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# THE INTERNET AND FIRM PERFORMANCE IN LARGE ORGANISATIONS: TOWARDS A MODEL

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# THE INTERNET AND FIRM PERFORMANCE IN LARGE ORGANISATIONS:

# TOWARDS A MODEL

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# THE INTERNET AND FIRM PERFORMANCE IN LARGE ORGANISATIONS: TOWARDS A MODEL


## Abstract

The Internet has provided an opportunity for innovation in the ways firms organise internal functions and relationships with customers and suppliers. This study using 281 large Australian organisations examined why some companies were more successful in enhancing their competitive advantage with the adoption of Internet-enabled business practices (IBP) than others. It found that IBP adoption was associated with employee productivity and market share growth. A full range of IBPs were also associated via complementary assets with higher return on assets (ROA) though a more customer-centric approach was directly related to ROA. A model explaining this relationship was developed and tested.



## Keywords

competitive advantage, complementary assets, innovation, Internet


## Introduction

Willcocks and Lester (1999) note the link between IT investments, such as using the Internet to enable business practices, and their effect on organisational performance can appear to be paradoxical. In an earlier study Hitt and Brynjolfsson (1996) found that IT had increased productivity and created substantial value for consumers but found no evidence that these benefits have resulted in supranormal business profitability. As Winter (2000) defines them, innovations are not only inventions or clusters of related inventions, but can also be new ways of organising internal functions or relations with customers or suppliers. The internet has provided an opportunity for such innovation. This study will address two questions:

1. Why might some large Australian organisations be more successful in using Internet-enabled business practices to improve or maintain their competitive advantage than others?
2. What evidence is there that the adoption of Internet enabled business practices improves or maintains the competitiveness of large Australian firms?

## The Study Sample: Large Australian Organisations

Every year the BRW magazine publishes the top 1000 Australian firms by revenue. In 2001 their revenue of A$984.5 billion dollars was approximately half of all the revenue generated by Australian organisations. They also had the higher revenue growth rate of 11.4%. The sample for this study was

drawn from the BRW list of the top 1000 Australian firms in 2001. The total assets of these firms was A$2,460.2 billion.

Membership of the BRW 1000 list changes each year. About 10 to 15% of the organisations that constitute the list change annually. Based on the 2001 list a survey was conducted in October 2001 to January 2001. The amount of change in the Australian business environment was illustrated by the fact that by October only 813 organisations were available to be surveyed due to mergers, takeovers and corporate failures.

The respondents to the survey were CEOs or a member of the senior executive group. A total of 281 valid responses were received (35 per cent valid response rate). The organisations represented all major industry groups. In addition to questions on Internet practices the survey had questions that covered management style, industrial relations structure, human resources, innovation, the market environment, strategy and organisational performance. Accounting and financial information from the IBISWorld database was added to this data. For those companies that were listed on the Australian Stock Exchange share market information was also added. The revenue for organisations in the sample ranged from approximately 100 million to over 25 billion. It is important to note that, given the size of these organisations by revenue and tangible assets, the following discussion of Internet practices relate to large Australian firms.

## Complementary Assets and Internet Practices

Established companies, according to Porter, are in the best position to meld Internet and traditional approaches because they are able to leverage existing complementary assets and reinforce their existing competitive advantages. Tripsas (1997) provides an historical perspective as well as some balance to Porters assertion. Using the typesetter industry, an industry that has had a series of technology revolutions of which the Internet is the latest (though not covered in her article), she asked a key question about technological change. Why, when radical technological change transforms an industry, do established firms sometimes fail drastically and are displaced by new entrants, yet at other times survive and prosper? Using a data set from 1886 to 1990, she argues that the ultimate commercial performance of incumbents

versus new entrants is driven by the balance and interaction of three factors: investment, technical capabilities, and appropriability through specialised complementary assets.

Porter's (2001) argument then is not only consistent with Tripas' findings but also Winter's (2000) position about capturing gains from innovations. Innovations, as Winter defines them, are not only inventions, or clusters of related inventions but can also be new ways of organising internal functions or relations with customers or suppliers. Innovations very often take the form of procedural and organisational changes and are not inventions as commonly understood, but are nevertheless innovations. The Internet provides a vehicle to create such innovations but without complementary assets the gains from these innovations are quickly shared with competitors. Winter sees complementary assets as access to distribution, service capability, customer relationships, supplier relationships and complementary products. Other ways of capturing gains from innovations, according to Winter, are patents, secrecy and lead time. Such mechanisms create barriers to imitation and enhance a firm's competitive advantage by enhancing its ability to appropriate gains from its innovation regardless of whether these innovations are products, processes or services. If the Internet is not by itself a source of competitive advantage it may become so in combination with complementary assets. Therefore in established firms, internet-enabled business practices will have a positive effect on firm performance via their complementary assets.

**The Value Chain And Internet-Enabled Business Practices.**

The value chain is the set of activities for which a product or service is created and delivered to customers (Porter 2001). Porter sees every firm's value chain as composed of nine generic activities, which are linked to each other and to the activities of its suppliers, channels and buyers. These activities can be divided into two broad types: *primary activities*, which involve the physical creation of the product, its sale and transfer to the buyer, and after-sales service; and *support activities*, which support the primary activities by providing purchased inputs, technology, human resources, and various firm-wide functions. When a company competes in any industry it performs a number of discrete but interconnected value creating activities. Since every activity involves the creation, processing, and communication of information the Internet can have a pervasive influence on the value chain. To illustrate; these activities, which also have points of connection with the activities of suppliers and customers, could include

operating a sales force, component fabrication and product delivery. The Internet's great advantage is its ability to link activities so that real-time data created in one activity is widely available. The data is disseminated not only within the company but also to suppliers and customers (Porter 2001).

## Internet-Enabled Business Practices and Self-Reported Organisational Performance

In this study the CEO or one of their direct reports were asked to rate, on a one to seven scale, to what extent they used the 10 different internet enabled business practices within their organisation. The questions formed a main scale with two subscales (see table 1). These subscales indicated an external market orientation (MIBP) and an internal knowledge and information management Internet enabled practice orientation (IIBP). The two subscales mainly consist of value-chain primary items and support items respectively. The full scale (TIBP) and the two subscales had alpha reliabilities of .87, .85 and .75 respectively. Though these subscales were highly correlated ($r_{270} = .67$ $p < .01$) their alpha was higher than their correlation so there is evidence for discriminate validity between the two scales.

**Table 1 Internal Enabled Business Practice and Self-Reported Performance (n= 246)**

| | Employee Productivity | Market Share Growth |
|---|---|---|
| External Market Orientation (Mainly Primary Activities) (MIBP) | 0.16** | 0.18** |
| Real-time transaction of orders (availability/delivery time) | 0.08 | 0.14* |
| Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers | 0.12 | 0.12 |
| Co-ordination of delivery arrangements | 0.13* | 0.18** |
| On-line sales channels including web sites and internet marketplaces | 0.17** | 0.12 |
| Collaborative product design/service coordination across locations | 0.18** | 0.04 |
| Sharing and dissemination of competitor information | 0.08 | 0.20*** |
| Internal Knowledge and Information Orientation (Mainly Support Activities) (IIBP) | 0.23*** | 0.12 |
| Sharing and dissemination of organisation information | 0.18** | 0.08 |
| Knowledge directories, and procedure or process manuals | 0.23*** | 0.04 |
| Customer self-service via web sites and intelligent service request processingTIBP | 0.15** | 0.13* |
| Self-service personnel, benefits administration or training | 0.16** | 0.09 |
| Total Scale (TIBP) | 0.21*** | 0.16** |

* $p < .05$ ** $p < .01$ *** $p < .001$

Organisations were asked to rate their performance in terms of Employee Productivity and Market Share growth compared to their industry. As Table 1 above shows there is a consistent pattern of positive correlations with higher levels of employee productivity and market share growth. MIBP which consisted mainly of primary activities correlated significantly with both the market share growth and employee

productivity self-reported measures. IIBP only correlated significantly with employee productivity measures. TIBP correlated with both employee productivity and market share growth.

For the companies listed on the Australian Stock Exchange their self-reported market share growth had a strong correlation ($r_{46}$ = -0.459 p< .001) with the company's last 3-year share price return rate. The share return rate was share price increase and dividends on $1000 invested three years before the date of the survey. Employee productivity also correlated strongly with market share growth. Therefore organisational self-reported performance measures are directly or indirectly associated with listed companies' rate of return to shareholders.

These finding are consistent are consistent with the study by Barua and Konana et al. (2001) on Internet-enabled business practices and organisational reported performance measures, though they asked a more generic question about e-business initiatives as a whole. However, what they did not examine, and what this study will concentrate on in the next section, is Internet-enabled business practice adoption and organisation ROA based on financial data. Using financial data on the organisations from the IBISWorld database a ROA measure was calculated. This measure was earning before depreciation, interest and tax (EBDIT) divided by total assets.

At the zero correlation level both TIBP and MIBP were not significantly correlated with ROA. IIBP (r246 = -0.165 p< .05) was significantly correlated to ROA. Surprisingly, the correlation was negative. This in part can be explained by organisational size and IIBP being positively correlated ($r_{246}$ = -0.255 p< .001) and organisational size being negatively correlated ($r_{246}$ = -0.152 p< .001) to ROA. These are the apparent paradoxes between IT investments and organisational performance that the rest of this study will try to unravel.

## Value Disciplines and Internet Enabled Business Practices

The Treacy and Wiersema (1995) strategy model consists of the three value disciplines of operational excellence, product leadership and customer intimacy. Their model can be seen as a refining elements of Porter's (1980) generic strategy model. However, they focused on the processes or competences of an organisation believing that all successful companies have one thing in common: the ability to focus on a single "value discipline". Their model is different in that they argue that organisations

excel in at least one value discipline but also meet a minimum threshold of competence in the other two. These value disciplines can be seen as placing different emphases on the nine generic activities within Porter's value chain (Kaplan & Norton 2001).

In addition to an operational excellence (OpExcel), product leadership (ProdLead), customer intimacy (CustInt) a fourth scale was constructed to measure a price taker or commodity seller (Commodity) position. As expected, the first three scales correlated moderately with each other but not with the cost. The reliability, Cronbach Alpha's, for the efficiency, leadership, intimacy and commodity scales were .79, .84, .75 and .72 respectively.

Treacy and Wiersema's (1995) model states that to be a market leader an organisation needs to excel in at least one value discipline but also meet a minimum threshold of competence in the other two. Their model suggests the three scales should be only moderately correlated to each other. It was also expected to have very weak or no correlation with the commodity scale. Operational excellence is similar to Porter's cost leadership there for it is consistent with the literature that it would occur in an environment where the firm is in a market monopoly position. Its weak association with the commodity seller strategy is also consistent with firms in this position trying to maintain their market share. Perception of industry turbulence is less likely to occur when firms are in a position of market monopoly. This is consistent with Miller (1988) in that a strategy of innovative differentiation is most likely to be pursued in uncertain environments, while the strategy of cost leadership is associated with stable and predictable environments.

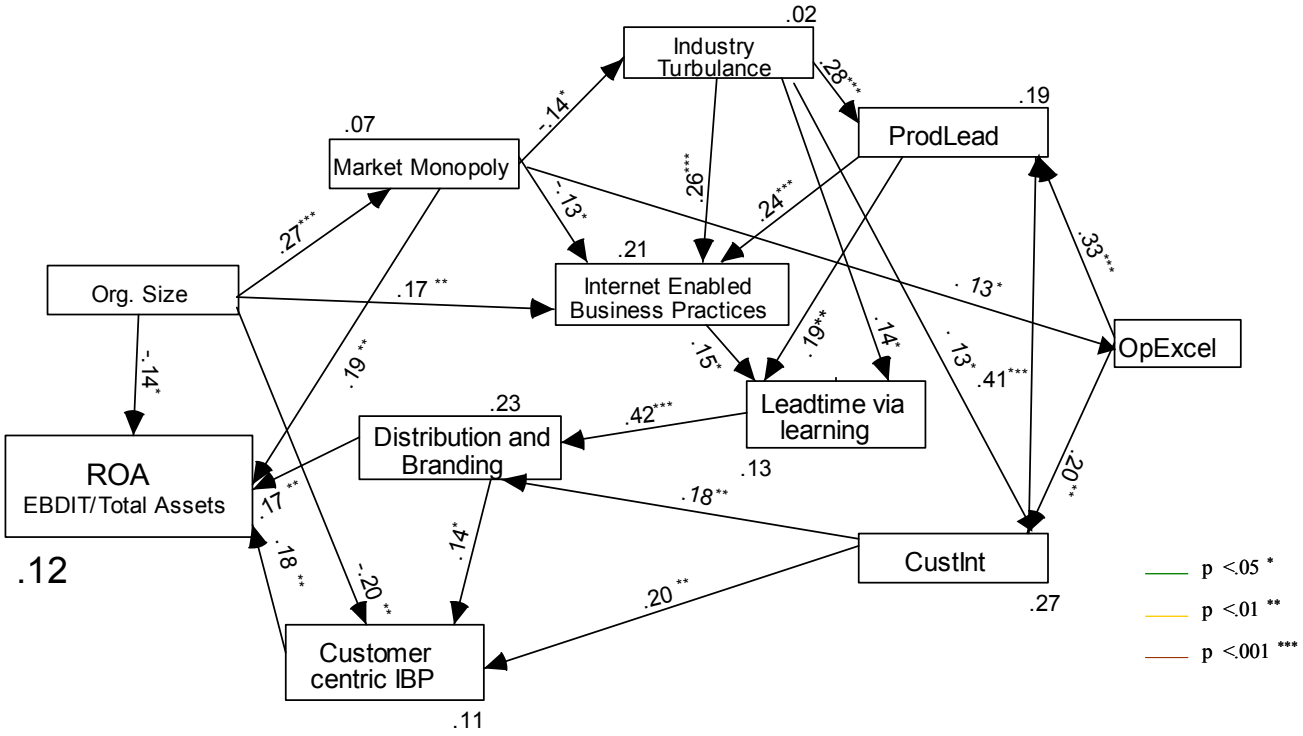
In this study a range of complementary assets identified by Winter (2000) were also measured. Organisations were asked how important a range of activities were in being able to gain a competitive advantage from their product and process innovations. Two scales formed from these items are used in this study branding and distribution and lead-time via learning. Brand name and distribution measured an organisation's use of brand name and marketing as well as its control over distribution to gain competitive advantage from product and process innovations. The second scale (lead-time via learning), measured an organisation's use of lead-time over its competitors and its ability to quickly move down the learning curve to gain benefits from its process and product innovations. The reliabilities for these scales were .82 and .89 respectively. Using financial data on the organisations from the IBISWorld database a ROA

measure was calculated. This measure was earning before depreciation, interest and tax (EBDIT) divided by total assets. Both distribution and branding ($r_{246}$ = 0.224 p< .001) and lead-time via learning ($r_{246}$ = 0.147 p< .05) were significantly correlated to ROA.

## Internet-enabled Business Practices And Firm Performance

Based on previous discussion of the literature and empirical investigation the following was developed (see figure 1). Customer-centric IBP was constructed by subtracting MIBP from IIBP. Industry turbulence was measured using five anchored 7 point Likert scales based on those of Kandwalla (1977) and (Miller 1988). It had a reliability, Cronbach Alpha, of .71. The log of tangible assets was used to calculate firm size (Size).

Figure 1 Path Diagram Internet-enable Business Practices and ROA




To test the adequacy of a path diagram a range of Goodness of Fit Indexes are used (Schumacker & Lomax 1996). The path diagram is presented in Figure 1. It meets a range of goodness of fit indexes. The chi-square was acceptable $\chi^2$ (31, N = 246) = 36.32, p = .235) CMINDF 1.17. The models GFI and AGFI were 0.975 and 0.946 respectively. The Comparative Fit Index (CFI) is a revised NFI (Normed Fit Index) were both acceptable at 0.985 and 0.912 respectively. The root mean square residual (RMSEA) for a well

fitting model will be approximately .05 or less and for this model was .048. The RMSEA was .026. No modification indexes were given. The model is consistent with the previous analysis and all pathways shown in the model are significant. The model explains 12% of the variation in ROA among the sample organisations.

## Implications For Management Practice

The results represented in Figure 1 have a number of implications for Management practice and a greater understanding of Porter's competitive strategy contention that the simple adoption of internet practices will not of themselves improve an organisation's financial performance. Treacy and Wiersema (1995) strategy model argues that organisation's need to excel in at least one value discipline but also meet a minimum threshold of competence in the other two. The full range of IBPs therefore are useful, especially if an organisation is adopting a differentiation strategy, as such a strategy combines elements of customer intimacy and product leadership. The reason for this is because there are two paths to improved ROA. The less direct path from customer intimacy to product leadership suggests that industry turbulence has effects on both and that product leadership might be a complement to customer intimacy as customer tastes and preferences change.

The findings are also consistent with Porter's assertion and the competitive strategy position that the adoption of internet-enabled business practices are of themselves not a source of sustainable competitive advantage. They enhance competitive advantage when they are consistent with an organisation's strategy. This is more likely to be the case when these organisations also have appropriate complementary assets. The customer centric IBP relationship with ROA also suggests that there might be configurations of practices that enhance the IBP business profitability link. This configuration is represented in the relationship between the customer intimacy value discipline and customer-centric IBP. The indirect relationships between this value discipline and business profitability via customer-centric IBP and distribution and branding suggests that a number of complementary practices might exist in these customer focused organisations. Therefore the initial finding that for organisations whose strategy is Customer Intimacy that market orientated IBP's offer more initial value, needs to be treated cautiously.

Customer-centric IBP is more a configuration with other market orientated behaviour within an organisation than a recommended set of practices for all organisations. It is better understood from a competitive strategy perspective than a production efficiency one (Hitt & Brynjolfsson 1996).

The inclusion of competitive environment and organisation size variables also clarifies the complex relationship between IBP adoption and business profitability. Within the sample, large organisations were less profitable, but because of their size they were more likely to have adopted Internet-enabled business practices. This is one reason why the relationship between IBP and ROA was negative at the zero-order correlation level. However the relationship is further complicated in that organisation size is positively related to business profitability by the indirect path through market monopoly. In other words, large organisations tend to be less profitable, where profit is a ratio of EBDIT over total assets, except where they have a market monopoly. Organisations with a market monopoly are less likely to adopt IBPs. One reason for this is that they are also less likely to see the industry they operate in as turbulent.

Organisations that see their industry as having high level of competitive turbulence are more likely to adopt product leadership or a customer intimacy strategy or a combination of the two. Those organisations who are in a market monopoly position are more likely to adopt an operational excellence position. This strategy seems to be indirectly related to IBP adoption through product leadership or customer intimacy. The full range of IBP adoption was more common in organisations that saw their competitive environment as competitive, were not in a market monopoly position and placed a strong emphasis on product leadership. Full range IBP adoption enhanced these organisations' leadtime via learning. This organisational capability was seen as a source of competitive advantage by organisations that perceived their competitive environment as turbulent and adopted a product leadership strategy.

The other complementary asset was distribution and branding. This had a direct relationship to business profitability. Organisations with a customer intimacy strategy were more likely see their ability to distribute and brand as an organisational capability that was associated with competitive advantage than organisations who had different strategy emphasis. These customer Intimacy strategy organisations were also more likely to adopt customer-centric IBP practices. The adoption of these practices were increased

in organisations that also saw distributing and branding as a competitive enhancing organisational capability. However as organisations become larger they were less likely to adopt this customer centric IBP practice configuration and adopt the full range of IBP practices.

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