

Does Business Format Matter?

Performance Measurement and Internet Retail Format

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Abstract – The purpose of this paper is to investigate performance measurement implemented by Internet retailers, its variation in terms of business format, and its potential effect. A mail survey among UK Internet retailers produced 252 usable responses of small and medium-sized businesses. The results indicate that Internet retailers without store presence are likely to have higher complexity of performance measurement than those with store presence. The potential effect of performance measurement to improve business performance was also observed. The results are limited to UK small-and-medium-sized Internet retailers, selling tangible goods. The study suggests Internet retailers to measure various aspect of their performance because of its potential impact in improving operational performance. The paper has contributed to enhance the understanding of performance measurement in e-commerce firms and its impact on performance.

Keywords - e-commerce, Internet, measurement, retail, performance

I. INTRODUCTION

Performance measurement has been recognized for its critical role in affecting the effectiveness of the management process. Its progress has been supported by the great interest among firms in the Balanced Scorecard [1] and the self-assessment of quality performance (e.g. EFQM, Deming Prize, ISO, Malcolm Baldrige). Performance measurement has been widely implemented in traditional business, but it is still immature for e-commerce firms. During its early development (dotcom era), e-commerce firms had paid less attention to performance measurement because their business was evaluated on an expectation basis, such as potential growth and potential efficiencies, rather than actual outcome (e.g. [2], [3], [4]). As this business has been becoming more stable and more rational than those within an ‘irrational exuberance’ era, they now need performance measurement concentrating on the evaluation of the real business health.

Prior studies on performance measurement in e-commerce firms are limited. Some performance models proposed could be identified as either too simplistic or too comprehensive. Too simplistic models in general focus on site popularity (e.g. [5], [6]) or customers’ online shopping experience (e.g. [7], [8], [9], [10], [11], [12]). However, the fact indicated that the success in site popularity and customers’ shopping experience is not necessarily a business success [13]. On the other hand, too

comprehensive models focus on the complex business activities [14] or various stakeholders of a firm [15]. Though these models are comprehensive, they have been less relevant for many e-commerce firms, which are small in size. This study was aimed to fill the gap by investigating performance measurement in e-commerce firms, specifically Internet retail, which is recognized as one of the fast growing business sectors in many countries.

Business format, which is the way Internet sales is conducted, is an important profile of Internet retailing. The difference in business format (e.g. pure play, clicks-and-mortar) entails the difference in operations and strategies [16]. The literature on performance measurement suggests that organizations should select and align performance indicators carefully to their business needs and strategies [1]. Therefore, the difference in business format of Internet retailers could entail the difference in performance measurement. This paper is to present the investigation of performance measurement in Internet retailing, its relationship with business format, and its potential effect in improving business performance.

II. THEORETICAL BACKGROUND AND HYPOTHESES

There are various ways to classify Internet retailing. Based on the business models in which Internet sales are conducted, sales through Internet can be performed in three main business formats ([17], [18], [19], [20]), as follows:

1) Pure-play retailers: These are commonly known as start-ups or virtual merchants and generate revenue mainly from online sales.

2) Clicks-and-mortar retailers: These retailers have a network of physical stores as their primary retail channel, and complement it with online sales. Customers are provided with the opportunity to switch to Internet-based shopping and easier delivery or to combine traditional and online shopping.

3) Home-shopping retailers: These retailers have an offline catalogue operation, as well as Internet sales.

The basic purpose of Internet retailing business is to realize potential advantages associated with two aspects: a retailer’s cost-saving and a customer’s benefit ([16], [17]). For pure-play retailers, that purpose is obvious as it is the ultimate reason of their establishment. For clicks-&-mortar and home-shopping retailers, the establishment of

the Internet sales channel could be seen as an expansion of their current business to gain a wider market and more sales. For store-based retailers, the existence of a website might be used for customers to gain information about the products, and then they might purchase in the store instead of through the Internet. Store-based and catalogue retailers that adopt the Internet channel could have some benefits over pure-play retailers, because they own an established brand name and a large customer base [16]. This difference, then, could be associated with the different focus of business strategy and performance measurement.

Pure-play retailers are relatively new in the retailing business, as they do not emerge from traditional retailers. They might have more concern to measure more performance indicators to track their online business progress, as it is their only retail channel. On the other hand, clicks-and-mortar retailers have previous experiences in the retailing business, and they might have less concern in tracking their Internet retailing operation. For them, the success of this Internet channel could be achieved indirectly through the sales increase in their traditional channel. Consequently, it is possible that there is a relationship between business format and performance measurement. This predicted relationship is presented in the following hypothesis:

H1: Internet retailers without store presence are likely to have higher complexity of performance measurement than those with store presence.

The implementation of performance measurement requires resources, therefore there should be a justification of its effect, especially in enhancing business performance [21]. However, empirical evidence of its benefit was limited. The concept of business performance has two aspects: financial and operational [22]. One of the basic purposes of performance measurement is to facilitate corrective actions. Therefore, the potential effect of performance measurement could be more related to operational performance, as its improvement is more under a firm's control than the financial one.

The relationship between performance measurement and operational performance was derived from the idea that performance measurement produces information that can be used to improve operational performance. The more a firm measures performance indicators, the more information on a business progress will be obtained, which subsequently can be used to improve operational performance. Therefore, a hypothesis is formulated:

H2: The higher complexity of performance measurement is associated with the better operational performance.

Following the first hypothesis (H1), it was expected that the difference in business format will affect the relationship stated in the second hypothesis (H2). Therefore, a third hypothesis is formulated:

H3: The relationship between performance measurement and operational performance is moderated by business format.

III. METHODOLOGY

A survey among Internet retailers was conducted to examine their performance measurement, business format, and business performance. Performance measurement, in this study, refers to a range of multidimensional performance indicators measured by an Internet retailer to evaluate its business performance. Performance measurement was examined in terms of its complexity, which was defined as the number of performance indicators measured. A structural framework of performance measurement was developed from literature ([3], [11], [12], [13], [15], [16], [23], [24], [25], [26], [27], [28], [29], [30]), and pre-tested in three stages with academics and Internet retail practitioners in the UK and Indonesia. The framework comprises 30 performance indicators classified into five dimensions: financial, market-sales, customers, web, and process, as shown in Table 1. In the survey, performance measurement was operationalized by asking respondents whether each performance indicator was measured.

Operational performance was investigated in three measures: (1) customer retention [32], (2) superiority of fulfillment process [33], and (3) quality of web store [33]. The rationale to include those three measures can be illustrated as follows: a good quality of web store may attract customers to buy products online, if the retailer is able to provide a good fulfillment process, customers could be satisfied and buy more/ other products.

TABLE 1
PERFORMANCE INDICATORS

Dimension	Indicators
Financial	Profit margin Revenue per customer Revenue per transaction Acquisition cost Customer maintenance cost Cost of fulfillment
Market	Total sales Sales value per transaction Ratio of sales overseas Market share Number of orders (transactions) Number of customers
Customer	Conversion rate visitor to registration Conversion rate visitor to purchase Number of newsletter subscribers Customer churn rate Repeated sales per customer Customer extension
Web	Number of visits Unique visitors Page views Web-site's usability Web-site's information quality Web-site's service-interaction quality
Process	On-time delivery (promised vs. actual) Online enquiry-to-response time Return notification-to-refund time Percentage error in goods picked and delivered to customer Percentage error in delivery destination Percentage error in charge made to customer

Source: Gunawan [31]

Operational performance was investigated by assessing respondents' satisfaction, using a 10-point numerical scale, anchored with 'very dissatisfied' at one end and 'very satisfied' at the other [7]. Business format was investigated whether the retailers do business through fixed location store and mail order in addition to Internet channel.

A mail questionnaire was adopted and the issue of validity was addressed by rigorously applying a pre-test among academics and retail practitioners, and a pilot test. The target population was UK Internet retailers selling tangible products, not services or digital products, in order to produce a homogeneous set of retailers. The sample was developed by using a combination of multiple sources: (1) established retail directory [34], (2) industrial body (TrustUK, Interactive Media Retail Group), and (3) selected online shopping directories. In total, 1417 Internet retailers were used as a planned sample. The survey, which was conducted in September-October 2005, produced 262 usable responses, 40 undelivered mail, and 8 non-participation responses. Among the respondents, 83% are owners, or managing directors, or CEOs, and the rest are manager/ senior managers. Data analysis was limited to cover only 252 responses representing small and medium-sized businesses, which were defined as having annual sales less than £10 million in order to provide a more homogeneous sample. The use of a time trend method to address non-response bias [35] suggested that persons who did not respond were not different from those who responded.

IV. RESULTS

Table 2 presents the findings of business format, whether Internet retailers also sell their products through store outlet and mail order channels. It shows that 18% of Internet retailers rely solely on Internet channel, 40% (from 4% + 36%) have store outlets, and 79% (from 43% + 36%) conduct mail order. This figure indicates that the Internet shopping channel is a complement to the traditional channels, which are store-outlet and catalogue mail order. Especially, the finding might indicate that most of the Internet retailers are mail order. For this condition, Internet retailers are categorized into two: (1) without store presence: 153 (61%), and (2) with store presence: 99 (39%).

The complexity of performance measurement is calculated by adding up all performance indicators measured. The use of summated score is supported by an internal validity test, which produced a Cronbach α score of 0.780, higher than a recommended minimum value of 0.6. Table 3 presents its mean scores for overall sample, those without store presence, and those with store presence. Internet retailers without store presence have higher complexity of performance measurement, than those with store presence ($t(250)=2.587$, $p<0.01$). Therefore, this result supports hypothesis H1. The result is also displayed in an error-bar chart shown in Figure 1.

Furthermore, an average score of operational performance is calculated from its three measures. The use of a single score was supported by the high score of Cronbach α (0.809). Both variables of operational performance and performance measurement could be treated as a metric scale, which facilitate the use of Pearson *bivariate* correlation. Table 4 presents the result for overall Internet retailers, those with store presence, and those without store presence. For overall sample, a significance relationship ($p<0.01$) is observed between the complexity of performance measurement and operational performance, though the correlation coefficient is small. The findings, therefore, support hypothesis H2.

TABLE 2
BUSINESS FORMAT

Business format	Frequency	Percentage
Internet only	45	18%
Internet + mail order	108	43%
Internet + store	9	4%
Internet + mail order + store	90	36%
Total	252	100%
Internet retail without store	153	61%
Internet retail with store	99	39%
Total	252	100%

TABLE 3
PERFORMANCE MEASUREMENT COMPLEXITY

Sample	Mean
Overall Internet retailers	15.440
Internet retailers without store	16.255
Internet retailers with store	14.182

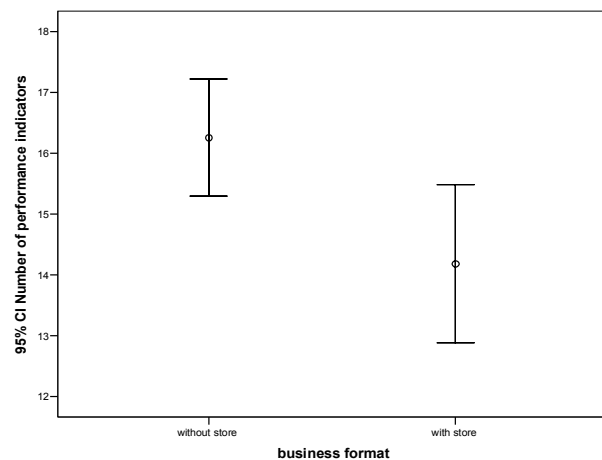


Fig. 1. Error bar chart: business format – performance measurement

TABLE 4
CORRELATION: PERFORMANCE MEASUREMENT –
OPERATIONAL PERFORMANCE

Sample	Correlation	PM complexity
Overall sample	Pearson Correlation	0.198
	Sig. (2-tailed)	0.002*
	N	252
Internet retail without store presence	Pearson Correlation	0.231
	Sig. (2-tailed)	0.004*
	N	153
Internet retail with store presence	Pearson Correlation	0.138
	Sig. (2-tailed)	0.173
	N	99

* Correlation significant at 0.01 level (2-tailed).

TABLE 5
SUMMARY OF TESTED HYPOTHESES

Hypothesis	Result
H1: Internet retailers without store presence are likely to have higher complexity of performance measurement than those with store presence.	Supported (p<0.01)
H2: The higher complexity of performance measurement is associated with the better operational performance.	Supported (p<0.01)
H3: The relationship between performance measurement and operational performance is moderated by business format.	Supported (p<0.01)

When the sample is split based on business format, the significant relationship is still maintained for Internet retailers without store presence (p<0.01), but not for those with store presence (p>0.05). These findings indicate that business format is a moderating factor in the association between performance measurement and operational performance. The findings thus support hypothesis H3.

Table 5 presents the summary of the findings, which indicates that those three hypotheses are supported at the significance level 0.01.

V. DISCUSSION

The findings reveal that Internet retailers have measured their performance with various performance indicators. Specifically, those without store presence are likely to measure more performance indicators than those with store presence. It is possible that as Internet selling is the main channel for Internet retailers without store presence, they have more concern in measuring their virtual store performance. For those with store presence, Internet selling could serve as only an additional channel for them, and they have less concern on performance measurement.

Internet retailers which measure more performance indicators (higher complexity) are likely to have better operational performance. The low correlation could be attributed that many factors could affect business performance [36], [37]. The results are consistent with performance measurement literature concerning the rationale (value) of performance measurement [38], [39], [40]. One possible explanation about the findings is that by measuring a range of performance indicators, Internet retailers would be better in understanding how the business is progressing. Based on this understanding, they could take some decisions and actions, such as providing better product selection, selecting better advertising channels, and selecting better suppliers, to ensure the business is progressing on the expected track.

The evidence that Internet retailers without store presence obtained more benefits of performance measurement in improving operational performance compared to those with store presence is possibly related to the difference in the complexity of performance measurement implemented. Those without store presence are more than twice (odds ratio test) likely to measure, for

example, number of visits, online enquiry-to-response time, profit margin, repeated sales per customer, and acquisition costs. These measures are critical to provide information about the effectiveness of web-site operation, the customer relationship management, and the business profitability.

VI. CONCLUSION

This study has enhanced the understanding of performance measurement in Internet retail, its variation based on the difference in business format, and its potential effect. This study would suggest that Internet retailers measure various aspects of their business performance because the information obtained could be used to improve operational performance. Better operational performance would attract more new customers and retain more existing ones, and it would lead to better financial performance. As supported by the findings, the study also suggests Internet retailers especially those with store presence to measure more performance indicators and use the information obtained to reap the benefit of performance measurement.

Though this study was conducted in the UK, the lessons obtained could be still relevant for Internet retailers in Asian countries. Firstly, the market structure of Internet retail which consist of many small-sized business, and with or without store presence are likely to be general condition. Secondly, UK Internet retailers are dominated by relatively young firms, which are likely to be similar condition in Asian countries. As the finding indicated that Internet retailers have managed the business more rationally by measuring various performance indicators compared to those during dotcom era, this study suggest Internet retailers in Asia to manage their business rationally.

In assessing the findings of this study, it is important to interpret the results in the light of some limitations. The cross-sectional nature of data limits the ability to make stronger conclusion about the causality between dependent and independent variables. The findings were also limited to small and medium-sized Internet retailers, selling tangible goods. Future research could be conducted in different contexts of Internet retailing, or with different research method (case study or longitudinal study), and could explore the process of how performance measurement could affect operational performance.

REFERENCES

- [1] R. S. Kaplan and D. P. Norton, "The balanced scorecard - measures that drive performance", *Harvard Business Review*, vol. 7, no. 1, January-February, pp. 71-79, 1992.
- [2] V. Agrawal, L. D. Arjona, and R. Lemmens, "E-performance: the path to rational exuberance", *McKinsey Quarterly*, no. 1, pp. 31-43, 2001.

- [3] L. J. Ring, and D. J. Tigert, "Viewpoint: the decline and fall of Internet grocery retailers", *International Journal of Retail & Distribution Management*, vol. 29, no. 6, pp. 264-271, 2001.
- [4] M. K. Starr, "Application of POM to e-business: B2C e-shopping", *International Journal of Operations & Production Management*, vol. 23, no. 1, pp. 105-124, 2003.
- [5] U. M. Dholakia and L. L. Rego, "What makes commercial Web pages popular? An empirical investigation of Web page effectiveness", *European Journal of Marketing*, vol. 32, no. 7/8, pp. 724-736, 1998.
- [6] N. Karagozoglu and M. Lindell, "Electronic commerce strategy, operations, and performance in small and medium-sized enterprises", *Journal of Small Business and Enterprise Development*, vol. 11, no. 3, pp. 290-301, 2004.
- [7] R. A. Feinberg, R. Kadam, L. Hokama, and I. Kim, "The state of electronic customer relationship management in retailing", *International Journal of Retail & Distribution Management*, vol. 30, no. 4, pp. 470-481, 2002.
- [8] Huang, M.-H. (2005), "Web performance scale", *Information & Management*, vol. 42, no. 6, pp. 841-852.
- [9] V. McKinney, K. Yoon, and F. M. Zahed, "The measurement of web-customer satisfaction: An expectation and disconfirmation approach", *Information Systems Research*, vol. 13, no. 3, pp. 296-315, 2002.
- [10] S. S. Srinivasan, R. Anderson, and K. Ponnnavolu, "Customer loyalty in e-commerce: An exploration of its antecedents and consequences", *Journal of Retailing*, vol. 78, no. 1, pp. 41-50, 2002.
- [11] D. Szymanski and R. T. Hise, "E-satisfaction: An initial examination", *Journal of Retailing*, vol. 76, no. 3, pp. 309-322, 2000.
- [12] N. Tamimi, M. Rajan, and R. Sebastianelli, "The state of online retailing", *Internet Research: Electronic Networking Applications and Policy*, vol. 13, no. 3, pp. 146-155, 2003.
- [13] Betts, M. (2001), "Turning browsers into buyers", *MIT Sloan Management Review*, vol. 42, no. 2, pp. 8-9.
- [14] J. F. Rayport, and B. J. Jaworski, *Introduction to e-commerce*, 2nd ed., McGraw-Hill, Boston, 2003.
- [15] A. Neely, B. Marr, C. Adams, and N. Kapashi, "Measuring e-business performance", in Neely, A. (ed.), *Business performance measurement: Theory and practice*, Cambridge University Press, Cambridge, pp.343-360, 2002.
- [16] A. Enders and T. Jelassi, "The converging business models of Internet and bricks-and-mortar retailers", *European Management Journal*, vol. 18, no. 5, pp. 542-550, 2000.
- [17] P. Jones, C. Clarke-Hill, and D. Hillier, "(R)etailing in the UK", *Marketing Intelligence & Planning*, vol. 20, no. 4, pp. 229-233, 2002.
- [18] K. C. Laudon and C. G. Traver, *E-commerce: Business, technology, society*. Addison Wesley, Boston, 2001.
- [19] T. P., Liang, C. Y. Lin, and D. N. Chen, "Effects of electronic commerce models and industrial characteristics on firm performance", *Industrial Management & Data Systems*, vol. 104, no. 7, pp. 538-545, 2004.
- [20] P. Oinas, "Towards understanding network relationships in online retailing", *The International Review of Retail, Distribution and Consumer Research*, vol. 12, no. 3, pp. 319-335, 2002.
- [21] M. Moullin, "Eight essentials of performance measurement", *International Journal of Health Care Quality Assurance*, vol. 17, no. 3, pp. 110-112, 2004.
- [22] N. Venkatraman and V.Ramanujam, "Measurement of business performance in strategy research: A comparison of approaches", *The Academy of Management Review*, vol. 11, no. 4, pp. 801-814, 1986.
- [23] J. P. Bailey and E. Rabinovich, "Internet book retailing and supply chain management: an analytical study of inventory location speculation and postponement", *Transportation Research - Part E*, vol. 41, no. 3, pp. 159-177, 2005.
- [24] S. J. Barnes, and R. T. Vidgen, "An integrative approach to the assessment of e-commerce quality", *Journal of Electronic Commerce Research*, vol. 3, no. 2, pp. 114-127, 2002.
- [25] J. Barsh, B. Crawford, and C. Grosso, "How e-tailing can rise from the ashes", *McKinsey Quarterly*, no. 3, pp. 98-109, 2000.
- [26] J. Bughin, *Finding the path(s) towards profitable e-commerce*: Free University of Brussels, 2001.
- [27] D. Chaffey, F. Ellis-Chadwick, K. Johnston, and R. Mayer, *Internet marketing: strategy, implementation and practice*, 3rd. ed., Financial Times/ Prentice Hall, Harlow, England, 2006.
- [28] S. Cotter, "Taking the measure of e-marketing success", *Journal of Business Strategy*, vol. 23, no. 2, pp. 30-37, 2002.
- [29] P. M. Janenko, *e-operations management*, Amacom, New York, 2002.
- [30] Vargas, M. (2004), *Decisions, Decisions: Retail e-fulfilment*, available at [//retailindustry.about.com/library/weekly/aa00718a.htm](http://retailindustry.about.com/library/weekly/aa00718a.htm), retrieved July 26, 2004.
- [31] G. Gunawan, "Performance measurement among small-and-medium-sized UK Internet retailers", PhD Thesis, unpublished, Loughborough University., 2007.
- [32] R. E.Morgan and C. A. Strong, "Business performance and dimensions of strategic orientation", *Journal of Business Research*, vol. 56, no. 3, pp. 163-176, 2003.
- [33] P. J. Trocchia, and S. Janda, "How do consumers evaluate Internet retail service quality?", *Journal of Services Marketing*, vol. 17, no. 3, pp. 243-253, 2003.
- [34] Hemming-Information-Services, *Retail directory of the UK-2005*, Hemming Information Services, London, 2005.
- [35] J. S. Armstrong and T. S. Overton, "Estimating nonresponse bias in mail surveys", *Journal of Marketing Research*, vol. 14, no. 3, pp. 396-402, 1977.
- [36] S. Powell, "The challenges of performance measurement - Andy Neely in conversation with Sarah Powell", *Management Decision*, vol. 42, no. 8, pp. 1017-1023, 2004.
- [37] J. W. Stoelhorst and E. M. van-Raaij, "On explaining performance differentials: Marketing and the managerial theory of the firm", *Journal of Business Research*, vol. 57, no. 5, pp. 462-477, 2004.
- [38] J. R. Evans, "An exploratory study of performance measurement systems and relationships with performance results", *Journal of Operations Management*, vol. 22, no. 3, pp. 219-232, 2004.
- [39] R. S. Kaplan and D. P. Norton, *The balanced scorecard: Translating strategy into action*, Harvard Business School, Boston, 1996.
- [40] S. K. Widener, "Associations between strategic resource importance and performance measure use: The impact on firm performance", *Management Accounting Research*, vol. 17, no. 4, pp. 433-457, 2006.



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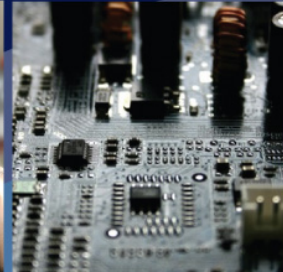


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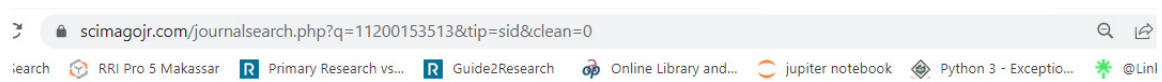
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