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Industry and Use of Internet Enabled Business Practices

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Abstract

The study aims to address the lack of empirical research into how industry factors influence the adoption of internet-enabled business practices (IBP) in large organisations. Using 2002 data from 281 Australian firms approximately 21.9% could be classified as 'brick and mortar' and while the rest could be classified as "click and mortar" organisations only 4.9% were high users of IBP's. Only 6% of the variation in internet-enabled business practices is explained by industry membership at the ANZSIC industry division level though at the sub-division level this rose to 14%. A firm's size, monopoly position and industry turbulence explained 14% (13% adjusted) of IBP adoption variation. The findings suggested that the adoption of Internet-enabled business practices is more likely to occur in industries where there is a perception by senior management of competitive turbulence.

Keywords

industry membership, industry turbulence, internet usage

Introduction

Relatively little empirical research has been undertaken about the adoption of Internet enabled business practices within large organisations and what environmental factors might shape this adoption. Specifically this study addresses two questions.

1. To what extent have large Australian organisations adopted Internet enabled business practices?
How many are 'click and mortar' organisations?
2. Does the extent of Internet enabled business practices adoption vary by industry, industry concentration, firm size and the degree of competitive uncertainty (turbulence) in an industry?

Literature Review

Using GE Capital as an example, Barua, Konana, Whinston and Yin (2001) suggest that organisations that have not exploited the Internet to improve internal processes are unlikely to succeed with IT applications aimed at customers and suppliers. Employees cannot be responsive to customers, for example, if they cannot readily access internal information through easy-to-use interfaces. GE Capital created one of the pioneering intranet applications in 1996. Barua and Konane et al. (2001) argue that at GE Capital the intranet site supported key functions including human resources, project management and the sharing of best practices.

Internet usage in the typical organisation might be far different from best or leading practice portrayed in the literature, such as GE Capital. Tchokogue and Boisvert (2002), in a study of 2,725

Quebec company Web sites from all industry sectors, found that most sites were largely promotional (77.8%). The promotional site provides general information about the company and showcases products and services offered by describing them, showing images or photographs, and displaying the product catalogue. Manadevan (2000) would contend that these companies are not yet engaged in "Internet-based e-commerce".

Of the 2,615 sites categorized by Tchokogue and Boisvert, 77.8% (or 2,037 sites) are promotional, 12.3 % (321 sites) are informational, and 9.9% (257 sites) are transactional. They also found that most companies are not harnessing the interactive capacities of the technology. They did not use the Internet to develop new products, to personalize existing products, to analyze the market and the competition, to produce customer profiles or to provide personalized after-sales service among other applications. The Internet was not used to complement or enhance existing capabilities within the organisation. Tchokogue and Boisvert concluded that many sites were mere windows into the organisations and that their creation had not engendered a reconfiguration of business processes, and hence do not change the way a product is delivered or a service rendered. For many companies, Tchokogue and Boisvert concluded, the Web site was nothing more than a virtual business card and that most organisations in the sample had barely begun to harness the potential of the Internet.

Large Australian Organisations: The Study Sample

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 were A\$2,460.2 billion. The amount of change in the Australian business environment was illustrated by the fact that by October 2001 only 813 organisations were available to be surveyed due to mergers, takeovers and corporate failures. The respondents to the survey were CEO's 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.

IBP Scale Results -Usage

In the 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. These subscales indicated an external market orientation and an internal knowledge and information management Internet enabled practice orientation. The two subscales mainly consist of value-chain primary items and support items respectively. The full scale 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.

As the mean score in Table 2 below illustrates the most common Internet business practice is *Sharing and dissemination of organisation information* followed by *Knowledge directories and procedure and process manuals*. Both are support activities and the four next highest are primary activities that show an external market orientation. The lowest reported internet-enabled business practice was *Self-service personnel, benefits and training*.

Table 2 Internet-enabled Business Practices (IBP)(n= 262 to 266)

	Mean	SD	Alpha
External Market Orientation (Mainly Primary Activities) (MIBP)			
Real-time transaction of orders (availability/delivery time)	3.77	1.81	
Internet-enabled linkage of purchase, inventory, and forecasting systems with suppliers	3.76	1.76	
Co-ordination of delivery arrangements	3.66	1.78	
On-line sales channels including web sites and internet marketplaces	3.60	1.91	
Collaborative product design/service coordination across locations	3.56	1.71	
Sharing and dissemination of competitor information	3.53	1.68	.85
Internal Knowledge and Information Orientation (Mainly Support Activities) (IIBP)			
Sharing and dissemination of organisation information	5.34	1.40	
Knowledge directories, and procedure or process manuals	4.89	1.56	
Customer self-service via web sites and intelligent service request processing	3.56	1.88	
Self-service personnel, benefits administration or training	3.47	1.75	.75
Total Scale (TIBP)			.87

The standard deviations (SD) of the measures in Table 2 also provide an indication of the amount of variation in the sample concerning the extent they use a given practice. The practice *Sharing and dissemination of organisation information* not only had the highest score but also the lowest standard

deviation. The practice that had the greatest variation in the sample was *On-line sales channels including web sites and internet marketplaces* with a mean score of 3.60 and a standard deviation of 1.91.

IBP Scale Results and E-commerce

Though it is difficult to get accurate published information in Internet site visits in Australia, American research suggests that large companies like those in the sample have a major presence on the Internet. According to Nielsen//NetRatings Inc Co in America large retailers were among the top 35 sites visited: these included Sears, Target, Wal-Mart, Kmart, Victoria's Secret, Barnes and Noble, QVC, and Gap in September 2001 (Rothfeder 2002).

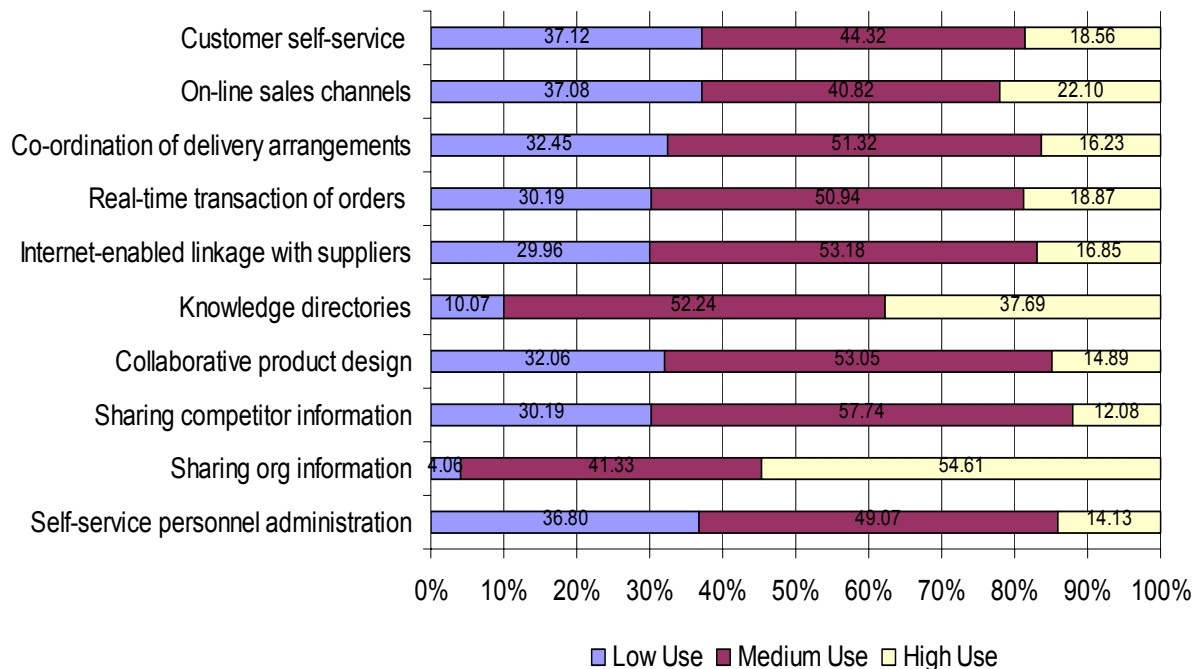
Organisations can be classified into three groups when discussing their degree of involvement with the internet: 'e-companies', 'click-and-mortar' and 'brick-and-mortar' (Garbi 2002). 'E-companies' are defined as companies that conduct most commercial transactions with other businesses and buyers over the Internet. 'Brick and mortar' companies are seen as being at the other extreme to 'e-companies' and are not involved in internet-based e-commerce. 'Click and mortar' companies lie between these two extremes.

Manadevan (2000) has suggested that "Internet-based e-commerce" does not include organisations that have merely set up some web sites displaying information on the products that they sell in the physical world. Only those organisations that conduct commercial transactions with their business partners and buyers over the net (either exclusively or in addition to their brick and mortar operations) should be seen as involved in Internet commerce. None of the sample included 'e-companies'. They consisted of 'click and mortar' and 'brick and mortar' companies. To clarify: the proportion of firms that lie in these two categories, and the degree to which this might influence their financial performance, was one of the aims of the study.

If Manadevan (2000) definition is accepted then organisations with a medium or high use of Internet enabled business practices in the external market orientation group can be seen to be engaged in Internet based e-commerce. Since most of these activities are also what Porter has called the primary activities of his value chain this is also consistent with his view.

To explore this variation in the adoption rate of internet enabled business practices the initial scales, which ranged from not at all (1) to a very great extent (7), were recoded 1 and 2 to Low Use, 3, 4 and 5 to Medium Use and 6 and 7 to High Use. The distribution of the practices are contained in Table 4 below. While *Sharing organisational information* was the most common at the high use level, *Sharing competitor information* was the lowest.

Table 4 Variation in Use of Internet-enabled Business Practices



The mean score for the market orientation was recoded as for Table 4 above. Low users representing 21.9% could be classified as ‘brick and mortar’ and medium and high users can be classified as ‘click and mortar’ organisations. These two medium and high users groups represented 73.9% and 4.9% respectively.

Consistent with Garbi’s (2002) findings there was no significant zero-level correlation between a company’s status as brick and mortar or click and mortar and return on asset. This offers support for Porter’s competitive strategy contention that the simple adoption of Internet practices will not of themselves improve an organisation’s financial performance.

Industry and Internet Enabled Business Practices

All organisations in the sample were classified using the Australian and New Zealand Standard Industrial Classification (ANZSIC). The objective when developing the industrial classification was to identify groupings of businesses that carry out similar economic activities. In the development of the ANZSIC, great emphasis was placed on alignment with international standards so as to enable comparison with these standards. The International Standard Industrial Classification of All Economic Activities (ISIC), Revision 3, was used for reference purposes.

The ANZSIC has a structure comprising categories at four levels, namely Divisions (the broadest level), Subdivisions, Groups and Classes (the finest level). There are 17 divisions within ANZSIC. At the divisional level the main purpose is to provide a limited number of categories that provide a broad overall picture. As Table 5 above illustrates all divisions were represented by the sample. The distribution across the divisions is also similar to that for the BRW 1000 companies.

Table 5: Major Industry Group of Organisations, Australia 2001

	Frequency	Respondent percentage	Top 1000 percentage
Major industry group			
Agriculture, Forestry & Fishing	1	0.36	0.8
Mining	8	2.85	4.5
Manufacturing	74	26.33	25.2
Electricity, Gas & Water Supply	23	8.19	4.8
Construction	36	12.81	2.9
Wholesale Trade	17	6.05	15.6
Retail Trade	2	0.71	6.4
Accommodation, Cafes & Restaurants	16	5.69	0.2
Transport & Storage	1	0.36	3.8
Communication Services	31	11.03	1.3
Finance & Insurance	23	8.19	15
Property & Business Services	2	0.71	8.1
Government Administration & Defence	16	5.69	0.4
Education	11	3.91	2.6
Health & Community Services	7	2.49	4.0
Cultural & Recreational Services	7	2.49	3.1
Personal & Other Services	1	0.36	1.3
Missing	6	2.14	
<i>Total</i>	<i>281</i>	<i>100.0</i>	<i>100.0</i>

In addition to the 17 divisions within ANZSIC there are subdivision, group and class levels that provide increasingly detailed dissections of the broad categories. Each subdivision is represented by a

two-digit code and each group by a three-digit code. Each class is represented by a four-digit code. This division, subdivision and group level was used in the analysis to answer the second question of the study:

Does the extent of Internet enabled business practices used in large Australian companies vary in their use by industry, industry concentration, firm size and the degree of competitive uncertainty (turbulence) in an industry?

The extent to which industry membership and characteristics affect business practices and performance has been a major focus of business research especially within the competitive strategy position. To examine the relationship between industry membership and characteristics relationships, and the adoption of IBPs, three analyses were conducted:

1. Estimates of the effect of industry division and sub-division membership on IBP adoption.
2. A four firm concentration ratio at the Industry group level was calculated and correlated with IBP adoption.
3. A perceptual measure of industry turbulence (competitive intensity) was correlated with IBP adoption.

The TIBP scale was used to calculate the mean for each of the industries. This is presented in Table 6 below. Standard deviations, lower and upper scores are also presented. Due to the small sample size in some industries caution should be exercised in generalizing to those industries. A non-nested ANOVA was conducted and a measure of industry effect was calculated using Eta squared. Eta was obtained by dividing the Between Group Sum of Squares by the Total Sum of Squares. This provides a rough estimate of group effects (Tabachnick and Fidell 1996). Only 6% of the variation in internet-enabled business practices is explained by industry membership at the ANZSIC industry division level. The ANOVA was not significant ($F(15,250) = 1.05, p > .05$).

However at the ANZSIC industry sub-division level the amount of variation explained raises to 14% and the ANOVA becomes significant ($F(38,227) = 1.85, p < .01$). The five sub-divisions with the highest means were: Personal Services; Storage; Accommodation, Cafes and Restaurants ; Metal Product Manufacturing; and Oil and Gas Extraction.

Table 6 TIBP Score by Industry

	N	Mean	Std. Deviation	Minimum	Maximum
Accommodation, Cafes and Restaurants	2	5.05	0.64	4.60	5.50
Communication Services	1	4.40	.	4.40	4.40
Government Administration and Defence	2	4.35	1.34	3.40	5.30
Mining	8	4.24	1.07	2.88	5.50
Education	15	4.12	0.88	2.70	5.70
Construction	33	3.99	1.17	1.60	6.22
Personal and Other Services	7	3.90	1.41	1.60	5.80
Finance and Insurance	31	3.85	1.18	1.70	6.50
Electricity, Gas and Water Supply	23	3.68	1.00	1.20	5.50
Property and Business Services	22	3.66	1.28	1.00	6.20
Manufacturing	72	3.64	1.00	1.00	6.50
Health and Community Services	11	3.60	1.20	1.25	4.80
Retail Trade	16	3.48	1.02	1.50	5.00
Cultural and Recreational Services	7	3.44	1.28	1.80	5.30
Transport and Storage	15	3.25	1.13	1.60	5.10
Agriculture, Forestry, Fishing and Hunting	1	2.60	.	2.60	2.60
Total	266.00	3.74	1.11	1.00	6.50

The second analysis consisted of a four firm concentration ratio at the Industry group level being calculated at the industry class level. The full IBIS World database for 2000 (n = 2539) was used to calculate the concentration ratio for the class the sample organisation belonged to. A weighted measure was calculated for organisations that were coded only to the sub-division level. As industry concentration increased, due to the size of the companies in the sample, then it is argued that the market monopolist position (MonPos) of the organisation in the study would also increase. Since incumbent monopolists have less incentive to invest in new technology than new entrants (Tripsas 1997) a monopolist position was expected to have a negative correlation with TIBP adoption. The correlation was very weak and only approached significance at a two-tailed level; however, it was in the direction expected ($r_{246} = -0.12$ p = .06).

Industry turbulence (InTurb) was calculated using a scale developed by Miller (Lee & Miller 1999). The scales assessed the degree of product obsolescence, the rate of changes in industry marketing practices and technologies, and the degree of predictability of customers' demands and competitors'

activities. The scale had an acceptable reliability of .70 with the sample of Australian organisations. The correlation was significant and in the direction expected ($r_{246} = 0.34$ $p < .001$).

The log of tangible assets was used to calculate firm size (Size). No significant relationship at the zero-order level was found between size and IBP Score. Table 7 shows the zero-order correlations of the three measures

Table 7 Monopoly Position, Industry Turbulence, Size and TIBP Score (n=246)

	MonPos	InTurb	Size
InTurb	-0.14*		
Size	0.24***	-0.10	
IBP Score	-0.12	0.34***	0.9

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

A standard multiple regression analysis was conducted between IBP score and MonPos, InTurb and Size. Altogether 14% (13% adjusted) were accounted by the three variables ($R^2 = .143$ $adj R^2 = .133$ ($F(3,242) = 13.51$, $p < .001$)). The standardized regression weights (Beta's) for InTurb and Size were significant. The partial correlation provides the correlation between the MonPos, InTurb and Size and IBP Score after adjusting for other predictors in the model. While MonPos and InTurb remained approximately the same, Size increased (*partial r* = 0.159) from its smaller zero-order correlation ($r = 0.092$) (see Table 8). MonPos seems to mediate the correlation between size and IBP Score. This suggests that as organisations become larger they have higher IBP Scores but that this is less likely to happen in organisations with a monopolistic position. Of the 14% (13% adjusted) explained variance, InTurb explained 11.2% and Size .02% of this variation, respectively.

Table 8 Standardized regression IBP score and MonPos, InTurb and Size (n=246)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
1 (Constant)	1.157	.595		1.945	.053			
MonPos	-.943	.525	-.112	-1.796	.074	-.119	-.115	-.107
InTurb	.364	.064	.340	5.643	.000	.341	.341	.336
Size	9.734E-02	.039	.155	2.499	.013	.092	.159	.149

The study's second question asked to what extent do Internet enabled business practices use vary by industry, industry concentration, firm size and the degree of competitive uncertainty (turbulence) in an industry? The three analyses indicate that industry accounts for approximately 14% of the variation in the

adoption of IBP's practices. This assumes industry subdivision level variation subsumes the industry division level variation.

Organisation size does seem to be related to this variation, however this is mediated by an organisation's monopolistic position. Industry concentration, that is the amount of sales generated by the top four organisations at an ANZIC group level, was negatively associated with IBP Adoption but did not reach significance. Altogether the MonPos, InTurb and Size accounted for 14% (13% adjusted) of TIBP variation. InTurb explained most of this variation (11.3%). This suggests that the adoption of Internet-enabled business practices is more likely to occur in industries where there is a perception by senior management of competitive turbulence.

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