

ONLY AS STRONG AS THE WEAKEST LINK: VALUE CHAIN PARTNERS ARE ESSENTIAL FOR E-BUSINESS SUCCESS

Kristina McElheran

It is generally assumed that market leaders are more likely to be early adopters of business process innovations that lead to success with E-business. But are they? Although they tend to enjoy economies of scale in adoption, leaders may find that adjustment costs also increase with scale. Adjustment costs typically include things like tweaking processes to match the flow of new software applications, hiring employees with new skill sets, and/or creating new points of contact between internal divisions of the firm. Prior research has focused on how the difficulty of making internal changes along these lines may adversely affect a business' technology strategy. However, misalignment between capabilities and technological requirements may also exist outside a firm's boundaries—that is, among its partners and customers. It turns out that these external adjustment costs matter a great deal, too.

This brief, summarizing my [detailed research paper](#), builds on well-known innovation concepts to outline naïve predictions about when market leaders will – or will not -- adopt certain business-process innovations (BPI). Testing these predictions in a large data set of early e-business adopters yields important new insights, however. Observed patterns of how business process innovations impacted different markets and types of customers teaches important lessons about how technology shifts can reinforce or challenge leading incumbents.

Overall, market leaders were significantly more likely to embrace a range of new IT-enabled practices. But one important exception points to a lurking source of disruption: When customer-related adjustment costs were a significant concern, the largest firms changed

tack and resisted the technological advance. This would be surprising if we only considered what is happening inside these powerful and highly capable firms. However, a careful appreciation of value-chain realities – and the influence they can exert on even the most successful firms - makes sense of this otherwise-surprising pattern.

Both internal and external adjustment costs must feed into firms' technology strategies. Business process innovations can be a key source of competitive advantage for a wide range of firms, but only if value chain partners can make the leap, as well.

BUSINESS PROCESS INNOVATIONS CAN BE A KEY SOURCE OF COMPETITIVE ADVANTAGE FOR A WIDE RANGE OF FIRMS, BUT ONLY IF VALUE CHAIN PARTNERS CAN MAKE THE LEAP, AS WELL.

IN THIS RESEARCH BRIEF

- Market leaders are significantly more likely to embrace new IT-enabled practices with one exception: when external customer-adjustment costs are a significant concern.
- Usually, market leaders have the greatest incentives to innovate. Yet their ability to make the necessary changes can vary widely in practice, resulting in a “capability gap” that must be closed.
- Technology-capability gaps may exist outside the firm's boundaries—that is, with partners and customers – as well as within the firm.
- Little attention has been paid to how underlying process complexity can impact downstream value-chain partners – which in turn, influence incumbent behavior.
- If the largest, most successful firms have significant exposure to customers that lag in their ability to embrace new technologies, smaller firms may enjoy new opportunities to leapfrog their competitors through B2B process innovation.



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EXPLORING THE CAPABILITY GAP

Since the pioneering work of Joseph Schumpeter (1934, 1942), scholars have repeatedly explored why certain innovations are embraced quickly by market leaders while others are resisted. Market leaders usually have the greatest incentives to innovate, yet their abilities to make these changes vary widely. A principal explanation of this “capability gap” focuses on the degree of alignment between the new technology and what incumbent firms are capable of implementing. Misalignment between the demands of new technologies and existing capabilities is often blamed for the failure of otherwise-healthy firms to maintain their technological– and often competitive – advantage over time.

More precisely, any technology that requires substantially new coordinating processes, new task knowledge, new routines, or new complementary resources also will require a potential innovator to change its processes, human capital, know-how, or other capabilities and resources. Wherever there is a distance between what the firm currently can do and what it needs to do to deploy new technology, there is a potentially harmful capability gap. The distribution of these gaps may predict not only the diffusion of technology in a market, but also patterns of new product introduction, market entry and exit, and firm growth and survival.¹

Most prior research on incumbent response to technological change has focused on how internal capabilities determine a firm’s likelihood of adopting a novel technology. But new insights can be gleaned from considering the impact of innovation on a firm’s external partners and the capabilities they possess. Previous work also has focused on direct suppliers or suppliers of complements²; but little attention has been paid to downstream links in the value chain – in other words, customers. The study described here specifically considers how adjustment costs for customers may affect the behavior of incumbent firms at the onset of technological change.

1. Abernathy, W. J. and K. B. Clark (1985). “Innovation: Mapping the Winds of Creative Destruction.”
2. Afuah, A. (2001). “Dynamic Boundaries of the Firm: Are Firms Better off Being Vertically Integrated in the Face of a Technological Change?” *The Academy of Management Journal* 44(6): 1211-1228.
Research Policy 14: 3-22. (Adner and Kapoor 2010), Adner, R. and D. Levinthal (2001). “Demand Heterogeneity and Technology Evolution: Implications for Product and Process Innovation.” *Management Science* 47(5): 611-628.

In addition, this study takes place in the context of business process innovation – a type of innovation that has received limited academic attention despite its growing importance in an increasingly digitized world.

Somewhat surprisingly, I found that market leaders have a disproportionate willingness to adopt a range of business process innovations – from e-buying to large enterprise software applications -- regardless of their internal adjustment costs. However, this was conditional on the process being one that did not make significant new demands of their customers. High-market-share firms were significantly less likely to make big changes to their customer interactions across a wide range of industries. The only mitigating factor was where customers’ adjustment costs (or their influence) were significantly less pronounced.

A COST-BENEFIT FRAMEWORK FOR INNOVATION

I developed a conceptual framework for exploring the costs and benefits of BPI depending on the magnitude of a firm’s output. Typically, economies of scale will promote adoption by firms with high market shares (simply because they have a greater scale of output over which they can spread fixed costs). However, the costs of closing the capability gap may also be disproportionately higher for market leaders. Many of the key mechanisms are well-understood for product innovation. “Disruptive Innovation,” as pioneered by Clay Christensen, and usefully extended by Rebecca Henderson, Joshua Gans, and others, is a particularly good example.³

However, the way in which disruption might occur is less understood for business processes. In particular, little attention has been paid to how underlying process complexity and impact on customers may condition incumbent behavior.

3. Christensen and Bower (1995), Christensen (1997), and Christensen, C. M. (1997). *The Innovator’s Dilemma*. New York, Harper Collins. Gans, Joshua, (2016), *The Disruption Dilemma*, MIT Press.

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My framework generates slightly different hypotheses about when leaders will be more or less likely to embrace certain types of business process innovations. In particular, the theory developed in this article sets up a tension between internal and external drivers of adoption that can only be resolved by looking at patterns in real data. As a result, they make somewhat naïve predictions that can only be resolved by looking at what dominates firm choices in practice. Fortunately, I was able to leverage robust and detailed U.S. Census Bureau data on both IT use and salient organizational features for over 34,000 plants across 86 manufacturing industries. The key survey is from 1999, which was a particularly good year to study the phenomenon, as firms across many industries were highly motivated to make e-commerce and related practices work in their particular market setting. This makes the failures of adoption I observed even more telling.

The hypotheses were as follows:

Hypothesis 1: Market leaders will be more likely to adopt business-process innovations.

Hypothesis 2: Market leaders will be less likely to adopt business-process innovations with high internal adjustment costs.

Hypothesis 3: Market leaders will be less likely to adopt business-process innovations with high adjustment costs for external customers.

Additionally, the research focused on three business-process innovations that correspond well to the costs and benefits highlighted in the conceptual framework:

- Internet-based purchasing (e-buying)
- Internet-based sales (e-selling)
- Enterprise resource planning (ERP) adoption.

Controlling for a wide range of firm and market characteristics, the results show robust conditional correlations between market share and the likelihood of adoption that vary dramatically by the process in question. Being in the top quartile by market share was associated with a 20% greater likelihood of adopting e-buying, which was a brand-new, but low-adjustment-cost innovation at the time of the study (even more so, today). Yet, market leaders also had a 48% greater probability of adopting enterprise resource planning (ERP) software, despite its notoriously high internal adjustment costs.

By contrast, leaders were 36% less likely to adopt e-selling. A comparison of e-selling adoption across different market contexts reveals critical variation in this relationship: in market segments where low competition made it strategically safer to demand that customers make critical adjustments to their business processes, leader reticence was significantly less pronounced.

Tellingly, when customer capabilities were better aligned with the new technology, market leader reticence was significantly reduced (on the order of 50%), or even reversed. Specifically, when customers were located in areas with high technological savvy, the reluctance of incumbent firms to innovate their sales processes by adopting e-selling, was eliminated. This paints a vivid picture of how important value-chain partners are in facilitating – or slowing – technological advances.

STRATEGIC IMPLICATIONS

As a result of this research paper I hope to deepen our understanding of how alignment between the demands of new technologies and the existing capabilities of firms influences innovative activity within a market. A rich theoretical literature has returned to this question time and again, but it has typically ignored how capabilities external to the firm condition its response to technological change. The paper highlights the importance of looking at the entire value chain for understanding how new technologies diffuse and intersect with the competitive considerations of leading incumbents.

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The finding that customers' adjustment costs may be the determining factor for essential types of innovative activity has important strategic implications. It means that even well-positioned firms with strongly aligned capabilities may fail to innovate if that innovation requires significant investments from business partners. Predicting how technological advances will be distributed within a market – and how they will effect competition and survival of incumbent firms – therefore, has two key requirements: One is a detailed understanding of participants in the market, and the other is an understanding of the interdependencies of external value chain partners and the capabilities they possess.

While these factors are not entirely new to the innovation literature, they have not been deeply explored for business process innovation. Moreover, the distinctions have often been obscured by a lack of care in distinguishing among different processes within firms. The single term “e-commerce” tends to lump the starkly different e-buying and e-selling processes together into one term, for instance. Distinguishing among target markets for an innovation – in this case B2B versus B2C – is also an essential distinction.

By carefully isolating different business processes and their targets from each other, and by considering

the importance of value-chain partners, this research highlights several key lessons for managers and strategy scholars. The first is that leading incumbents typically enjoy significant advantages when it comes to BPI. However, it is risky to ignore how innovations impact key downstream value-chain relationships.

It is essential to look outside the firm for capability gaps. In fact, failure to do so could lead to dangerously flawed predictions. In particular, the inter-firm coordination challenge looms large in a range of processes that are being disrupted by new digital technologies. And there's a lot at stake: If the largest, most successful firms have significant exposure to customers that lag in their ability to embrace new technologies, smaller firms may enjoy new opportunities to leapfrog their competitors through B2B process innovation.

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