

Training for the e-business competition: an empirical investigation of the relationship between competence, training and performance in European SMEs

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Abstract

This article examines the relationship between e-business competence, training, and the performance of e-business in small and medium-sized enterprises (SMEs). E-business competencies and e-business performance were investigated based on survey data from a sample of 339 SMEs in three European countries. In addition, data of the training supply related to e-business was collected from a sample of 116 providers of e-business related training. The findings show that training can explain variances in e-business related competencies as well as e-business performance in terms of efficiency, complementarities, lock-in and novelty. The research has implications for business managers and for policy makers who make decisions regarding support for the SME segment.

1. Introduction

The purpose of this study is to investigate the relationships between training supply, e-business competence and e-business performance in SMEs. This is an area that has received little attention from researchers, and there is no substantial evidence that training leads to better performance in SMEs [1-3]. Small and medium sized enterprises (SMEs) constitute a major share of the industrial economies. The survival and growth of SMEs has therefore been a prominent issue, and considerable funding has been granted to research programs targeting e-business diffusion in SMEs. It is assumed that success with e-business in the SME segment will increase a country's competitiveness in the long run, and that successful adoption and use of e-business technology is crucial for survival in the new economy (see [4] for an overview). However, several studies indicate that SMEs for the most part are unable to successfully adopt and use e-business technology [4]. A number of studies has emphasized the lack of e-business competence [5-8] as the major cause for this problem. Such competence is viewed as important not only for understanding the implications of e-business for the business domain, but

also for developing the distinctive capabilities needed to perform well in the e-business era [9].

Governments in most industrialized countries have implemented various stimulation programs including training to increase e-business competence. Despite these efforts, there is only scarce theoretical and practical knowledge of how training programs influence the creation of competence and e-business performance. With better understanding of the relationship between training, e-business competence and performance in the SME segment, governments would be able to increase the effectiveness of their training programs and thereby also increase long term survival of SMEs.

2. Theory

2.1. E-business and SMEs

There are many definitions of e-business [e.g. see 10, p. 6] and related terms: Internet business, Internet commerce, new economy, network economy and electronic commerce. We adopted a relatively broad definition of e-business as the conduct of business generally with the assistance of telecommunication and telecommunications-based tools [11].

Definitions of SMEs do also vary. The term Small Business is commonly used in the United States where measures as number of employees, total turnover, and industry are used to define an SME. The European Union (EU) uses a uniform definition of SMEs as independent companies with fewer than 250 employees, with either a turnover of less than 40 million € or total assets of less than 27 million € [12]. Independent companies are those that are not owned as to 25% or more of the capital or the voting rights by one enterprise, or jointly by several enterprises. We have adopted the EU definition.

2.2. Training and performance in the context of e-business

There is a widespread belief that the provision of training in terms of developing existing or introducing new skills and/or knowledge to SMEs, will increase their business performance. This assumption is general and includes the context of e-business. Governments invest substantial resources in stimulating training suppliers to develop competence programs to this sector. The demand side is also stimulated. Financial incentives encourage organizations, including SMEs, to develop training programs for their employees.

Yet, there is an ongoing debate on whether a positive relationship exists between training and small business performance. SMEs are reluctant to engage in training initiatives despite the existence of incentives [13]. Organizational constraints seem to create barriers to SMEs. Lack of time and financial resources, along with ignorance to the supply of training have been found to represent such barriers [3, 14].

In a review of the research on small business performance and training, Patton, Marlow and Hannon [1] conclude that despite the almost axiomatic proposition that training increases business performance, very few empirical studies have been able to demonstrate the significance of this relationship. A similar review by Westhead and Storey [2, 3] concluded in a similar vein that there was no substantial evidence showing that training is positively related to business performance in SMEs. Cosh, Duncan and Hughes [15] studied a large sample of SMEs from the manufacturing and business services sectors during the two time periods 1987-90 and 1990-95. When controlling for other factors like firm maturity and past innovation, the study found weak evidence linking training to survival rate for SMEs, with the exception of SMEs with between 10 and 20 employees. Other effects, such as employment and sales growth, were also found to be positively related to training, but this relationship was not always significant.

Winterton and Winterton [16] investigated the relationship between competence based management development and performance in companies of different size, and found that the evidence for the relationship was significantly weaker in smaller companies. Also, Wynarczyk, Watson and Storey [17] could not find any significant relationship between management training and performance in managerial labor markets.

In a review of the status of research on training and performance in small firms, Patton et al [1] propose three possible explanations for the mixed and inconclusive results and the problems of finding a casual link between training and performance: Firstly, it is possible that a causal relationship does not exist. Secondly, methodological problems associated with measuring and isolating the effects could explain the lack of evidence. Thirdly, the lack of evidence could be a result of not taking into account other possible variables that influence

the relationship between training and business performance. Patton et al [1] argue that since studies already have demonstrated that it is possible to find a significant link between training and business performance, it is less likely that a causal relationship does not exist. They find it much more likely that there are methodological explanations behind to the inability to explain the lack of clear empirical findings and to identify and separate the effects of training.

Patton et al [1] suggest that improvements in research methodology could improve the ability to detect contextual factors. In addition, improved research methodology could improve the ability to generalize the results. They advise that future studies should explore the differences in business context and utilize research methods that triangulate qualitative field research with quantitative surveys. Future studies should also focus on characteristics of the providers of training along with the characteristics, needs and available resources of the small businesses themselves. Studies from UK (see e.g. [2]) have analyzed the training supply and found that the supply rarely is based on what is demanded, thereby creating a gap between the content of the supply and the needs of the business sector.

2.3. Competence and e-business performance in SMEs

What are the types of competence that should be included in training programs to stimulate SMEs in their struggle to succeed in the context of e-business? We base our identification of potentially important competence dimensions on a review of several sources including the IS field and organization science.

Most of the IS competence literature has acknowledged the role of business strategy competence. Bharadwaj et al. [18] and Feeny and Willcocks [19] have conceptualized this dimension as "Business IT strategic thinking". Elements of this dimension are also implicitly contained in two of the dimensions of both Peppard et al. [20] and Basselier et al. [21], and one of the dimensions of Sambamurthy and Zmud [22] and Feeny and Willcocks [19]. Several empirical studies have documented the important role of strategic vision for SMEs' adoption of e-business [9, 23]

According to our review, this dimension consists of two sub-dimensions. First, a significant part of this dimension is the company's ability to envision the strategic potential of new e-business technology in its marketplace [18, 19]. It involves understanding the concept of e-business, and it will reflect the maturity of the enterprises' understanding of the e-business domain and what new possibilities and threats e-business creates in the business domain. Second, this dimension also includes the ability to understand and use strategic

planning methods needed to develop an e-business strategy, which describes how e-business will be put into action [18].

The IS literature offers broad support for the notion that a company's ability to realize potential benefits of new technology is influenced by the ability to organize business processes that leverage this potential (e.g. [24, 25]). More specifically, empirical studies in the area of IS economics have documented that among Fortune 500 companies productivity gains from utilizing new technologies are higher in companies that organize themselves in ways that leverage the potential of the new technology (e.g. [26]). In a European study of 441 Spanish SMEs, Dans [27] found a similar correlation between IT-investments and productivity for SMEs that can partly be attributed to organizational redesign.

The most fundamental challenge to SMEs may lie in changing the mindset of the organization. Several authors [28-30] have argued that the adoption of e-business fundamentally alters internal procedures within SMEs. This dimension is explicitly recognized in recent articles on IT/IS competence [18, 20], and implicitly present in the other sources. We define competences in IT-business process integration as the ability to integrate IT and Business knowledge to devise new business processes. It describes the organization's ability to envision and implement work processes made possible by new technologies. New business or IT work processes can be designed or old processes can be restructured in order to leverage the opportunities of new technology [31]. Regardless of which strategy is chosen, the company must have the ability to identify and implement changes in business processes in order to increase process efficiency to the level required by the business and the potential of the technology [18, 31]. Companies need competence to organize and manage work processes in new and powerful ways. Competence is needed both in developing the new business model and in the subsequent implementation of this model in the organization.

IT management is defined as activities related to the management of the IT function, such as IS planning and design, IS application delivery, IT project management, and planning for control and standards [18, 32]. The work of Bharadwaj et al. [18] clearly demonstrates the empirical significance of IT management. Research shows that SMEs generally have an ad-hoc approach to IT management, and therefore seldom have a defined IT budget or an explicit IT plan or strategy, and investments in technology are often driven by the owner, rather than by any formal cost-benefit or strategic analysis [27, 33].

Competence in systems and infrastructure was covered in several literature sources, including the empirical study of Bharadwaj et al. [18]. We define competence in systems and infrastructure as the knowledge of the data, network, and processing architectures that support the enterprise

applications and services. Systems and infrastructure influence the gamut of business opportunities available to firms applying IT in their business strategies [25]. Successful use of e-business technologies involves both finding technology with a strategic potential and having a technological and managerial infrastructure that can implement and support it. As a result, companies need competence on available e-business solutions as well as on the importance of having or creating internal structures that can utilize the new solutions.

A core premise of the network economy is that business networks that effectively source and coordinate resources and capabilities will be highly competitive [34-36]. Therefore effective communication and interaction internally as well as with business partners will be important to e-business performance. Our literature review identified two dimensions of relationship competence, sourcing and alignment. These dimensions are present in Bharadwaj et al. [18] where they are termed "IT-business partnerships" and "External linkages", and implicitly contained in other competence terms in all our other sources.

We define competence in sourcing as the ability to secure access to relevant competences either inside or outside of the company. MacGregor [37] argues that electronic business has forced organizations to reassess their boundaries and focus their attention on inter-organizational issues. A study of small manufacturing firms found that inter-organizational relationships are important for performance [38]. Networks, whether in the form of strategic alliances or informal linkages, are important to pool resources and talents for mutual benefit of participants [39-41]. Jarrat [42] found that competence derived through participation in networks overcame other business weaknesses. Studies on EDI adoption and Internet adoption have also highlighted the role of relationship competence [43, 44]. Also, studies of IS outsourcing success have documented the importance of the ability to form high quality partner relationships and having the capability to learn or to acquire the needed knowledge [45, 46].

We define competence in alignment as the ability to combine and use available competences. For example, sourcing could take place through two different activities that either create access to competences through recruitment, training, or contractual arrangements, or outsource activities where competences are needed. When the need for and access to competences are defined by sourcing arrangements, competences in alignment will influence how well accessible competences are combined and activated in the use process. Normally, alignment is regarded in the literature as an intra-organizational activity (e.g. "IT-Business partnership" in [18]); but when companies cooperate and form alliances, alignment takes on an inter-organizational dimension. As a result,

competence in alignment will have both an internal and an external perspective.

Few of the studies of competence in the reviewed literature explicitly describe competence in sourcing. Most studies point to the importance of flexible systems and IT infrastructure with key business partners without explicitly recognizing the importance of competences in managing these inter-organizational relationships (e.g. [18]). In the network economy, businesses that are able to form effective partnerships will be more agile [47] and competitive. This ability is particularly important for small and medium-sized enterprises, which typically have scarce resources and limited ability to exploit business opportunities on their own. Sourcing and alignment competences will enable small businesses to take advantage of e-business opportunities and take part in business network partnerships.

2.4. E-business performance dimensions

Our definition of e-business performance is based on the work of Amit and Zott [48] who describe the potential of value creation in the context of e-business in four interrelated dimensions: efficiency, complementarities, lock-in, and novelty. Efficiency describes possible reductions in transaction costs, whereas complementarities describe the value potential from combining products and services, technologies and activities in new and innovative ways. Lock-in describes the potential value in creating switching costs from arrangements that motivate customers and business partners to repeat and improve transactions and relationships. Novelty describes value creation resulting from innovations in the way business is conducted (e.g. web-based auctions, etc.).

3. Research model and hypotheses

We introduce the concepts of e-business competence to conceptualize the ability of SMEs to utilize e-business. E-business competence is believed to influence e-business performance directly and is defined here as the knowledge, skills and capability of SMEs to utilize the concept of e-business and e-business related technologies. In addition, we include the concept of training as a potential predictor to e-business competence and e-business performance. Training is defined here as the relevant training supply in the context of e-business and SMEs. The providers' interest in SME segment and the content of the training supply are important factors in defining the training supply. The demand for training is formed by the SMEs' awareness of the training supply and the ability to invest in the training offered.

E-business performance is believed to be influenced by both e-business competence and relevant training supply

in this context. E-business performance is defined as the results of the e-business efforts in terms of the effects created in the four dimensions of efficiency, complementarities, lock-in and novelty. The research model is illustrated in figure 2. We propose the following research hypotheses:

H1: There is a positive association between training and e-business performance in terms of a) efficiency, b) complementarities, c) lock-in and d) novelty.

H2: There is a positive association between training and e-business related competence.

H3: There is a positive association between e-business related competence and e-business performance in terms of a) efficiency, b) complementarities, c) lock-in and d) novelty.

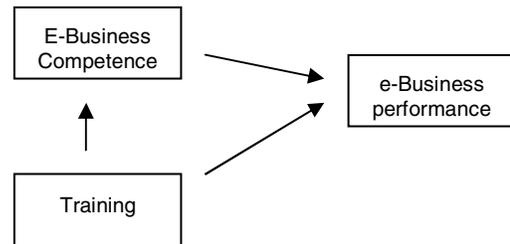


Figure 1. Research model

4. Methodology

To test the hypotheses we conducted a cross sectional study with a sample of 339 SMEs from three industries (tourism, transportation, and food and beverages) in three European countries (Norway, Finland and Spain). In addition, a sample of 116 training providers was drawn from the same countries.

Based on a random sample of SMEs, executives were phoned, and if they could confirm that their company used web pages, e-mail or e-commerce systems for business purposes, they were invited to take part in the survey. 339 executives accepted and were subsequently interviewed. A sample of 130 training providers, equally shared between the countries, were phoned and invited to take part in a sample. 116 providers accepted and were then interviewed.

The operationalizations of e-business competence were based on instruments and operationalizations previously documented [18, 19, 21, 22, 49, 50]. The operationalization of e-business training was based on the work of Patton et al. [1] who identified characteristics of both the supply side and demand side as important to understand the training supply that was relevant. As a

result, relevant training supply was operationalized in four dimensions: the attractiveness of the different SME size segments to the training provider, the financial ability of SMEs of different sizes to invest in training programs, the SMEs' awareness of existing training programs, and the content of the training offered in terms of the types of competence offered. The competence dimensions characterizing the training supply were the same as in the e-business competence variable covering the SMEs. The final measure of the training content was constructed as a summed index for each country.

To combine the data from the SME sample with the sample from the providers, the supply and demand of training as a function of SME size, were added to the data set of each country. The average awareness of SMEs about the training supply in each country was coded with the average value for each SME in the respective countries. The index representing the training content in each country was coded in a similar fashion.

The final measure of training was constructed as a formative measure where training emerged as a result of the external supply and internal demand described above.

'E-business performance' was operationalized according to the dimensions described by Amit and Zott [2]. The indicators for all constructs were measured on a seven point Likert-type scale between 'totally disagree'/'not at all' and 'totally agree'/'very large extent'.

The independent variables were measured as formative indicators (for a review of construct indicators and measurement model specification, see [51]). The dependent variable e-business performance was measured with reflective indicators of each of the four dimension of performance: efficiency, complementarities, lock-in and novelty.

We then conducted open-ended interviews with eight SME managers and two related consultants as an additional reality check of our model and as a test of the relevance, wording and response format of the indicators. The outcome of this process led to the resulting questionnaires.

5. Data Analysis

Partial least squares analysis (PLS) was chosen as the most appropriate technique in the testing of our hypotheses along with the measurement quality of our formative and reflective indicators. PLS is a confirmatory, second-generation multivariate analysis technique [52] that is well suited for highly complex predictive models [53]. PLS has several advantages that makes it well suited for this study, including the ability to handle reflective and formative indicators and robustness in relation to departure from multivariate normality, as occurred in our

data. Moreover, as with multiple regression, PLS focuses on the model's ability to predict rather than explain the variability of the dependent variables. PLS is therefore most useful in situations where the theory is still being developed [54] and can suggest refinements in theory by showing how substantially indicators are related to constructs and how assumed predictors are related to one or more dependent variables. In PLS, the predictive ability of constructs is optimized and the performance of the individual scale items is reported.

5.1. Descriptive statistics

Descriptive statistics for the two samples is shown in appendix 1. All 339 SMEs in our sample used at least one of the eight e-business systems surveyed (Q4) in addition to e-mail. Each company had at least a web presence where individual customers or companies could find information about products and services. Appendix 1 shows the distribution of the different e-business systems (Q4a-h) in the SME sample.

The second sample consisted of 116 training providers, where Norway and Finland were represented by 40 providers each and Spain by 36 suppliers. The size of the training providers varied substantially, ranging from 1 to almost 800 employees. The median size of the training providers in the sample was 37.4 employees.

Table 1. Descriptive statistics, weights and t-statistics for formative indicators measuring competence

	<i>Mean</i>	<i>Std. dev.</i>	<i>Weight</i>	<i>t-stat.</i>
Competence (Formative)				
Q10	4.11	1.73	0.16	1.82
Q11	4.25	1.71	0.04	0.34
Q14	3.65	1.64	0.11	1.10
Q16	4.38	1.74	0.13	1.80
Q22	4.08	1.53	0.55	6.39
Q25	4.31	1.61	0.10	1.09
Q26	4.55	1.60	0.11	1.41
Q27	3.63	1.83	0.13	1.40
Training (Formative)				
V8	3.98	1.06	0.18	2.02
V9-28	4.80	0.33	0.14	5.62

5.2. Measurement and measurement quality

Formative items represent measures that cause the construct under study [55]. Changes in the construct are therefore not expected to cause any changes in the indicators (for an overview of indicator specification, see [56]). As a result, items within a formative scale are not expected to correlate. Tests of convergent and discriminant validity based on the inter-correlations between items are therefore not relevant for evaluating the

psychometric properties of formative items. Instead, item weights and their significance are used to indicate how relevant each item is in measuring its latent construct. These results are reported in table 3. After examining the indicator weights and t-statistics, several indicators in the e-business competence scale were deleted because of negative weights indicating problems with multicollinearity. A new analysis of the reduced model showed no further problems. Of the eight remaining indicators three were found to have significant t-values ($p \leq .05$). These indicators were related to competencies in e-business strategy and vision, sourcing of competence, and IT business process integration. This empirically suggests that the overall e-business related competence is primarily formed by competence in IT business process integration (Q22), knowledge of the value of e-business technologies in relation to business (Q10), and knowledge of outsourcing (Q16).

In measuring training, the two indicators V8 (financial resources of SMEs of different size to invest in training) and the index of V9-28 (competence areas represented in the training content offered), were found to have both positive and significant weights ($p \leq .05$). The other two indicators included in the measurement model of training had negative weights, indicating a problem with multicollinearity and were therefore removed. The resulting measure of training consists of the SMEs' ability to invest in training, and the content of the training offered by the provider.

The reliability of the dependent variable constructs was assessed using Cronbach's alpha. Hair et al. [57] suggest that an alpha of 0.60 is acceptable for exploratory research and 0.80 for confirmatory research. Reliability analysis for the multi-item scales showed the following coefficient alphas: e-business efficiency 0.86, e-business complementarities 0.88, e-business lock-in 0.70, and e-business novelty 0.72. These results show that all concepts had sufficient reliability for exploratory research.

Table 2. Results of the reliability test

Variable	Reliability of scale
E-business performance: efficiency (v11-13)	0.86
E-bus. performance: complementarities (v14-16)	0.88
E-business performance: lock-in (v17-18)	0.70
E-business performance: novelty (v19-20)	0.72

The reflective items are believed to be caused by the latent constructs they intend to measure [55]. Inter-correlations between the items are therefore expected. The psychometric properties of the reflective items were examined by analyzing their internal consistency in terms of their convergent and discriminant validity. Convergent

validity was estimated based on the item loadings, and a loading of above .70 is recommended, which indicates that at least half of the variance in each item is accounted for by the latent construct [58]. For all dimensions of e-business performance the items had sufficient convergent validity in terms of their squared loadings (see table 2). In addition, average variance extracted (AVE) was calculated. AVE indicated that the set of indicators as a whole was sufficient of explaining the latent construct. All constructs with reflective items had AVE above the recommended level of 0.5 [59], as shown in table 3.

Table 3. Descriptive Statistics – E-business Performance, reflective indicators

E-business efficiency (Reflective)				
Composite Reliability 0.86; AVE 0.67	Mean	Std. dev.	Loading	t-stat.
Q28	3.66	1.90	0.84	49.20
Q29	3.84	1.91	0.85	62.36
Q30	4.20	1.76	0.76	22.77
E-business complementarities (Reflective)				
Composite Reliability 0.90; AVE 0.75				
Q31	3.78	1.76	0.84	35.37
Q32	3.98	1.75	0.90	81.06
Q33	3.60	1.78	0.86	59.06
E-business Lock-in (Reflective)				
Composite Reliability 0.85; AVE 0.74				
Q34	2.97	1.73	0.84	33.26
Q35	3.76	1.81	0.88	47.79
E-business Novelty (Reflective)				
Composite Reliability 0.87; AVE 0.77				
Q36	2.93	1.85	0.88	46.59
Q37	3.75	1.76	0.87	45.12

5.3. Test of hypotheses

The structural model was tested with the estimated path coefficients and their standard errors, along with the R^2 value, which reflects the predictive ability of the model including the dependent variables' ability to explain the dependent variable.

In conducting the structural analyses and hypotheses tests we used PLS-graph version 3.0 [60]. The significance of each path in the structural model was estimated using the bootstrap re-sampling method with 200 re-samples. Our sample size of 339 exceeds the minimum recommended sample size of the greater of either 1) ten times the number of indicators in the scale with the largest number of formative indicators, or 2) ten times the largest number of structural paths directed at a particular dependent construct in the structural model [61].

Hypotheses H1a states a positive association between training and e-business performance in terms of efficiency, and this was not supported. Hypothesis H1b holds that training will be positively related to e-business performance in terms of complementarities, which was supported (.15, $p \leq .01$). Hypothesis H1c states a positive relationship between training and lock-in, which was supported (.15; $p \leq .01$), and finally hypothesis H1d states that training will be positively related to e-business performance in terms of novelty, which was also supported (.20, $p \leq .01$). Hypothesis H2 states a positive relationship between training and the e-business related competence in the SMEs, which was supported (.26, $p \leq .01$, $R^2 = .07$). Finally, hypothesis H3a states a positive relationship between e-business competence and e-business performance in terms of efficiency, which received strong support (.58, $p \leq .01$). Hypothesis H3b suggest that e-business competence is positively related to e-business performance in terms of complementarities, which was strongly supported (.61, $p \leq .01$). Hypothesis H3c states that e-business competence is positively related to e-business performance in terms of lock-in, which received strong support (.49, $p \leq .01$). The last hypothesis, H3d, holds that e-business competence will be positively related to e-business performance in terms of novelty, which was also strongly supported (.55, $p \leq .01$). As a whole the structural model explained a substantial amount of variance in e-business performance. Competence and training explained 36%, 45%, 30% and 40% of the variance in e-business efficiency, complementarities, lock-in, and novelty, respectively. Figure 2 summarizes the significant findings of the structural model.

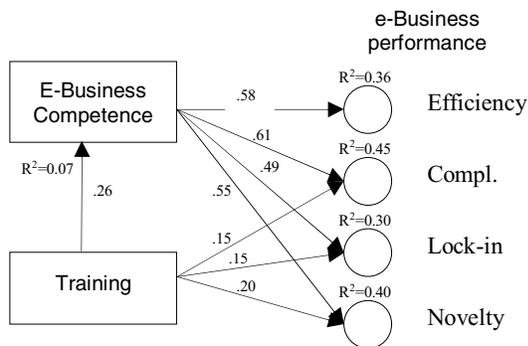


Figure 2. Structural model with significant paths and path coefficients

6. Discussion

This study examined the factors that affect e-business performance in SMEs by using a research model developed from the IT competence literature and the small business literature, interviews and survey data from both SMEs and training providers.

There are three contributions in this exploratory study. First, we have developed a way to conceptualize e-business related training that both include the supply side as well as the demand side of training as suggested by Patton et al [1]. This conceptualization combines factors identified in the IS literature with factors identified in the small business literature. Second, our results demonstrate a relationship between training and e-business competence in SMEs and e-business performance. In addition to the direct relationship between e-business competence and performance, training was found both to influence competence levels and performance both direct and indirectly. This supports the small business literature which suggests that a positive relationship exists between SME training and performance (e.g. [15]). The findings also support the proposition of Patton et al.[1] that empirical studies should focus more on specific contexts when investigating the relationship between training and performance.

Third, we have demonstrated that value creation in e-business can be explained by a limited set of e-business related competencies as well as the demand and supply side of training. The competencies which explained a substantial amount of e-business performance were competence in e-business strategy and vision, competence in sourcing, and competence in process integration between IT and business. These competencies explain a substantial amount of the variance in performance and should be considered by the SMEs in evaluating their own e-business related competence level.

The programs aimed at training and stimulating competence development in SMEs could also benefit from these results. The training providers should evaluate whether the content of their training programs sufficiently cover the competencies identified in this study. In addition, the training providers should be aware of the fact that the SMEs' inability to invest in these training programs could represent significant barriers to developing e-business related competence and hence e-business performance. The effect of financial ability could represent a selection mechanism that can explain difference in survival rates between SMEs of different size. In fact, our data includes training supply and ability to invest in training in three countries in Europe. Of these countries, Spain had public arrangements that helped the smallest SMEs in particular, since these have the lowest ability to pay for training and the greatest need for competence. Our data suggest that such public arrangements that increase the ability to pay for training for the smallest of the SMEs, could increase e-business

performance as well as survival of these SMEs. The impact of this policy could be positive for the economy, since small SMEs dominate the SME segment through their numbers as well as are the ones with the lowest survival rates.

There is a clear need for more studies on the issue of training and e-business competence, particularly in the context of SMEs. The lack of theoretical and empirical work on this topic and the results from our exploratory study, suggest that future research should devote more resources to further explore the importance of training, competence and performance in SMEs.

This exploratory study has several limitations. Our data consist of subjective evaluations of e-business managers and training providers and are not necessarily reflecting objective facts. Future studies should include less subjective information about e-business performance and its antecedents. An interesting approach would be to follow e-business training programs over time with more in depth research methods focusing on how several characteristics of the training offered could influence the competence build up and the SME performance over time. Such studies should be followed by quantitative research methods that could test the hypotheses developed with the ability to generalize the results.

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Appendix 1. Descriptive statistics

Figure 1: SME sample

Item	n	Mean	Std. Deviation
Q1	339	29,52	34,84
Q2	339	1,00	,00
Q3	339	2,06	,80
Q5	321	4,38	1,74
Q6	327	4,43	1,42
Q7	309	4,72	1,55
Q8	299	4,34	1,72
Q9	330	4,74	1,45
Q10	325	4,32	1,42
Q11	261	3,66	1,90
Q12	258	3,84	1,91
Q13	303	4,20	1,76
Q14	274	3,78	1,76
Q15	283	3,98	1,75
Q16	286	3,60	1,78
Q17	287	2,97	1,73
Q18	299	3,76	1,81
Q19	309	2,93	1,85
Q20	307	3,75	1,76
E-bus. Efficiency	234	3,89	1,64
E-bus. Complem.	255	3,79	1,59
E-bus. Lock-in	276	3,34	1,55
E-bus. Novelty	299	3,36	1,59
Valid N (listwise)	172		

Figure 2: E-business systems used in the SME sample

E-business systems	# SMEs	Percent
Web pages with information to individual customers about products and services (V4a)	256	75,5
Web pages where individual customers can make orders (V4b)	134	39,5
Web pages where companies can find information about products and services (V4c)	270	79,6
Systems for electronic sales of products and services to other companies (V4d)	51	15
EDI solutions on the Internet (V4e)	73	21,5
Systems where suppliers can find information about our demand and supply (V4f)	62	18,3
Systems that integrate supply chains (V4g)	36	10,6
Other (V4h)	102	30,1