

Integrating marketing and information services functions: a complementarity and competence perspective

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Received: 18 September 2009 / Accepted: 8 November 2010 / Published online: 3 December 2010
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Abstract Integrating two disparate functions in organizations—marketing and information services (IS)—has become a critical business concern due to the increasing use of information technology (IT) to find and open new markets, deliver improved services to customers, and streamline internal marketing processes. This study appears to be the first to empirically examine the dynamics of bringing these distinct groups of specialists together. We investigate potential antecedents, consequences, and contingencies of IS-marketing integration, drawing on theories of complementarity and competence. Through a survey of IS and marketing executives, we learn that integration is facilitated by trust between the two functions and the interaction between IT strategic intent and customer orientation; it is impeded by a gap in top management knowledge of IT versus marketing. We also find that integration fosters the much-coveted capabilities of developing and introducing innovations (innovativeness) as well as responding flexibly, swiftly, and adroitly to

opportunities (strategic responsiveness). Additionally, we determine integration is bounded by market dynamism. In sum, integration between marketing and IS can be enhanced via managerial efforts, and the relationship is profoundly beneficial to businesses.

Keywords Marketing-IS functional integration · Innovativeness · Strategic responsiveness · Complementarity theory · Competence concept

Introduction

Today a major influence on marketing is information technology (IT). IT, or computer systems and related devices, helps firms find and open new markets, deliver improved services to customers, and streamline internal marketing processes. Examples are customer websites to collect detailed browsing and buyer information, intranet platforms to share best marketing practices across global subsidiaries, and artificial intelligence software to automate inventory management. To develop and exploit such technologies, two groups of specialists who have traditionally operated apart are now working together: marketers, who ensure the delivery of value to customers, and information services (IS) technologists, who provide the IT tools to do so. How well the two functions integrate in terms of their interactions and collaboration is a crucial concern, given the potential of IT to shape marketing strategies and improve firm performance (Dedrick et al. 2003).

Curiously, integration of the marketing and IS functions has not garnered much attention. Perhaps the dearth is due to a common assumption that we know all we need to about integration from studies on other cross-functional relationships. There is a sizable body of work about inter-group

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activities and relationships, especially on marketing-R&D collaboration in new product development (NPD) (e.g., Ayers et al. 1997; Song and Parry 1997). However, the issue of bringing marketing and IS work units together—how to do so (antecedents), what benefits result (consequences), and which boundaries apply (contingencies)—deserves examination due to the knowledge gaps in the extant cross-functional and marketing literature.

Knowledge gaps

The extant literature increasingly points out that, depending on which functions interact, the dynamics of integration differ. Henard and Szymanski (2001) determined through a meta-analysis that integration is not uniformly beneficial in NPD; rather, integration's outcomes depend on context. Troy et al. (2008) elaborated upon context by proposing that the functions involved matter. Olson et al. (2001) provided empirical evidence when they showed that R&D and operations jointly improve the early NPD stages, whereas marketing with operations aids the later stages. Likewise Maltz and Kohli (2000) found that drivers of integration vary by functional pair. Formalization, for instance, strengthens bonds between marketing and R&D, but not between marketing and manufacturing or marketing and finance. They warned that “the results obtained in previous empirical studies focusing on the marketing-R&D relationship may not be generalizable to other interfaces” (p. 488). Since the dynamics of integration are function-specific, and the marketing-IS interface has not been studied as best we know, the first knowledge gap is on bringing these two particular groups together.

The second gap is on strategic, firm-level implications of functional integration. The focus of integration studies involving marketing has been largely confined to tactical, project-level implications, such as a new product success (see Table 1). The reason is the predominant interest in creating new products for sales growth. Yet it has long been theorized that integration has broader implications (Lawrence and Lorsch 1967). Partnerships between functions are said to produce strategic, firm-level capabilities, which in turn determine overall business performance (Barney 1991). One such partnership is marketers working with IS technologists. It is through this interface—where one function identifies value-creating activities and the other assembles the enabling computer infrastructure—that companies appear to be developing two capabilities needed for today's rapidly changing and less predictable environments: innovativeness (the ability to create new products, ideas, and processes for internal and external use) and strategic responsiveness (the ability to respond quickly and well to market and technological opportunities) (Brynjolfsson and Schrage 2009). By studying marketing-IS integration, we

propose to extend knowledge on integration from a tactical, project-level focus to strategic, firm-wide implications.

The third knowledge gap is in theory. Within the cross-functional and marketing literature, several explanations have been proposed on what leads to and results from stronger ties between work units. Notable are frameworks by Gupta et al. (1986) and Ruekert and Walker (1987), which describe influences on and results of these ties, such as participative structures and relationship efficacy. While shedding much light on integration, these studies are particular to the marketing-R&D relationship and NPD setting. Moreover, they do not explain why distinct groups come together rather than remain apart, and what boundary conditions or contingencies around their joint endeavors exist. Henard and Szymanski (2001) and others suggest there are limits to the value of groups being highly intertwined, but what are those limits? We look for answers in two theoretical perspectives on intra-organizational and strategic effectiveness. One is the complementarity theory outlined by Milgrom and Roberts (1995) and the other is the competence concept articulated by Santos and Eisenhardt (2005). By utilizing these perspectives, we expand the theoretical base girding and illuminating functional integration.

Proposed study

To address the above gaps, we examine the marketing-IS interface. The purpose of our study is to understand the dynamics—antecedents, consequences, and contingencies—of integration between these two groups. Since there appears to be no prior empirical work, many variables may be investigated; for practical reasons, we confine our study to the few explained subsequently. We look at IT strategic intent, customer orientation, marketing-IS trust, and top management IT-marketing knowledge gap as possible antecedents; innovativeness and strategic responsiveness as potential consequences; and market dynamism as a boundary condition. We select variables that are either specific to this inter-group relationship and thus have not been studied before or are not well understood about integration generally and therefore warrant examination. In the next section we lay out the conceptual framework, drawing on the complementarity theory and competence concept. Thereafter we articulate the research hypotheses, detail the method and findings, and discuss managerial and research implications.

Conceptual framework

Complementarity theory

We begin by defining *marketing-IS functional integration* as the interactions and collaboration that bring marketing

Table 1 Functional Integration Studies Involving Marketing

Study	Functions sampled	Integration construct	Consequences studied
Song and Parry (1997)	New product managers	Cross-functional integration	<ul style="list-style-type: none"> • Market proficiency • Technological proficiency • Market intelligence • Relative new product success
Ayers et al. (1997)	R&D and marketing	R&D-marketing integration	<ul style="list-style-type: none"> • Relational norms • Perceived effectiveness • New product success
Stank et al. (1999)	Logistics	Marketing-logistics integration	<ul style="list-style-type: none"> • Overall performance relative to competitors • Marketing-logistics relationship effectiveness
Sherman et al. (2000)	R&D and any manager	R&D-marketing integration	<ul style="list-style-type: none"> • New product development cycle time
Song and Montoya-Weiss (2001)	New product managers	Cross-functional integration	<ul style="list-style-type: none"> • New product financial performance • New product competitive advantage
Leenders and Wierenga (2002)	R&D and marketing	R&D-marketing integration	<ul style="list-style-type: none"> • New product performance
Boyle et al. (2005)	New product managers	Support for functional integration	<ul style="list-style-type: none"> • Frequency of concurrent engineering usage • Functional representation on concurrent engineering teams • Customer representation on concurrent engineering teams
Sherman et al. (2005)	R&D and marketing	R&D-marketing integration	<ul style="list-style-type: none"> • Recording and retrieving new product information • Reviewing new product information
Masrek et al. (2008)	Any manager	Functional integration	<ul style="list-style-type: none"> • Intranet usage
Song and Swink (2009)	New product managers	Marketing-manufacturing integration	<ul style="list-style-type: none"> • New product ROI and market share

A sample, not complete compilation, of cross-functional integration studies involving the marketing function.

and IS groups together in a cohesive fashion (Kahn and Mentzer 1998). Our chief questions about integration are (1) what drives these two units, which are typically separate and distant, together or apart (antecedents); (2) what firm-level strategic capabilities result from this integration (consequences); and (3) how do the latter relationships depend on conditions external to the firm (boundaries)? We look to complementarity theory for insight on the first and second questions, and the competency concept for understanding on the third.

The theory of complementarity is rooted in the Resource-Based View (RBV). According to the RBV, firms perform differently due to varied resource endowments. Resources are all assets, processes, information, knowledge, and attributes controlled by a firm that enable it to be more efficient and effective (Barney 1991). Resources can be tangible such as capital and equipment or intangible such as trust, IT knowledge, and customer service commitment (Ray et al. 2004). Of particular value are complementary resources. Complementary resources, for example the technology know-how of computer engineers and the customer know-how of marketers, result in better capabilities when combined than if only one is present or they are managed

independently (Milgrom and Roberts 1995; Moorman and Slotegraaf 1999). The emphasis is on identifying mutually reinforcing pairs of factors, which do not have simple additive but rather multiplier effects, making them especially potent. The theory has been demonstrated in a range of issues, including planning capital investments with process re-engineering (Devaraj and Kohli 2000) and aligning skill and task complexities among knowledge workers (Chen and Edgington 2005).

Antecedents of integration Based on complementarity theory, we argue that when marketing and IS jointly gather their distinct resources, they create synergies in the form of integration, which in turn produces critical capabilities. We follow the notion of mutually reinforcing resources to identify pairs of distinct resources from each function that when combined propel integration. These antecedents are strategic, socio-cultural, and managerial in nature, consistent with major categories of organizational influences on intergroup dynamics (Griffin and Hauser 1996; Gupta et al. 1986).

The first pair of complementary resources is of a strategic nature: IT strategic intent and customer orientation. *IT strategic intent* refers to the degree a firm's IT is

strategically focused (Pollanis 2003; Tallon et al. 2000), and *customer orientation* is the degree to which a firm strategically focuses on customers' interests and value creation (Narver and Slater 1990; Rindfleisch and Moorman 2003). These are resources insofar as they help the firm achieve effectiveness through clarity of purpose. We selected these variables because they represent the primary strategic concerns of the IS and marketing functions, respectively. When applied together, such that the variables interact, functional integration may be enhanced.¹ Having a more focused IT strategy, along with a stronger customer orientation, may facilitate cross-functional exchanges since each side recognizes and aligns with the other's aims.

Another resource, of a socio-cultural nature, is trust (Barney and Hansen 1994). Trust, or social capital, is a resource in that it lubricates relationships and makes them efficient. The IS and marketing staffs have contrasting views and priorities (Basu and Jarnagin 2008). These differences reflect the classic divide between technical and non-technical personnel where a "glass wall" limits cooperation. To break this barrier, a dual form of trust—of marketing toward IS and IS toward marketing—may be needed. Called *marketing-IS trust*, it represents another pair of complementary resources that may spur integration. It refers to the degree to which positive expectations exist between IS and marketing personnel about one another's abilities, actions, and motives (Huff and Kelley 2003; McAllister 1995). We incorporate trust into our framework because it is deemed essential for boundary-spanning exchanges and organizational efficacy (Sitkin and Stickel 1996).

A third resource, of a managerial kind, is top management knowledge. Knowledge is a coveted resource since it forms a basis for competitive advantage (Barney 1991). One form of knowledge is held by senior managers, who keep abreast of both IT and marketing in order to recognize and seize opportunities that arise at their intersection. The twin areas of knowledge represent synergistic resources according to the complementarity theory. To the degree the knowledge domains are comparable or equal, instead of lop-sided or unequal, top management is able to direct and coordinate efforts of the marketing and IS staffs, ensuring that the workers coalesce around shared ends. We therefore look at *top management IT-marketing knowledge gap* as an antecedent of integration (hereafter called *top management knowledge gap*). It refers to the difference in the levels of top management knowledge of IT (current and next generation IT and its

applications) and of marketing (ways marketing builds and contributes to firm advantage, strategy, and success) (Armstrong and Sambamurthy 1999).

Consequences of integration The theory of complementarity also provides a useful perspective on the consequences of integration. As differing resources are shared between separate work units, the process creates strategic capabilities such as flexibility and faster time to market with innovations. The reason is that integration enables the formation of socially complex, causally ambiguous, firm-specific routines (Grant 1991; Milgrom and Roberts 1995). High integration may be difficult to achieve because it centers on such routines, characterized by tacit, human-to-human interfaces. Once achieved, however, integration represents a unique, difficult-to-imitate endowment leading to capabilities that produce superior returns (Menguc and Auh 2006).

Based on the theory, we argue that as marketing and IS staffs work cooperatively with each other, propelled by complementarities, two strategic capabilities result: *innovativeness*, which is the ability to introduce new ideas, processes, and products internally in the organization or externally in markets (Deshpande et al. 1993; Hult et al. 2004), and *strategic responsiveness*, or the ability to respond rapidly, flexibly, and well to changing market and technology opportunities (Grewal and Tansuhaj 2001; Zhang 2005). We focus on the two capabilities due to (1) conjectures that they result from complementarity-based integration and (2) evidence of IT's enabling role in producing new ideas as well as adjusting to environmental flux (Weil et al. 2002; Zhang 2005).

Competence concept

The competence concept is likewise rooted in the RBV (Santos and Eisenhardt 2005). The concept furthers the RBV by recognizing boundary conditions. It asks, what happens to resource configurations under greater or lesser market dynamism? The answer is that in stable environments, organizations develop tight resource configurations for efficiency and effectiveness. Resources that are complementary, such as those of IS and marketing, tighten linkages further because of their synergies. Yet in dynamic environments, tight linkages are less adaptive to evolving and unpredictable circumstances, resulting in less appropriate and functional responses. The firm can suffer by being out of step with the new requirements of the environment. Loose linkages by comparison allow the firm to flexibly and quickly change resource configurations since the resources are more independent of one another. The results are better solutions to external challenges (Santos and Eisenhardt 2005, p. 497).

¹ In the methods section, we theorize and test additional interaction effects as rival models, including customer orientation as a potential moderator of functional integration onto innovativeness and strategic responsiveness.

The competence concept raises an important contingency of integration. It suggests that, contrary to what is widely assumed and only beginning to be recognized, more functional integration is not always better (Henard and Szymanski 2001). The competence concept says under higher market dynamism, integration is less potent and diminishes the firm's abilities to innovate and strategically respond. We therefore incorporate into our framework the moderator of *market dynamism*, which is the amount and unpredictability of change in customer preferences and competitors' activities (Miller and Friesen 1983).² Figure 1 shows our conceptual framework.

Research hypotheses

Companies have historically poured large sums of money into computer infrastructures (Dedrick et al. 2003). Increasingly, it is understood that to obtain benefits from these investments, IT must be more rather than less strategically focused, i.e., have a clear business purpose or intent (Kearns and Lederer 2003; Tallon et al. 2000). IT that is less focused, simply installed because of the need to keep up with the latest technologies, runs the same risks as R&D pursued for its own sake: it is apt to squander resources. The notion that IT should have more of a strategic focus follows from wide recognition that the efficacy of any IT rests on its congruence with and support of a firm's broader strategies (Weil and Broadbent 1998).

In parallel with IT strategic intent is customer orientation, the marketing group's strategic concern. The main role of the marketing group is to amplify the voice of customers in order to direct beliefs and behaviors across the organization toward superior value creation. This interest is captured by customer orientation (Narver and Slater 1990). Consistent with complementarity theory, IT strategic intent and customer orientation represent paired strategic resources that produce outcomes greater than the sum of their parts. With respect to integration, we hypothesize that greater IT strategic intent together or interacting with higher customer orientation spurs exchanges between the marketing and IS areas.

The reason for this interaction is that greater customer orientation clarifies the IT strategy by providing an overarching emphasis on customers. This emphasis makes it easier to decide which IT to implement and how to use it, based on the criterion of whether or not it improves the firm's sensitivity and responsiveness to customer preferences. As this occurs, the IS and marketing visions align. Task cooperation in turn increases because of shared

² In the methods section, we theorize and test additional interaction effects as rival models, including market dynamism as a potential moderator of IT strategic intent, trust, and top management knowledge gap onto functional integration.

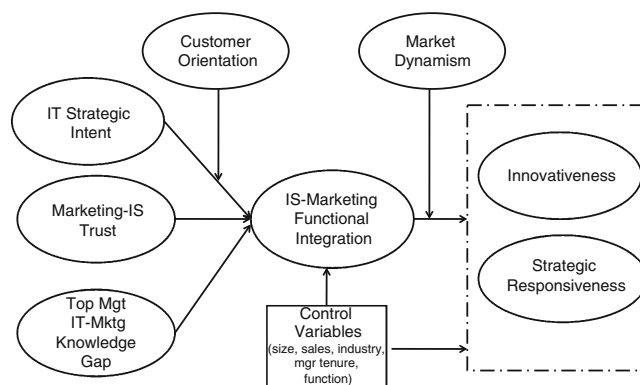


Fig. 1 Conceptual framework: marketing and IS functional integration

assumptions about the purpose and capabilities of the IT. Research indicates when IT is integrated into strategic planning, cross-functional integration increases to coordinate activities around exploiting the IT (Pollanis 2003).

H1: IT strategic intent and customer orientation positively interact onto marketing-IS functional integration.

The marketing and IS functions represent contrasting backgrounds and priorities. Marketing personnel, with business educations and responsibilities for customers, are occupied with market initiatives that ensure the financial health of the firm. By contrast IS staff, with engineering educations and responsibilities for IT architectures, assemble, run, and upgrade computer systems. People from dissimilar groups tend to view each other with suspicion and animosity. These perceptions create psycho-social barriers, impeding dialogue and interactions (Sitkin and Stickel 1996).

One way to mitigate adversarialism is trust, a valuable social resource per the RBV (Barney 1991). Trust lubricates complex organizational endeavors that rely on coordinated actions among individuals (Beccerra and Gupta 1999). Trust is especially helpful in situations where groups are distinct yet interdependent and there is potential for opportunism. In the case of marketing and IS, neither side has formal authority over the other. Without trust, one group can exploit the other or break promises cavalierly; with trust, however, each group puts forth its best effort and is committed to the other (Sitkin and Stickel 1996). Trust avoids the high cost of monitoring others, formalizing procedures, and specifying contracts.

Reflecting complementarity theory, the kind of trust most useful is dyadic, not one way: marketers trust IS technologists and IS technologists trust marketers. We therefore propose that this trust facilitates integration. Our hypothesis is premised on theorization that when trust is present there is an increased willingness to interact, be adaptive, reciprocate gestures of openness, and exchange valuable ideas and information (Collins and Smith 2006).

Trust allows marketers and IS specialists to move beyond group allegiances and functional stereotypes to realize their shared purpose. All these behaviors spell integration.

H2: Marketing-IS trust is positively related to marketing-IS functional integration.

Top management is a key driver of cross-functional ties (Griffin and Hauser 1996; Gupta et al. 1986). One aspect that deserves examination is top management knowledge, specifically of IT and marketing. Such knowledge is a valuable resource as a basis for competitive advantage (Barney 1991). The plethora of current and next generation IT tools suggests that for businesses to fully leverage these technologies top managers should have sufficient knowledge about their features, ways rivals are using them, and how they can improve marketing efforts.

Equally important and complementary is marketing knowledge, specifically an understanding of how marketing builds competitive advantage, shapes business strategies, and contributes to overall business success. With only IT knowledge, top management may look to IT as an easy panacea, while ignoring how IT tools are used alongside marketing approaches to strategically advance the firm. Marketing knowledge has been found critical for top management functioning, given the unique responsibility of leadership to monitor and address market openings (Luo and Hassan 2009).

We posit that when the two kinds of knowledge are disparate, or the gap wide, functional integration is weakened. Specifically, executives will lean toward the area they are more familiar with (IT or marketing), ignore interdependencies between the two, and fail to provide the balanced direction exploiting each function's relative strengths. Conversely, when the gap is narrow, integration is fostered because executives direct the two groups to assemble and utilize the most appropriate computer architectures, enamored by neither gee-whiz technologies nor faddish marketing. From the perspective of complementarity theory, the two types of knowledge heighten managerial insights and emphasize integration. Suggestive are studies which demonstrate that top management's knowledge of IT and knowledge of business is associated with more integrated IT-business strategies, and more effective assimilation of IT into the value chain (Armstrong and Sambamurthy 1999).

H3: Top management knowledge gap is negatively related to marketing-IS functional integration.

Innovativeness allows firms to improve their competitive posture by developing new ideas, products, and processes for internal organizational and external market uses (Hult et

al. 2004; Menguc and Auh 2006). As a higher-order strategic capability, it depends on the application of tacit knowledge and complex routines (Teece et al. 1997). Marketing-IS functional integration, whereby knowledge can be accessed and routines implemented, may be a driver of innovativeness.

The theory of complementarity is helpful in explaining this dynamic. Units like IS tend to have deep, technical resources, whereas those like marketing tend to have broad, conceptual resources (Moorman and Slotegraaf 1999). Integration taps into the groups' specialized knowledge cachets, as well as engages the two staffs to formulate complex innovation routines. It has been theorized that high-level functional integration is required for innovation processes due to the difficulty and range of problems encountered. Integration helps produce the implicit sequential patterns of engagement that make innovation work seemingly automatic (Grant 1991).

Marketing-IS functional integration may lead to innovativeness in several ways. As the groups positively relate, they experience participative decision making as well as co-learning. These activities establish a climate of acceptance, which in turn spurs the creativity required for innovativeness (Hurley and Hult 1998). Another way is through stimulating knowledge exchange. Groups that work well together share their knowledge. Through exchanges new thoughts and information are discovered, generating innovation spillovers (Collins and Smith 2006). A third way is via communications. When functions are well integrated, communications are open and frequent. The nature of communications encourages each side to move away from routine problem solving and adopt more unfettered, risk-taking approaches.

H4: Marketing-IS functional integration is positively related to innovativeness.

In today's rapidly changing business environment, responsiveness is a vital strategic capability (Grewal and Tansuhaj 2001). Strategic responsiveness involves re-deploying assets to take advantage of existing as well as nascent market and technological conditions surrounding the firm, mindful of the need for speed and agility in action taking. Strategic responsiveness has been tied to continuous organizational improvements as well as acquisition of new knowledge and skills (Grewal and Tansuhaj 2001). Like innovativeness, strategic responsiveness is a higher order capability that allows firms to maintain its competitiveness (Teece et al. 1997; Zhang 2005).

Integration possibly contributes to the development of strategic responsiveness. It has been observed that strategic responsiveness results from not only applying varied resources to pursue new markets or adopt new technologies (i.e., what to respond to), but also coordinating the uses of

these resources from different functional areas (i.e., how to respond) (Sanchez 1995). In other words, the meshing of divergent areas such as IS and marketing, each with its own assets (skills, experience, and so on), aids strategic responsiveness.

In the same vein, the literature argues that inter-group bonds “promote smooth acquisition and sharing of critical information and knowledge that firms need in order to quickly detect market and product changes, redesign business processes and workflows, and develop new insights and skills,” i.e., in order to be strategically responsive (Zhang 2005, p. 167). Studies show that cross-functional coordination in the supply chain increases responsiveness, and that more communications lead to faster decision making (Beccerra and Gupta 1999).

Hence, we expect that ties between the marketing and IS areas contribute to strategic responsiveness. For instance, marketers who collaborate with IS specialists may combine email, instant messaging, and social networking sites in order to reach new customers not accessible through traditional channels. The strategy, which neither function could create on its own, rests on meshing their efforts and insights to exploit evolving customer habits, technologies, and markets.

H5: Marketing-IS functional integration is positively related to strategic responsiveness.

While much past research suggests more integration is always better, this conclusion is increasingly questioned in light of meta-analyses pointing to boundary conditions (Henard and Szymanski 2001; Troy et al. 2008). An important boundary raised recently is market dynamism (Santos and Eisenhardt 2005). When dynamism is high, the composition and tastes of customers are quickly altering; competitors are engaging fiercely in product and price wars; and these trends are difficult to estimate in duration and direction. The confluence of such conditions spells instability, placing severe demands on businesses.

The competence concept specifies how market dynamism impinges on integration (Barney 1991; Santos and Eisenhardt 2005). Stable, low market dynamism environments reward well-established functional competencies, including collaboration (Pavlou and El Sawy 2006). By contrast, under high market dynamism, tight resource configurations—as represented by close functional linkages—are strained to adapt to external flux. Information processing pressures and coordination complexities escalate, disturbing delicate balances of power, resources, and priorities between groups. A core competency such as integration can become a core rigidity (Leonard-Barton 1995) as well-established patterns of inter-group cognitions and behaviors are difficult to undo (Santos and Eisenhardt 2005). Thus tight

functional linkages, previously a strength in stable environments, become maladaptive in unstable ones. Recent studies support this notion, pointing to patterns of effective firm competencies varying with market dynamism (e.g., Wang et al. 2006).

The effects of market dynamism may also be understood in terms of the resource endowments in the IS-marketing relationship. Because integration is difficult to achieve, resources accumulate slowly over time in that relationship. Faced with a fast-moving environment, those resources must be re-examined and rapidly altered to meet new externalities (Pavlou and El Sawy 2006). While urgency dictates action, the process is hindered by the lack of opportunity and time to reach a new working equilibrium before another adjustment must be made. Out of frustration technologists and marketers may revert to habitual problem frames and solutions rather than seeking new views and approaches (Lawrence and Lorsch 1967). Innovativeness and strategic responsiveness suffer as a consequence.

H6a: Market dynamism negatively interacts with marketing-IS functional integration onto innovativeness.

H6b: Market dynamism negatively interacts with marketing-IS functional integration onto strategic responsiveness.

Methodology

Sample selection and data collection

We obtained a national database of 600 chief information officers (CIOs) or equivalent of U.S.-based strategic business units (SBUs) in a range of manufacturing and services industries from a research firm. CIOs are in charge of IT strategy and operations and were thus appropriate representatives of the IS function. Next we phoned each CIO to verify his/her position and mailing address, as well as request the name and address of his or her marketing corollary, the chief marketing officer (CMO) or equivalent. The CMO is an appropriate representative of the marketing function due to oversight of all marketing activities in a firm. Our intent was to survey IS and marketing representatives in order to reduce functional bias in general model testing. By phoning each CIO, we were able to correct and update the database. We did not reach some CIOs despite a standard of three phone calls, and we encountered refusals by others to provide CMO contact information. The process resulted in a sampling frame of 320 CIOs and CMOs each.

After developing the sampling frame, we drafted two questionnaires, one for CIOs and the other for CMOs (detailed hereafter). The two questionnaires were identical

except for references to the specific function. Next, ten academicians from the marketing and IS disciplines reviewed the questionnaires for wording and face validity. Then five CIOs and five CMOs completed the questionnaires and were interviewed to assess the instruments' length, clarity, organization, and relevance. This was not a pre-test. Based on the feedback, we made minor changes to the questionnaires to avoid confusion, such as reordering some questions. We also determined that CIOs and CMOs were quality key informants since interviewees said the questions were appropriate and not difficult to answer.

Finally, the questionnaires, along with a cover letter explaining the study and a postage paid envelope, were mailed to the sampling frame. Study results were promised as an incentive for participation. One week after the first mailing, a reminder postcard was sent, and after another week a second questionnaire was sent to all respondents. Fifty-five questionnaires were returned from CMOs and 65 from CIOs for a total of 120 returns. The effective response rates were 17% for CMOs and 20% for CIOs, or 19% for the total sample. The return rates were similar to those reported in other surveys of senior executives (e.g., Homburg and Pflesser 2000). Since the unit of analysis was the SBU but only partial matching returns from CIOs and CMOs were obtained, we randomly removed multiple returns for any SBU. Thus each SBU was represented by a single return either from a CIO or CMO. The remaining 100 returns (53 CIOs and 47 CMOs) were analyzed.

To assess non-response bias, we followed Armstrong and Overton (1977) by comparing responding firm characteristics with known population characteristics. Specifically we looked at sales revenues, number of employees, and industries reported by respondents about their firms versus those for U.S. business subsidiaries captured by the Lexis Nexis database of SBUs. The analysis showed that the responding firms did not differ from the U.S. business subsidiaries in average employee size ($F=1.95$, $p=.17$), annual sales revenue ($F=1.43$, $p=.23$) and the distribution of major SIC classifications (Chi-square=1.89, $df=2$, $p=.39$). We therefore concluded that the likelihood of non-response bias was low.

Sampling of the two functions was intended to reduce functional bias, unlike single function samples in some prior integration studies (see Table 1). To assess potential bias in the marketing versus IS subsamples, we calculated mean values for each survey measurement and conducted ANOVA tests of differences between the subsamples. None of the differences was significant at $p<.05$, indicating a low likelihood of bias (results available from the authors). As explained later in the analysis section, we used the marketing versus IS function as a control variable and determined that function had no significant impact ($p>.05$) on the model results.

Measurement procedures

Our survey included two types of perceptual measures: reflective and formative. Reflective measures are appropriate when items are inter-exchangeable manifestations of a latent construct, whereas formative measures are used when observed items collectively define the latent construct without necessarily correlating with each other (Diamantopoulos and Winklhofer 2001; Jarvis et al. 2003). Measures for both types of constructs were adopted or adapted from prior studies where possible or created anew. Measures for marketing-IS functional integration, customer orientation and innovativeness were reflective, whereas those for IT strategic intent, top management knowledge gap, trust, strategic responsiveness, and market dynamism were formative. Each measure used a seven-point agreement-disagreement scale. We first discuss the reflective, followed by formative measures.

A single confirmatory factor analysis (CFA) of all constructs is done to assess the validity of the measurement model. We were able to assess the model only through separate analyses for reflective versus formative measures. For the reflective measures, described hereafter, we examined reliability and validity through a CFA measurement model in partial least squares (PLS). Each measurement item had a significant loading on its expected latent construct at $p<.001$, and each scale manifested a Cronbach's alpha of at least .70 and composite reliability of at least .60, meeting reliability requirements (Bagozzi and Yi 1988). In addition, each measure's square root of average variance extracted (AVE) was higher than the coefficient for any pair of two latent variables, indicating discriminant validity (Fornell and Larcker 1981). Scale items, factor loadings, Cronbach's alphas, and composite reliability values after purification are detailed in Appendix A. The square roots of AVE values are provided in Table 2.

Marketing-IS functional integration (FI) Kahn and Mentzer (1998) created a measure of functional integration reflecting interaction and collaboration as key dimensions. We adapted and expanded this measure to focus on the IS and marketing functions. The measure consisted of eight items, six of which were retained through the purification process.

Customer orientation (CO) The CO measure was adopted from Narver and Slater (1990), and consisted of six items to evaluate the degree to which the SBU's beliefs, objectives, strategy, and behaviors are directed toward customer needs and value creation. Five items were retained.

Innovativeness (INNO) We adapted Deshpande et al.'s measure of innovativeness (1993). For consistency with our definition of innovativeness, we included forms of innovation

Table 2 Mean, standard deviation, composite reliability, square root of average variance extracted, and correlation matrix of variables

Variables	Mean	S.D.	FI	INNO	SR	ITSI	Trust	TOP GAP	CO	MD	CO × ITSI	FI × MD
FI	4.23	0.92	<i>0.85</i>									
INNO	4.05	1.17	0.39	<i>0.80</i>								
SR	4.69	1.19	0.56	0.58	–							
ITSI	5.78	0.91	0.38	0.30	0.32	–						
TRUST	4.95	1.23	0.64	0.23	0.34	0.25	<i>0.86</i>					
TOPGAP	0.88	0.78	–0.08	–0.14	–0.16	0.09	0.10	–				
CO	5.09	1.09	0.69	0.49	0.62	0.36	0.53	–0.01	<i>0.82</i>			
MD	3.34	1.17	0.07	0.23	0.17	0.09	–0.15	–0.10	0.10	–		
CO × ITSI	0.36	0.96	0.00	–0.02	–0.04	–0.08	–0.11	–0.05	–0.17	–0.01	–	
FI × MD	0.08	1.13	–0.26	–0.14	–0.25	–0.08	–0.21	–0.07	–0.24	0.37	–0.14	–

The diagonal (in italics) shows the square root of the average variance extracted (AVE) for each reflective construct.

ITSI IT strategic intent; *TOPGAP* top management knowledge gap; *TRUST* marketing-IS trust; *CO* customer orientation; *FI* marketing-IS functional integration; *MD* market dynamism; *INNO* innovativeness; *SR* strategic responsiveness; *TENURE* years the manager has worked for the SBU; *SIZE* log value of SBU employee size; *SALES* self-reported last year sales of SBU by dollar; *INDUSTRY* dummy variable with 1 for service and 0 for goods.

besides new products, such as managerial, operational, and technological innovations. All five items were retained.

Following Diamantopoulos and Winklhofer's (2001) guidelines for formative measures, we constructed the formative scales (described below and in Appendix A). We paid special attention to content specification, indicator specification, indicator collinearity, and external validity. Without the two extra reflective items developed for each formative construct to allow for identification, we adopted alternative validity approaches documented in the literature. We inspected potential collinearity among indicators and did not find collinearity to be a problem. The maximum squared Pearson inter-indicator correlation was .36 (Cohen et al. 2003). To examine external validity, we correlated each of the indicators to a general overall measure; for instance, we used “our IT goals are clear and focused” to validate IT strategic intent and “we (the SBU) quickly see and respond to meaningful changes and signals in the environment” to validate strategic responsiveness. All correlations were significant at $p < .001$, indicating external validity (Coviello et al. 2006).

IT strategic intent (ITSI) This measure was based on Tallon, Kraemer, and Gurbaxani's conceptualization of IT goals (2000). We developed a three-item formative scale of the strategic intent behind an SBU's IT, assessing to what extent the IT is purposed to “make critical contributions to all areas of value chain,” “enhance operational efficiency and effectiveness,” and “strengthen the SBU's strategic position.”

Marketing-IS trust (TRUST) Based on work by McAllister (1995) and Huff and Kelley (2003), we created ten items to

capture the cognitive (three reflective items), affective (four reflective items), and moral dimensions (three reflective items) of trust between the marketing and IS functions. We then ran a first-order factor analysis, retaining all items. Next, using the three first-order factors as formative indicators for the second-order TRUST construct, we performed a second CFA that showed significant loadings at both the first- and the second-order construct levels (all t -values > 24); the three first-order indicator loadings on the second-order TRUST construct were significant at .32, .45, and .31 ($p < .001$). Hence, the second-order construct was used for path model testing.

Top management IT-marketing knowledge gap (TOPGAP) Based on discussions of top management knowledge of IT and business functions by Armstrong and Sambamurthy (1999), we created three items to describe the level of top management knowledge of IT applications and two items for the level of top management knowledge of marketing. To calculate the gap, we first generated the mean score for each type of knowledge and then determined the absolute difference between them to form a single-item measure.

Strategic responsiveness (SR) A five-item formative measure was adapted from Grewal and Tansuhaj (2001) to encompass not only strategic flexibility—the emphasis of the original measure—but also speed and appropriateness of strategic choices in response to environmental demands and opportunities.

Market dynamism (MD) The two-item measure was taken from Miller and Friesen (1983) who presented one of the

first formulations of this construct. Consisting of the unpredictability of both customer needs and competition, the scale has been widely applied in strategy and marketing studies.

The means, standard deviations, AVE values, and Pearson correlation matrix for all reflective as well as formative scales are shown in Table 2.

Prior to testing the hypotheses, we estimated the possibility of multicollinearity. Per Mason and Perreault’s recommendations (1991), we assessed that possibility by regressing each predictor variable on the other predictor variables to detect linear relationships among them. We found none of the R-squares among the predictor variables exceeded the R-square of the overall model. Consistently, the maximum variance of inflation factor (VIF) score was 1.78, much lower than the suggested cutoff value of 5 recommended by O’Brien (2007) and Belsley et al. (1980). Therefore, we concluded multicollinearity was not a problem.

Due to the self-reported nature of the data, there was a potential for common method variance. Following the procedures outlined by Podsakoff and colleagues (2003) and the technique described in Liang et al. (2007) for testing common method bias, we included in the PLS measurement model a common method factor whose indicators included all the trait factors’ indicators. We then calculated each indicator’s explained variance by method and trait. The results showed that the common method factor accounted for a small portion of each construct’s variance (average of 2.1%), whereas the trait factors explained most (average of 71.8%). Given the high ratio of variance between the method and trait factors, common method bias was unlikely.

For model testing, we included five control variables in the analysis: SBU size (employees), industry (services vs. goods), annual sales, manager’s tenure at the firm, and function (IS vs. marketing). The control variables reflected key endogenous and exogenous influences on functional integration or business capabilities, as found in some studies (Saini and Johnson 2005; Troy et al. 2008). All measures were self-reported by survey respondents.

Hypothesis testing procedure

The relationships proposed in the hypotheses were examined using PLS, a recommended method to test a path analysis model with both reflective *and* formative measures using a small to medium size sample (Chin 1998; Davis and Golicic 2010). We followed Chin’s (1998, p. 311) guidelines for determining the adequacy of the sample size to estimate the measurement model and path model. Our test reached the ratio of 10 cases per

predictor of the endogenous latent variable with the largest number of paths (in this case, functional integration has 10 incoming paths, five from independent variables and five from control variables). Hence the sample of 100 was sufficient for measurement and model testing.

Because our path model included formative constructs and moderating effects, we adopted the two-stage testing approach recommended for PLS (Chin et al. 2003; Henseler and Fassott 2009). In particular, after we tested the measurement model, we formed a single indicator from all equally weighted related items for each construct in the path model and used the mean-centered approach to generate interaction terms. It is noteworthy that unlike reflective measures, formative indicators do not have error terms. The error variance of the formative latent constructs is completely captured in the disturbance term that is uncorrelated with all predictors (Diamantopoulos and Winklhofer 2001). Below are the three path model equations we estimated simultaneously in the path analysis.

$$\begin{aligned}
 \mathbf{FI} &= \beta_0 + \beta_1 \mathbf{ITSI} + \beta_2 \mathbf{TRUST} + \beta_3 \mathbf{TOPGAP} + \beta_4 \mathbf{CO} \\
 &\quad + \beta_5 \mathbf{CO} \times \mathbf{ITSI} + \beta_6 \mathbf{TENURE} + \beta_7 \mathbf{SIZE} \\
 &\quad + \beta_8 \mathbf{SALES} + \beta_9 \mathbf{INDUSTRY} + \beta_{10} \mathbf{FUNC} + \varepsilon \\
 \mathbf{INNO} &= \beta_0 + \beta_1 \mathbf{FI} + \beta_2 \mathbf{MD} + \beta_3 \mathbf{FI} \times \mathbf{MD} + \beta_4 \mathbf{TENURE} \\
 &\quad + \beta_5 \mathbf{SIZE} + \beta_6 \mathbf{SALES} + \beta_7 \mathbf{INDUSTRY} \\
 &\quad + \beta_8 \mathbf{FUNC} + \varepsilon \\
 \mathbf{SR} &= \beta_0 + \beta_1 \mathbf{FI} + \beta_2 \mathbf{MD} + \beta_3 \mathbf{FI} \times \mathbf{MD} + \beta_4 \mathbf{TENURE} \\
 &\quad + \beta_5 \mathbf{SIZE} + \beta_6 \mathbf{SALES} + \beta_7 \mathbf{INDUSTRY} \\
 &\quad + \beta_8 \mathbf{FUNC} + \varepsilon
 \end{aligned}$$

Results

Results of the path analysis are reported in Table 3. Hierarchical regression analyses were conducted as a supplement, and the results were very similar (available from the authors).

Antecedents of marketing-IS functional integration

We proposed in the first hypothesis that IT strategic intent and customer orientation positively interact onto functional integration. The result shows the standardized coefficient is significant ($\beta=.13, p<.01$), providing support for H1. In the second hypothesis we posited that trust is positively tied to integration. The coefficient of .41 was significant ($p<.001$), providing support for H2. According to H3, top management knowledge gap is negatively related to integration. The coefficient of $-.13$ was significant ($p<.05$), and therefore H3 was supported.

Table 3 Results of PLS Path Model Test ($N=100$)

Dependent Variable	Independent Variables	β	t-value	Hypothesis
FI ($R^2=.65$)	CO x ITSI	.13	2.72**	H1, supported
	TRUST	.41	5.32***	H2, supported
	TOPGAP	-.13	-2.23*	H3, supported
	ITSI	.17	2.01*	
	CO	.42	4.66***	
	TENURE	-.09	-1.66	
	SIZE	-.04	-.52	
	SALES	-.01	-.27	
	INDUSTRY	.10	1.39	
	FUNC	-.04	-.68	
INNO ($R^2=.25$)	FI	.33	3.05***	H4, supported
	FI x MD	-.16	-1.43	H6a, not supported
	MD	.29	2.51*	
	TENURE	-.08	-.72	
	SIZE	-.12	-1.24	
	SALES	.03	.21	
	INDUSTRY	-.07	-.79	
SR ($R^2=.38$)	FUNC	.07	.83	
	FI	.50	5.91***	H5, supported
	FI x MD	-.21	-2.36*	H6b, supported
	MD	.22	2.18*	
	TENURE	.01	.13	
	SIZE	-.09	-1.01	
	SALES	-.01	-.15	
INDUSTRY	-.06	-.59		
FUNC	-.03	-.42		

β is standardized coefficient

* Significant at $p < .05$;

** Significant at $p < .01$;

*** Significant at $p < .005$

(two-tailed)

ITSI IT strategic intent; *TRUST* marketing-IS trust; *TOPGAP* top management knowledge gap; *CO* customer orientation; *FI* marketing-IS functional integration; *MD* market dynamism; *INNO* innovativeness; *SR* strategic responsiveness; *TENURE* years the manager has worked for the SBU; *SIZE* log value of SBU employee size; *SALES* self-reported last year sales of SBU by dollar; *INDUSTRY* dummy variable with 1 for services and 0 for goods; *FUNC* dummy variable for respondent's functional background with 1 for marketing and 0 for IS.

Consequences of marketing-IS functional integration

Next, we expected that integration contributes to innovativeness. The coefficient for this relationship was positive and significant ($\beta=.33$, $p<.005$), providing evidence for H4. Thereafter, we predicted that integration is positively associated with strategic responsiveness. The result supported H5, with a coefficient of .50 ($p<.001$).

Contingencies of marketing-IS functional integration

Lastly, we predicted that market dynamism interacts negatively with integration onto innovativeness (H6a) and strategic responsiveness (H6b). The coefficient for the first interaction was negative but not significant ($\beta=-.16$, $p>.05$); therefore H6a is rejected. The second interaction was significant and negative for ($\beta=-.21$, $p<.05$), supporting H6b.

Collectively, the antecedents accounted for 65% of the variance in marketing-IS integration, indicating a strong explanatory model for its formation. The conceptual model also explained a fair amount of variance, 25%

and 38%, in the dependent variables of innovativeness and strategic responsiveness, respectively (see R-squares in Table 3).

Robustness tests

To check the robustness of the hypothesized model, we carried out two tests. First, we examined whether the inclusion of five control variables influenced the results. As Table 3 shows, our results are robust since none of the control variables had a significant effect. Importantly, one of the control variables was respondent function (IS vs. marketing). To confirm that function had no impact in the model, we added four mean-centered interaction terms to the hypothesized model ($ITSI \times FUNC$, $TRUST \times FUNC$, and $TOPGAP \times FUNC$ on FI; $FI \times FUNC$ on INNO and SR). The results showed none of the interactions were significant (all t values were less than 1.32, $p>.05$), indicating that our model is robust in the face of potential functional bias.

Second, we tested two rival models. In the first model, we assessed whether market dynamism interacts with the

antecedents of integration, not just the consequences. We proposed this model based on past theorization that market dynamism is a strong externality influencing internal arrangements, including relational trust (Adjei et al. 2009), IT structures (Plugge and Janssen 2009), and knowledge capabilities (Cui et al. 2005). For example, greater market dynamism is thought to elevate knowledge management. Thus we created three mean-centered interaction terms composed of market dynamism and each antecedent (TRUST \times MD, ITSI \times MD, and TOPGAP \times MD), and tested their effects on integration. Dynamism was found to have a moderating impact with trust ($t=-2.02$, $p<.05$) but not with IT strategic intent or top management knowledge gap ($t=-.11$, $p>.05$ and $t=-.43$, $p>.05$).

In the second rival model, we theorized that customer orientation interacts with functional integration onto the two consequences. We considered these effects because research suggests synergies between customer orientation and functional integration generate strategic capabilities (Narver and Slater 1990). Specifically customer orientation may elevate the effect of functional integration, leading to higher firm capabilities. The results showed that the interaction does not impact innovativeness or strategic responsiveness ($t=1.82$, $p>.05$ and $t=1.15$, $p>.05$, respectively). In sum, the robustness tests generally supported the original model. In both rival models all other paths held as hypothesized.

Discussion

To the best of our knowledge, this is the first empirical study on marketing-IS functional integration. The purpose was to understand the dynamics—antecedents, consequences, and contingencies—of integrating these disparate areas. More specifically, we pursued three questions: (1) what drives these two units, which are typically separate and distant, together or apart; (2) what firm-level strategic capabilities result from this integration; and (3) how do the latter relationships depend on conditions external to the firm? In so doing, we addressed several important gaps in the cross-functional and marketing literature, namely the function-specific dynamics of marketing-IS integration, the strategic and firm-level implications of integration, and the theoretical base beyond conceptualizations of R&D-marketing cooperation in NPD.

With respect to the first question, we learned that marketing-IS trust and the interaction of IT strategic intent with customer orientation foster marketing-IS integration, whereas top management knowledge gap diminishes it. In terms of the second question, we found that integration leads to greater innovativeness and strategic responsiveness, underscoring the importance of this means of capability building and competitive advantage. Finally, in relation to

the third question, we discovered market dynamism dampened the effect of integration on strategic responsiveness. These results held across a range of larger SBUs in terms of size, sales, industry, function, and managerial experience. In sum, we demonstrate the profound benefits of IS-marketing integration along with the internal paths and external considerations to achieve them.

Our conceptual framework is supported, except for the finding that market dynamism does not moderate the relationship between function integration and innovativeness. This result may be due to contradictory influences of market dynamism. While high velocity environments may make it difficult to innovate since core rigidities have become established between and within groups, the environments may also propel cooperation, perhaps out of urgency to act in order to survive (Troy et al. 2008). Research can be done to tease out these competing influences.

In comparing this functional integration study to others, we observe that its variables and relationships are largely new and are grounded in contemporary theories on organizational dynamics rather than just NPD. Prior work has focused on functional integration as a driver of new product success, with considerable elaboration of the R&D-marketing relationship (Troy et al. 2008). While shedding light on integration, those findings are limited to the NPD setting. This means (1) the IS function has been ignored since it is not directly involved in creating new products, (2) consequences tend to be NPD project-specific, e.g., a new product's ROI (Song and Swink 2009), and (3) antecedents and consequences are often at the project level, e.g., new product complexity (Ayers et al. 1997; Boyle et al. 2005). In contrast to prior studies (Table 1), this study expands the implications of integration to firm-level strategic capabilities, examines variables and their ties based on complementarity and competence theories, and incorporates IS as a key function due to its increasing impact on all marketing and organizational processes.

Theoretical and research implications

A theoretical implication of our study is that it provides some of the first empirically based insights on marketing-IS functional integration, uncovering its dynamics of drivers, outcomes, and boundaries. Since previous research points to such dynamics as function-dependent, and yet IS-marketing integration has not been examined despite wide-scale incorporation of IT in marketing activities, this study fills an important gap in current understanding of the value and mechanics of this particular inter-group relationship.

A second, more particular implication is that our study demonstrates how the previously ignored marketing-IS relationship yields valued outcomes: greater introduction of new processes and products internally in the firm and

externally to the market, as well as more adroit and agile adaptation to changing market and technological opportunities. To date, marketing's relationships with other functions, such as manufacturing, have garnered sizable attention. However, in today's knowledge based economy, competitive advantage is increasingly rooted in the management of intellectual capital, rather than tangible assets. As articulated by Vargo and Lusch (2004), the product dominant logic is giving way to the service dominant logic. This means businesses that find ways of using intangible knowledge assets toward value-creating capabilities, such as innovativeness, prosper. One avenue is managing marketing's interface with IS.

A third implication is that the study advances knowledge on the strategic and firm-level implications of functional integration. Given past interest in the R&D-marketing tie especially, our understanding of the consequences of integration (i.e., why it should matter) has been largely confined to tactical benefits, such as new product success (Olson et al. 2001). While such benefits are valuable, our study indicates that integration also leads to *strategic* benefits, namely the innovativeness and responsiveness capabilities. Prior research has shown other routes to these ends, such as elevating customer orientation (Hurley and Hult 1998). This study demonstrates a new route, the bridging of IS and marketing functions. We also theorize that customer orientation may directly lead to these strategic benefits.

A fourth implication is the value of complementarity theory for predicting and explaining integration. Based on this theory, which had not been applied previously to the integration issue, we were able to describe how the strategic, socio-cultural, and managerial resources of the technologists versus marketers converge to benefit the firm. We can continue to explore the utility of complementarity theory for understanding intergroup ties generally and the IS-marketing relationship particularly. The theory may be used to identify other assets of each unit and how they collectively generate outcomes. IS assets such as IS quality and marketing assets such as relationship marketing ability may be examined for their combined effects on competitive advantage and other critical results. The mechanics of resource elevation, where one set increases the positive effects of another (the notion of co-specialized assets), may also be investigated.

A fifth implication centers on competence theory. Consistent with this theory, we learned that market turbulence weakens the effect of IS-marketing integration on strategic responsiveness, underscoring the deleterious role of market dynamism discussed in previous studies (e.g., Hult et al. 2007). The finding provides a more nuanced picture of the impact of functional integration, advancing understanding of the inter-dependence of the two business functions. By pointing out that integration

has its limits and can turn from a strength to a weakness, we provide one of the few tests of boundary conditions for integration, which has been presumed universally beneficial.

Other potential contingencies are also worthy of study. One is IS outsourcing. Firms have moved toward contracting outside agencies to provide information services. Outsourcing, while generating short-term cost savings, may hinder interactions and communications between the two functions, weakening in-house capabilities. Another condition is IT competency use. Researchers in the IS field are recognizing that a firm's IT must be effectively applied if it is to produce strategic and operational gains (Pavlou and El Sawy 2006). Computer technicians are providers of IT, whereas marketers are users. To the degree marketers are competent in using IT, this condition may propel innovativeness and strategic responsiveness. A third contingency is competitor orientation, which may help focus a firm's IT and thereby affect integration.

Managerial implications

Managers may be tempted to bypass the IS-marketing relationship in favor of more traditional linkages, such as between R&D and marketing. This study demonstrates that managing the IS-marketing tie has sizable business payoffs. Focusing on IS-marketing integration requires managers to appreciate more fully the impacts of IT on all areas of the business but particularly IT's potential to empower marketing initiatives. It also requires managers to avoid imposing IT as a quick fix to all that ails a business, but instead to tend to the slow, difficult process of cultivating positive attitudes and actions between groups that do not have a natural affinity (Dedrick et al. 2003). Thus the first implication is to focus intentionally on the IS-marketing relationship.

Another implication is for managers to develop a strategic plan for IT, one that through the influence of customer orientation furthers the firm's attention to and servicing of customer needs. More often than not, computer and related technologies are installed without coherent expectations of what they will do, other than somehow improve operations and the bottom-line (Tallon et al. 2000; Weil et al. 2002). This ad hoc, IT-as-a-blackbox expansion typically produces disappointing outcomes, including difficulty pinpointing performance improvements (Dedrick et al. 2003). Importantly, too, it results in costly systems at odds with the overall business and marketing thrusts of the firm (Kearns and Lederer 2003). To arrive at a clear, customer-centric IT strategic plan, both groups should contribute to it. Research suggests that participatory planning on IT usage reduces functional conflict and ensures efficacy (Butler 2005).

A third implication is for the senior executive team to obtain IT *and* marketing knowledge for better decision making and direction giving. CIOs are a part of this team. Typically they are technologists who have risen the ranks due to their expertise in information systems; however, this expertise must be combined with a deep understanding of marketing if the firm’s IT is to strengthen the business’ competitive posture (Basu and Jarnagin 2008). CMOs are also a part of the team. While they have the business background to make sound marketing decisions, they avoid learning about IT and ways it can re-shape business models and practices. For the team to possess the proper knowledge, CIOs and CMOs must exchange their views to close any knowledge gap. As the two forms of knowledge become more balanced, managers are able to provide valuable direction to their staffs on collaborative efforts.

A fourth implication is to cultivate trust. Trust is unlikely to occur spontaneously between marketing and IS staffs due to biases rooted in specialization. Consequently, trust must be created. Trust is produced when leaders engage in trusting behaviors. After seeing a pattern of trusting actions, subordinates reciprocate, engendering trust across departments. One approach would be for the heads of the marketing and IS groups to model trust first, perhaps through informal and formal climate- and relationship-building activities with one another, followed by similar activities for their staffs. Cross-training may be another means. Marketers can host seminars on customer profiling and servicing for IS specialists. Conversely, IS can teach marketers about emergent IT, what they can and cannot do, and what marketing operations it realistically supports.

Finally, in light of the dampening effect of market dynamism on the integration-responsiveness relationship, managers must loosen the bonds between IS and marketing under high velocity conditions so the two sides find new ways of absorbing information and solving problems. This may be done through rewards and structures that maintain collaboration but permit new routines to be co-established rapidly and iteratively. Possible paths are forming short-term cross-functional teams, compressing project schedules, and providing intermediate milestones.

Study limitations

We conclude by noting several limitations of this study. One limitation is that the full measurement model including both reflective and formative measures could not be assessed. Future work requires creation of all reflective measures or two reflective items for each formative construct for CFA testing. Another limit is the cross-sectional nature of the data, which makes it difficult to confirm causal ordering of variables. A longitudinal study is necessary for such determinations. A further limit is the lack of a separate sample for measurement purification purposes. Finally, more control variables can be tested to rule out the risk of Type I error. Nevertheless, we hope this study expands understanding about the critical interface between marketing and IS staffs, and that others will join us in researching it ramifications.

Acknowledgment The Center for Research on Information Management at the University of Illinois at Chicago is gratefully acknowledged for a grant to conduct this research awarded to the first author.

Appendix A

Table 4 Measurements and Item Loadings (N=100)

Construct	Measurement Items	Item Loading
Marketing-IS Functional Integration (FI; reflective; $\alpha=.92$; CR=.94)	<i>How frequently or how have the following aspects been between the IS and Marketing groups?</i>	
	1. Informally work together (never...very often)	.79
	2. Shared ideas, information, and/or resources	.89
	3. Shared the same vision for the SBU	.85
	4. Worked together as a team	.86
	5. Frequency of communications (low...high)	.84
Innovativeness (INNO; reflective; $\alpha=.86$; CR=.90)	6. Quality of communications	.85
	1. We (the SBU) often introduce new products and services to the market before any of our competitors (strongly disagree...strongly agree)	.78
	2. New products and services generate the majority of our current sales	.74
	3. Relative to our competitors, we invest a greater percentage of our revenues in research & development	.79
	4. We routinely incorporate cutting edge managerial and technological innovations in our operations	.87
5. Other companies in the industry see us as highly innovative	.81	

Table 4 (continued)

Construct	Measurement Items	Item Loading
Marketing-IS Trust (TRUST, formative) ³	<i>We in IS (Marketing) believe persons in Marketing (IS)...</i>	
	<i>Cognitive Marketing-IS Trust (reflective, $\alpha=.93$, CR=.96; second-order formative item loading=.32)</i>	
	1. Are competent at their jobs (strongly disagree... strong agree)	.95
	2. Uphold professional work values	.93
	3. Are skilled and knowledgeable in their work	.93
	<i>Affective Marketing-IS Trust (reflective, $\alpha=.93$, CR=.95; second-order formative item loading=.45)</i>	
	1. Really care and are concerned for persons in IS (Marketing)	.91
	2. Are close enough to freely share ideas, thoughts, and feelings	.92
	3. Invest emotionally in work relationships with IS (Marketing)	.93
	4. Enjoy and like persons in IS (Marketing)	.90
	<i>Moral Marketing-IS Trust (reflective, $\alpha=.90$, CR=.94; second-order formative item loading=.31)</i>	
	1. Do what is right rather than what is ethically questionable	.87
	2. Deal with people in IS (Marketing) fairly and justly	.94
	3. Treat people in IS (Marketing) with dignity and respect	.93
	Customer Orientation (CO; reflective; $\alpha=.88$; CR=.91)	1. Our business objectives are driven primarily by customer satisfaction (not at all...to an extreme extent)
2. Our strategy for competitive advantage is based on our understanding of customer needs		.86
3. Our business strategies are driven by our beliefs about how we can create greater value for customers		.83
4. We measure customer satisfaction systematically and frequently		.70
5. We give close attention to after-sales service		.84
IT Strategic Intent (ITSI, formative)	1. We expect our IT to make critical contributions to all areas of our value chain (strongly disagree...strongly agree)	.70
	2. The purpose of our IT is to enhance our SBU's operational efficiency and effectiveness	.83
	3. The purpose of our IT is to strengthen our SBU's strategic position	.90
Top Management IT-Marketing Knowledge Gap ^a (TOPGAP, formative)	<i>How knowledgeable is your SBU's top management team about the following aspects of IT and marketing?</i>	
	1. Potential and limitations of current IT	.81
	2. Potential and limitations of "next generation" IT	.72
	3. How key competitors are applying IT	.75
	4. Ways in which marketing can build competitive advantage	.80
Strategic Responsiveness (SR, formative)	5. How marketing can contribute to a firm's strategy and success	.89
	1. We manage our resources flexibly in order to redirect them to meet emerging market needs	.67
	2. We exploit market opportunities with greater agility and speed than key competitors	.65
	3. We continuously improve our internal operations, external customer relations, or both	.87
	4. When it's clear our strategy is not working well, we promptly change it	.85
Market Dynamism (MD; formative)	5. We rapidly apply new technologies to gain competitive advantage	.75
	1. The tastes and preferences of our customers in our principle industry are (very predictable...very unpredictable)	.81
	2. Market activities of our key competitors are (very predictable...very unpredictable)	.94

^a Calculated as the absolute difference of the mean of the first three items and mean of the last two items.

α Cronbach's Alpha.

CR Composite Reliability.

³ As noted earlier, Marketing-IS Trust has three formative first-order indicators, each having reflective measures.

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