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Opportunities and Constraints: The Impact of Production and Organizing Intangible Resources on Multidimensional Firm Performance

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A fundamental question in strategy research is why some firms outperform others. Several recent research streams highlight intangible resources as key causes of differential firm performance. Intangible resources receive many names, including inimitable resources (Barney, 1991), idiosyncratic exchange relationships (Teece, 1986), core competencies (Prablad & Hamel, 1990), and isolating mechanisms (Rumelt, 1984). These terms share the common idea that intangibles are firm-specific, knowledge-based assets that intertwine with a business’s tacit organizational routines. Many key questions remain open concerning how intangibles affect firm performance. Conceptual arguments sometimes view intangibles as having a monotonically
positive influence on performance. Empirical studies tend to show that intangibles associate with positive performance, but often center on single industries, specific intangibles, and single measures of performance (e.g., Henderson & Cockburn, 1994; Levinthal & Myatt, 1994; Maijoor & Van Witteloostuijn, 1996). In practice, though, intangible resources and performance are multidimensional concepts (Eccles, 1991; Mitchell, 1991; Amit & Schoemaker, 1993). If intangibles and performance decompose into multiple dimensions, what general relationships between the elements should one expect? Several conceptual features of intangibles suggest that intangibles present constraints for firms as well as competitive opportunities (Hannan & Freeman, 1977; Nelson & Winter, 1982; Wernerfelt, 1984; Leonard-Barton, 1992). If so, then possession of intangible resources will often produce tensions that result in tradeoffs along different performance dimensions.

This chapter attempts to determine how different types of intangibles account for differential firm performance along several performance dimensions. We emphasize the distinction between three types of resources: production resources, organizing intangibles based on internal routines, and organizing intangibles based on interorganizational relationships. In turn, we consider potential tradeoffs for profitability, growth, productivity, and survival performance. The research offers three contributions to our understanding of business strategy and performance. First, the chapter suggests that intangibles create opportunities and constraints on strategy, which in turn lead to performance tradeoffs. These tradeoffs may involve different performance dimensions at a particular point in time and performance tradeoffs over time along a particular dimension. Second, the chapter shows that the performance tradeoffs differ for varying types of intangibles. Third, the empirical operationalization of intangibles offers insights to aid development of generizable theory.

**BACKGROUND: INTANGIBLE RESOURCES**

**RELEVANT LITERATURES**

Several literature streams contribute to our understanding of intangible resources. Five key literatures are: the resource-based view of the firm, transaction cost theory, behavioral theories, interorganizational network theories, and evolutionary theories.

The resource-based view of the firm gives the most extensive treatment on the subject of intangibles. Resource-based theorists describe intangibles as knowledge-based assets (Penrose, 1959). There are many typologies of intangible resources, with common distinctions between technical, manufacturing, marketing, managerial, and financial resources (Barney, 1986, 1991;
Chatterjee & Wernerfelt, 1991; Amit & Schoemaker, 1993; Capron, Dussauge & Mitchell, 1998). More generally, Kogut & Zander (1992) refer to first-order and second-order intangible resources. First-order intangibles are resources that yield direct design, manufacturing, marketing, and other commercialization advantages, while second-order intangibles consist of knowledge on how to put assets to use. Similarly, Henderson & Cockburn (1994) distinguish between component competencies, which are abilities that apply to day-to-day problem solving, and architectural competence, which is the ability to use and integrate component competencies. The key distinction in these discussions is that some resources directly create commercial advantage, while others create commercial advantage because they help a firm organize and apply its first-order resources. As Penrose (1959, p.54) put it, “A firm may achieve rents not because it has better resources, but rather the firm’s distinctive competence involves making better use of its resources.”

We will refer to first-order component resources as production resources. We will refer to second-order architectural intangibles as organizing resources. The distinction between production resources and organizing resources provides a useful overarching resource typology. Later in the chapter, we will also develop the distinction between organizing resources that a firm holds within its boundaries and organizing resources that span organizational boundaries.

The basic argument of the resource-based view is that financial performance tends to increase with the degree to which a firm possesses valuable, scarce, and inimitable intangible resources. At the same time as an intangible resource may create value, however, the inimitability of a once-valuable resource may also constrain a firm in its attempts to change the resource when competitive conditions change. We will return to the issue of resource-based constraints later in the chapter.

The second literature, transaction cost theory, brings additional insight to the concepts of production and organizing resources, emphasizing economizing issues (Williamson, 1991a). Transaction cost economics argues that firms form governance relationships that minimize the combined costs of producing goods and protecting their value. In this view, the critical issue is to protect the value of idiosyncratic, transaction-specific assets. In some cases, such assets are tangible physical assets with dedicated uses. Often, though, transaction-specific assets involve substantial degrees of knowledge-based intangibility. Moreover, in the transaction cost view, the tacit nature of intangible resources typically creates a substantial degree of asset specificity (Williamson, 1985). Thus, the transaction cost and resource-based views examine intangible resources from converse sides. Where resource-based arguments emphasize that intangibles may create value, transaction cost arguments emphasize that firms must create governance mechanisms that protect the value of intangible resources. The mechanisms
must deal with the governance of internal activities and with the governance of external exchanges involving transaction-specific assets that enjoy specialization economies and therefore suit external production (Williamson, 1975). The governance regime concept in the transaction cost view is the converse side of the organizing resource concept that arises in the resource-based view.

The performance implication of the transaction cost view is that firms must construct governance regimes that allow the optimal combination of production economies and governance economies. The governance regime must provide short-term incentives to undertake specialized investments, protect the value of the investments, and encourage valuable knowledge exchange among firms (Arrow, 1971; Grossman & Hart, 1986). An appropriate governance regime can also help managers to minimize the cost of achieving flexibility in the exchange arrangement over time. Several empirical studies in the transaction cost literature and in the related international business field of internalization theory offer support for this view (e.g. Armour & Teece, 1982; Morck & Yeung, 1992).

Despite the value of governance regimes, the short-term goal of exploiting the current value of a relationship and achieving long-term flexibility may sometimes conflict. The greater the investment in governance regimes that protect transaction-specific assets, the less attractive will be alternative options apart from current internal and external relationships. This is the basis of the fundamental transformation phenomenon that Williamson (1985) describes, whereby a large numbers bargaining situation evolves into a small numbers bargaining relationship once a firm makes a particular governance choice. In turn, this transformation may create path dependency and inadaptability of reorganizing intangibles over time.

In the third literature, behavioral theories of the firm take an introspective view of firms. Under these views, business actions derive from managers with finite analytical capacity and potentially self-serving motivations. As a result, firms are successful to the degree that they provide their employees with the right decision rules (March & Simon, 1958; Cyert & March, 1963) and incentive systems (Barnard, 1938; Cyert & March, 1963; Jensen & Meckling, 1976). Such decision rules and incentive systems constitute the firm's bureaucratic systems, and commonly involve substantial tacit, routine-based elements. In parallel with the resource-based and transaction cost views, these bureaucratic systems constitute a firm's set of organizing intangibles. Despite their necessity, the bureaucratic systems often detract from firm performance over time, because their routine-based nature makes them difficult to change. Organizational rules, heuristics, and other bureaucratic mechanisms can take on a life of their own (Zhou, 1993). Because of the institutional nature of rules and systems, bureaucratic systems may continue to govern firm actions long after the rules have served their initial usefulness.
in prompting profit-seeking behavior (Meyer & Rowan, 1977). In other words, once-valuable organizing resources can detract from performance when competitive environments change.

Interorganizational network theories, which constitute the fourth literature, lend a more macro perspective to the discussion of intangibles. A network position is the nexus of a set of a firm's interorganizational relationships. A firm's network position tends to result from its possession of resources, such as technical capability, that attract other firms as exchange partners. Although such resources may be scarce tangible assets, the most attractive resources will tend to be intangibles, due to their inimitability. From a network theoretical perspective, more central positions in networks of relationships confer second-order opportunities for firms to exploit resources throughout the network, in addition to their own resources (Baker, 1990). In this sense, network positions create organizing resources that allow firms to use production resources throughout a network of firms. Thus, network positions closely correspond to the concept of intangible resources. Network positions are valuable in that they determine access to information and resources (Powell, 1990; Burt, 1992) and may protect a firm from environmental threats (Baum and Oliver, 1991). Moreover, the organizing resources that arise from central network positions must be both scarce and imperfectly imitable or else all organizations would be equally capable of assuming the most favorable position. Once established, network positions and their underlying internal intangibles may mutually reinforce themselves through reputational effects, the ability to influence market standards, path dependence in investment, and other forces (Podolny, 1993; Methe et al., 1997). At the same time, though, central network positions may be the most at risk if environmental pressures come to bear upon key elements of the entire network (Singh & Mitchell, 1996). Positions at the margin that allow for more boundary spanning may allow firms to observe and prepare for environmental change (Cohen & Levinthal, 1990; Granovetter, 1985).

Finally, in the fifth literature, evolutionary theories such as evolutionary economics and organizational ecology contribute to our understanding of intangibles in at least two ways. First, organizational routines provide the locus for intangible assets (Nelson & Winter, 1982). Second, evolutionary theories emphasize dynamic perspectives in which intangibles contribute to some aspects of adaptation while hindering others. Organizational ecology stresses that routines are valuable because they contribute to reliability, which in turn is necessary for survival (Hannan & Freeman, 1984). Evolutionary economics provides a fuller characterization of routines, addressing three sets of issues. First, routines are tacit in nature, which makes them hard to imitate but also makes it difficult for the focal organization to replicate or change its own routines (Nelson & Winter, 1982; Henderson & Clark, 1990). Second, routines affect firm behavior on three levels of activities. At
the lowest-level, operational routines provide the basis for reliability
(Nelson & Winter, 1982). At the next level, organizational routines provide
coordination and investment rules that bridge operational routines. In turn,
firms use a third level of routines, which Amburgey, Kelly & Barnett (1993)
refer to as modification routines, to restructure existing routines. Modification
routines, the underpinnings of dynamic capabilities (Teece, Pisano &
Shuen, 1997), trigger path-dependent adaptation and innovation by recombining
operational and organizational routines (Henderson & Clark, 1990;
Amburgey, Kelly & Barnett, 1993; Lei, Hitt & Bettis, 1996). In an evolutionary
view, then, intangible resources contribute to current firm performance
and influence the way in which firms respond to competitive changes.

AN INTEGRATED VIEW OF INTANGIBLES

These five sets of literature share two themes. First, the literatures have
similar underlying definitions of the concept of intangible resources. Second,
the literatures either explicitly or implicitly suggest that intangible resources
create both opportunities and constraints on superior performance
(Leonard-Barton, 1992). These themes lead to four propositions concerning
how different types of intangibles will influence different types of
performance.

The Concept of Intangible Resources

One common element of the literatures is that they view intangibles as firm-
specific, knowledge-based assets that intertwine with a business’s tacit organiza-
tional routines. The tacitness of organizational routines yields two
additional properties of intangibles (Nelson & Winter, 1982). First, intang-
ibles are unique to the firm for some time. Second, people both inside and
outside the firms only partially understand the intangibles.

Intangibles emerge from a firm’s choice of what activities to pursue and its
choice of structures with which to govern those activities (Mosakowski,
1993). These two aspects of intangibles correspond to production and organ-
izing intangibles. Organizing intangibles further divide into two subcateg-
ories: those that govern intra-firm relationships and those that govern inter-firm
relationships. The strength of an intangible resource will increase
as the intensity of the production activity or governing relationship in-
creases. The strength of an Intangible will also increase as the duration of a
firm’s experience with the Intangible increases. At the same time, though,
greater experience may create greater inertia and difficulty in adapting to
environmental changes. Although the concept of third-level modification
routines tempers the inertia concern, even modification routines tend to
induce path-dependent responses to environmental changes, responses that may still be maladaptive.

**Contributions to Current and Future Performance**

Because they are only imperfectly imitable, intangible resources provide a source of sustained advantages in production and organization. The advantages, in turn, contribute to superior performance. Production intangibles contribute to future performance as well as current performance. The non-depleting nature of production intangibles affords growth opportunities (Fenrose, 1959). Once a firm has secured a valuable intangible asset, its marginal cost of expansion is minimal and the firm has a growth advantage over firms that lack the intangible base.

Organizing intangibles contribute to future performance as well as current performance. Organizing intangibles, including those that stem from intra-firm routines and those that derive from inter-firm routines, affect a firm's ability to use current knowledge. Effective intra-firm organizing routines aid the efficiency of knowledge use (Teece, 1982; March, 1991; Kogut & Zander, 1992; Henderson & Cockburn, 1994; Conner & Prahalad, 1996). Meanwhile, organizing routines that facilitate inter-firm collaboration allow the firm to access a broad base of knowledge (Powell, 1990; Henderson & Cockburn, 1994; Powell, Koput & Smith-Doerr, 1996).

Intra-firm and inter-firm organizing routines also affect a firm’s flexibility to put new knowledge to use. Utilization of new knowledge often calls for a reconfiguration of organizing routines (Henderson & Clark, 1990). Successful reconfiguration, in turn, requires two types of flexibility: negotiating flexibility, which is the ease with which parties can agree upon required changes, and structural flexibility, which is the capacity to implement agreed upon changes. In an uncertain environment with boundedly rational individuals and incomplete contracting, internal governance affords greater negotiating flexibility (Masten, 1988; Williamson, 1991b; Conner & Prahalad, 1996; Mitchell & Singh, 1996a). With internal control, authority dictates at will unless the employment contract specifically restricts the action. By contrast, external relationships typically involve greater bargaining (Williamson, 1991b). On the other hand, inter-firm collaboration offers greater structural flexibility than does hierarchy (Powell, 1990). Compared to internal routines, inter-firm routines are apt to couple more loosely with a firm’s full set of routines. Thus, restructuring of inter-firm routines, through dissolution or reconstitution, should be easier, assuming that the parties agree on the necessary changes.

In assessing the respective advantages of different types of intangibles, no one type of intangible would seem to have a dominant impact on firm performance. Both production resources and organizing resources will contribute to performance, because firms require both intrinsic production
capabilities and the ability to organize their production skills. Moreover, both organizing intangibles that derive from intra-firm routines and organizing intangibles that stem from inter-firm routines may contribute, although with somewhat different tradeoffs. The inertial forces involved in hierarchical relationships enhance survival by decreasing variance in performance, but this low variance may hurt the conditional expectation of financial performance given firm survival (March, 1991). Firms that pursue collaborative relationships may increase their opportunities for primacy and their conditional expected performance, but the gains may come at a higher risk of failure due to greater performance variability. Theoretically, then, each type of intangible creates its own set of opportunities for superior performance. These opportunities are perhaps best realized when firms use the different types of intangible resources in combination.

**Constraints on Current and Future Performance**

Intangibles create two forms of constraints on performance, including temporal traps and incompatible concurrent performance goals. Temporal traps are perhaps the most obvious constraint. Intangibles that were sources of advantage under past conditions become constraints as environmental change over time calls for adaptation. Three types of temporal traps may emerge. The first are structural traps stemming from path dependencies. A firm may see the need to change and desire to do so, but may be unable to recombine its routines to respond appropriately (Dierickx & Cool, 1989; Henderson & Clark, 1990; Amburgey, Kelly & Barnett, 1993). Although selection pressure may come to bear upon a specific routine (Miner & Haunschild, 1995), the intertwined, complementary nature of routine-based resources can make adaptation disruptive for the whole organization (Teece, 1986; Amburgey, Kelly & Barnett, 1993; Helfat, 1994). The second type of temporal trap stems from myopia. Management may fail to perceive the need for change due to its focus on its current knowledge trajectory (Levinthal & March, 1993). Intangibles enhance learning within a firm's existing knowledge domain but may retard awareness of developments outside the domain (Cohen & Levinthal, 1990). The third type of temporal trap is that the success that intangibles initially yield can breed complacency. The complacency trap occurs when management is lulled into a false sense of security that change is not necessary since it has discovered the right formula (Cyert & March, 1963; Levinthal & March, 1993).

In addition to temporal traps, the nature of intangibles may create conflicts among performance goals, because the same intangible may present an opportunity to improve one type of performance while constraining another performance dimension. For instance, growth and current profitability may conflict. Growth goals may require ongoing investment in intangibles in
order to maintain them (Nelson & Winter, 1982; Mosakowski, 1993), while profitability goals may drive a cash-cow, exploitation approach towards firm resources.

The different types of intangibles may present differing degrees of constraints. Two differences arise among the constraints. The first difference concerns production versus organizing intangibles. The second difference arises with respect to internal versus inter-firm organizing intangibles.

First, temporal traps will tend to differ for production and organizing intangibles. Organizing intangibles create more frequent and greater temporal constraints than production intangibles. The difference arises because competitive environments are more likely to require changes in organizing intangibles than production intangibles and because changing organizing intangibles is potentially more damaging than changing production intangibles. To reach this conclusion, we must first recall that temporal traps arise from environmental changes. Henderson & Clark (1990) categorize types of environmental change as incremental, architectural, modular, and radical. At the extremes, incremental changes require few new production and organizing intangibles, while radical changes require changes in both production technology and organizing intangibles. Modular and architectural environmental shifts represent intermediate levels of change. Modular changes require new production intangibles and architectural changes require new organizing intangibles.

Different sets of changes present different constraints. Under incremental or radical environmental change, production and organizing intangibles present the same level of constraint. Under incremental change they both pose little constraint, while under radical change they pose a severe dual constraint. Note, though, that the two intermediate cases of architectural and modular environmental change have different implications for production and organizing intangibles. Architectural change, which requires new organizing intangibles, tends to be more common than modular change, which requires new production intangibles (Tushman & Anderson, 1986). Thus, the need to modify organizing routines will exceed the need to modify production routines. Moreover, technology theorists tend to view architectural adaptation as more difficult than modular adaptation because architectural adaptation requires a reassembling of the firm’s communication pathways and problem-solving strategies (Henderson & Clark, 1990). By contrast, when faced with the need to revamp production technology during modular changes, firms can still rely upon their current organizational structure to develop solutions. These arguments suggest that organizing intangibles will present greater and more frequent inter-temporal constraints than production intangibles.

The second difference in the constraints is that a firm’s mix of internal and inter-firm organizing intangibles will tend to affect the type of constraints
that the firm encounters. Until this point in the discussion, we have presented organizing intangibles based on internal and inter-firm relationships as independent constructs. However, a choice to govern an activity using internal relationships often represents a decision not to use inter-firm relationships and vice versa. In addition, the overall balance of internal versus inter-firm routines that a firm uses to manage its knowledge may be critical in determining the effective utilization of that knowledge. Using a diffusion model based on individual agents, March (1991) posits that organizations maximize learning by having an appropriate mix of what he calls efficient learners and diverse learners. Taking this abstraction of efficiency and diversity to the level of routines suggests that some mix of exploitation-oriented routines and exploration-oriented routines will maximize an organization's knowledge utilization. As we noted earlier, internal routines often aid exploitation of current knowledge, while inter-firm routines are likely to aid exploration. Thus, a firm's mix of internal and inter-firm routines may create tradeoffs for current and future performance.

We can illustrate the interdependent nature of organizing intangibles based on internal and inter-firm routines by examining the consequences of having extreme levels of either. Firms that primarily rely on inter-firm routines, with little capability based on internal routines, may be able to tap a large knowledge pool but may be unable to absorb and apply the knowledge (Cohen & Levinthal, 1990). A firm might also become extremely dependent on other firms due to its lack of bargaining power and lack of unique capabilities (Pfeffer & Salancik, 1978; Singh & Mitchell, 1996). At the other extreme, firms that primarily rely on intra-firm routines, with little capability based on inter-firm relationships, may miss opportunities to exploit new markets due to lack of information and lack of attention to developments outside their immediate domain. This type of myopia will cause a firm to miss growth opportunities (Slater & Narver, 1995; Mitchell & Singh, 1996b).

Thus, firms will tend to require some mix of internal and inter-firm intangibles. Maintaining a correct mixture is particularly difficult since strengthening of one often comes at the expense of the other. As a result, nonlinear and nonmonotonic relationships between levels of each organizing intangible and performance may well arise. The arguments concerning opportunities and constraints lead us to the following summary logic and resulting propositions.

**Propositions**

Production intangibles present an inter-temporal constraint with respect to obsolescence of technical or marketing knowledge. Although product obsolescence may occur, obsolescence of the underlying production
knowledge will be less common under mere incremental or architectural environmental change. Under these conditions, production intangibles afford great opportunities with little short-term constraint. Even under modular change, many firms can use their production experience as the basis for adapting their production technologies. Hence, production intangibles that are valuable for today's financial performance should also enhance survival prospects until the next technical shock, which is a rare event in most industries.

Proposition 1: In the absence of radical environmental change, greater levels of production intangibles will contribute to superior financial performance and greater likelihood of survival.

Internal governance increases inertial forces which, in turn, enhance reliability. Information flows are also more reliable under internal governance (Helfat & Teece, 1987). Reliable, low variance performance, in turn, enhances survival prospects (Hamman & Freeman, 1984). This effect, which centers on a reduction in performance variance, may be independent of the impact on expected financial performance (Helfat, 1988). We also expect that integration towards the edges of a firm's environment will help focus managerial attention on critical factors for survival, such as technical changes and customer needs.

Proposition 2: Greater levels of internal organizing intangibles will contribute to greater likelihood of survival.

Clearly, some degree of expertise in managing internal or external relationships contributes to financial performance. Firms need to be able to manage knowledge within the firm for exploitative purposes and knowledge outside the firm for exploratory purposes. However, too little or too much experience with either form of governance will lead to under-utilization of knowledge and cause performance problems. Thus, when observed in isolation, we expect moderate levels of organizing intangibles, either internal or inter-firm based, to exhibit the most favorable impact on financial performance.

Proposition 3: Greater levels of organizing intangibles will exhibit a curvilinear relationship with financial performance, in which performance first rises and then falls.

Firms often face tradeoffs in satisfying various dimensions of financial performance. For example, investments to support growth may have a detrimental short-term impact on profitability. Similarly, collaborations that aid
productivity by leveraging internal resources may compromise the development of unique firm capabilities and thereby undermine prospects for sustained growth.

Proposition 4: A given intangible resource will have non-uniform influences on different dimensions of financial performance.

The propositions focus on relationships that no one traditional research perspective predicts. The resource-based view presents a primarily static view of the relationship between intangibles and performance, thus underemphasizing the inter-temporal constraints that intangibles present. Transaction cost economics also takes an equilibrium view of intangibles. The theory acknowledges the need to evaluate the most advantageous governance form over time, but avoids explicit discussion of structural flexibility, which is the capacity to make desired structural changes. Behavioral arguments focus on internal, organizing intangibles such as decision rules and incentive systems, rather than production intangibles, inter-firm relationships, and environmental influences. By contrast with behavioral views, interorganizational network views focus on external relationships while tending to under-emphasize internal processes. Lastly, evolutionary views explore the link between firm intangibles and survival prospects over time, but lack explanatory power in assessing differences in current financial performance between firms. Thus, an integrated view of intangibles that cuts across literature streams offers a unique contribution to understanding the sources of differential firm performance. By taking an integrated view we can compensate for the limitations of each individual perspective. Empirical support for the propositions will help develop this integrated approach.

DATA AND METHODS

The data set we used for the empirical analysis included 141 Midwestern US adolescent firms in technology industries such as telecommunications, medical devices, instrumentation, computers, and semiconductors. By adolescent, we mean firms from 5 to 20 years of age. The firms responded to a 1993 mail survey. We used the responses to the 1993 survey to operationalize the measures of intangibles and current performance. We then obtained follow-up information on the firms’ status via telephone interviews in 1997, which we used for the survival measure. Adolescent firms in technology-intensive industries suit this study for several reasons. Adolescent firms are past the high risks of early failure due to the liability of newness (Stinchcombe, 1965) but have not yet reached the extremes of age-induced inertia (Barron, West
& Hannan, 1994). Adolescent firms commonly remain in their growth stage, typically within one main industry. Using technology-intensive industries helps ensure that the firms face changing competitive environments that create adaptation requirements. Table 13.1 reports the descriptive statistics and correlation matrix for the data set.

**Intangible Variables**

This chapter deals with three categories of intangible resources: production intangibles, organizing intangibles based on internal routines, and organizing intangibles based on inter-firm relationships. Table 13.2 lists the survey items we used to operationalize these constructs. By measuring the activities and relationships that produce intangibles, these constructs seek to test our propositions.

We constructed two measures of production intangibles: technical capability and market scope. The evolutionary economics literature stresses the importance of firm-specific technical capability in shaping a firm’s prospects for survival and financial performance (Nelson & Winter, 1982; Dosi, 1988; Henderson & Cockburn, 1994). We operationalized technical capability as R&D leadership and R&D productivity using four items. Market scope seeks to capture the underlying level of marketing expertise available to the firm. Marketing expertise allows the firm to participate successfully in multiple product markets. This broad participation, in turn, reinforces the underlying marketing expertise (Mahoney & Pandian, 1992; Slater & Narver, 1995). We operationalized marketing expertise with four items that measured breadth of experience across product and geographic markets.

We used marketing integration to operationalize our concept of organizing intangibles based on internal routines. Marketing integration is the degree to which firms integrate towards the customer by internalizing distribution, sales, and service functions. Marketing integration reflects the extent to which firms use intra-firm routines to manage their marketing know-how. Internally-oriented routines may be valuable in helping firms to focus managerial attention on the customer or become more efficient in transferring knowledge about how to satisfy market needs (Teece, 1982; Helfat & Teece, 1987; Kogut & Zander, 1992). We determined marketing integration with three items that measured internal control over distribution, sales and service to end customers. Of course, some of the expertise that a firm develops as a result of its market activities may reside in inter-firm relationships as well as in internal routines. We include this element of marketing expertise in our measures of organizing intangibles based on inter-firm relationships.

We constructed two measures of organizing intangibles based on inter-firm relationships: vertical relationships with suppliers and customers, and
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<td>10 Firm age</td>
<td>-0.24</td>
<td>-0.23</td>
<td>-0.13</td>
<td>0.07</td>
<td>-0.17</td>
<td>-0.02</td>
<td>0.05</td>
<td>-0.01</td>
<td>-0.05</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Firm size</td>
<td>0.24</td>
<td>0.02</td>
<td>-0.14</td>
<td>-0.06</td>
<td>0.03</td>
<td>0.20</td>
<td>-0.07</td>
<td>-0.05</td>
<td>0.08</td>
<td>0.15</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Environmental turbulence</td>
<td>0.07</td>
<td>0.04</td>
<td>-0.26</td>
<td>-0.03</td>
<td>0.32</td>
<td>0.20</td>
<td>0.14</td>
<td>0.09</td>
<td>0.15</td>
<td>0.00</td>
<td>0.12</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13 Environmental munificence</td>
<td>-0.09</td>
<td>0.26</td>
<td>0.38</td>
<td>-0.14</td>
<td>-0.11</td>
<td>0.02</td>
<td>-0.08</td>
<td>0.01</td>
<td>0.04</td>
<td>0.08</td>
<td>-0.07</td>
<td>-0.44</td>
<td>1</td>
</tr>
</tbody>
</table>

**Summary statistics**

- Mean: 111.151, 3.48, 4.13, 0.84, 4.4, 3.86, 5.23, 0.13, 0.83, 8.89, 24.44, 3.97, 3.85
- Standard deviation: 67.563, 1.26, 1.54, 0.36, 1.36, 1.38, 1.39, 0.23, 1.05, 3.39, 68.79, 1.19, 1.34
- Minimum: 20,000, 1, 1, 0, 1, 1, 1, 1, 0, 0, 5, 1, 1.4, 1
- Maximum: 350,000, 6, 6, 1, 7, 6.75, 7, 1.2, 4.15, 20, 740, 7, 7
- Cases: 99, 141, 141, 141, 141, 141, 141, 141, 141, 141, 141, 141, 141
### Table 13.2 Items used to measure constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Wording</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A  Production intangibles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a Technical capability</td>
<td>Continuous new product development</td>
<td>0.595</td>
</tr>
<tr>
<td>1b Technical capability</td>
<td>Products are customized to customer requirements</td>
<td>0.654</td>
</tr>
<tr>
<td><strong>B  Organizing intangibles based on internal routines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a Marketing integration</td>
<td>All marketing done in-house</td>
<td>0.499</td>
</tr>
<tr>
<td>3b Marketing integration</td>
<td>Direct product sales to customers</td>
<td>0.627</td>
</tr>
<tr>
<td><strong>C  Organizing intangibles based on inter-firm routines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4a Horizontal relationships</td>
<td>Joint purchasing agreements with competitors</td>
<td>0.471</td>
</tr>
<tr>
<td>4b Horizontal relationships</td>
<td>Joint sales agreements with competitors</td>
<td>0.471</td>
</tr>
<tr>
<td>4c Horizontal relationships</td>
<td>Engaged in a joint venture with competitors</td>
<td>0.725</td>
</tr>
<tr>
<td>4d Horizontal relationships</td>
<td>Engaged in joint research with competitors</td>
<td>0.633</td>
</tr>
<tr>
<td>4e Horizontal relationships</td>
<td>Engaged in joint advertising with competitors</td>
<td>0.408</td>
</tr>
<tr>
<td>4f Horizontal relationships</td>
<td>Engaged in licensing agreements with competitors</td>
<td>0.391</td>
</tr>
<tr>
<td><strong>D  Other influences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6a Environmental turbulence</td>
<td>Our firm must change its marketing practices extremely frequently</td>
<td>0.445</td>
</tr>
<tr>
<td>6b Environmental turbulence</td>
<td>The rate of obsolescence is very high</td>
<td>0.720</td>
</tr>
<tr>
<td>6c Environmental turbulence</td>
<td>Actions of competitors are unpredictable</td>
<td>0.449</td>
</tr>
<tr>
<td>6d Environmental turbulence</td>
<td>Consumer demand and tastes are unpredictable</td>
<td>0.590</td>
</tr>
<tr>
<td>6e Environmental turbulence</td>
<td>The mode of production/service changes often and in a major way</td>
<td>0.661</td>
</tr>
<tr>
<td>7a Environmental munificence</td>
<td>Very safe, little threat to the survival and well-being of the firm</td>
<td>0.694</td>
</tr>
<tr>
<td>7b Environmental munificence</td>
<td>Rich in investment and marketing opportunities</td>
<td>0.859</td>
</tr>
<tr>
<td>7c Environmental munificence</td>
<td>An environment which the firm can control and manipulate to its own advantage</td>
<td>0.683</td>
</tr>
</tbody>
</table>
horizontal relationships with competitors. Both constructs consider the
degree to which firms use inter-firm relationships to manage upstream or
downstream activities such as research or advertising. A firm’s position
among a network of firms and its skill in managing a web of relationships is
the essence of this particular intangible (Kogut, 1988; Powell, 1990; Burt,
1992). The key difference between vertical and horizontal relationships is the
type of firm with which the firm collaborates. Horizontal relationships are
with competitors, while vertical relationships are with customers and sup-
pliers. We measured horizontal relationships with six items and vertical
relationships with three items.

We measured technical capability, market scope, and marketing integra-
tion using seven-point Likert scales. Following recommended practice, we
used an unweighted average of the responses for each set of items to
develop the scores. For horizontal and vertical relationships, we transfor-
meth checklist responses into binary code. These scores, like the others, were
unweighted averages for each set of responses.

We checked the fit of the measurement model using Lisrel 8.14, which
yielded fit parameters within acceptable range (Cudeck & Browne, 1983),
especially given the macro nature of our constructs. We confirmed internal
consistency by calculating Cronbach’s alphas for technical capability (0.76), mar-
ket scope (0.70), marketing integration (0.61), horizontal relations (0.68), and
vertical relations (0.60). We confirmed discriminant validity with Lisrel’s phi
matrix, which captures the correlation between constructs. The matrix yielded
low values (0.33 or less) that were only on the margin of significance (alpha =
0.10). Thus, there is strong support for reliability and discriminant validity.

**Performance Variables**

We divided performance into two subcategories, financial performance and
survival. Financial performance served as an indicator of performance in the
recent past, while survival served as an indicator of long-term performance.
We measured financial performance on three dimensions: productivity,
sales growth, and profitability. We derived each measure from self-report
data obtained in the 1993 survey and then validated the measures with
information from published reports. We measured productivity as a contin-
uous variable recording dollar sales per full-time equivalent (FTE) em-
ployee, which is an indicator of labor productivity. We measured sales
growth as percentage sales growth from the prior year. We measured prof-
itability as income before taxes as a percentage of sales. The growth and
profitability measures were categorical variables derived from survey re-
sponses. Respondents chose one of six response categories indicating their
most recent year’s performance.
We determined survival status in 1997, four years after the initial survey, using phone interviews and follow-up investigation of firms that we could not contact via phone. Of the 141 firms, 118 cases (84%) were still operating as either independent firms (112 cases, 80%) or acquired businesses (6 cases, 4%). The remaining 23 firms (16%) had shut down.

We obtained growth, profitability, and survivor status information for all 141 firms, but only 99 firms had complete sales per FTE data. We corrected the productivity models for sample selection bias.

CONTROL VARIABLES

We used control variables for environmental and firm-level factors to help isolate the impact of intangibles on performance. Since our sample was a cross-industry data set, we used the environmental factors of industry munificence and turbulence as controls. We measured these variables with survey response data, using three items for munificence (alpha = 0.79) and five items for turbulence (alpha = 0.77), as Table 13.2 reports. We also used the firm-level factors of size, measured in FTE employees, and age, measured as years since founding.

METHODS

We used two sets of models, as Figure 13.1 summarizes. One set of models predicted financial performance. Another set of models predicted survival. We approached survival prediction in two ways. The first model sought to identify the impact of intangibles (I) on survival (S) without controlling for financial performance (I \rightarrow S; model 2a in Figure 1). The second model, (I, P \rightarrow S; model 2b in Figure 13.1), adds controls for financial performance (P).

The distinction between the two models is important because there are two mechanisms by which intangibles could influence survival chances. First, intangibles might affect financial performance directly, which, in turn, would influence survival chances. In this first case, intangibles affect survival only indirectly, through their influence on financial performance. The alternative argument is that intangibles have a residual direct impact on survival, net of their impact on financial performance. That is, intangibles may influence a firm's survival chances independent of their contribution to current performance. The second survival model seeks to estimate any direct influence of intangibles on survival by controlling for financial performance.

We used two approaches to estimate influences on financial performance. The first approach examined the impact of intangibles on each dimension of
financial performance (i.e. productivity, growth, and profitability), while controlling for the remaining financial performance factors. When attempting to model growth, for example, it may be important to control for profitability and productivity because the individual dimensions of financial performance are likely to interact. The second set of models examined the possibility of curvilinear relationships between intangibles and financial performance by incorporating a squared term for each intangible. We used this approach to test proposition 3, which predicted curvilinear relationships between organizing intangibles and financial performance.

We used maximum-likelihood, binomial logit analysis for all survivor models because the dependent variable, survival status, was binary. We used two different methods to estimate models predicting the dimensions of financial performance. We used the Grouped Data Regression Model in the statistical package LIMDEP to analyze factors affecting sales growth and profitability. Growth and profitability are both categorical variables with known ranges. The case is similar to those in which one might use an
ordered probit model, but the Grouped Data Regression Model is more efficient than ordered probit because it permits one to specify the categorical ranges when known (Greene, 1995). Productivity, a continuous variable that was only available for a subset of the sample, required a different modeling approach. We used two-stage, maximum-likelihood regression with correction for sample selection bias. In addition to the constant, we used four parameters for the selection equation: age, FTEs, growth, and profitability. These parameters reflect assumptions regarding the factors that would influence the probability of a firm responding to a request for financial information.

RESULTS

Tables 13.3 and 13.4 present the results. Productivity failed to show any significant relationships as an independent variable with survival or as a

<table>
<thead>
<tr>
<th>Table 13.3: Binomial logit estimates of influences on business survival from 1993 to 1997 (141 cases, 23 shut down)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intangibles</strong></td>
</tr>
<tr>
<td>Marketing integration</td>
</tr>
<tr>
<td>Market scope</td>
</tr>
<tr>
<td>Horizontal relationships</td>
</tr>
<tr>
<td>Vertical relationships</td>
</tr>
<tr>
<td>Technical capability</td>
</tr>
</tbody>
</table>

**Financial performance**
- Sales growth
- Profitability: 0.129
- Profitability: 0.377**

**Other influences**
- Firm age: -0.079
- Firm size: 0.010
- Environmental turbulence: 0.226
- Environmental munificence: 0.460**
- Constant: -1.080

Loglikelihood: -55.7
Loglikelihood ratio χ², full model versus constant and controls (d.f.): 4.4 (5 d.f.)
Loglikelihood ratio χ², model 2 versus model 1 (2 d.f.): 5.8*

* p < 0.10; ** p < 0.05 (two-tailed tests).
Table 13.4: Grouped data regression estimates of linear and nonlinear influences on financial performance in 1993 (141 cases)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2a</th>
<th>2b joint test</th>
<th>3</th>
<th>4a</th>
<th>4b joint test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I, P →</td>
<td>I, D, P →</td>
<td>Joint test *</td>
<td>L, P →</td>
<td>I, D, P →</td>
<td>Joint test *</td>
</tr>
<tr>
<td></td>
<td>Sales growth</td>
<td>Sales growth</td>
<td>p-value</td>
<td>Profitability</td>
<td>Profitability</td>
<td>p-value</td>
</tr>
<tr>
<td>Intangibles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing integration</td>
<td>-1.820**</td>
<td>1.610</td>
<td>0.07</td>
<td>-0.218</td>
<td>-2.790</td>
<td>0.57</td>
</tr>
<tr>
<td>Market scope</td>
<td>-1.040</td>
<td>-0.892</td>
<td>0.46</td>
<td>0.532</td>
<td>1.610</td>
<td>0.49</td>
</tr>
<tr>
<td>Market scope squared</td>
<td>-0.028</td>
<td>-37.20**</td>
<td>0.01</td>
<td>-1.510</td>
<td>5.990</td>
<td>0.54</td>
</tr>
<tr>
<td>Horizontal relationships</td>
<td>-1.260</td>
<td>-54.70**</td>
<td>0.01</td>
<td>-0.745</td>
<td>-0.610</td>
<td>0.59</td>
</tr>
<tr>
<td>Vertical relationships</td>
<td>1.680</td>
<td>3.630</td>
<td>0.19</td>
<td>0.121</td>
<td>-2.080</td>
<td>0.63</td>
</tr>
<tr>
<td>Technical capability squared</td>
<td>1.720*</td>
<td>0.326</td>
<td>0.22</td>
<td>0.260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales growth</td>
<td>1.890**</td>
<td>1.570**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other influences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm age</td>
<td>-0.872**</td>
<td>-0.910**</td>
<td></td>
<td>-0.162</td>
<td>-0.237</td>
<td></td>
</tr>
<tr>
<td>Firm size</td>
<td>0.004</td>
<td>0.001</td>
<td></td>
<td>-0.014</td>
<td>-0.001</td>
<td></td>
</tr>
<tr>
<td>Environmental turbulence</td>
<td>2.520**</td>
<td>2.700**</td>
<td></td>
<td></td>
<td></td>
<td>-1.040*</td>
</tr>
<tr>
<td>Environmental munificence</td>
<td>2.190**</td>
<td>2.150**</td>
<td></td>
<td>1.300**</td>
<td>1.380**</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.10</td>
<td>-5.010</td>
<td></td>
<td>3.940</td>
<td>12.30</td>
<td></td>
</tr>
<tr>
<td>Sigma</td>
<td>12.60**</td>
<td>12.20**</td>
<td></td>
<td>6.560**</td>
<td>6.580**</td>
<td></td>
</tr>
<tr>
<td>Loglikelihood</td>
<td>-251.4</td>
<td>-245.8</td>
<td></td>
<td>-229.6</td>
<td>-229.0</td>
<td></td>
</tr>
<tr>
<td>Loglikelihood ratio *=2, full model</td>
<td>15.6(5)**</td>
<td>26.8(10)**</td>
<td></td>
<td>12.6(5)**</td>
<td>13.8(10)</td>
<td></td>
</tr>
<tr>
<td>versus constant and controls (d.f.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loglikelihood ratio *=2, main effects</td>
<td>11.2(5)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>versus squared terms model (d.f.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < 0.10.  ** p < 0.05 (two-tailed tests).
* The joint test p-value compares the model to estimates that omit each individual intangible and its squared effect.
dependent variable with intangibles. Even the selection equation for productivity information failed to produce any significant results. Thus, we removed productivity from further consideration in order to work with the full data set. As we noted earlier, the subset of cases with productivity data included 99 of the 141 cases. Removing productivity from further consideration allowed us to use all 141 cases in the remaining analysis. Thus, the productivity analysis does not appear in the reported results.

**Survival Models**

Table 13.3 reports the main effects of intangibles on survival. We first consider the results without performance controls (I → S; model 1). When we fail to control for financial performance, it appears that none of the intangibles has a significant impact on survival. This result proves to be misleading because the direct impact of intangibles and indirect impact of intangibles via financial performance intertwine, thereby masking significant relationships. Only industry munificence appears to impact performance in the first column of Table 13.3.

Once we control for financial performance in Table 13.3 (I, P → S; model 2), we see that marketing integration has a positive, direct impact on survival. None of the other intangibles has a significant direct impact on survival. The marketing integration result is consistent with proposition 2 and highlights the positive effect of organizing intangibles based on internal routines on survival.

Notice also that profitability strongly affects survival in column 2 of Table 13.3, while the effect of munificence disappears in model 2. In the financial performance models that follow, munificence proves to relate positively with profitability. These two results suggest that munificence influences survival only to the degree that firms translate environmental benevolence into profits.

**Linear and Curvilinear Financial Performance Models (I, P → P; I, P, P → P)**

Column 1 of Table 13.4 reports the linear influences of intangibles on growth. Technical capability and profitability positively influence growth, while marketing integration negatively influences growth. The causal direction between profitability and growth is likely to be mutual. Profitability may generate the funds to fuel investments that support growth. Reciprocally, growth indicates an increase in sales volume and eventually sales margins as concentration rises, thereby leading to increased profits.
Column 3 of Table 13.4 reports linear influences of intangibles on profitability. Beyond the control variables, only growth influences profitability. However, recall that technical capability and marketing integration influence growth; therefore, an indirect relationship likely exists between these intangibles and profitability via growth. Since profitability contributes to survival, intangibles share an indirect influence on survival via growth and profitability.

Column 2a of Table 13.4 reports the curvilinear influences of intangibles on growth. From the change in the chi-squared statistic relative to model 1 ($\Delta \chi^2 = 11.2, \Delta d.f. = 5$), we see that the curvilinear model is a significant improvement over the linear model ($p < 0.05$). Marketing integration and horizontal relationships provide the increased explanatory power of model 2. The curvilinear effect of marketing integration reaches moderate statistical significance. As Figure 13.2 depicts, marketing integration has an inverted-U relationship with growth. At moderate levels, marketing integration has a positive influence on growth. However, high levels of marketing integration influence growth negatively. The mean level of marketing integration is high, which leads to the results in the linear model in column 1 where the relationship with growth was negative and significant. The curvilinear influence of horizontal relationships on growth in model 2 of Table 13.4 is highly significant. Like marketing integration, horizontal relationships also have an inverted-U relationship with growth, as Figure 13.2 depicts. At moderate levels, horizontal relationships have a positive influence on growth, while high levels of horizontal relationships reduce growth.

![Figure 13.2 Impact of organizing intangibles on percentage growth](image-url)
The positive relationship that technical capability shows in the linear model appears to lose its statistical significance in the curvilinear model of column 2 in Table 13.4. However, the loss of significance occurs only because the result spreads across the technical capability and the technical capability squared coefficients, which both have positive relationships with growth. In fact, the overall influence of technical capability on growth remains positive.

Model 4a of Table 13.4 investigates the possible presence of curvilinear influences of intangibles on profitability. No such influences emerge. The profitability results in model 4 are similar to the results of the linear model in column 2. As before, only growth, turbulence, and munificence hold significant relationships. Compared to the linear model, the curvilinear model is not a significant improvement ($\Delta \chi^2 = 1.2$, $\Delta d.f. = 5$). Thus, there are no observable nonmonotonic relationships between intangibles and profitability.

**Discussion and Future Research**

**Tests of Propositions**

Several results stand out. The results offer moderate support for proposition 1, which predicted that production intangibles would contribute to financial performance and survival, barring radical environmental changes. Consistent with the proposition, technical capability, which is a production intangible, has a positive impact on financial performance, specifically on growth. This relationship is linear rather than nonlinear, which would imply the presence of some constraint. Technical capability also has an indirect, positive impact on survival, via growth and profitability. On the other hand, market scope, which is the other production intangible that we measured, holds no significant relationship with either financial performance or survival.

The results support propositions 2 and 3. Consistent with proposition 2, internal organizing intangibles, in the form of marketing integration, contribute to survival. Consistent with proposition 3, internal organizing intangibles, again in the form of marketing integration, and inter-firm organizing intangibles, in the form of horizontal relationships, exhibit a curvilinear relationship with growth, first rising and then falling.

The results provide weak support for proposition 4, which predicted that a given intangible resource will have non-uniform influences on different dimensions of financial performance. There are no cases in which an intangible has a positive impact on one financial performance dimension and a negative impact on another dimension. However, we observe cases in which
an intangible significantly influences one dimension of financial performance while having no impact on other dimensions. This outcome is true for technical capability, marketing integration and horizontal relationships.

**Conceptual Implications**

The results suggest three conceptual implications, concerning balancing issues for organizing intangibles, unambiguous effects of production intangibles, and lack of impact by market scope and vertical relationship intangibles. First, our results suggest that firms face delicate balancing issues and some dilemmas regarding the organizing intangibles that result from governance choices. A balanced mix of internal and inter-firm governing relationships seems to yield the greatest contribution to firm growth. This is consistent with March's concept (1991) of balanced exploration and exploitation. However, survival chances appear to improve with greater reliance upon internal routines, which aid exploitation of existing knowledge and contribute to reliable performance through inertial forces.

Marketing integration, in its turn, involves an apparent paradox. High levels of marketing integration have a direct positive benefit for survival prospects. Firms that have pursued forward integration are more likely to be keenly aware of the needs of existing customers. Internal structures may also aid efficient transfer and exploitation of this customer knowledge (Teece, 1982; Helfat & Teece, 1987; Kogut & Zander, 1992; Conner & Prahalad, 1996). These same structures strengthen inertial forces, making reliable performance and survival more probable. At the same time, however, growth goals call for a low to moderate degree of marketing integration. It is likely that a moderate amount of marketing integration helps supply the minimum amount of customer awareness necessary for growth and helps increase the firm's absorptive capacity for understanding and applying knowledge regarding new markets. A high degree of marketing integration, while enhancing survival directly, may induce a myopia that limits awareness of new markets for growth (Slater & Narver, 1995). When high levels of marketing integration hinder growth, the lack of growth creates an indirect, negative impact on survival via lower profitability, thus partially offsetting the direct positive benefit of marketing integration on survival. Therefore, firms concerned about survival face a tension. As marketing integration increases beyond moderate levels, the direct impact on survival chances is positive. But the increase of marketing integration may also create countervailing, negative pressure on survival via the constraint on growth and profitability.

As is the case with marketing integration, a moderate array of horizontal relationships aids growth. However, over-dependence on horizontal
relationships may preclude the development of unique firm knowledge. The over-dependence may also block the development of the minimum amount of internal routines necessary to absorb and apply outside knowledge (Cohen & Levinthal, 1990), thus negating much of the benefit of horizontal relationships. Alternatively, though, it is possible that reverse causality is at work at high levels of horizontal relationships. That is, poor performance may force a firm into the arms of its competitors, as a rescue strategy. In turn, though, such relationships born of necessity will have a direct, negative influence on performance, because they may further jeopardize the weaker firm’s growth prospects.

In the end, firms will need to create a mix of internal and inter-firm routines. Extreme forms of organization, such as the “virtual corporation”, invite peril. In assessing the appropriate mix, managers must weigh survival concerns against the search for primacy. If survival concerns outweigh the latter, then our research suggests that firms should conduct more of their marketing, distribution, sales, and service activities themselves. If the search for primacy predominates then the firm should engage in a greater degree of collaboration in order to tap the rich pool of knowledge outside the firm.

The second implication is that, in contrast to the give-and-take results for organizing intangibles, production intangibles have strictly monotonic influences on performance. Modular environmental change is infrequent and radical environmental change is even less frequent (Tushman & Anderson, 1986). Therefore, most or all of the firms in our sample likely faced only incremental or architectural change during the four-year period of the study. Thus, the constraint issue associated with core production intangibles did not arise as a performance factor in most cases. In the short run, firm investments in technical capability provide substantial opportunities, yielding an unambiguous, positive impact on growth and, indirectly, on survival.

The third implication concerns the two intangibles, market scope and vertical relationships, that demonstrated no significant relationships with performance. This outcome might have occurred for several reasons. First, it could be true that the opportunities and constraints presented by these resources offset each other at all levels of the intangible. A second possibility might exist for vertical relationships. From a transaction cost perspective, the null result for the vertical relationship is the expected result. This is because transaction-level characteristics determine the decision to integrate, features of which are likely to have a random distribution across countless transactions for a variety of firms in a variety of industries. In this view, an observed link between vertical relationships and performance would require the presence of systemic, transaction-level traits across the firms in our sample, which is an improbable scenario.

One final explanation for the insignificant results could be measurement error on any of three dimensions, including marketing know-how, vertical
relationships, and relative magnitude. First, we used marketing scope to attempt to determine the level of marketing know-how. The question arises, however, whether marketing know-how is a function of marketing breadth or depth. We chose to measure the breadth of marketing knowledge. Different results might be obtained if one instead measured a firm’s depth of marketing knowledge, perhaps using cumulative advertising spending as a measure. Second, our measure of vertical relationships combines two types of relationships—links with suppliers and links with customers—but these two sets of relationship may have different effects, despite the close empirical relationship in our data. Relationships with suppliers tend to focus on the management of technical knowledge, while relationships with customers tend to build around the management of marketing knowledge. Separating these two effects in a larger sample might yield significant relationships. Third, for all intangibles we measured absolute amounts rather than levels relative to an industry. As Barney (1991) pointed out, intangibles may enhance survival but only lead to competitive parity in financial performance if they are not scarce. As a result, measurement of absolute rather than relative intangible amounts may have also been responsible for the non-results. Nonetheless, we believe that the overarching contribution of the results is significant.

Our effort at understanding the complexities involved in the relationship between production and organizing intangibles and multiple dimensions of performance has produced useful results. Future research should help validate these initial results and address open issues. A first step would be refinement of measures, particularly for marketing know-how and vertical relationships. Second, we plan to obtain another wave of data for intangibles and performance in this sample. This should help to tease out some of the causal relationships and allow examination of whether the stock of intangibles or changes in the level of intangibles has greater influence on performance.

REFERENCES


References


