

2017

Dynamic Capabilities in Small Service Firms

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Recommended Citation

Beltran, Gabriel and Ramesh, Balasubramaniam (2017) "Dynamic Capabilities in Small Service Firms," *Engaged Management ReView*. Vol. 1 : Iss. 3 , Article 2.

Available at: <https://doi.org/10.28953/2375-8643.1018>

<https://commons.case.edu/emr/vol1/iss3/2>

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EDITORIAL NOTE

This article by Beltran and Ramesh on “Dynamic Capabilities In Small Service Firms” addresses a little studied problem of how small service organizations respond to drastic changes in their environment. In this particular case, the study examines small software and technology service firms that offer contracted services to the Department of Defense. Most firms need to anticipate new technologies and other service capabilities to remain competitive in their market offerings in a competitive environment. To this end they need to find new ways to integrate those capabilities into their service offerings in a timely manner. A specific constraint for the studied firms is the size and scale of their operations which does not provide space for extensive and specialized technology searches or their extensive trials. The article, based on a careful data collection and analysis of small four service firms, develops an analysis of the firm’s routines — supported by associated IT functions — that enabled the firms to sense, seize, and reconfigure their resources and knowledge as to more proficiently prepare competitive bids for defense department’s contracting competitions. The practical value of the article is its identification of relatively broad and specific set of routines and practices that are available to other small service firms to explore. The article also shows a nice way of using dynamic capabilities theory to address challenges that small firms face in competitive and highly turbulent environments.

Dynamic Capabilities in Small Service Firms

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ABSTRACT

In constantly shifting service environments, managers face the challenge to renew, modify, and reconfigure their firm’s service offerings to respond effectively to industry turbulence. Dynamic capabilities have been proposed as a primary means by which firms can reconfigure their operational processes to generate these new service offerings. The role of dynamic capabilities in large organizations has been investigated extensively, but their role in small organizations has not yet received much attention. We explore how dynamic capabilities manifest in small service firms and how these firms use IT to achieve these capabilities. Using a multi-site case study in four small service firms, we examine how the four dynamic capabilities identified by Pavlou and El Sawy (2011) — namely, the capabilities of sensing, learning, integrating, and coordinating — are manifested. Our study extends the literature on dynamic capabilities by examining small service providers operating in the defense contracting industry. It explains how these firms can develop dynamic capabilities by reconfiguring operational capabilities when operating in a state of industry turbulence. Our findings also reveal IT as a critical enabler of dynamic capabilities. For managers, our study offers new insights into how they can better understand, assess, and acquire dynamic capabilities in their firms.

SYNOPSIS

Purpose

The purpose of this study is to explore how dynamic capabilities can be achieved in small service firms. This study used a model of dynamic capabilities proposed by Pavlou and El Sawy (2011) to explore how dynamic capabilities were achieved in our focal firms.

Problem of Practice

Today's services industry is as competitive, complex, and unpredictable as it has ever been. Unpredictable actions by competitors, the complexity of emerging technologies and customer requirements, and turbulence in the market and economy have all created an environment of rapid change and uncertain futures. Small service firms need to constantly rethink their strategies and reconfigure their service offerings to gain or sustain competitive advantage. This study investigates how these firms can use their information technology (IT) resources to reconfigure their current service offerings as part of their business development (BD) process.

Results

Focal firms follow a standard BD life cycle process in the defense contracting industry: identifying and pursuing opportunities; preparing proposals; submitting proposals; and conducting post-award notice operations. By centering our discussion on the pre-award phases of the BD process and analyzing the use and manifestation of four dynamic capabilities—sensing, learning, integrating, and coordinating capabilities—we were able to investigate the implementation of these dynamic capabilities at the sub-routine level within the firms studied. Our results demonstrate how the model proposed by Pavlou and El Sawy (2011) can be used to sensitize managers to how their firm's dynamic capabilities are being mobilized. In this regard, our study offers new recommendations for better understanding and enhancing a small service firm's dynamic capabilities.

Conclusions

Firms operating in today's dynamic markets must be ready to respond to industry turbulence to achieve and sustain a competitive advantage. Dynamic capabilities are the mechanism that allow firms to be responsive to market turbulence. This study is one of the first to examine and validate the ways in which small service firms achieve dynamic capabilities. The results of the study provide managers of small service firms with practical insights into how they can use their firm's existing IT resources to build up and reconfigure its dynamic capabilities. Further, managers can use the results of this study to operationalize dynamic capabilities not only within BD processes but also in other IT-driven processes.

Practical Relevance

This study validates the presence of the four dynamic capabilities of Pavlou and El Sawy (2011) in small service firms. Managers can use the insights to reconfigure operational processes to respond to industry turbulence. Further, managers can use the results to understand and institute change within IT-driven business processes.

Key Words

Dynamic capabilities, small firms, service firms, information technology (IT), industry turbulence.

METHOD

Research Question

How do small service firms reconfigure their operational processes by leveraging IT resources to achieve dynamic capabilities?

Research Method and Design

Myers (2009) suggests that qualitative research is appropriate for studying a particular subject in depth. We conducted a qualitative study to explore the manifestations of dynamic capabilities in small service provider firms — that is, to examine how such capabilities are used and deployed. Yin (2009) suggests that the case study method is appropriate when the research question is a “how” or “why” question, as in our study.

The selection of the study sites was driven by purposeful, replication logic (Yin, 2009). The four small service firms we sampled offered the potential to investigate how IT resources might be leveraged to achieve dynamic capabilities. Our selection of study sites was driven by three factors:

- 1) The sites offered the appropriate setting to understand the phenomena of dynamic capabilities through IT enablement. They also offered a theoretically relevant organizational context because of the turbulent environments in which they operate.
- 2) The sites offered opportunities for disconfirming our expectations (Dubé & Pare, 2003; Markus, 1989) that the organizations would be able to successfully use IT enablement of business processes to achieve dynamic capabilities. To this end, study participants that had achieved different levels of competitive success were selected.
- 3) All the study participants had been actively engaged in the use of IT for reconfiguring service offerings within their BD process.

Data Collection, Sample, and Analysis

Study participants ranged from executives to high-level managers (i.e., CEOs to directors of IT). By working directly with company owners, we were able to access participants who are actively engaged in BD and IT. These criteria ensured that our selection of case study sites and participants provided a rich context to garner insights on IT enablement for creating dynamic capabilities. We chose semi-structured interviews as the primary means of data collection and conducted 24 interviews at our focal firms. We used the Pavlou and El Sawy (2011) model of dynamic capabilities to guide our interviews. Appendix A offers additional information on the study sites, interview participants, and excerpts from our interview protocol.

PRACTICAL PROBLEM

The government contracting industry and, in general, the service industry is constantly changing as customers' requirements change, new technologies emerge, and budgets fluctuate. Small service firms must continuously survey and monitor their environment, looking for industry shifts. When industry shifts occur, they might need to reconfigure service offerings to meet current industry demands. For instance, if a customer has limited funding available, it might move to a low-price, technically acceptable (LPTA) contracting strategy. In response, small firms need to ensure that they make a technically qualified offer, but their emphasis should be on lowering costs so that they can offer this customer a still profitable but reasonably priced product or service. Firms that are unable to rapidly and effectively reconfigure offerings in response to turbulence will undoubtedly become irrelevant or simply get beat out by competitors.

LITERATURE REVIEW

Dynamic Capabilities

In today's rapidly changing markets, firms must demonstrate both responsiveness and innovation if they hope to stay competitive. They also must have the leadership necessary to innovate and redeploy not just internal competencies, but external ones as well. This approach to competitive advantage — the *dynamic capability* approach — has two key emphases: first, the shifting character of the environment, and second, the key role of management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and competencies in light of this changing environment (Teece et al., 1997). Teece and Pisano (1994) argue that the competitive advantage of firms stems from the dynamic capabilities that are rooted in the high-performance routines operating inside the firm, are enacted within the firm's processes and are conditioned by its history.

Teece et al. (1997) define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments and to achieve congruence with these changes. Certain innovative responses are required when time-to-market is critical, when the rate of technological change is rapid, and when the nature of future competition and markets is difficult to determine. Further, Teece et al. (1997) note that the term "capabilities" emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of the changing environment. They argue that dynamic capabilities reside in large measure with an enterprise's top management team but also are affected by the organizational processes, systems, and structures that the enterprise has created to manage its business.

Eisenhardt and Martin (2000) state that dynamic capabilities actually consist of identifiable and specific routines. Their research concludes that dynamic capabilities are the antecedent organizational and strategic routines by which managers alter their resource base — acquiring and shedding resources, integrating them together, and recombining them — to generate new value-creating strategies (Grant, 1996; Pisano, 1994). These new strategies then become the drivers behind the creation, evolution, and recombination of other resources into new sources of competitive advantage (Henderson and Cockburn, 1994; Teece et al., 1997). Similar to Teece et al. (1997), Eisenhardt and Martin (2000) define dynamic capabilities as a firm's processes that use resources — specifically the processes for integrating, reconfiguring, gaining, and releasing resources — to match and even create market change. They conclude that dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations.

Eisenhardt and Martin (2000) explore market dynamism and conclude that effective dynamic capabilities rely heavily on existing industry knowledge in moderately dynamic markets — markets in which change occurs frequently, but along roughly predictable and linear paths. Here, managers analyze situations within their existing tacit knowledge and rules of thumb, and then they plan and organize their activities in a relatively ordered fashion (Burns and Stalker, 1966). Further, in these markets managers can develop efficient processes that are predictable and relatively stable and that involve linear steps, beginning with analysis and ending with implementation (Helfat, 1997).

Our research focused on identifying actionable routines that managers use to reconfigure their existing operational processes in moderately turbulent environments. Pavlou and El Sawy (2011) argue for the need to develop a model of dynamic capabilities for helping managers not only to develop such capabilities but also to reconfigure their firm's operational capabilities to enhance the quality of decision-making in turbulent environments. Based on a study of new product development (NPD), Pavlou and El Sawy (2011) identify four capabilities that help reconfigure operational capabilities into new ones to better match the environment: (1) sensing; (2) learning; (3) integration, and (4) coordination capabilities. They note that these dynamic capabilities are neither exhaustive nor sufficient for reconfiguration to occur but see them as important enablers to reconfigure operational capabilities. Pavlou and El Sawy's (2011) model is shown in Figure 1, and definitions of dynamic capabilities and subroutines are presented in Table 1.

Figure 1: Dynamic Capabilities Framework (Pavlou and El Sawy 2011)

A framework for representing the proposed measurable model of dynamic capabilities.

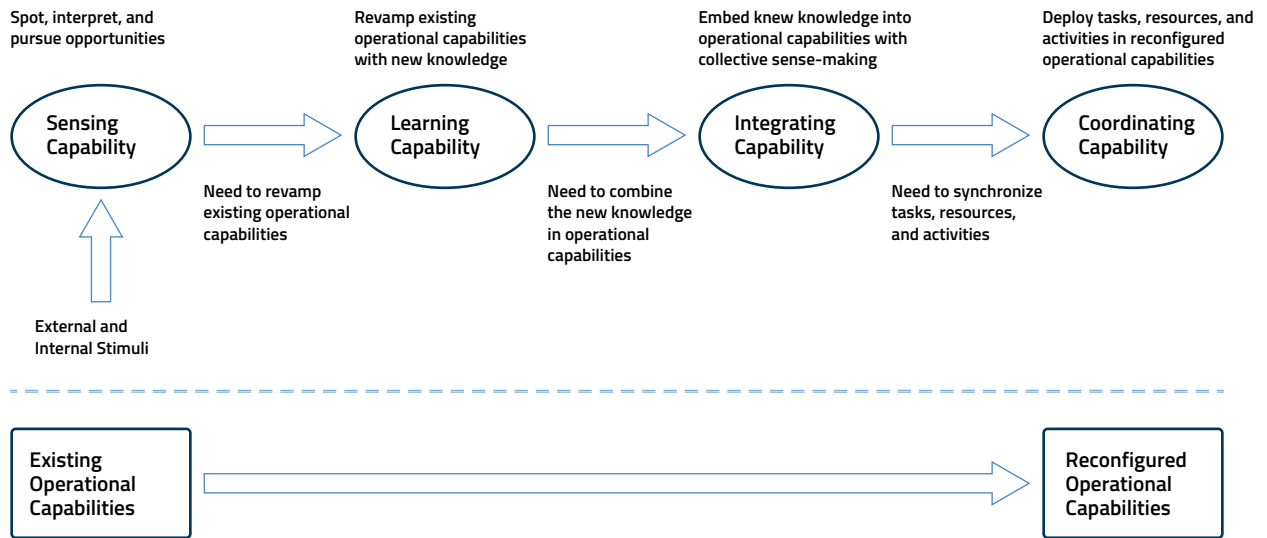


Table 1: Definitions and Subroutines

Reproduced from Pavlou and El Sawy (2011)

Capability	Definition	Subroutines
Sensing Capability	The ability to spot, interpret, and pursue opportunities in the environment. (Pavlou & El Sawy 2011)	<ul style="list-style-type: none"> Generating market intelligence (Galunic & Rodan, 1998) Disseminating market intelligence (Kogut & Zander, 1996) Responding to market intelligence (Teece, 2007)
Learning Capability	The ability to revamp existing operational capabilities with new knowledge. (Pavlou & El Sawy 2011)	<ul style="list-style-type: none"> Acquiring, assimilating, transforming, and exploiting knowledge (Zahra & George, 2002)
Integrating Capability	The ability to embed new knowledge into the new operational capabilities by creating a shared understanding and collective sense-making. (Pavlou & El Sawy 2011)	<ul style="list-style-type: none"> Contributing individual knowledge to the group (Okhuysen & Eisenhardt, 2002) Representation of individual and group knowledge (Crowston & Kammerer, 1998) Interrelation of diverse knowledge inputs to the collective system (Grant, 1996)
Coordinating Capability	The ability to orchestrate and deploy tasks, resources, and activities in the new operational capabilities. (Pavlou & El Sawy 2011)	<ul style="list-style-type: none"> Assigning resources to tasks (Helfat & Peteraf, 2003) Appointing right persons to right tasks (Eisenhardt & Brown, 1999) Identifying synergies among tasks, activities, and resources (Eisenhardt & Galunic, 2000) Orchestrating activities (Henderson, 1994)

While academics have widely accepted Pavlou and El Sawy’s (2011) model as a means to articulate “dynamic capabilities” as well-defined and actionable, little research has been done to understand the manifestation of these capabilities in concrete settings and how IT resources help to achieve these capabilities in the context of small service firms.

IT as an Enabler of Dynamic Capabilities

IT has long been proposed as a key enabler of organizational capabilities (Mata et al. 1995). Recent studies indeed show that IT not only supports organizational processes but also can be used to reconfigure them in ways that enable dynamic capabilities. In new product development (NPD), an IT-leveraging capability has a direct positive effect on dynamic capabilities because different types of IT systems enhance the ability of NPD work units to sense the environment, enhance learning, integrate resources, and coordinate activities (Pavlou & El Sawy, 2006). Our study examines how small service firms are using IT resources to reconfigure existing service offerings or are exercising specific dynamic capabilities with the help of IT.

The literature also suggests that leveraging IT to develop dynamic capabilities has a direct positive effect on competitive advantage (Pavlou & El Sawy, 2006). For example, Pavlou and El Sawy (2010) found that organizations can increasingly engage in competitive dynamics because their process changes are enabled or induced by IT. Similarly, other empirical studies confirm that competitive advantage can be achieved through effective leveraging of IT (Chi et al. 2007, 2008b): IT enables firms to become nimble and responsive to environmental changes and to execute swift competitive actions (Pavlou & El Sawy, 2010). Prior research generally demonstrates that IT enables dynamic capabilities, such as sensing, learning, integrating, and coordination (Pavlou and El Sawy, 2006). While most prior studies have examined the development of dynamic capabilities in large firms' NPD work units, our study focuses on small firms in the service industry. Furthermore, the study examines how firms leverage existing IT resources in *moderately* turbulent environments to build up their dynamic capabilities.

FINDINGS

Our focal firms are service providers in the defense contracting industry; they are classified as small businesses with less than 50 employees, and each has operated for between 4 and 10 years. All firms are continuously changing their service offerings to keep pace and remain competitive in the turbulent business environment. Our firms follow an industry standard BD life cycle process, in which they *identify opportunities, pursue opportunities, conduct proposal preparation and development, submit proposals, and conduct post-award notice operations*. We centered our discussion with the firms on the pre-award phases of the BD process and on the four dynamic capabilities (i.e., sensing, learning, integrating, and coordinating). In doing so, we found evidence of dynamic capabilities in our firms and treated these dynamic capabilities as first-order constructs; sub-routines of

these capabilities were treated as second-order constructs.

We offer a framework (Table 2) representing a pre-award phase of the BD process and the corresponding dynamic capabilities. The first column of the framework depicts the BD process, which we have chosen as the common operational process across the firms. The second column lists the four dynamic capabilities proposed by Pavlou and E-Sawy for reconfiguring operational processes into new operational processes. The third column lists sub-routines within each dynamic capability. Here, we use the notion of sub-routines as the empirical indicator that manifests the presence of the higher order construct of the dynamic capability (i.e., sensing, learning, integrating, and coordinating). We found IT to be a critical enabler, undergirding each dynamic capability by supporting or constituting related sub-routines. Appendix B provides more detailed evidence on how our firms used their IT infrastructure and tools to enact their dynamic capabilities.

How Firms Exercised Dynamic Capabilities in Their BD Process

Sensing Capability

Firms used direct contacts with customers to facilitate the initial phase of the BD process — namely, *Opportunity Identification and Development*. They often worked in close physical proximity to their customers and on occasion in government facilities. They used their professional relationships and daily interactions to collect and organize information to **generate business intelligence** — a Sensing Capability sub-routine. Although their proximity to the customer allowed them to gather information, they also recognized the need to enhance skills for the collection and interpretation of data to make more informed decisions. In each of our target firms, we found examples of the use of IT to enhance information spotting and interpreting skills. The firms used web-based application frameworks and platforms (e.g., SharePoint and GovWin) to collect, store, organize, share, and access information. With the help of a system for managing information about potential

Table 2: Business Development Process and Dynamic Capabilities

Business Development Process	Dynamic Capability (First-Order Constructs)	Dynamic Capability Sub-Routines (Second-Order Constructs)
Opportunity Identification and Development	Sensing	Generating market intelligence Disseminating market intelligence Responding to market intelligence
Pursuit	Learning	Acquiring knowledge Assimilating knowledge Transforming knowledge Exploiting knowledge
Proposal Development	Integrating	Contributing individual knowledge Representation of individual and group knowledge Interrelation of diverse knowledge
(Pre)Proposal Preparation	Coordinating	Assigning resources to task Appointing right person to right task Identifying synergies among tasks, activities, and resources Orchestrating activities

business opportunities, the focal organizations developed business intelligence by integrating information collected at customer sites with information collected through external industry interactions. The firms also used IT resources to store and **disseminate business intelligence** — another Sensing Capability sub-routine. This intelligence was made accessible to firm managers and other process owners so that they could use it to make more timely decisions, reconfigure their service offerings, and pursue new opportunities. Locally stored intelligence was also coupled with other information to **respond quickly to market intelligence**. One CEO noted, “we know we need program managers; let’s have a pool of them, and let’s use IT to do that. Let’s use social networking. Let’s use LinkedIn. Let’s use all of those different types of systems to have a pre-vetted pool of resources, so we’re not scrambling.” Although we found evidence of the firms’ exercising the sensing capability, we also found that the firms were challenged in using their IT resources to sense the environment. They were in a constant search for more advanced tools to search for and prioritize new business opportunities that were specific to their existing service offerings.

Learning Capability

All firms used new knowledge to reconfigure existing offerings to better **pursue opportunities** — phase two of the BD process. Firms used data providers to **acquire knowledge**, a Learning Capability sub-routine, over long periods and then stored the data until they were needed. They also made use of their internal talent by holding roundtable discussions and running meetings to exploit and integrate inter-firm knowledge and to **assimilate new knowledge**. Thus, firms were **acquiring knowledge** from customers, **transforming this knowledge**, and then **exploiting this knowledge** to resolve customers’ issues. One Director of BD offered this example: “...[We’re hearing an issue..., we gathered data, discussed the data, and figured out how to solve the problem.” The firms transformed

knowledge by correlating what they knew with new knowledge provided by their system used to track new business opportunities. They exploited the assimilated knowledge to make better customer-focused decisions and to generate more relevant service offerings. Firms also used conferencing tools, such as GoToMeeting, to interact with outside groups to share information and hold virtual meetings to **assimilate** and **transform knowledge**.

In addition, we found that firms placed significant emphasis on their ability to learn as an organization. Managers considered learning to be the most critical of the four dynamic capabilities. They were satisfied with their IT resources that supported the learning capability and felt that they had adequate knowledge about how to use these IT resources.

Integrating Capability

Firms leveraged their IT resources to **incorporate individual knowledge** — an Integration Capability sub-routine, during the *Proposal Development* phase. They used tools like SharePoint to share time-sensitive information, collected by remotely located team members, that could make a difference in the development of a successful bid. The firms used IT resources as a means of developing large, complex proposals. They divided these complex proposals into manageable components and then assigned section leaders to collect and prepare inputs for the proposal that **represented individual and group knowledge**. This approach ensured that all knowledge was captured and that the final proposal presented a single, common voice. One CEO reported that “we started an initiative at the beginning of the year where we bring everyone’s proposal content into one repository.” The firms also used IT to **explore and develop relationships** among the various components of knowledge that contributed to their proposal development. They made every effort to integrate collected intelligence with internally available information so that they could assemble well-researched solutions in their proposals.

Coordinating Capability

Firms leveraged their IT infrastructure as a means to coordinate proposal development during the *(Pre)Proposal Preparation* phase of their BD process. They **assigned IT resources**, a Coordinating Capability subroutine, by using tools like SharePoint and MS One Drive, which allowed virtual teams to collaborate and share information. Text messaging — a simple but effective way to communicate — facilitated collaboration between non-co-located team members. The firms also used human resource management (HRM) systems, which could identify and track pre-vetted individuals, to ensure that they **appointed the right person to the right task**. A CEO remarked, “when the government says ‘I need this type person in two weeks,’ we have somebody to give them...” IT also was used to coordinate and **identify synergies among tasks, activities, and resources**. For instance, multiple means of coordination, including text messaging, email, and FaceTime, supported the bidding process. The firms also built templates from previously successful proposals and used them as a starting point for new proposals, thus identifying and using synergies between the previous proposals and their current efforts. To **orchestrate activities** in their (pre)proposal preparation and the proposal writing process, they used video services (e.g., FaceTime and Skype) to hold virtual meetings. The small firms became increasingly adept at facilitating coordination by leveraging their IT resources.

We found that our firms exercised the most creativity during their coordinating efforts. Although our analysis shows evidence of coordinating capability in each of the firms studied, we also found the greatest variation among the firms in how they achieved coordination. All the firms possessed essentially the same tools, but we noted wide variations in the effectiveness with which these tools were used to achieve coordination and its sub-routines.

LESSONS FOR PRACTICE

Change is difficult in any industry, but it is especially challenging for small service firms that operate in an environment characterized by rapid technological innovation. The development of dynamic capabilities to deal with such industry turbulence was the focus of this study. Based on the findings of our study, we offer the following recommendations to help small service firms enhance their dynamic capabilities through the use of IT.

How to Use IT to Enable Four Dynamic Capabilities

Sensing: *Firms need to leverage their IT resources to enhance their ability to collect information about changing market conditions.*

Firms should train employees who directly support customers to listen for, identify, and gather critical information about their changing needs. Managers should carefully analyze this information to better understand the evolving needs of their customers. Example of IT tools that can help firms to enhance their sensing capability include intelligence-gathering tools (e.g., GovWin) that provide access to available opportunities and that track competitors and key decision makers; information-sharing tools, such as Share-Point; and analytical tools that help analyze and predict demand for products and services.

Learning: *Firms need to assimilate and exploit new knowledge to reconfigure existing offerings that better satisfy new customer requirements.*

Acquiring, assimilating, and transforming knowledge is essential to producing new offerings or introducing process changes that meet new customer requirements in rapidly changing environments. Collaboration tools that help various internal and external stakeholders share relevant information and knowledge management systems that help to assimilate knowledge gathered from both internal and external

sources could help identify opportunities for reconfiguration of existing offerings to satisfy new customer requirements.

Integrating: *Firms need to leverage IT resources to develop a collective understanding of how this knowledge could be used to enhance operational capabilities.*

Firms should engage in developing a common understanding by codifying the newly acquired knowledge (i.e. converting tacit knowledge to explicit knowledge). Codification allows individual knowledge and expertise to be shared with other stakeholders so that firms can develop a collective understanding of how such knowledge could be used to support and enhance operational capabilities. In addition, knowledge management and information sharing systems can help facilitate coordination among various team members in the organization who work together on complex tasks like proposal preparation. Such systems help managers to integrate all available information, to establish a comprehensive understanding of the environment, and to develop relevant service offerings.

Coordinating: *Managers need to use IT resources to facilitate reconfiguration of operational capabilities.*

When coordinating reconfigurations of offerings or processes, managers can use existing IT systems to break complex tasks into manageable components so that individuals and teams can work in parallel. Using IT resources to facilitate the distribution of process and product templates can provide firms with a significant advantage over their competitors. Collaboration tools that help to coordinate the tasks performed by various organizational stakeholders facilitate the reconfiguration of capabilities available in and to the organization.

CONTRIBUTIONS TO THEORY

Our study uses Pavlou and El Sawy's model (2011) as a conceptual scaffolding for an inquiry into how dynamic capabilities are organized as routines and thus provides important micro-foundations for understanding dynamic capabilities. In this regard, our study extends our understanding of how dynamic capabilities can be developed in small service firms in the defense contracting industry. Our findings reveal IT to be a critical enabler of the development and use of dynamic capabilities, and we offer further evidence of the link between IT and organizational performance (Tallon and Pinsonneault, 2011; Wu et al., 2015).

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APPENDIX A

Table 3. Focal Organizations

	Employee Count	Core Competencies	Select Customers	Years in Business
Site 1	< 50	Application modernization, infrastructure modernization, and business process optimization	Department of Defense, Veterans Administration, and Department of Homeland Security	8
Site 2	< 50	Engineering and technology, business analytics, enterprise concepts and strategy, data and information management	Department of Defense	5
Site 3	< 50	Science and technology, research and development, training, testing and evaluation, and program management	Department of Defense, Federal Bureau of Investigation, and the Office of Naval Research	10
Site 4	< 50	Total life cycle management, workforce training, process improvement, and technology transition	Department of Defense	4

Table 4. Interview Data

Organization	Interviewee Title
Company 1	HR Manager COO Program Manager CEO
Company 2	Senior Engineer Senior Financial Analyst Business Analyst Senior Engineer Managing Director
Company 3	VP Program Manger Operations Manger Director of Business Development Director of HR President and CEO
Company 4	Senior Engineer President Director of HR Chief Engineer Program Manager

Table 5. Interview Protocol Excerpt

1. Background	
1.1	Please state your job title and how long you have been in this position.
2. Industry Turbulence: Turbulence describes the conditions of unpredictability in the environment because of rapid changes in customer needs, emerging technologies, and competitive actions.	
2.1	Do you consider your industry to be moderately dynamic, which means the industry structure is stable?
3. IT Innovation: IT innovation is defined as the creation and new organizational application of IT infrastructure and IT capabilities.	
3.1	Can you describe your existing IT infrastructure, which is the set of IT hardware, software, and networks, including applications software and database management software, that is available to your firm?
3.3	Can you give me an example of an IT innovation that your firm implemented to overcome a situation brought on by industry turbulence?
4. Dynamic Capabilities: Dynamic capabilities can be defined as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.	
4.4	Does your firm exercise a "sensing capability" to spot, interpret, and pursue opportunities?
4.5	Does your firm exercise a "learning capability" to revamp existing operational capabilities with new knowledge?
4.6	Does your firm exercise an "integrating capability" to embed new knowledge into operational capabilities?
4.7	Does your firm exercise a "coordinating capability" to deploy tasks, resources, and activities in reconfigured operational capabilities?
5. Competitive Advantage	
5.1	Does your firm exploit tangible firm resources, such as IT hardware and software, in the execution of its business processes?
5.2	Does your firm exploit intangible firm resources, such as IT-enhanced capabilities, in the execution of its business processes?

Table 6. Select Quotes for Each Dynamic Capability and Sub-Routines

Dynamic Capability	Sub-Routines	Industry Quotes
Sensing	<p>Generating market intelligence</p> <p>Disseminating market Intelligence</p> <p>Responding to market intelligence</p>	<p>"The owner of the company, he's constantly out there, you know, networking with people that he knows in the industry."</p> <p>"tools like GovWin... that provide you with a little bit of business intelligence."</p> <p>"...we need better tools that... monitor the types of opportunities we're interested in..."</p> <p>"we're using a SharePoint space and messaging and notifications..., collecting the data and the information in a common place."</p> <p>"We know we need program managers, let's have a pool of them. Let's use IT to do that. Let's use social networking. Let's use LinkedIn. Let's use all of those different types of systems to have a pre-vetted pool of resources, so we're not scrambling."</p> <p>"You know, it might have taken anywhere from two weeks up to a month to find the right person. Well, the way that the government is working right now we really have to compress that timeline and so we're constantly using technology to build a pool of resources, pre-vetted, you know, we've already talked to them. We have a repository, you know, we can go out and choose a person of the ilk that we know we're going to need."</p> <p>"...because in our case if we thought that 'hey, we just identified, you know, some market information and some learning objectives that we need to implement into our business process to be competitive within the next 3 months,' we'd do that."</p>
Learning	<p>Acquiring knowledge</p> <p>Assimilating knowledge</p> <p>Transforming knowledge</p> <p>Exploiting knowledge</p>	<p>"...in proposal development, there is content that can be reused... so we've built a library..."</p> <p>"...we use our CRM tool and SharePoint to store knowledge... and cross between teams."</p> <p>"...we're hearing an issue.... We gathered data, discussed the data, and figured out how to solve the problem."</p> <p>"you're taking in data, but you have to leverage what you already know to be able to analyze and understand the problem..."</p> <p>"...teleconferencing and net-conferencing to quickly share information with a group of people that aren't co-located.... You've got the ability to rally the members of your team virtually..."</p>
Coordinating	<p>Assigning resources to tasks</p> <p>Appointing the right person to the right task</p> <p>Identifying synergies among tasks, activities, and resources</p> <p>Orchestrating activities</p>	<p>"We have within SharePoint several different things that we use for business development, to track RFIs, RFPs, to write proposals, to share that work. We also do that for existing programs, for different reporting types — you know, for different customers, monthly status reports, financial reports, etc. We buy services from some organizations like LinkedIn or Monster for doing searches for employees, with a particular skill sets."</p> <p>"When the government says I need this type person in two weeks, we have somebody to give them, versus let's put it in the marketplace and try and find somebody.... That's very difficult to do."</p> <p>"...we leveraged teammates in a kind of distributed effort to get proposals together... — collaboration on the front end to synchronize expectations for everyone's assignments. And then we release everyone to do their writing and their work and then you bring it back at kind of some synchronizing points... where we'll integrate everyone's input..."</p> <p>"...we're still using a number of ways of coordinating; sometimes SharePoint, sometimes email, sometimes text message, sometimes voicemail. I don't think we've found a particular method or means of coordination that works all the time.... We try and coordinate using multiple means."</p>
Integrating	<p>Contributing individual knowledge</p> <p>Representation of individual and group knowledge</p> <p>Interrelation of diverse knowledge</p>	<p>"We have remote workers to work on-site with the client or work in a different geographic area, and we share information through some of the different tools that are available, like the Office 365 Suite...and a great collaborative tool that has a SharePoint site that we leverage."</p> <p>"We started an initiative at the beginning of the year where we bring everyone's proposal content into one repository."</p> <p>"We use GovWin and Salesforce as our primary tools for pipelining."</p>

ABOUT THE AUTHORS



Gabriel Beltran serves as the Chief Executive Officer for Skylla Engineering Ltd., an engineering services company providing engineering and technical services to federal government. Gabe founded Skylla Engineering in 2004, and is Service Disabled Veteran Owned Small Business. Over the past 4 years, Gabe and Skylla raised and contributed over \$485,000 for the Marine Semper Fi Fund that provides immediate financial support for critically injured and ill Marines and their families. Gabe is a retired Marine Officer with over 22 years of service, rising from the rank of Private to Major. Gabe is a graduate of Texas Tech University, holding a BSME, and a graduate of the Naval Post Graduate School, holding an MSEE. Gabe earned his Executive Doctorate of Business at Georgia State University. Gabe has been an invited speaker on topics such as issues affecting small business and the role of businesses in the community. Gabe resides in Houston, Texas with his wife of 35 years, Maria. They enjoy two sons and three grandchildren together. Gabe enjoys exercise and participates in Triathlons to include Ironman Texas, 2014.



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