the purpose of telemarketing or conducting surveys (Gans et al. 2003). The company of our focus ASIASPEAK functioned both as an inbound as well as an outbound call center. Technology is often employed extensively within call centers to facilitate the work of the customer service representatives (CSRs). These include interactive voice response (IVR) and voice response units (VRUs) to allow callers to self-serve, computer-telephone integration (CTI) linking the information and telephone systems to facilitate call-routing, automatic call distributors (ACD), and customer relationship management (CRM) systems (Gans et al. 2003). Given that call centers are often the primary point of contact between the customer and the organization, the efficiency and effectiveness of call centers are crucial to an organization’s reputation (Gilmore 2001). For outbound call centers, the key performance and profitability metrics are quantitative and can be easily measured (for instance, number of units sold through telemarketing, number of surveys conducted etc.). Inbound call centers, on the other hand are usually rated based on the quality of service delivered by the employees who interact on the telephone with customers. Such employees are usually referred to as *customer service representatives* (CSRs).

3.1. Data collection and analysis

The case study research design featured the use of multiple data sources and multiple qualitative methods. In the initial stages of access negotiation two of the authors conducted semi-structured interviews with managers at ASIASPEAK to get a better idea of the organizational context and also to help develop a more comprehensive list of questions for the subsequent interviews. During this period one of the authors systematically collated information about ASIASPEAK available in trade magazines, newspapers and on ASIASPEAK’s official website. Once formal approval for the study was obtained from ASIASPEAK, one of the authors began his intensive fieldwork. The author’s familiarity with the native language of the places where the interviews were conducted helped us better interpret the meanings of the non-English phrases used by some of the informants. The main source of evidence was the 25 face-to-face interviews conducted with the company’s employees. More in-depth data was also collected from various sources including publicly available information about the company on the Internet and internal documents obtained

from the company intranet. The multiple sources of evidence facilitated data triangulation (Patton 1987). There was at least one representative from each business unit, and the interviews covered employees at different levels in the company's hierarchy. All the interviews were audio-recorded with the permission of the informants and transcribed. The interviews were conducted using a mix of semi-structured and unstructured questions. The open-ended questioning helped us gather a rich set of data by not constraining the interviewees' responses through an overly-rigid framework of questions. Interviewees were allowed to describe their recollection of events without the interviewer interrupting too much; hence the line of questioning followed was partially dependent on the flow of conversation during the interview.

The primary data for the case study comprised of more than thirty hours of audio recordings of interviews, about a thousand pages of interview transcripts, summaries, and other documents related to ASIASPEAK. Following Yin's (2003) recommendations, we set up a case database to give structure to the pool of data. In the literature review phase, selected relevant papers were organized around keywords (eg: 'modularity', 'dynamic capability' etc). Next, the case data was examined for instances of situations that fitted these keywords. For example, case data related to modularity was earmarked and grouped under this category for further use. Likewise, quotations from the transcripts were organized around the keywords in a similar manner.

4. CASE DESCRIPTION

ASIASPEAK is a leading call centre, which has *customer support* operations in three major Asian cities. Employing more than 2000 customer service representatives, ASIASPEAK provides voice-based customer support to companies mostly in the telecommunications sector. Initially a business unit within a large Asian telecommunications company, ASIASPEAK was spun-off as an independent company with an aim to expand its customer base beyond those served by its former parent organization. For the new company, existing independently proved a challenging task as it was no more seen as a *cost centre* in a large organization, but rather came to be viewed exclusively as a profit-centric company. Since its inception as a separate organization, ASIASPEAK has been fairly successful in attracting new customers and increasing its revenues and has also won numerous accolades from reputed international agencies for its excellent service and high quality standards.

ASIASPEAK is organized into five autonomous business units (see Table 1) of which BUs 1 to 3 dedicated primarily to serving the needs of ASIASPEAK's three major clients, Telecom1, Telecom2 and Telecom3 account for close to 90% of the company's revenue. Supporting the business units in their operations are a number of departments such as finance, law, public relations, sales and systems (see Appendix B). Requests for service by customers are normally organized into projects, with several departments involved in setting the project up, before handing it over to one of the operational BUs for execution. Each BU consists of a service development (SD) division and frontline operations (FO) team. While the processes for handling customers are planned and designed by the SD division, the FO team is responsible for executing these processes through its customer service representatives (CSRs).

Business Unit	Industry	Major Clients
BU1	Telecom (inbound service)	Telecom1
BU2	Telecom (inbound service)	Telecom2
BU3	Telecom (inbound service)	Telecom3
BU4	Business development	N/A
BU5	Automobile, airline, banking, IT, insurance, transportation (outbound service/sales)	Toyota, Microsoft, Fubon Bank, etc.

Table 1: ASIASPEAK's business units and clients

4.1. Information Technology (IT) management

ASIASPEAK makes extensive use of IT to enhance its operational efficiency. The systems department is responsible for developing and maintaining the company's IT infrastructure. Customers are able to self-serve by using Interactive Voice Response (IVR) systems or through ASIASPEAK's web servers. For more complex services, customers are routed to the most appropriate CSR to handle their issues, via automatic call distributors (ACD). Computer-Telephone Integration (CTI) servers enable customer records to be automatically retrieved from the company's database servers,

legacy systems or data warehouse, providing seamless information feed to the CSR. Additional technology components such as fax servers, automatic diallers, monitoring servers and wireless network equipment play supporting roles in facilitating smooth operations. Backup systems complete with uninterruptible power supplies and generators are on standby at all three ASIASPEAK locations. ASIASPEAK's technological framework and use of equipment is illustrated in Appendix A.

Interestingly, ASIASPEAK is one of the few call centers that still maintains an in-house systems department with an aim to further develop competency in this area. The company only purchases non-core software and hardware from the open market; the design and coding of core systems are done entirely in-house. ASIASPEAK, thus tailors' its systems to its business processes if necessary, rather than having to make the processes suit the system. According to a manager who worked at another call center previously:

“At ASIASPEAK, I don't have to negotiate with vendors and coordinate multiple parties whenever a (systems) problem arises. In my previous workplace, it was so troublesome. I had to deal with so many parties just to introduce a small change in the system. It is so much easier to get things done here.”

In order to reduce the costs involved in software development and maintenance, ASIASPEAK has adopted a *platform strategy* with respect to its IS. In other words, all of ASIASPEAK's software applications are based on a common technology platform. By plugging in application or industry-specific components, the same software can be used to serve different needs or different industries. Explained the deputy director of the systems department:

“A major benefit of the platform strategy is that components can be plugged in or removed easily without requiring system-wide changes. Changes to an application can be performed locally, at most requiring slight modifications to its interface with the platform. A platform strategy also makes it possible to reuse components to build applications for a new client by just changing the interface!”

According to a manager at BU2:

“When the application interface, data format, etc are very similar, we'll just copy it, change the logo (of the client company) and voila, we have a new application created in record time!”

Also, while designing work processes or IS for a new project, the CSRs are encouraged to reuse existing processes and application components wherever possible. This reuse is made possible also because many operational processes are very similar for clients within the same industry; some are similar even for clients across industries.

4.2. Managing CSRs

Key components of ASIASPEAK's operations are the CSRs who upon being hired are assigned to a call team in one of the operational business units (BUs), under the charge of a supervisor. When CSRs interact with customers on the phone, they are required to complete the call in the shortest time possible, while maintaining a high level of service quality. This involves an obvious trade-off between efficiency (completing a call in the shortest time possible) and effectiveness (ensuring a high level of service quality in resolving the issue). In the absence of hard-and-fast rules to achieve this trade-off, ASIASPEAK has collaborated with a UK-based company specializing in behavioural research and developed a set of standard interaction techniques. These techniques serve as guidelines or *dialogue patterns* for CSRs to use when interacting with customers. In other words, these guidelines serve to ensure a certain level of standardization in the process while allowing sufficient leeway for the CSRs to vary the script according to the situation. According to a CSR:

“The dialogue patterns are very useful because I can just use the pieces that I need depending on how the conversation with the customer flows. The guidelines also help new CSRs to learn quickly and to anticipate possible responses by the customer at each juncture.”

CSRs attend short technical briefings at the start of each day, which helps them remain updated about the latest developments in their area of work and ensures that they do not inadvertently give wrong information to customers on the phone. These updates are delivered to them either by their supervisors or via digital audio or video messages. The CSRs are closely monitored during working hours for purposes of evaluation and also to spot potential problems

before they occur. As a frontline supervisor put it, CSRs “are required to input reasons for their absence each time they leave their terminals, other than for lunch or toilet breaks”.

4.3. The challenge of managing knowledge

The BU based decentralized organizational structure and the effective management of its technological infrastructure and human resources has made it possible for ASIASPEAK to grow rapidly by responding quicker to changing customer needs. However, this period of rapid growth has also seen the emergence of a number of challenges for ASIASPEAK’S management. A particularly vital challenge has resulted from the increasing inclinations of CSRs and managers to withhold information or knowledge of best practices from their colleagues so as to outperform them. It also seemed to the top management that managers held allegiance more to their own teams and BUs rather than to the entire organization. To counteract this challenge, the top-management has introduced several measures. In addition to being evaluated based on their interactions with customers, CSRs are now appraised according to how well they share information and help their team mates. A portion of an individual CSR’s salary has also been linked to the performance of the team. Further, remuneration schemes for managers are now based partially on the performance of the corporation as a whole.

ASIASPEAK has also established an electronic knowledge warehouse which, according to an assistant manager in BU1, serves to “...preserve frontline operators’ operational knowledge and store knowledge of industry-specific processes.” The warehouse thus helps any employee at ASIASPEAK access general information such as industry-specific knowledge, standards and internal company memos. Further, the knowledge warehouse is able to store audio-visual data, which has proved very useful in knowledge transfer. For example, a manager with BU5 noted:

“We have videotaped the entire automobile maintenance process for Toyota. This is used as background knowledge for all CSRs serving the automobile industry...very useful to show them what goes on in the industry.”

In addition to the knowledge warehouse, each BU has also been asked to maintain knowledge websites with client-specific knowledge that may not be shared with other BUs given that the other BUs may be serving a competing client organization. Also, both CSRs and their supervisors are strongly encouraged to enhance their abilities to perform different kinds of service tasks and to acquire domain-specific knowledge in other industries. Job rotations have been introduced to help employee learning by exposing them to different service areas or industries. A senior manager of a BU explained the reasoning behind the move to initiate job rotations:

“We felt that CSRs need to upgrade their skills and know more about inbound and outbound services and about the sales processes. They should ideally pick up expertise to serve multiple industries. This enables us to call upon CSRs to provide backup manpower in the area of their secondary skills, if the need arises.”

Job rotations have also helped relieve monotony leading to increased employee morale. According to a CSR:

“I feel excited when my supervisor temporarily assigns me to work on other hotlines as a replacement. Occasionally switching to different tasks does help to make life more interesting. Always doing the same thing is boring. With rotation, I can see how things are done in other areas and pick up new ideas.”

Another challenge ASIASPEAK confronts stems from the need to transfer the tacit, yet vital knowledge held by highly rated managers to managers at other ASIASPEAK locations and BUs. Towards this end, ASIASPEAK also arranges periodic *site visits* for managers to the three operational locales so that they may observe other managers at work and discuss with them.

5. FINDINGS: MANAGING MODULARITY AT ASIASPEAK

Modularity remains the cornerstone of ASIASPEAK’S management of both its technology resources and human resources and much of ASIASPEAK’S dynamic capabilities are rooted in this modular management. The section discusses the main findings of our study, explores lessons for managers and examines the importance of managing modularity which was found in our case study (see Table 2).

5.1. Modular management of technology resources

The hardware equipment used by ASIASPEAK such as IVR systems, ACDs, fax machines, automatic diallers and monitoring servers are mainly purchased off-the-shelf. With the design of call centers already in a fairly mature stage (Teece 1997), many equipment suppliers compete for business, thus enabling ASIASPEAK to achieve lower costs by purchasing rather than building its hardware. In other words, the modular design of ASIASPEAK's systems framework, as shown in Appendix A, allows pieces of equipment to be swapped in and out easily should they become faulty or obsolete. This has twin advantages of increasing the *fault tolerance* of the system and allowing new technology to be introduced into the system in a piece-meal manner (Gershenson 2003).

As for software, ASIASPEAK keeps the development of its core IS in-house, which offers several advantages over other call centers. Firstly, keeping the systems development capability in-house allows ASIASPEAK to quickly respond to their clients' requests for changes instead of having to negotiate with vendors and coordinate multiple parties. Secondly, ASIASPEAK's dynamic capabilities are significantly enhanced thanks to the *platform strategy*, which bases all its software applications on a common technology platform. By using pre-existing components, development time is greatly reduced. Additionally, by plugging in the right mix of application and industry-specific components to the platform, the resulting application can be tailored to the needs of individual clients with minimal effort. Maintaining this pool of flexible resources in the form of pre-developed application components gives ASIASPEAK much strategic flexibility when deploying its resources, allowing many alternate uses for them (Sanchez 1997).

In short, following a modular technology management strategy has allowed ASIASPEAK to develop several dynamic capabilities, which it otherwise might not have been able to develop. The modular design of ASIASPEAK's systems framework has enabled ASIASPEAK the capability to dynamically reconfigure its hardware resources, easily integrating new technology into the existing system. Also, ASIASPEAK's modular application development strategy of rapidly assembling application components into software applications has enabled the company to develop this capability into a competitive advantage.

5.2. Modular management of operations

The call team is the basic unit of operations at ASIASPEAK. Organizing CSRs around a call team led by a supervisor offers a modular structure with several advantages. Firstly, each call team operates as a more-or-less self-contained "black-box" which serves customers. These black-boxes plug into the organizational architecture through the team supervisor (who serves as the interface) and information such as instructions or feedback flows through the supervisor. This modular structure greatly reduces coordination efforts for instructions can be relayed through fewer supervisors instead of directly contacting the large number of CSRs. Further, modular call team has made it possible for each team to try different methods to improve its efficiency. In effect, what has been achieved is the (dynamic) capability to respond to ASIASPEAK's customer's needs. Further, "plug-and-play" of the CSRs is facilitated by ASIASPEAK's information systems, wherein application components and interfaces are re-used wherever possible. The result is that the layout of application screens remain similar even across industries, making it simpler for the CSRs to use the IS, even as they perform another service function or serve in a different industry. All in all, by managing the skills of each CSR in a modular fashion (as opposed to not knowing what skills each CSR possesses and treating them as homogeneous and immovable from an assigned team), it is possible for ASIASEPAK move the CSRs around the organization when required

Modularity in managing projects has enabled ASIASPEAK to improve its capability to satisfy customers. By putting each project under the charge of only one BU, external clients are given a single point of contact, thereby eliminating the hassle of having to contact multiple parties in ASIASPEAK for different issues. And again, there is an improved capability to manage complexity, as most communications related to a project will be kept within a BU, insulating the rest of ASIASPEAK from unnecessary "noise". Also, modularity has facilitated ASIASPEAK's capability of rapid project roll-out, allowing the company to re-use existing processes such as the "welcome call", with little or no modification. At an individual-level too, there is also evidence of modularity in the interaction between customers and CSRs. By using the interaction techniques that ASIASPEAK co-developed with a behavioural research company, CSRs have a dialogue structure to use, into which they insert dialogue components according to the needs of the situation. In a way, this modular interaction technique gives CSRs a strategic flexibility (Sanchez 1997) to use only the pieces of dialogue absolutely necessary, thus serving the customer effectively in the shortest time possible.

In short, organizing operations around modular structures has allowed ASIASPEAK to facilitate the task of the

dynamic capabilities. Likewise, organizing around modular call teams has also facilitated improvements in the other operations area capabilities, such as the capability to manage complexity (by treating call teams as “black-boxes”), the capability to manage employees (reduce learning curve; foster camaraderie; increase employee satisfaction) and the capability to deliver good customer service efficiently (through use of interaction techniques developed).

5.3. Overcoming the limitations of modularity

While ASIASPEAK’s modular organizational structure and modular management of technology and operational processes facilitated the development of dynamic capabilities, paradoxically, it also hindered the development of dynamic capabilities. The downsides of modularity were most obvious in the area of knowledge management (KM) in the sense that employees preferred to hoard rather than share knowledge with the rest of the organization. Further, the inclination to define themselves purely in terms of their immediate contexts rather than that of the entire organization hindered ASIASPEAK’s intent to better channel the capabilities of the individual BUs towards building a strong organizational knowledge base. Theoretically, ASIASPEAK’s challenges of KM find reflection in studies that highlight a disinclination amongst members to contribute to an organizational KM effort (Ravishankar and Pan 1997). In response to these challenges of managing organizational knowledge, managers at ASIASPEAK introduced a number of measures to encourage members to share knowledge with others in the organization. *Knowledge conduits* have been established to facilitate the flow of knowledge from one part of the company to another and to mitigate the undesirable effects of the modular organizational structure, systems and processes. Such conduits have taken different forms.

Firstly, encouraging the various departments and BUs to aggregate their knowledge in an electronic knowledge warehouse has allowed the preservation and consolidation of knowledge across spatial and temporal boundaries, thus reducing the effects of employee turnover. Secondly, meetings to enable knowledge sharing between employees at all levels have been initiated. This has allowed people, who were usually ‘insulated’ in their own modules (BUs, functional roles, etc) to come together and share ideas, thus removing the barriers created by business units or functional roles. Thirdly, skill committees have been established with an aim to unite functional groups across BUs, which are serving as special interest forums for people to discuss specialized knowledge topics. Lastly, the initiation of *site visits* between the three of ASIASPEAK’s operational hubs has facilitated transfer of knowledge, especially of the tacit kind not easily captured explicitly.

The team-based incentives has also served to moderate the steep learning curve faced by new CSRs and enhanced the productivity of the team as a whole. By linking a portion of an individual CSR’s performance to the performance of the team, ASIASPEAK has ensured that the more experienced CSRs do not hoard their knowledge and leave the new-comers to flounder on their own. This system of peer support has reduced the variance in customer service levels encountered by customers, and also helped foster a spirit of camaraderie, leading to increased employee satisfaction. The costs of high employee turnover - loss of productivity and decreased customer satisfaction (Heskett et al. 1994) - have thus been kept down by having a system in place to accelerate the learning rate of new CSRs.

6. CONCLUSIONS AND IMPLICATIONS

In this paper, we have built on the resource based view (RBV) of the firm, which argues that resources and capabilities contribute to the differential performance of firms (Grant 1991; Wernerfelt 1994). In particular, we looked at modularity as a means of organizing these resources and capabilities and facilitating the creation of dynamic capabilities by allowing the resources to be easily integrated, built and reconfigured (Hellström and Wikström 2005). The key business areas of a call center, ASIASPEAK, were analyzed for instances where a modular approach was pursued. ASIASPEAK has chosen to pursue a modular management strategy in many of its key business areas because of the benefits such an approach offers. Modularity has enabled ASIASPEAK with the capability to dynamically reconfigure and integrate new technology into its hardware resource base and also the capability to rapidly assemble application components into software applications. Further, organizing the CSRs into modular call teams has provided benefits such as improved capabilities to provide customer service, manage employees, and to manage complexity. In short, ASIASPEAK has been able to achieve strategic flexibility in its technology management and operations management and is able to put resources to alternate use with little switching difficulty.

However, the modular approach also brought in its wake challenges to the effective management of organizational knowledge. To reduce the obstructions to knowledge sharing and transfer that a modular organizational structure and processes presented, ASIASPEAK has introduced a number of initiatives, which have acted as knowledge conduits

and helped knowledge move more easily from one part of the company to another.

Interestingly, in spite of the emphasis on modularity in a few areas ASIASPEAK has favoured an integrated approach over a modular approach. For instance, although IT management has followed a highly modular structure ASIASPEAK has integrated all IT capabilities into one systems department so as to facilitate the development of core competences in IT (see Appendix B). Core competences are enhanced the more they are used (Hamel and Prahalad 1990) and managers at ASIASPEAK believe that centralizing the IT competence in the systems department will allow more opportunities for this competence to be exercised. Moreover, creating a separate systems department can be seen as an investment in deliberate learning efforts through which codification of important knowledge is expected to take place thereby hastening the development of ASIASPEAK's dynamic capabilities in the IT area.

An integrated approach is also seen in the centralizing of all business development work in BU4, which has provided cost efficiencies to ASIASPEAK. In other words, the cost-per-unit of work is lower since the BU4 is well equipped in sourcing for clients and marketing ASIASPEAK's services. Economies of scope are also available to ASIASPEAK since the same set of resources (eg: people, equipment, etc) in BU4 can be put to multiple uses while incurring the same overhead costs. It is more economical for sales-personnel to market the many services of ASIASPEAK as an organization, than to market the services of individual BUs individually, as each BU may only have a few specialized services to offer on their own.

In short, managers need to evaluate the trade-off between a modular and an integrated approach (Hoetker 2006). By focusing on the resources and capabilities in the key business areas of their companies, the advantages and disadvantages of both approaches can be quickly assessed, given an importance weightage and checked for their fit with the overall corporate strategy. Contingency strategies can then be implemented to mitigate any undesirable effects that result from adopting either approach.

While a modular approach facilitates the capability to learn at a component level (or project team level), managers also need to carefully initiate integrated approaches for managing knowledge, which aids the development of dynamic capabilities at an architectural or system level (Richard and Devinney 2005). For example, at ASIASPEAK CSRs are required to develop a secondary skill in addition to their primary skill. In other words, CSRs can either learn about another industry or about another service area such as making outbound calls. Thus ASIASPEAK is able to call on the CSRs with the relevant secondary skills to serve as backup manpower in the event of an unexpected spike in demand somewhere. ASIASPEAK's experience suggests that equipping each CSR with a secondary skill makes it possible to reshuffle (or reconfigure) the human resource base by changing the proportion of CSRs working in any given industry or function. Job rotations may also be used by managers to reduce the narrow-mindedness and silo mentality that will inevitably occur due to the strong focus on team-centricity. By exposing CSRs to different service areas and industries, managers can help them build a web of informal networks through which learning and knowledge can traverse. This aids with the diffusion of best practices as the CSRs bring along their tacit experiences when they rotate jobs, resulting in a cross-pollination of ideas. Finally from a theoretical perspective our study suggests that while modularity does greatly facilitate operational processes, it also simultaneously demands implementation of innovative HR processes to bolster strategic organizational level KM and to build dynamic capabilities.

No.	Key Findings	Lessons
1	Modular management of technology resources	<ul style="list-style-type: none"> • Modular technology management strategy made possible the development of dynamic capabilities • Modular design of systems framework helped develop the capability to reconfigure hardware resources • Modular applications development strategy of rapidly assembling application components into software applications enabled the company to develop competitive advantage
2	Modular management of operations	<ul style="list-style-type: none"> • The modular structure greatly reduces coordination

	efforts
	<ul style="list-style-type: none"> • Modular call team structure made it easier to improve efficiency • Modular project design has enabled higher customer satisfaction and improved the capability to manage complexity
3	Overcoming the limitations of modularity (in KM) aggregate their knowledge
	<ul style="list-style-type: none"> • Various departments and BUs were encouraged to • Meetings were initiated to enable knowledge sharing between employees • Skill committees were established to unite functional groups (special interest forums) across BUs • Site visits between operational hubs were initiated

Table 2: Summary of Findings

REFERENCES

- Alavi, M., and Leidner, D.E. "Knowledge Management Systems: Issues, Challenges and Benefits," *Communications of the AIS* (1:7), 1999, pp. 2-35.
- Baldwin, C.Y., and Clark, K.B. *Design Rules: The Power of Modularity*, MIT Press: Cambridge, MA, 2000.
- Baldwin, C.Y., and Clark, K.B. "Managing in an Age of Modularity," *Harvard Business Review* (75:5), 1997, pp. 84-93.
- Baldwin, C.Y., and Clark, K.B. "The Architecture of Participation: Does Code Architecture Mitigate Free Riding in the Open Source Development Model?," *Management Science* (52:7), 2006, pp. 1116-1127.
- Barney, J.B. "Firm Resources and Sustained Competitive Advantage," *Journal of Management* (17:1), 1991, pp. 99-120.
- Brusoni, S. "The Limits to Specialization: Problem Solving and Coordination in 'Modular Networks'," *Organization Studies* (26:12), 2005, pp. 1885-1907.
- Brusoni, S., and Prencipe, A. "Making Design Rules: A Multidomain Perspective," *Organization Science*, (17:2), 2006, pp. 179-189.
- Brusoni, S., and Prencipe, A. "Unpacking the Black Box of Modularity: Technologies, Products and Organizations," *Industrial and Corporate Change* (10:1), 2001, pp. 179-205.
- Call Centre Association, 1999, Website, <http://www.cca.org.uk>.
- Conner, K.R., and Prahalad, C.K. "A Resource-Based Theory of the Firm: Knowledge Versus Opportunism," *Organization Science* (7:5), 1996, pp. 477-501.
- Cusumano, M., and Nobeoka, K. *Thinking Beyond Lean*, Free Press, New York, 1998.
- Eisenhardt, K.M., and Brown, S.L. "Patching: Restitching Business Portfolios in Dynamic Markets," *Harvard Business Review* (77:3), 1999, pp. 72-82 (1999).
- Eisenhardt, K.M., and Martin, J.A. "Dynamic Capabilities: What are they?," *Strategic Management Journal* (21:10/11), 2000, pp. 1105-1121.
- Ethiraj, S.K., and Levinthal, D. "Modularity and Innovation in Complex Systems," *Management Science* (50:2), 2004, pp. 159-173.
- Fleming, L., and Sorenson, O. "Navigating the Technology Landscape of Innovation," *Sloan Management Review* (44:2), 2003, pp. 15-23.
- Fleming, L., and Sorenson, O. "The Dangers of Modularity," *Harvard Business Review* (79:8), 2001, pp. 20-21.
- Galunic, D.C., and Eisenhardt, K.M. "Architectural Innovation and Modular Corporate Forms," *Academy of Management Journal* (44:6), 2001, pp.1229-1249.
- Gans, N., Koole, G., and Mandelbaum, A. "Telephone Call Centers: Tutorial, Review, and Research Prospects," *Manufacturing and Service Operations Management* (5:2), 2003, pp. 79-141.
- Garud, R., and Kumaraswamy, "A Technological and Organizational Designs for Realizing Economies of Substitution," *Strategic Management Journal* (16:1), 1995, pp. 93-109.
- Gershenson, J.K., Prasad, G.J., and Zhang, Y. "Product Modularity: Definitions and Benefits," *Journal of Engineering Design*

- (14:3), 2003, pp. 295-313.
- Ghoshal, S., and Gratton, L. "Integrating the Enterprise," *Sloan Management Review* (44:1), 2002, pp. 31-40.
- Gilmore, A. "Call Centre Management: Is service Quality a Priority?," *Managing Service Quality* (11:3), 2001, pp. 153-159.
- Grant, R.M. "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation," *California Management Review* (33:3), 1991, pp. 114-136.
- Hamel, G., and Prahalad, C.K. "The Core Competence of the Corporation," *Harvard Business Review* (68:3) 1990, pp. 79-91.
- Helfat, C.E., and Eisenhardt, K. "Inter-Temporal Economies of Scope, Organizational Modularity, and the Dynamics of Diversification," *Strategic Management Journal* (25:13), 2004, pp. 1217-1232.
- Hellström, M., and Wikström, K. "Project Business Concepts Based on Modularity – Improved Manoeuvrability through Unstable Structures," *International Journal of Project Management* (23:5), 2005, pp. 392-397.
- Heskett, J.L., Jones, T.O., Loveman, G.W., Sasser, W.E., and Schlesinger, L.A. "Putting the Service-Profit Chain to Work," *Harvard Business Review* (72:2), 1994, pp. 164-174.
- Hoetker, G. "Do Modular Products Lead to Modular Organizations?," *Strategic Management Journal* (27: 6), 2006, pp. 501-518.
- Johnson, G. Scholes, K., and Whittington, R. *Exploring Corporate Strategy*, Prentice Hall, 2006.
- Karim, S. "Modularity in Organizational Structure: The Reconfiguration of Internally Developed and Acquired Business Units," *Strategic Management Journal* (27:9), 2006, pp. 799-823.
- Langlois, R.N. "Modularity in Technology and Organization," *Journal of Economic Behavior and Organization* (49:1), 2002, pp.19-37.
- MacCormack, A., Rusnak, J., and Baldwin, C.Y. "Exploring the Structure of Complex Software Designs: An Empirical Study of Open Source and Proprietary Code," *Management Science*(52:7), 2006, pp.1015-1030.
- M.N. Ravishankar, and Shan L. Pan. "The Influence of Organizational Identification on Organizational Knowledge Management (KM)," *Omega*, 2006, doi: 10.1016/j.omega.2006.06.006.
- Malhotra, A., Gosain, S., and El Sawy, O.A. "Absorptive Capacity Configurations in Supply Chains: Gearing for Partner-Enabled Market Knowledge Creation," *MIS Quarterly* (29:1), 2005, pp. 145-187.
- Miozzo, M. and Grimshaw, D. "Modularity and Innovation in Knowledge-Intensive Business Services: IT Outsourcing in Germany and the UK," *Research Policy* (34: 9), 2005, pp. 1419-1439.
- Montealegre, R. "A Process Model of Capability Development: Lessons from the Electronic Commerce Strategy at Bolsa de Valores de Guayaquil," *Organization Science* (13:5), pp. 514-531 (2002).
- Parnas, D.L. "On the Criteria for Decomposing Systems into Modules," *Communications of the ACM* (15:12), 1972, pp. 1053-1058.
- Patton, M.Q. *How to use Qualitative Methods in Evaluation*, Sage Publications, Newbury Park, CA,1987.
- Peteraf, M.A. "The Cornerstones of Competitive Advantage: A Resource-Based View," *Strategic Management Journal* (14:3), 1993, pp. 179-191.
- Quinn, J.B. "Outsourcing Innovation: The New Engine of Growth," *Sloan Management Review* (41:4), 2000, pp.13-29.
- Richard, P.J., and Devinney, T.M. Modular Strategies: B2B Technology and Architectural Knowledge, *California Management Review* (47:4), 2005, pp. 86-113.
- Sanchez, R. "Preparing for an Uncertain Future," *International Studies of Management and Organization* (27:2), 1997, pp. 71-94.
- Sanchez, R. "Strategic Flexibility in Product Competition," *Strategic Management Journal* (16:1), 1995, pp. 135-159.
- Sanchez, R., and Mahoney, J.T. "Modularity, Flexibility, and Knowledge Management in Product and Organization Design," *Strategic Management Journal* (17:winter special issue), 1996, pp. 63-76.
- Sanderson, S.W., and Uzumeri, M. *Managing Product Families*, McGraw Hill, New York, 1996.
- Schilling, M.A., and Steensma, H.K. "The Use of Modular Organizational Forms: An Industry-Level Analysis," *Academy of Management Journal* (44:6), 2001, pp. 1149-1168.
- Sinha, K.K., and Van de Ven, A.H. "Designing Work Within and Between Organizations," *Organization Science* (16:4), 2005, pp. 389-408.
- Sosa, M.E., Eppinger, S.D., and Rowles, C.M. "The Misalignment of Product Architecture and Organizational Structure in Complex Product Development," *Management Science* (50:12), 2004, pp. 1674-1689.
- Shah, S.K. "Motivation, Governance, and the Viability of Hybrid Forms in Open Source Software Development," *Management Science* (52:7), 2006, pp. 1000-1014.
- Teece, D.J. "Capturing Value from Technological Innovation: Integration, Strategic Partnering, and Licensing Decisions," in *Managing Strategic Innovation and Change*, M.L. Tushman and P. Anderson (eds), Oxford University Press, New York, Oxford, 1997. pp. 287-306.
- Teece, D.J., Pisano, G., and Shuen, A. "Dynamic Capabilities and Strategic Management," *Strategic Management Journal* (18:7),

1997, pp. 509-533.

Tu, Q., Vonderembse, M.A., Ragu-Nathan, T.S., and Ragu-Nathan, B. "Measuring Modularity-Based Manufacturing Practices and their Impact on Mass-Customization Capability: A Customer-Driven Perspective," *Decision Sciences* (35:2), 2004, pp. 147-168.

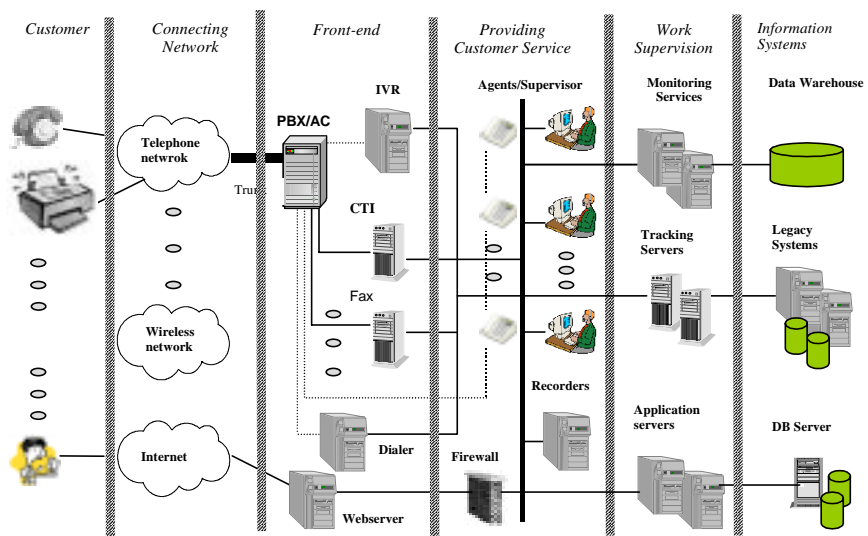
Ulrich, K.T., and Eppinger, S.D. *Product Design and Development*, McGraw Hill, New York, 1999.

Wernerfelt, B. "A Resource-Based View of the Firm," *Strategic Management Journal* (5:2), 1984, pp. 171-180.

Warren, N., Moore, K., and Cardona, P. "Modularity, Strategic Flexibility, and Firm Performance: A Study of the Home Appliance Industry," *Strategic Management Journal* (23:12), 2002, pp. 1123-1140.

Yin, R.K. *Case Study Research Design and Methods* (3rd Edition), Sage Publications, Thousand Oaks, CA, 2003.

Appendix A– ASIASPEAK’S Systems Framework



Appendix B – ASIASPEAK’S Organizational Structure

