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## ALTERNATIVE MEASURES OF PERFORMANCE FOR E-COMPANIES: A COMPARISON OF APPROACHES

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### Abstract

*Understanding firm performance is as important in the new economy as it was in the old one. It seems difficult, however, to make a judgment about which measures of performance are good predictors of future success for e-companies. This paper contrasts indicators of asset productivity, shareholder value, growth, survival, and cyberspace usage, exploring how these different indicators reflect performance for a sample of e-companies, and compares them with a sample of brick-and-mortars competing in the same industries. Results suggest that multiple indicators are more necessary than ever to capture the variability of outcomes in the Internet economy.*

### Introduction

One of strategic management's main challenges as a field has been the conceptualization and measurement of firm performance (Barney 1997; Venkatraman & Ramanujam 1986). Several authors have highlighted the importance of firm performance for the field of strategy (Day, Farley & Wind 1990; Prahalad & Hamel 1994; Rumelt, Schendel & Teece 1994) and have also pointed out the inadequacy of most indicators to capture its complexities (Jacobson 1987; March & Sutton 1998; Venkatraman & Grant 1986). Now, the transformation of business models accompanying the new economy seems to be making it even more challenging to find indicators that can help managers and researchers predict a firm's future success based on its current operations.

The e-commerce environment seems to complicate the measurement of firm performance and, at the same time, seems to offer new opportunities for developing new performance indicators. On one hand, the emphasis on information-based operations and on the use and exploitation of intangible assets that characterize the new economy suggests that e-companies performance cannot be measured with traditional accounting or assets productivity indicators such as ROA and ROE. Also, the condition of "newness" of these firms precludes the use of profitability ratios to assess their future potential of success. On the other hand, this same emphasis on interactive information and the access it provides to direct customer data has created opportunities for the development of new performance indicators, such as accessibility, web presence, and usefulness.

Understanding, explaining and predicting firm performance is, nevertheless, as important in the new economy as it was in the old one. Why do firms perform differently? What are valid and useful measures of firm performance? What indicators allow us to predict when an operation is on the right track, and when it is not? How can we distinguish a strong industry performer from a weak one? Questions such as these are still fundamental, especially if we want to develop theories that are useful and that offer effective recommendations for managers.

When discussing performance of e-commerce firms, some of the prevailing arguments do not seem to offer very useful answers to these questions. We frequently find a position of skepticism about the future of Internet-based firms, more now than the optimism and enthusiasm characteristic of the e-commerce initial boom (Fox 1999) have turned into widespread pessimism (Chen & Lindsay 2000; Kedrosky 2000) as many companies have been unable to survive the inevitable shakeout (Choi & Whinston 1998; LeDuff 2000; Useem 2000). If we take this position, the answer to the question will be not to bother studying and analyzing these companies since most of the "no-profit" companies are going to die anyway.

Another stance regarding e-companies performance is to argue that not enough time has passed yet in order to be able to understand and predict what is going on; that it is better to wait before attempting to value the performance of firms in the e-commerce world (Warren Buffett, as cited by de Figueiredo 2000). This position seems to assume that, with time, it will be possible to develop performance measures for e-companies and to value their results. This position also supposes that it is not necessary to understand and predict performance *ex ante* and that it is better to wait to see what happens and then analyze the situation *ex post*.

The problem with these two approaches is that, in one case, it applies old economy conceptualizations of performance, based on a manufacturing era, that are not necessarily reflective of performance in the information age. In the other case, by waiting for the situation to develop, we are missing the opportunity of observing and gathering real time data. Gathering data and attempting to understand the phenomena now is important, however, and will open the path and set the bases for future knowledge in the field. We should not forget, though, that the evaluation of firm performance in an embryonic industry calls for special considerations, and that e-commerce has important particularities in its value creation activities.

This paper addresses these issues by comparing and contrasting traditional measures of performance with alternative measures that seem especially relevant for an industry in its embryonic/growth phase. The paper identifies and discusses multiple indicators of performance such as accounting and profitability ratios, inflow/outflow net growth ratio, growth and survival indicators, as well as e-commerce specific measures such as web presence growth and indicators of cyberspace brand and presence. Some of these indicators are applied to a sample of thirty e-companies and compared with a sample of thirty traditional (brick-and-mortar) companies in the same group of business activities.

### **Traditional Definitions of Firm Performance**

Strategic management as a field of study pursues the building of theories that explain and predict differences in firm performance (Rumelt, Schendel & Teece 1994). Why are firms different? Why do firms perform differently? Those are fundamental research questions for strategic management scholars (Prahalad & Hamel 1994; Rumelt, Schendel & Teece 1994). In a sample of *Strategic Management Journal* current issues (January-August 2000), approximately sixty percent of articles dealt with performance as a dependent variable. Similarly, about forty percent of articles published during the last two years in the *Journal of Business Strategies* assessed firm performance as the researcher's dependent variable.

Within the field, there are many definitions of firm performance and not a general agreement on particular definitions. One approach that seems to be widely followed, however, compares the value that an organization creates using its productive assets with the value that the owners of these assets expect to obtain. It addresses the feasibility and survivability of the firm, assuming that owners of the productive assets will continue to make those assets available to a particular firm only if the value it creates is at least as large as the value they expected. A firm's level of performance is determined by its ability to generate the expected value. A firm can perform according to expectations, below expectations, or above expectations. Firms performing above normal will enjoy competitive advantages to attract productive assets in their industry. This perspective for defining firm performance is the one adopted by most authors in strategic management (Porter 1980; Rumelt 1984) and the resource-based view of the firm (Amit & Shoemaker 1993; Barney 1986; 1991; 1997; Michalisin & Kline 2000).

Within this approach, firm performance has been measured as survival, or operationalized using accounting, stakeholder, or present-value indicators. Profitability ratios such as ROA and ROE are by far the most commonly employed accounting measures of firm performance in strategic management research. Other traditionally used accounting measures are revenues and sales growth, as well as stock price and stockholder value. Market value, market-to-book value, and Tobin's  $q$  (a firm's market value divided by its replacement cost) are used to address market capitalization and market valuation, as well as strategic actions and moves. Some authors address other stakeholders' interest, as suggested by Cameron (1986) and others, evaluating performance from the employees side (turnover, growth in employees, employee satisfaction), the customer side (market share, sales growth, customer loyalty), as well as other performance aspects assumed to reflect the long term potential of a firm such as innovativeness and learning (percentage of sales generated by new products, time to innovation, time to market).

The following sections discuss traditional indicators of firm performance, organized in three different groups of measures: asset productivity indicators, shareholder value indicators, and growth and survival indicators. Each section

briefly addresses and discusses the applicability and limitations of these indicators for the case of e-companies.

### **Asset Productivity Indicators**

Most accounting measures of performance are based on the assumption that a business firm's efficiency of operations is the best way to assess goal attainment. The criteria for performance in this case is how much the company obtains as returns from the amount invested on its operations. One of the most commonly used measures of firm performance is the return on investment (ROI) or return on assets (ROA), which is simply the result of dividing net income before taxes by total assets.

Besides its limitations for capturing real and long-term firm performance (amply discussed in Barney 1997; Jacobson 1987; March & Sutton 1998; Venkatraman & Grant 1986) there are clear limitations to the use of assets productivity measures of performance as indicators of performance for new e-companies. One characteristic of e-business firms is that they utilize distribution technologies to render their service or to make their products accessible to a large base of customers. Hence, the proportion of variable costs for e-companies is expected to be smaller than that of equivalent traditional companies. Thus, the margins obtained could more appropriately be considered a function of the distribution capability and reach of the e-commerce channel, as opposed to inherent efficiencies dependent on use of assets. In the sale of downloaded software or content, for example, the developmental costs and expenses remain fixed but the amount of such software or content being downloaded and paid for will depend on the effectiveness of the e-commerce presence of the software firm. New internet-based companies, on the other hand, are characterized by the typical expenses and negative profits of new companies in a new industry, as well as by the volatility associated with an embryonic stage. By incurring in less than zero numerators, mathematical comparability is meaningless for most profitability ratios in regards to the new internet-based companies.

### **Shareholder Value Indicators**

For an industry in its embryonic period, a common proxy used for financial performance is shareholder value. Indicators of shareholder value as measured by market capitalization, market-to-book value, share price or others could be estimated, but might be misleading for industries in initial stages of growth and, as in the case of e-commerce, with highly speculative investment. It is in the components that make up the shareholder value that financial and other operation indicators should focus. A direct financial indicator that can be used as a performance proxy for companies in this stage is the rate of revenue growth over the rate of costs and expenses growth, or inflow/outflow net growth ratio. If it is — or longitudinally tends to be — greater than one, it can be deemed as an indicator of positive performance, even if profits are negative. This measure has

to be “net”, however, i.e. not including extraordinary income from investors, credit or other “liquidity event”.

Another indicator of value used in traditional managerial accounting is the value of the brand and other components of goodwill. The method estimates the value of the brand by calculating the market-to-book value. A high market-to-book value is considered to be an indicator that the market attaches a high value to the brand. For pure-play start-up e-companies, however, that have not yet developed strong brand names, the goodwill value is ascribed more to the market expectations of its business plan. A value related indicator that can be used then for this stage is the power of business design, as defined by Rappaport (1986), which is measured by dividing the market value by the gross revenues. The greater the number, the more powerful is the business model as perceived by the market and the investors.

The incredibly high market capitalizations of e-commerce companies (Venkatraman 2000) reflect a high perception of their business models by investors. This seems to be the argument used to explain why a majority of e-commerce related web sites have a high cost of marketing, for which popular literature establishes a ratio of at least 30% of expenses dedicated to marketing in the first year as the minimum required for building a web company. How important are, however, these high market capitalizations as indicators of future success? Even though recent publications on the performance and strategy of e-business firms present brand equity as one important source of first mover advantages and entry barriers (de Figueiredo 2000) the reality seems to show the contrary in terms of success and survivability of first movers. We see day after day many highly recognized companies, with high market capitalizations, such as Pets.com or Webvan, filing for bankruptcy. This situation indicates that measures of performance based on market valuation reflect speculation rather than real future potential of success; hence, they are not good indicators of long-term performance.

### **Growth and Survival Indicators**

E-commerce firms in general, and e-startups in particular are characterized by its newness and, as all new things, by its growth. While it seems abysmal to incur in growing negative profits quarter after quarter, enthusiasm is generated among executives and investors by the growing revenues of e-businesses; the losses generated by the growing costs and expenses are dismissed as investment. Key performance indicators are, hence, those related with growth. Undoubtedly, the inflow/outflow net growth ratio described earlier can be an indicator of growth trends and financial health in this context, by assessing the value to the consumer market of the business proposition over a certain period of time.

The rate of dot-com failure is probably one of the most publicized aspects of the Internet economy recently. Companies such as Furniture.com, Garden.com, Mortgage.com have made the headlines as very notorious failures. Bankruptcy or the discontinuing of operations can obviously be used as indicators of negative

performance, though they are ex post indicators. A key potential indicator of survival (or the threat of failure) is the burn rate, i.e., speed at which the company is spending money. This rate determines when the capital raised will run out. The recent stock market movement away from dot-coms has highlighted this indicator, as many companies were expecting additional rounds of financing to raise "burned" capital required to sustain the company until revenues exceeded costs and expenses to allow for self-sustained reinvestment. The indicator measured is in effect "time before money runs out", which equals the cash reserves of the company divided by the burn rate. If the burn rate is adequately timed, with financing rounds allowing for market volatility, it is more probable that the firm will be likely to survive market fluctuations. An important and useful indicator, it is usually available to investors and venture capitalists but not publicly available.

An additional survival indicator can be extracted from the resource attraction and retention scheme typical of the e-commerce activity. Due to its initial speculative nature, great amount of talent and resources were attracted to e-companies by following a vesting options scheme. The volatile nature of these ventures has made many of these options lose value to a great extent. Risk averse talent as well as consulting and governance resources are in fact leaving firms where a high ratio of compensation was based on these options. Typical of this situation are the recent talent departures from Priceline.com, where even its high profile spokesman, William Shatner, reportedly ended his contract after his options declined from a value of more than \$20 million to less than \$300,000. Companies with high reliance on resources through equity options have a greater survival risk than companies that do not have this high reliance.

### **E-Commerce-Specific Indicators of Firm Performance**

Because e-commerce has as its critical interface the computer screen, it is important to consider indicators related to accessing and viewing. Two companies in particular gather and analyze data on web presence and traffic: Gomez.com and Jupiter Media Metrix. Because cyberspace is growing more and more crowded, the "stake of the web claimed" is an important factor impacting the success of e-companies. It can be considered as another indicator of first mover advantages for a company. Some specific indicators developed to measure web presence are page views (the amount of times a page is loaded onto a computer screen), as well as measures of frequency such as recurring visits and the rate of unique visitors (which identifies the number of visitors that have accessed a site for the first time). These indicators are numeric and easy to understand, but might not be publicly available for many companies. The rate of unique visitors is however available through Jupiter Media Metrix (2000). A brief list of the most commonly used indicators of cyberspace presence is included in the Appendix.

### **Data**

With the purpose of assessing the applicability to e-companies of some of the measures discussed above, and to compare the results to a sample of traditional firms, this paper studies two randomly selected samples of thirty companies each, composed by e-companies and brick-and-mortar companies. For the sample selection, two lists of companies were built from the Standard & Poor's Register of Corporations. Only U.S. public companies with available financial data and that had been incorporated after 1992 were included in the original list.

The original set of companies was limited to fifteen SIC codes (4724, 5735, 5912, 5942, 5945, 5961, 5963, 5999, 6162, 6211, 7311, 7389, 7812, 7999, 8099) which included several categories of retail, security brokers, mortgage and loan correspondents, and entertainment, business and travel related services. A diverse set of activities was necessary in order to attain a large enough list from which to randomly select the two sets of thirty companies. The selection of industries was based on the industries represented by the e-companies included in the Fortune e-50 list (1999), excluding those SIC codes for which there were no clearly identifiable traditional companies performing the same business activity (information retrieval services, computer related services, computer programming, and prepackaged software).

E-companies are defined as those that conduct most commercial transactions with other businesses and buyers over the Internet (Mahadevan 2000). To classify firms as e-companies, information about the company business activity from the S&P Corporation Records, and the company's description of activities in its two latest Annual Reports (SEC filings of 10-K) was used. Companies were considered to be e-companies if: a) the company was listed as a Fortune e-50 companies; or b) the S&P Corporation Records specifically included the term "on-line" as part of the business description AND the company's 10-Ks reported that the company was performing most of its operations on-line. This second criterion was very clear in some cases, for which the business description and the annual reports described a firm that was conducting most of its business transactions on-line. Obviously, just having a website was not considered enough to classify a firm as an e-company, since many traditional companies have incorporated websites without making any substantial changes to the way in which they conduct their business. For some companies, however, the situation was not as clear and those cases were dropped from the list to avoid misrepresentation. To classify companies as brick-and-mortars, a search of key words (Internet, on-line, website) was conducted on the companies latest 10-K. Companies were classified as brick-and-mortars if they did not have mention of any of these words regarding their business activity in their 10-K report.

The financial indicators used for descriptive statistics and analyses were: ROA, ROE, market value, market-to-book value, market value/revenues (power of business design), growth in revenues, income and costs and

expenses, the inflow/outflow net growth rate, employee growth, and the rate of unique visitors as a measure of cyberspace presence. Indicators of age (years since incorporation) and size (number of employees, revenues and assets) were also included. Accounting and financial indicators of performance were obtained from the company financials section of SEC filings, 10-K reports and Disclosures. Hoovers' company profiles and financial reports were used for the few private companies in the sample for which SEC filings were not available. The rate of unique visitors for e-companies was obtained from Jupiter Media Metrix. To classify companies as survivors or not survivors, SEC bankruptcy filings as well as a search for newspaper and business journals publications was conducted, using ABI Informs and Lexis-Nexis. Firms that have entered bankruptcy, that have been acquired and have downsized most of their employees, or that have changed names and area of activity were considered non-survivors for the effect of the analyses.

### **Results**

Table 1 summarizes descriptive statistics, comparing the group of survivors and the group of non-survivors within the sample of e-companies. A one-way ANOVA comparison shows no significant differences between the means for the two groups of companies for most indicators. The only two indicators for which significant differences were reported are the 1999 rate of unique visitors and the size in assets. E-companies that have survived and are still in business by early 2001 were those with higher volume of unique visitors and with higher level of assets.

Table 2 shows a t-test comparison of means for the two samples (e-companies and brick-and-mortars). Interestingly, only few indicators present significant differences between the two samples. As it was expected, considering the highly publicized market capitalizations of e-commerce companies, especially for the year 1999, market values of e-commerce firms were significantly higher than those for brick-and-mortars. The situation a year later changed, however, and no significant differences were found for the same two samples for the year 2000. The market value/revenues indicator was also, as expected, significantly higher for e-companies. This reflects the much-publicized over-valuation of "new business models" associated with e-companies during the year 1999. The growth in revenues was significantly higher for e-companies, with an average of more than 500% yearly increase in revenues (1998 to 1999). The growth in costs and expenses was also substantially higher for e-companies. E-companies show an average growth in costs and expenses of 310% between 1998 and 1999. No other indicators between the two samples show significant differences. The two samples are similar in terms of age and size of the companies, as well as in terms of profitability ratios.



**Table 1**  
**Descriptive Statistics and ANOVA test: Comparison of E-Companies**  
**Survivors and Non-Survivors by End of 2000/Beginning of 2001**

Indicator <sup>1</sup>	Survivors		Non-Survivors	
	Mean	S.D.	Mean	S.D.
ROA	(13.2)	51.6	(0.9)	0.7
ROE	(13.3)	51.6	(1.3)	1.6
Market value 1999 (\$M)	3,778.5	4,174.0	1,176.7	2,260.1
Market-to-book value	30.1	73.7	4.6	6.1
Market value/revenues	37.2	70.9	32.5	64.5
1-year revenue growth (%)	655.4	2,005.3	388.2	344.3
1-year net income growth (%)	251.6	4,763.3	(406.6)	290.2
1-year cost & expense growth (%)	305.8	531.0	317.5	224.0
Inflow/outflow net growth	1.3	0.9	(9.5)	31.2
1-year employee growth (%)	355.7	754.5	82.8	79.9
Unique visitors (M)	10.8*	5.7	5.2*	2.4
Age (years since incorporation)	3.2	1.7	2.5	1.9
Size in number of employees	1,360	1,869	509	701
Size in revenues (\$M)	237.9	422.7	110.5	190.3
Size in assets (\$M)	470.9*	701.0	136.4*	180.6
N	16		14	

Differences are statistically significant at \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

<sup>1</sup>Figures for 1999 unless otherwise specified.

Tables 3 and 4 report the correlations between these different indicators for the two samples. As shown in Table 3, the rate of unique visitors shows significant correlations with measures of market value (.65 and .47), net income growth (.51), employee growth (.51), age of the firm (.48) and size in assets (.77).

Other correlations that should be noted are the negative but significant correlations between market-to-book value (and indicator of goodwill value) and ROA (-.98), ROE (-.98), and positive significant correlations between market-to-book value and revenues growth (.97), cost and expenses growth (.92), and employee growth (.96). Again, these correlations seem to indicate that these companies' valuation were based on the visibility of revenues volume, growth in employees, as well as the already noted rate of accessibility to customers (unique visitors).

E-companies show a high and positive correlation between revenues growth and cost and expenses growth (.95) and between revenues growth and employees growth (.95). The more they make, the more they expend and the more they grow. These relationships seem to explain also the significant negative correlations between profitability ratios, ROA and ROE, and revenue and employee growth (-.99 and -.96 respectively).

**Table 2**  
**Descriptive Statistics and t-test for Equality of Means: Comparison of E-Companies and Brick-and-Mortars Incorporated After 1992**

Indicator <sup>1</sup>	E-Companies		Brick-and-Mortars	
	Mean	S.D.	Mean	S.D.
ROA	(7.7)	38.3	(0.1)	0.7
ROE	(8.0)	38.2	(0.1)	0.7
Market value 2000 (\$M)	538.4	780.3	165.9	381.8
Market value 1999 (\$M)	2,873.5***	3,865.8	126.0***	353.6
Market-to-book value	21.8	59.5	2.3	4.4
Market value/revenues	35.6*	67.3	3.1*	7.5
1-year revenue growth (%)	542.4*	1,522.3	50.0*	97.6
1-year net income growth (%)	(16.6)	3,637.4	3.8	127.2
1-year cost & expense growth (%)	310.5**	428.2	32.0**	69.2
Inflow/outflow net growth	(2.8)	19.2	4.1	14.5
1-year employee growth (%)	256.5	610.4	22.2	54.2
Unique visitors (M)	6.9	5.0	N.A.	N.A.
Age (years since incorporation)	3.0	1.8	3.8	1.5
Size in number of employees	979.5	1,505.8	1,593.6	2,995.9
Size in revenues (\$M)	178.4	335.9	159.4	311.0
Size in assets (\$M)	431.0	706.7	265.5	436.8
Survivors by end of 2000	16		22	
N	30		30	

Differences are statistically significant at \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$  (2-tailed, equal variances not assumed).

<sup>1</sup>Figures for 1999 unless otherwise specified.

In terms of market value, besides correlations with unique visitors that were already discussed, it is interesting to notice the significant and positive relationships with size in employees (.62 and .70 for 1999 and 2000, respectively) and with size in assets (.68 and .57). A positive and significant correlation with age of the firm is only present for the market value of 2000 (.62), which seems to reflect the adjustment of the market in the year 2000.

Some differences between e-companies and brick-and-mortars can be established by comparing the correlations shown in Table 4 with those of Table 3. In particular, the differences between the two groups appear in the lack of significant correlations between revenues growth and market-to-book value, as well as no negative correlations between revenue growth and profit ratios. Other noticeable difference is that, for traditional start-ups, revenue growth is negatively correlated with age (-.46), which seems to indicate a typical characteristic of new ventures, for which the rate of revenue growth is expected to decline as the firm ages.

**Table 3**  
**Pearson's Correlation Matrix of Performance Indicators: E-Companies<sup>a</sup>**

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. ROA	1.00														
2. ROE	1.00**	1.00													
3. Market value (2000)	.16	.16	1.00												
4. Market value (1999)	.16	.16	.85**	1.00											
5. Market-to-book	(.98)**	(.98)**	(.03)	.01	1.00										
6. Market value/revenues	.10	.11	.10	.19	(.12)	1.00									
7. Revenue growth	(.99)**	(.99)**	(.19)	(.19)	.97**	(.10)	1.00								
8. Net income growth	.06	.06	.19	(.03)	(.12)	(.46)*	(.08)	1.00							
9. C & E growth	(.91)**	(.91)**	(.26)	(.21)	.92**	(.01)	.95**	(.13)	1.00						
10. Inflow/outflow growth	(.07)	(.07)	(.07)	(.10)	(.10)	(.08)	.05	.03	.18	1.00					
11. Employee growth	(.96)**	(.96)**	(.17)	(.07)	.96**	(.11)	.95**	(.07)	.87**	.05	1.00				
12. Unique visitors	.33	.21	.65*	.47*	.38	(.28)	(.22)	.51*	(.20)	.03	.51*	1.00			
13. Age	.12	.12	.62*	.33	(.09)	.19	(.18)	.21	(.22)	(.01)	(.14)	.48*	1.00		
14. Size (employees)	(.26)	(.26)	.70**	.62*	.40	(.10)	.22	.06	.16	.02	.30	.45	.38	1.00	
15. Size (assets)	.13	.12	.68**	.57*	(.02)	(.13)	(.16)	.40*	(.23)	.01	(.09)	.77**	.55*	.63*	1.00

NOTE: <sup>a</sup>Correlations estimated for sample of e-companies (N = 30)

\* Correlation is significant at  $p < 0.05$  (2-tailed)

\*\* Correlation is significant at  $p < 0.01$  (2-tailed)

**Table 4**  
**Pearson's Correlation Matrix of Performance Indicators: Brick-and-Mortars<sup>b</sup> Incorporated After 1992**

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. ROA	1.00													
2. ROE	1.00**	1.00												
3. Market value (2000)	.08	.08	1.00											
4. Market value (1999)	.06	.06	.99**	1.00										
5. Market-to-book	(.52)**	(.52)**	.16	.23	1.00									
6. Market value/revenues	(.34)	(.34)	(.09)	(.04)	.32	1.00								
7. Revenue growth	.15	.15	(.16)	(.08)	(.03)	(.11)	1.00							
8. Net income growth	.06	.06	.12	.09	.10	(.24)	.16	1.00						
9. C & E growth	(.15)	(.15)	(.02)	(.00)	.06	.20	.68**	.24	1.00					
10. Inflow/outflow growth	(.39)*	(.39)*	(.10)	(.05)	.15	(.05)	.03	(.03)	(.08)	1.00				
11. Employee growth	.27	.27	.00	.05	.11	(.15)	.29	.23	.41*	(.28)	1.00			
12. Age	(.29)	(.29)	(.04)	.07	.30	(.12)	(.46)*	(.04)	(.35)	(.07)	(.02)	1.00		
13. Size (employees)	.15	.15	.81**	.79**	.12	(.16)	.05	.10	.13	(.06)	.43*	.09	1.00	
14. Size (assets)	.28	.28	.79**	.78**	.02	(.16)	(.04)	.02	(.03)	(.11)	.06	.04	.61**	1.00

NOTE: <sup>b</sup>Correlations estimated for sample of brick-and-mortar competitors, with year of incorporation after 1992 (N=30)

\* Correlation is significant at  $p < 0.05$  (2-tailed)

\*\* Correlation is significant at  $p < 0.01$  (2-tailed)

### **Conclusions**

The analyses and results presented in this paper are descriptive and exploratory in nature, given the small size of the sample. In that sense, the analyses did not attempt to explain a particular outcome or dependent variable but to compare indicators within and across samples. An interesting difference found through these comparisons refers to the rate of unique visitors, which appears much higher for those companies that seem to be surviving the shakeout than the e-commerce environment has experienced during the past two years. Survivors are also larger in their asset base, which seems to agree with the observed trend of dot-coms enlarging their tangible asset base in order to survive competition with established large competitors.

The comparison between e-companies and brick-and-mortars suggests also interesting differences between the two groups of companies. The significant differences between both groups in terms of market valuations for 1999 and the lack of difference for the year 2000 reflects the e-commerce boom, the high expectations of investors and analysts regarding the dot-com business model, and then the adjustment of the market to a more traditional view of the industry as one in an embryonic stage.

E-companies, as much speculated in the popular press, do appear to behave differently than traditional brick-and-mortars regarding their rates of revenues and expenses. E-companies have been able to grow a lot faster than traditional competitors, and have been expending these resources at a much faster rate also. An interesting indicator, the inflow/outflow net ratio, which is positive for brick-and-mortars but negative for e-companies, seems to suggest the same conclusion. This difference, however, as well as a similar observation regarding survivors and non-survivors, does not appear large enough to be significant in this sample. This could be attributed to two factors: the sample size and the high variability around the mean.

In terms of profitability, though e-companies seem to have larger losses than traditional brick-and-mortars, the differences do not appear significant in this sample. E-companies losses are, however, much more noticeable by the public and press. While most new ventures of any type have an initial period of negative profits, the peculiar attractiveness of e-companies has also allowed them to sustain these typical initial negative profits, garnering wide attention from the media, analysts and investors. The also normal failure rate of new businesses, when applied to these firms has impacted capital and venture markets to a greater extent given the large amounts invested which, combined with the high profile media scrutiny, generated greater volatility.

The nature of the industry studied does not allow, still, for definite answers regarding profitability and sustainability measures. The experiment is still ongoing. The discussion and analyses shown in this paper could, nevertheless, offer some guidance to managers of e-commerce ventures on the need to look at

indicators of value, growth and usage in combination. Developing a large customer base appears as one key source of sustainability. How much should a manager expend in order to attain that customer base is, however, still a question mark. Results in this study do not show significant differences between companies that expended beyond their inflows in order to obtain potential customers (unique visitors). Managers should be cautious, however, since some of the results found seem to suggest that healthier firms (regarding their inflows/outflows ratios) have higher probability of survival, even though the sample did not show significance for this difference. Cyberspace is only one component of a successful e-commerce operation.

Some of the limitations of the study relate to the short history of the companies and to the relative small number of companies within industries that could be classified as pure play dot-coms or pure play brick-and-mortars. Hence, the newness of the e-commerce environment makes difficult to study larger samples of companies and precludes longitudinal studies of historical windows larger than two or three years of data.

The data available for these companies is also relatively limited. It would be desirable, for example, to count with disclosure information for these companies that could allow for better classifications regarding their incomes and expenses by type of activities (on-line versus off-line). This could help to more precisely classify companies between those that are e-companies, those that are pure traditional brick-and-mortars, and those that belong to a mixed group that combines e-commerce and traditional channels (click-and-mortars). The present study purposely excluded click-and-mortars since they did not clearly belong to either of the two groups analyzed (e-companies versus brick-and-mortars).

These and other limitations should not discourage future research attempts in the field. On the contrary, increasing interest and research efforts are going to build a much stronger base of propositions and data from which to work from. Also, time will provide a larger base of information available on companies' actual performance. A caveat is important here, however, and it is to reinforce the need to collect data while it still exists, because the embryonic nature of the industry will inevitably make many of the current companies disappear, along with the interesting data they have generated. To overcome survivor bias analyses, this is the time to gather the information, and this need highlights the importance of intensifying our research efforts to provide useful answers to questions of performance, even more so when changes in the general business environment challenge us to reconsider conventional concepts and metrics of performance.

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## Appendix

### Cyberspace Presence Indicators for E-Companies

**Page Views.** Page views is defined as the amount of times a web page is loaded onto a computer screen. Every time a web page from any site gets downloaded onto any user's computer, the site's server keeps a count. This is a popular measure and it has been used as an advertising price benchmark, likening it to the CPM standard of performance for advertising reach when pricing advertisement on websites. It measures "eyeballs" on the page.

**Stickiness.** A measure of recurring visits and use for a particular website. A key measure of the site's effectiveness, it is driven by economic switching costs incurred for two main reasons: (1) users increasingly familiar with a particular site will be more reluctant to learn navigation in other similar sites, and (2) users having inputted private data or otherwise committed information or money in or through a site may also be reluctant to repeat the process in other similar sites. Stickiness could be considered a major component of barriers to entry in cyberspace.

**Unique Visitors.** Measures new viewers (called unique viewers) to a website. The server can identify which DNS user has accessed the site and its pages. It is called "unique" because it counts an individual viewer only once, when it is identified as a new visitor to the website.

**Click-Through Rate.** Measures people connecting from one website to another through a link on the original site.

**Conversion Rate.** The ratio of page views to actual transactions carried through. Considers the "usefulness" of the site to its visitor indicated by the visitor actually inputting data, purchasing or otherwise exchanging private information or money in the site.

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