E-business Performance Measurement: A User-level Approach

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EXECUTIVE SUMMARY

A sample of Portuguese executives and sixty tree performance measures were used to study issues related to the utilization of e-business. In the process, cluster analysis, ANOVA, and Gap analysis procedures were used analyze the data. Overall, the results of this study point to a common pattern of performance preferences in B2C and B2B contexts. The findings of this research can be very useful to the design, adoption, and utilization of performance measurement systems of business organizations in e-business markets. Executives of these business organizations are advised to pay close attention to the environmental variables which may influence their targeted markets.

Keywords: Performance measurement, E-business, E-satisfaction

BACKGROUND

A performance measurement system (PMS) can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions (Neely, Gregory, & Platts, 2005). It is a very important management tool which helps to identify where improvements should be made and contributes to the strategic planning process (Bititci, Nudurupati, & Turner, 2002). In order to meet and exceed the evolving needs and wants of customers a well-designed PMS has become increasingly important (Moullin, 2004). In this context, the information managed by the PMS must be accurate, relevant, timely and accessible (Gomes & Yasin, 2013). Therefore, finding out performance customer preferences in different contexts of e-business could contribute for the performance measurement system design and effective utilization.

For the purpose of this research, the relevant literature related to the different facets of e-business performance measurement was reviewed. The search was conducted in Science Direct and Emerald databases. Articles published between 2003 and 2013 were searched using keywords which include e-business measures, e-business measurement, electronic measures, electronic measurement, e-commerce measures, e-commerce measurement, electronic commerce measures, electronic commerce measurement, e-supply measures, e-supply measurement, electronic supply measures, electronic supply measurement, e-procurement measures, e-procurement measurement, electronic procurement measures, and electronic procurement measures.

As a result of this search, one hundred and seventeen (117) articles were found. After a content analysis, only 14 articles yielded topics related to performance measures and measurement. These topics focused on issues related to e-satisfaction (Evanschitzky, Iyer, Hesse, & Ahlert, 2004), performance assessment for e-commerce (Huang, Jiang, & Tang, 2009), Internet channel evaluation (King & Liou, 2004), B2B relationship performance (Lages, Lancastre, & Lages, 2008), business value of *Business Intelligence* systems (Elbashir, Collier, & Davern, 2008), online store image and the intention to purchase online (van der Heijden & Verhagen, 2004), e-SCM diffusion (Wu & Chang, 2012), perceived service quality of information presenting web portals (Yang, Cai, Zhou, & Zhou, 2005), measures and metrics for e-supply chains (Sambasivan, Mohamed, & Nandan, 2009), *Visitor Relationship Management*, B2C (*Business-to-Consumer*), B2B (*Business-to-Business*), CRM (*Customer Relationship Management*), EP (*Electronic Procurement*) and ERP (*Enterprise Resource Planning*) (Fink, 2006), levels of uptake amongst Internet retailers (Gunawan, Ellis-Chadwick, & King, 2008), web-based electronic commerce on organizational benefits (Mora-Monge, Azadegan, & Gonzalez, 2010), e-service performance of online retailers (Trabold, Heim, & Field, 2006), and underlying areas of dissatisfaction of e-banking (Joseph, Sekhon, Stone, & Tinson, 2005).

In general, when analyzing the literature related to online users, factors such as web-site design, fulfillment/reliability, privacy/security and customer service, merchandising have been suggested as predictive of e-business performance (Szymanski & Hise, 2000; Trabold et al., 2006; Wolfinbarger & Gilly, 2003). In some more mature markets, convenience and site design emerged as the most important drivers of e-performance (Evanschitzky et al., 2004). In this context, it seems that business organizations could be better off making their websites more useful and enjoyable, rather than spending money increasing store familiarity and store style (van der Heijden & Verhagen, 2004). Thus, another important e-business performance dimension is web site usability (Agarwal & Venkatesh, 2002). This performance dimension was found to be one of the determinants of overall service quality (Yang et al., 2005). Also, customer service has been identified as an important competitive e-business factor (Huang et al., 2009). However, due to the pace of e-market competition order winning e-service features seemingly become order qualifiers overnight (Trabold et al., 2006).

Overall, the development of theoretical models that satisfy the generic requirements of e-commerce applications constitutes a research challenge (Fink, 2006). The importance of determining measures and metrics for e-supply chains is also stressed by literature (Sambasivan et al., 2009). Therefore, considering that even to assess the success of e-supply initiatives, managers should, at least, capture information on user utilization and transactions statistics (Sammon & Hanley, 2007), the development of a measurement profile that matches customers' most important requirements regarding the online experience could be a good starting point.

In this context, the objective of this study is to analyze the current views of Portuguese executives on key performance aspects of e-business practices and utilization. In the process, this study attempt to identify the profile of e-business performance measures utilization in two different contexts, namely business-to-business (B2B) and business-to-consumer (B2C).

METHODOLOGY

Sample and Data Analysis

An invitation to fill out the online research instrument was sent to 500 alumni from Executive MBA program of University of Coimbra – School of Economics. Forty-six (46) completed responses were received. Twenty-one (21) were returned because email addresses does exist anymore. Forty-one questionnaires were found without answers, maybe because the respondents are not involved in any kind of e-business. This resulted in a response rate of approximately 10.5%. The participating executives were asked to provide information regarding age, education, and industry type of the organization where they are currently working (see Table 1).

Instrument

The research instrument used in this study has been designed based on a literature review survey. The first phase of the instrument development included translation and adaptation to the Portuguese environment. In the second phase, the instrument was presented to a panel of experts. For the purpose of this study, the final version of the research instrument is composed of sixty one (61) performance measures related to e-business. For the sixty-one measures studied, executives were requested to provide their responses with regard to level of importance they assign to each of the performance measures in two different contexts: B2C and B2B. For this purpose, a Likert type scale, ranging from 1 to 5, was used to directly measure the above variables. The level of importance value signifies the relevance of the measures from the perspective of the executives when they made an e-business interaction.

Models, Variables, and Data Analysis

The data obtained from the participants was analyzed using cluster analysis, gap analysis, and ANOVA. In the first phase, clusters analysis was used to evaluate the obtained responses. In this context, performance measures were classified in relation the importance during an interaction in B2C and B2B contexts. The second phase of the data analysis utilized gap analysis to gain a better understanding of the relative importance of the performance measures in different e-business context. The differences between the importance assigned in B2C and B2B contexts, for each of the 61 measures were examined.

Finally, ANOVA was used to analyze the influence of gender, industry, and age of users on the importance assigned to each of the 61 performance measures.

TABLE 1
Respondents' Profile

Item	Frequency	Percentage
Gender		
Male	31	67,4
Female	9	19,6
No response	6	13,0
Total:	46	100.0
Age		
Less or equal to 30	9	19,6
From 31 to 35	12	26,1
From 36 to 40	9	19,6
More than 40	14	30,4
No response	2	4,3
Total:	46	100.0
Industry		
Services	12	26,1
Manufacturing	12	26,1
Construction	5	10,9
Commerce	2	4,3
Public sector	5	10,9
Other industries	8	17,4
No response	2	4,3
Total:	46	100,0

RESULTS

Cluster Analysis Results

The cluster analysis results related to e-business importance of performance measures in a B2C context are presented in Table 2. The first column presents the cluster number, the second column designates the measure, in the third column the average of the executives' responses is reported, followed by the standard deviation, and finally the last column reports the coefficient of variation. At the top of the user preferences (3 most important measures) is the user's concern with security and accurate information during the interaction process. The other measures classified as most important (cluster 1) are related with interaction effectiveness characteristics, such as quality/value of the product and service, confidence, customer service support, after-sales service, site navigation, efficiency of transaction process, on on-time delivery. Cluster 5, which includes the least important performance measures in a B2C context, consist of only one measure related with the store style (calm vs. pushy).

The cluster analysis results related to e-business importance of performance measures in a B2B show at the top of the preferences 3 measures. They include two measures related to we security and one related to accuracy. It is to be noted that this pattern was the same for both B2C and B2B. This reflects the importance the users attach to these measures. The other measures classified as most important (cluster 1) are related with interaction effectiveness characteristics, such as quality/value of the product and service, confidence, customer service support, after-sales service, site navigation. Cluster 5, which includes the least important performance measures in a B2B context, consists of three measures related with the store style (calm vs. pushy), and frequency of advertisements on the internet and outside the internet.

TABLE 2
Cluster Analysis Results for Performance Measure Importance (B2C)

Cluster	Measure	Average	Stand. Deviation	Coefficient of Variat.
1	Financial security of the transaction	4,81	0,45	0,09
	Security of data/security environment	4,78	0,60	0,13
	Provide accurate records of all transactions	4,69	0,56	0,12
	Ease of returns and refunds	4,64	0,62	0,13
	Product/services quality	4,64	0,53	0,11
	Confidence	4,63	0,68	0,15
	Satisfaction with claims	4,63	0,58	0,13
	Ease ordering	4,62	0,58	0,13
	Comparative prices	4,59	0,59	0,13
	Providing easy-to-follow search paths/navigation	4,57	0,75	0,16
	Value for money	4,52	0,67	0,15
	Product/service complete information/description	4,52	0,63	0,14
	Customer service and support	4,46	0,81	0,18
	Waiting time/solves problems quickly/system response time	4,43	0,78	0,18
	Ease of access/ease to use	4,43	0,81	0,18
	On-time delivery	4,43	0,81	0,18
	Up-to-date/automatic updating	4,42	0,66	0,15
	Efficiency of transactions process	4,40	0,86	0,20
	Ease of browsing	4,38	0,68	0,16
	Overall Customer satisfaction/user satisfaction	4,36	0,63	0,14
2	Practices that make solving problems easy	4,33	0,65	0,15
	Understandability	4,24	0,57	0,13
	Simplicity	4,24	0,73	0,17
	Overall website quality	4,15	0,61	0,15
	Delivery options/provide additional options for some customers	4,14	0,65	0,16
	Relevance	4,13	0,59	0,14
	Interesting offers	4,10	0,62	0,15
	Empathy	4,10	0,77	0,19
	Usefulness	4,09	0,76	0,19
	Complete contents	4,07	0,79	0,19
	Convenience compared with traditional channels	4,07	0,77	0,19
	Technical quality	4,05	0,77	0,19
	Fast payment process	4,02	0,88	0,22
	Detailed contact information	4,00	0,77	0,19
	Users feel confident/in control	3,98	0,64	0,16
4	Users learn from using the site	3,26	0,96	0,29
	Playfulness	3,14	0,97	0,31
	Establishing useful linkages with other related firms	3,02	1,02	0,34
	Frequency of advertisements outside the internet	2,90	1,03	0,36
	Frequency of advertisements on the internet	2,79	1,22	0,44
5	Calm vs. pushy online store style	2,55	1,17	0,46

Gap Analysis Results

To understand the reasons behind the relative importance of the performance measures in different e-business context, the differences between the importance assigned in B2C and B2B interaction for each of the 61 measures were examined using the indicator (GAP) below:

$$GAP_i = IMP_{iB2C} - IMP_{iB2B}$$

The results of gap analysis suggest that comparative prices, the familiarity with the website (e.g. reflected by the frequency of advertisements on the internet), convenience and enjoyment are more important in B2C, rather than in B2B interaction. On the other hand, establishing useful linkages with other related firms, providing services in different languages, customization/personalization, and promotion appear to be more important performance measures in a B2B interaction than in a B2C interaction.

ANOVA Results

Based on the ANOVA results related to gender influence on the e-business interaction process, significant differences between male and female users were found. In a B2C interaction female users assign more importance than male users to 13 performance measures. These measures are related with the website design and understandability, along with the firm integrity, and online store style (calm vs. pushy). In a B2B interaction context female users assign more importance than male users to 4 performance measures, namely ease of access/use, firm integrity, online store style (calm vs. pushy), and frequency of advertisements outside the internet. The ANOVA results related to industry influence on the e-business interaction process, significant differences between users working in service industry and users working in manufacturing industry were found. In a B2C interaction, 7 performance measures were considered more important for users working in service industry than for users working in the manufacturing industry. These measures are related with the ease of website utilization, frequency of advertisement, and technical quality. Based on results related to user's age influence on the e-business interaction process, significant differences were found. In B2C context, younger users assign more importance to customer service and support, relevance, and customer feedback services. In B2B context, younger users assign more importance to customer feedback services.

CONCLUSION

The objective of this study is to gain a better understanding of Portuguese key performance aspects of the e-business interaction. The results derived from this study, based on a sample of Portuguese executives, and 61 e-business performance measures lead to the following conclusions. First, there appears to be a consistent pattern of importance assigned to performance measures in both B2C and B2B contexts. It seems that Portuguese executives are giving more importance to security/privacy issues, confirming the results obtained by other authors in literature (Szymanski & Hise, 2000; Trabold et al., 2006; Wolfinbarger & Gilly, 2003). Second, the frequency of advertisements on the Internet and outside the Internet seems to be at the bottom of Portuguese executives preferences, confirming the weak relationship of this variable on online purchasing (van der Heijden & Verhagen, 2004). Third, the results obtained from the gap analysis are expected, taking into consideration the objectives of the transactions in each context. In fact, we expected that measures such as establishing useful linkages with other related firms and on-time delivery to be more important in B2B transactions, and other items such as convenience and enjoyment to be more important in a B2C context. Fourth, the results obtained from ANOVA point to the existence of significant differences between male and female e-business users relating to some important dimensions of the interaction both in B2C and B2B contexts. Based on these results it seems the female users give more importance to all these dimensions than male users. To be noted that female measures give more importance to website design issues which confirms the results of (Evanschitzky et al., 2004) obtained for all users. Fifth, the results of this study point to the existence of significant differences between users that are working in service industry and users that are working in the manufacturing industry. It seems that, in a service environment, users are giving more importance to advertising, and user friendly e-business interaction. Finally, it seems that younger users are giving more importance to customer support and content relevance than older users. The practical implications of the above conclusions are direct and relevant to organizations utilizing different facets of e-business.

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