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The Role of Dynamic Capabilities in Creating Business Value from IS Assets

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ABSTRACT

This paper draws on and extends the emerging literature on dynamic capabilities to understand and explain the role of information systems (IS) assets in creating business value. Our analysis identifies the critical roles of managerial actions and the organizational context in identifying, resourcing and implementing IS-enabled competitive actions in delivering business value. This paper extends earlier treatments of the relationship between IS assets and organizational strategy and performance by explicitly accounting for the roles of human agency and context, which have not been adequately addressed in prior literature. A research model for future research is proposed.

Keywords (Required)

Dynamic capabilities, IS assets, strategy, human agency, context, organizational performance.

INTRODUCTION

Delivering value from organizational investments in information systems (IS) remains an important theoretical and managerial challenge (Kohli & Grover, 2008). Prior research in this area has identified the roles of a number of resources, such as specific types of IT (Aral & Weill, 2007), organizational capabilities (Sambamurthy, Bharadwaj, & Grover, 2003), resource complementarity (Nevo & Wade, 2010) and internal fit (Sharma, Yetton, & Zmud, 2008), in generating business value from IS assets.

However, the role of agency and context in shaping competitive actions and their performance outcomes has not been adequately examined in the literature. In particular, while recent literature has focused on the key role that IS-enabled competitive actions play in delivering value from IS investments (Kohli, 2007; Sambamurthy et al., 2003), it is not clear how an organization's internal context enables or constrains the ability of managers to devise and execute IS-enabled value-creating actions? Further, while prior literature gives a good description of the IS assets, capabilities and resources that a high-performing organization possesses, it does not adequately address a more fundamental theoretical issue of how the organizational context and managerial actions shape the development and execution of IS-enabled competitive actions. These are important questions as they mirror a key issue faced by top and middle managers in organizations, viz. "What should I do to generate value from the investments in IS that my firm has made?"

The absence of agency and context in current theories is an important limitation. To address this limitation, this paper draws on and extends the emerging literature on dynamic capabilities (Eisenhardt & Martin, 2000; Helfat et al., 2007; Teece, 2009) to understand and explain the role of managerial actions and the organization's internal context in developing and implementing IS-enabled value-creating actions and delivering performance gains.

Specifically, this paper makes three contributions to the literature. First, the extant literature generally abstracts away the role of managers in the process of creating value from IT investments. This limitation mirrors that in the broader strategy literature which has focused extensively on the strategy content, while research into the strategy process has been relatively neglected (Helfat et al., 2007). The model developed here addresses this limitation to explicitly include the roles of managers in searching, selecting and executing value-creating competitive actions.

Second, extant literature largely ignores the role of the organizational context in generating and delivering value-creating actions. This paper addresses this limitation by including the effects of three key contextual variables, social capital, transactive memory, and organizational structure on managerial actions and organizational performance. Finally, it extends the dynamic capabilities perspective by clarifying the distinct contributions of search and select, and asset orchestration capabilities in undertaking competitive actions (Helfat et al., 2007).

This paper is organized as follows. We begin by illustrating the roles of agency and context in shaping IS-enabled competitive action. We then review the treatment of agency and context in the extant literature and identify the implications

of not explicitly including these constructs. Next, we draw on and extend the dynamic capabilities theory to account for the effects of agency and context. Finally, we discuss implications for future research.

IS ASSETS AND ORGANIZATIONAL PERFORMANCE

The IS literature has a rich tradition of theorizing the relationship between IS assets and organizational performance (Kohli & Grover, 2008; Sambamurthy et al., 2003). A key argument underpinning recent literature is that competitive actions mediate the relationship between IS assets and firm performance: IS assets enable organizations to take more frequent and complex competitive actions resulting in improved firm performance. For instance, Sambamurthy et al. (2003, p. 238-241) argue that IT investments create digital options that can be exploited through competitive actions, such as innovations in products, services and channels. Similarly, Piccoli and Ives (2005) argue that IT-dependent competitive moves are key to the creation and appropriation of economic value and delivering high levels of firm performance.

However, despite the recognition of the key role of competitive actions, extant literature generally does not explicitly include the roles of human agency and context in undertaking competitive actions. Agency and context are key concepts in understanding social phenomena: They define 'what is' in the social world and are therefore a fundamental means of understanding individual actions (Jones & Karsten, 2008). Agency refers to the capacity of individuals to act independently and to make their own free choices. Individuals have the capacity to construct and reconstruct their worlds and act autonomously. However, individual actions take place within a structure that is both constituted and reconstituted by human actions. Context refers to the set of structures within which actions are embedded. Structure and agency are viewed as a mutually interacting duality that shapes social phenomena (Giddens, 1976). Structure both constrains and enables individual actions: while it constrains action, it is also a resource deployed by humans in their actions (Walsham & Han, 1991).

We argue here that an understanding of human agency and the relationship between context and the actions of human agents are important for understanding the role of IS in contributing to organizational performance. Undertaking competitive actions is, at its core, a social phenomena involving multiple actors. An understanding of the role of agency and context is crucial in understanding and explaining the process by which information systems enable change in an organizational context (Orlikowski, 1993). While this perspective has been employed in prior research to understand the process of IS-enabled adaptation, we employ it here to understand the effects of IS on competitive actions and performance. This extends prior research into the strategy process, which has also started to focus on the role of human agency in explaining innovation and change (Helfat et al., 2007).

In current theorizing, agency is often ascribed to organizational capabilities or resources (Nevo & Wade, 2010; Sambamurthy et al., 2003). This obscures the role that organizational members play in developing, implementing and successfully executing competitive actions. Further, the extant literature also generally ignores the role of the organizational context in shaping and constraining human actions. This too is an important limitation of the literature as it obscures an understanding of the role of situational context in enabling or constraining the ability of human actors to undertake competitive actions.

In this paper, we draw on the foundation developed in current theorizing to develop a complementary perspective that explains firm performance as a function of the capabilities of IS assets, human actions and the organizational context within which those actions take place. Placing human actions and organizational context at the core of such theories generates better prescriptions for actions that can be employed by managers to improve performance.

Agency and context in IS-strategy research: An illustration

Good descriptions of phenomena are good starting points for developing good theory (Gregor, 2006; Whetten, 1989). Following this dictum, Sharma et al. (2010) present an illustration from IS research that describes the role of managers and the strategy process in creating competitive actions and contributing to firm performance. They draw on Kohli's (2007) rich case study of how managers at UPS leveraged their IS assets to undertake competitive actions and create organizational value. Sharma et al. (2010) draw a number generalized insights into the role of IS assets, human actions and the organizational context in creating value-creating actions and contributing to organizational performance. They argue that:

One, generating and executing value-creating actions involves multiple organizational members across multiple business and functional areas of an organization. Irrespective of the level of integration of IS assets across the organization, competitive actions and performance gains are the result of dispersed exploitation. IS-enabled value creating actions involve diffused exploitation across business units, functional areas and hierarchical levels.

Two, organizational routines to intervene in the product, customer, supplier, and operations spaces are essential for obtaining performance gains from IS assets. In the absence of institutionalized routines for generating competitive actions, organizations are unlikely to obtain performance gains from their IS assets.

Three, performance gains from IS assets cannot be planned or predicted at the time an organization makes its investments in those assets. The specific IS-enabled competitive actions that will be identified and pursued are an outcome of entrepreneurial processes in response to local conditions, not of ex-ante planning.

Four, the magnitude of performance gains available from individual competitive actions are often marginal, rather than substantial. However, organizational performance gains resulting from the sustained accumulation of small gains from multiple applications across multiple functions could be substantial.

A review of a number of other cases describing the role of IS assets and human action in contributing to firm performance, for example, Harrah's (Piccoli & Ives, 2005) and Continental Airlines (Anderson-Lehman, Watson, Wixom, & Hoffer, 2004), confirms these insights.

We conclude that IS assets may not be "a killer application" by themselves. Rather, IS assets provide a platform from which a number of competitive actions could be launched. This echoes Sambamurthy et al.'s (2003) conclusions regarding the role of IT as a digital options generator, as well as Nevo and Wade's (2010) notion of the complementary effects of IS and other synergistic resources. However, it also extends those notions by highlighting the role of managerial actions and the organizational context in exploiting IS assets.

Agency and context in extant research: A review and critique

Not explicitly including human agency in models of strategy often has unintended consequences on the form of the theory that is developed. For instance, Sambamurthy et al. (2003) argue that superior IT assets and resources lead to superior firm performance. Specifically, they argue that IT investments and capabilities lead to organizational capabilities, which interact with each other to produce competitive actions and impact organizational performance (Sambamurthy et al., 2003, Figures 1 and 2).

Sambamurthy et al. (2003) argue that their theory can be considered both a process theory and a factor theory. A process interpretation of their theory suggests that IT investment is the driver of a process that culminates in improved firm performance, i.e. IT investment or capabilities set in motion a 'process' that culminates in the end state. In this respect, these theories are examples of life cycle process theories (Van de Ven, 1992, p. 177). Life cycle process theories "assume that change is immanent": that there is an underlying "logic, program, or code" that governs and regulates progression through stages (Van de Ven, 1992). The intermediate and end stages of the process are "already prefigured in the present state." Development through the stages of the life cycle is similar to the development driven by the operation of a genetic code contained within the body that regulates in a prefigured manner the stages of growth and development (Van de Ven, 1992).

Within the above interpretation of Sambamurthy et al.'s theory, there is no explicit role for human agency in influencing the process or the outcomes. Rather, agency is ascribed to certain organizational characteristics that are implicitly assumed to provide the teleological engine that enables the unfolding of a process set in motion by IT investment (Van de Ven, 1992). Admittedly, the model proposed by Sambamurthy et al. is more complex. However, the absence of human agency is evident in other key organizational characteristics included in the model too, e.g. IT competence and entrepreneurial alertness. These constructs are conceived as organizational-level properties or resources possessed by organizations. These organizational characteristics are exogenous givens and there is no explicit recognition that they are enabled by volitional human conduct. This process is similar to the manner in which DNA drives the growth of living organisms – while human actions can have some influence on a person's growth trajectory, there is no influence on the unfolding of the code immanent in the DNA.

The absence of human agency is also evident in the manner in which agency is ascribed to non-human actors, primarily, the firm. For instance, "Firms leverage two distinct mechanisms in the form of resource-picking and capability-picking" (Sambamurthy et al., 2003, p. 239); "firms possess perfect and complete knowledge … firms might possess imperfect knowledge … firms differ in their knowledge … firms have their own cognitive maps … firms are often ignorant of the real market opportunities" (p. 242); "firms that possess a more complex base of resources and capabilities will be in an advantageous position to launch competitive actions" (p. 246); "Entrepreneurial alertness is the capability of a firm to explore its marketplace …" (p. 250); "… firms continually develop their capabilities and shape their strategic conduct over time" (p. 256).

While ease of linguistic exposition often leads to inadvertent imprecision in expression[1], and some of the quotes above no doubt reflect that, it can also reflect an underlying philosophical position.

[1] Such instances occur in this paper too.

The exclusion of human agency is also generally reflected in the manner in which the resource-based view of the firm has been applied in the IS literature. Applications of the resource-based view typically model organizational value as a function of certain characteristic of resources, specifically the valuable, rare, inimitable and non-substitutable (VRIN) properties of resources (Wade & Hulland, 2004). Extending that paradigm, Nevo and Wade (2010, p. 164) argue that organizational value should be modeled as a function of the emergent capabilities that arise from certain resource configurations. However, which resource bundles have emergent capabilities is not a judgment that can be made a priori according to some theoretical framework. Rather, claims that certain resource bundles have emergent properties are made on a post hoc basis.

Nevo and Wade's (2010, p. 170) definition of compatibility in terms of fit and congruency also reflects a post hoc self-referencing orientation that also characterizes the resource-based view: "… organizational resources and IT assets are compatible when the features and functionalities of the latter fit, or are congruent with, the working routines, level of expertise, and other characteristics of the former." Similarly, they define IT asset-organizational resource compatibility as "the ability of an organizational resource to apply an IT asset in its regular activities and routines" (Nevo & Wade, 2010, p. 170). In both cases, the predictor construct is defined in terms of the criterion construct. Overlapping definitions, such as the ones above, can produce tautological relationships that are empirically difficult to test. Indeed, Nevo and Wade (p. 179) acknowledge this difficulty when they observe that "valid and reliable measures of resource properties have not yet been developed."[2]

Theories that do explicitly include human agency but focus instead on abstract constructs, such as organizational capabilities, synergy and emergent VRIN properties of resource bundles result in implications for practice that could be difficult for managers to follow. For instance, Nevo and Wade's suggestion to practitioners is that "managers should think about synergy and compatibility, and make an effort to integrate IT assets and organizational resources in a manner that is conducive for the realization of synergy" (Nevo & Wade, 2010, p. 179). However, the above models ascribe agency to "organizational resources", defined as "tangible or intangible factors of production that the organizations own, control, or have access to on a semi-permanent basis" (Nevo & Wade, 2010, p. 164), rather than to managers. More importantly, since such theories usually do not explicitly include constructs relating to managerial actions, it is difficult for managers to figure out what actions will result in the realization of synergies.

Piccoli and Ives (2005) offer a contrasting perspective that acknowledges the role of agency: "Our focus on IT-dependent strategic initiatives is rooted in a perspective that views strategy not as the making of a few discrete "one time" decisions, but as the configuration of interrelated and interlocking activities" (2005, p. 748). Further, they argue that "competitive advantage accrues when competitors face significant challenges in acquiring, developing, and using the resources underlying the value creating strategy" (2005, p. 749). Their notion of competitive response too has agency at its core: "Once rivals recognize that a firm has achieved a position of advantage, they begin to scrutinize in an effort to identify its sources, Considerable ambiguity may exist with respect to these sources, however, making it difficult for imitators to mount a response" (2005, p. 749).

Piccoli and Ives (2005, p. 750) also implicitly argue for the influence of context on competitive actions: "Different competitors will move with different speed and with different degrees of success … Response-lag drivers are characteristics of the firm, its competitors, the technology, and the value system in which the firm is embedded."

We propose here that since resource compatibility cannot be predicted by the properties of the interacting resources, a more fruitful avenue for research is to develop a theory where managerial actions to create compatibility between resources and generate organizational value are the key constructs.

While we have critiqued at some length the theories proposed in Sambamurthy et al. (2003) and Nevo and Wade (2010), we clarify that it is not our intention to critique these specific papers. We acknowledge the significant contributions that they make to the ongoing discourse. Rather, we have employed these seminal works to illustrate our argument regarding the absence of agency and context in extant theories. Indeed, the absence of agency and context is evident in a number of other seminal papers too, for instance, Powell and Dent-Micallef (1997), Wade and Hulland (2004), Tanriverdi (2005, 2006), Pavlou and El Sawy (2006, 2010), Aral and Weill (2007), Rivard et al. (2006), and Mithas et al. (2011). Space considerations prevent a fuller discussion of other papers.

[2] As a solution, they recommend that perceptual constructs be employed to test their model. However, as Sharma, Yetton and Crawford's (2009) analysis of the effect of method bias shows, the use of perceptual constructs is likely to produce spurious support for theories on account of the very high levels of method bias.

A DYNAMIC CAPABILITIES PERSPECTIVE

The dynamic capabilities perspective offers a complementary theory-building perspective. In contrast to the perspectives focusing on organizational characteristics and resource properties as drivers of organizational performance, the dynamic capabilities perspective focuses on the role of human actions. Two key limitations of strategy research motivate the dynamic capabilities perspective. The first limitation is the abstracting away the role of managers in creating value through orchestrating organizational assets (Helfat et al., 2007, p. 19-21). The second is the almost exclusive focus on strategy content research, to the exclusion of research on the process of strategy formulation (Helfat et al., 2007, p. 30-33). The literature on IS assets and strategy has broadly mirrored these two limitations of the strategy literature, as illustrated above.

A point of departure for the dynamic capabilities perspective is to understand the role of managers in realizing the optimal value of assets that the firm possesses. The dynamic capabilities perspective recognizes that under certain conditions firms can create value from specific resource bundles in ways that markets cannot. This is on account of market failures arising from many causes, for instance high transaction costs, contract incompleteness and the thinness of markets for identifying, building, aligning, adapting, and coordinating activities involved in creating configurations of co-specialized assets (Helfat et al., 2007, p. 28-29; Teece, 2009). However, rather than focusing on the properties of resources, scholars in this tradition focus on the actions of managers in creating special value within the firm by good alignment of co-specialised assets (Helfat et al., 2007, p. 28). Firms are able to capture this special value as managers within the firm can apply their entrepreneurial insights to search, select and orchestrate assets to create configurations of co-specialized assets and to maintain them in value-creating alignment (Teece, 2009). The strategic role of astute managers in "orchestrating complementary and co-specialized assets, inventing and implementing new business models, and making astute investment choices in situations of uncertainty and ambiguity" (Helfat et al., p. 25) is key to creating firm value.

Dynamic capabilities refer to "the capacity of an organization to purposefully create, extend, or modify its resource base" (Helfat et al. 2007). Dynamic capabilities have their origins in stable patterns of collective activities that get invoked in organisations on a repeated rather than an idiosyncratic basis (Helfat et al., 2007; Teece, 2009). Dynamic capabilities are underpinned by institutionalized organisational and managerial processes and routines: "when we observe a dynamic capability in use, we are observing the underlying processes" (Helfat et al., 2007, p. 31). Two processes are critical for the operation of dynamic capabilities, search and selection processes, and asset orchestration processes. Search processes involve identification of a need or opportunity, while selection processes involve processes for formulating actions and resource allocation (Helfat et al., 2007, p. 30). Search and selection processes may include designing new business models, selecting configurations of co-specialized assets, selecting investments and courses of action to invest in, and selecting organisational, governance and incentive structures (Helfat et al., 2007, Figure 2.3, p. 28).

While search and selection processes deliver decisions and the commitment of resources, the ability to put those decisions into effect and executing the changes depends on a related, but independent dynamic capability – the ability to orchestrate assets (Helfat et al., 2007, Figure 2.3, p. 28). Asset orchestration dynamic capability refers to the "assembling and orchestrating configurations of co-specialized assets" toward creating innovation and new market opportunities (Helfat et al., 2007, p. 24-27). Asset orchestration involves astute decision making and entrepreneurial capacity and is the process through which new combinations and co-alignment of assets are achieved (Teece, 2009).

The dynamic capabilities perspective has generally treated the two components of dynamic capabilities, search and select, and asset orchestration as equivalent in terms of their effect on organizational performance (Helfat et al. 2007; Teece 2009). Here we extend the dynamic capabilities perspective and propose that the two capabilities, search and select, and asset orchestration, influence organizational performance through different mechanisms and that they occupy unique and non-equivalent positions in the nomological net relating IS assets to organizational performance. Further, we argue that the two capabilities reside in different sets of actors and that the factors influencing the development of these capabilities are also distinct.

We argue here that search and selection capability rests on routinely enacted managerial processes to identify actions for improving performance and committing specific resources to selected courses of action. These processes often rely on information to aid the search and selection processes. The availability of IS assets delivering high quality data and analysis to decision-makers is likely to make the search and selection capability more effective, resulting in a positive effect on the competitive actions that the organizations undertake. The two resources, IS assets and search and selection routines, exert an interactive effect on competitive actions.

Asset orchestration capabilities, on the other hand, rest on routinely enacted managerial processes to undertake change. The changes may be in the form of new products, new processes, new decision-making routines, new reporting relationships etc. Asset orchestration often requires a high degree of coordination across organizational boundaries to undertake changes.

Implementing change requires support, sponsorship and alliances with other internal actors as changes often require the development and institutionalization of new patterns of interdependent action repertoires (Sharma et al., 2008). Social capital is an important enabler of asset orchestration capability: "Social ties facilitate inter-unit resource exchanges and promote product innovation … Absent this social capital, resources remain unconnected and opportunities go unrealized" (Blyler & Coff, 2003, p. 680). Social capital enables trust, communication, and coordination leading to higher levels of asset orchestration capability. Asset orchestration capability is also likely to be positively influenced by a well-developed transactive memory system, i.e., a knowledge of "who knows what" and "who does what" (Brandon & Hollingshead, 2004; Sharma & Yetton, 2007).

The influence of social capital and transactive memory represent the effect of context on human actions. Contexts with a high level of social capital and a well developed transactive memory system are likely to be better at orchestrating assets to undertake competitive actions.

We consider here the effect of another key contextual variable, organizational structure, which influences the ability of managers to undertake competitive actions and also directly influences organizational performance (Gavetti, 2005). In addition, a number of control variables, such as size, age, operational capabilities, incentive structures, R&D intensity, diversity etc. that have been hypothesized in prior literature to influence performance (Hitt, Hoskisson, & Kim, 1997).

Figure 1 summarizes the discussion in this paper. Search and select actions, asset orchestration actions, and value-creating competitive actions represent the role of human agency; transactive memory, social capital and organizational structure represent the effect of context, and control variables represent the effect of other variables identified in prior literature as influencing performance.

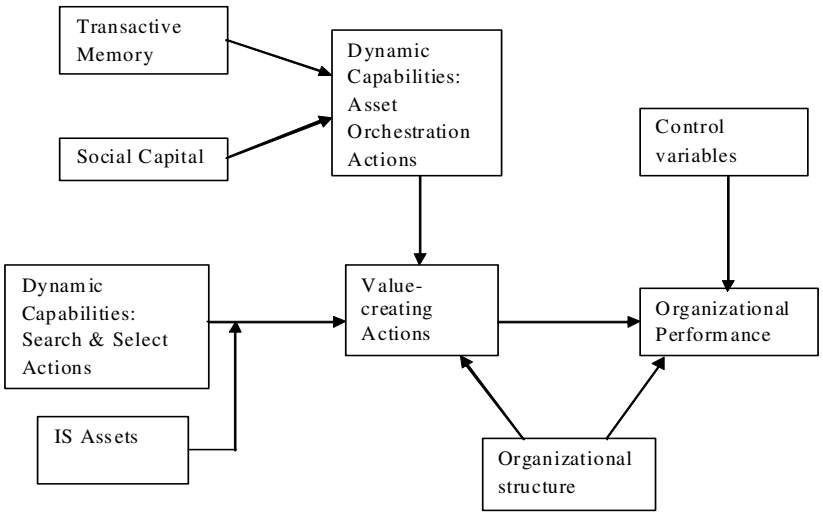

Figure 1: Dynamic capabilities, IS assets and organizational performance

DISCUSSION AND CONCLUSIONS

This paper has developed a model of the relationships between IS assets, dynamic capabilities, organizational context and organizational performance. The key contribution of this paper is a model that specifically includes the effect of agency and context in explaining organizational performance. This complements and extends prior literature in this area that has focused on the effect of resources and resource bundles on performance. It also extends the dynamic capabilities perspective by identifying the distinct roles of search and select and asset orchestration capabilities.

The model developed here has clear implications for practice. It can both explain performance and suggest courses of action for improving performance in terms that are managerially actionable. Specifically, the model suggests that routinization of search and selection, improving social capital and transactive memory, and increasing autonomy and reducing interdependence improve the ability of the organization to undertake competitive actions and improve performance.

The model is also easily testable as it is based on constructs that are directly observable and measurable. Constructs for social capital and transactive memory have already been employed in the literature (Blyler & Coff, 2003; Brandon & Hollingshead,

2004); autonomy and interdependence are well developed constructs in the literature on structural contingency theory (Donaldson, 2001); and behavioral measures capturing routinized search and selection behavior and asset orchestration behavior can be easily developed employing the definitions of those constructs.

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