

Does e-Business Matter to SMEs? A Comparison of the Financial Impacts of Internet Business Solutions on European and North American SMEs

by David A. Johnston, Michael Wade, and Ron McClean

Small and medium-sized enterprises (SMEs) are adopting Internet Business Solutions (IBS) internationally to improve their performance. What is the net impact of these solutions for SMEs? This paper presents the results of survey research involving 1,666 organizations in Europe and North America. The research found that IBS adoption mattered resulting in tangible financial benefits for SMEs in all the nations studied. However, these benefits were not evenly distributed across regions, industries, technologies, or size categories. The results suggest that SME managers should adopt a staged approach to IBS adoption in order to maximize performance gains.

Introduction

In May 2003, Nicolas Carr confidently stated in a *Harvard Business Review*

paper that “IT Doesn’t Matter” (Carr 2003). The paper stirred considerable debate among the business and academic communities. Most of this debate focused

David A. Johnston is associate professor of operations management at the Schulich School of Business, York University. His current research is on technological innovation, interorganizational cooperation, and sustainability in operations. His research has appeared in the *Journal of Operations Management*, *IEEE Transactions in Engineering Management*, *Interfaces*, and *International Journal of Operations Management*.

Michael Wade is assistant professor of information systems at the Schulich School of Business, York University. His research has appeared in journals such as the *Journal of MIS* and *MIS Quarterly and Information and Management*. He is coauthor of three textbooks on information systems and electronic commerce. His current research focuses on the strategic use of information systems for sustainable competitive advantage.

Ron McClean is assistant professor of information systems and director of academic computing and technologies at the Schulich School of Business, York University. His current research is focused on e-business technologies and their effects on organizational processes.

Address correspondence to: David A. Johnston, Schulich School of Business, York University, 4700 Keele Street, Toronto, Canada. Tel: (416) 736-2100 Ext 77950. E-mail: johnston@rogers.com.

on the influence of information technology (IT) on large firms, with comparatively little attention paid to small and medium-sized enterprises (SMEs). In addition, no attempt was made to segment the discussion to focus on particular sectors, regions, or categories of IT. In this paper, we pose a modified version of Carr's proclamation: Does e-business matter to SMEs?

Clearly, this is a question of substantial interest to SME managers. Some SMEs have wholeheartedly embraced e-business, whereas others have taken more of a "wait and see" attitude. Still, others have shunned e-business completely. For example, statistics show that some form of Internet Business Solutions (IBS) has been adopted by approximately 55 percent of SMEs in the United States, 48 percent in the European Union (EU), and 63 percent in Canada (McClellan, Johnston, and Wade 2003). At least part of this reticence can be attributed to a lack of understanding of the benefits associated with IBS adoption and use. Although there is no shortage of economic statistics about the penetration of IBS, Internet access, use of broadband, and expenditures on information and communication technologies (ICT) (i.e., Organization for Economic Cooperation and Development [OECD] 2002), there are very few studies that have provided any insight into how well SMEs are doing where it really counts: improving financial performance. In addition, most multinational research has focused on national competitiveness, or "readiness" of an economy versus specific segments such as SMEs (i.e., Dutta and Jain 2002).

A more granular examination of macroeconomic data reveals some causes for concern. For example, recent research has found that IBS adoption rates are significantly lower for SMEs than for large organizations in the United States and EU (Varian et al. 2002). A concern for policymakers and individual business

decision-makers is that SMEs lag larger firms in the adoption of wealth-creating technologies, therefore adversely affecting their economic performance.

In this paper, we present the results of a survey of 1,666 SME organizations in five OECD nations on firm-level financial impacts attributable to IBS adoption. We describe the survey methods then follow with a summary of the findings. Next, the major contingent aspects of SME financial improvement are presented. The paper concludes with implications for managers and an agenda for future research.

Methodology

The data in this report were drawn from three rounds of data collection. A telephone survey of approximately 25 minutes in length was replicated in each round. The first study was conducted in the United States in late 2001 (Varian et al. 2002). It measured the current and anticipated financial impacts (cost savings and revenue increases) that organizations believed had been created as a result of IBS investment. An IBS was defined as an initiative that combined the Internet with networking, software, and computing hardware technologies to enhance or improve existing business processes or to create new business opportunities. IBS were categorized as impacting seven areas: (1) customer development and e-marketing; (2) customer service and support; (3) e-commerce, finance, and accounting; (4) human resources, procurement, and maintenance; (5) repair and operation; (6) sales force automation; and (7) supply chain management.

The second study, also a telephone survey, was conducted in three EU nations—the United Kingdom, France, and Germany—in early 2002. A third, Canadian iteration of the research was conducted in summer 2002. Although the three studies did not differ in methodology, the Canadian study diverged from

the previous two on one important dimension—it focused exclusively on the SME population, whereas the U.S. and EU studies looked at firms of all sizes.

In each study, a stratified random sample of organizations was drawn from five broad industry sectors: (1) manufacturing; (2) financial services; (3) retail, wholesale, and distribution; (4) communications and internet service provider; and (5) the public sector. The sampling frames for each study consisted of public and private databases that mirrored the firm populations of the region. For purposes of this study, the U.S. and EU data sets were filtered to include only SMEs, defined as firms with up to 500 employees. This process resulted in a data set containing responses from 1,666 organizations—1,011 from the United States, 257 from the EU, and 398 from Canada.

On account of small individual country sample sizes, data from the United Kingdom, France, and Germany were aggregated into one EU category. Although this approach may overlook important differences among these three countries, it was necessary in order to have sufficient data to make statistically meaningful comparisons. Data weights were used to match the sample to the relevant population in terms of organization size and industry.

Results

In each of the surveys, respondents were asked about financial costs and benefits (in the form of revenues and costs) that were directly attributable to the adoption and use of IBS. Thus, respondents were encouraged to isolate the financial impacts of IBS adoption from other sources of performance

variance. The research reported *actual* financial results, as well as *anticipated* financial results because many organizations were still in the process of implementing IBS.

In the following sections, we explore the financial impacts of IBS adoption by different categories. First, we examine results by firm size. Next, we will look at the type of IBS. Finally, we look at differences by industry sector. In each section, we explore regional difference in financial impacts.

Differences in Financial Results among Regions by Firm Size

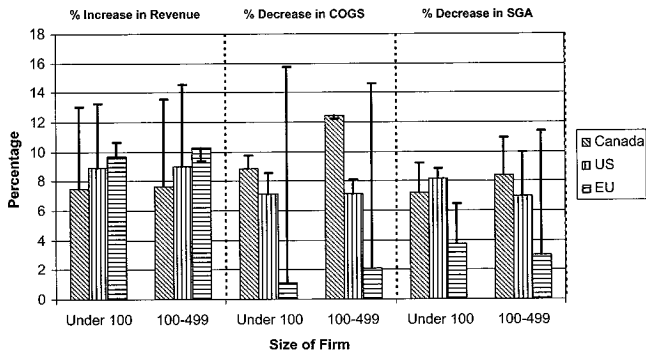
Figure 1 shows the financial impacts of IBS adoption for each region, segmented by firm size. The expected percentage increases or decreases once all IBS are implemented are represented by the "whiskers" for each bar. We first observe that in each financial category, there were positive benefits across all three regions.¹ For revenues, there were no significant differences in average revenue increases among the three regions ($F = 1.116, p = .329^2$).

For sales, general, and administrative costs (SGA), there were also no significant differences among regions ($F = 1.83, p = .158$). However, medium-sized firms tended to expect larger cost decreases than small firms once all IBS had been implemented ($t = 4.2, p = .04$). For costs of goods sold (COGS), significant differences among regions were found. Canadian firms reported larger decreases in COGS than their U.S. and E.U. counterparts, regardless of size ($F = 3.571, p = .03$). More importantly, medium-sized Canadian SMEs had significantly higher COGS savings than small Canadian SMEs, which in turn, had larger decreases than U.S. and EU SMEs

¹All are significantly different from 0 or not change at a p -value (p) of less than 0.0001.

²Where comparisons are made among three or more categories, analysis of variance (ANOVA) tests are employed. The test statistic for ANOVA is the F statistic (F). Where a comparison is made between two categories, the Bonferroni t test is employed (t).

Figure 1
Financial Impacts by Region and Size



($F = 8.161, p = .000$). It would appear that EU firms expected larger future COGS savings than SMEs in the United States or Canada, but because of the small number of firms reporting future expectations, this difference was not statistically significant.

Financial Impacts by Type of IBS

Customer-focused IBS (e-marketing, customer service, and e-commerce) were ranked as the primary drivers of increased revenue and reduced costs (see Table 1). This result was consistent across all three regions. Surprisingly, customer-focused solutions were also ranked in Table 1 as having a greater impact on costs than internally focused solutions (financial/accounting, human resources, and sales force automation) or those solutions focused on the supply chain (procurement and supply chain management). As indicated by the number of observations for each column of financial results in

Table 1, many SMEs were unable or unwilling to attribute financial results to specific technologies.

Impact on Revenue by Industry Sector

There were some significant differences in the magnitude of revenue increases among the three regions when examined by industry sector (see Figure 2). These differences existed for both current ($F = 3.428, p = .01$) and future expected revenue benefits ($F = 4.597, p = .001$). In general, the communications sector led the field, whereas the retail and manufacturing sectors showed the smallest effects. For most industry categories, expectations were high for still further performance improvement.

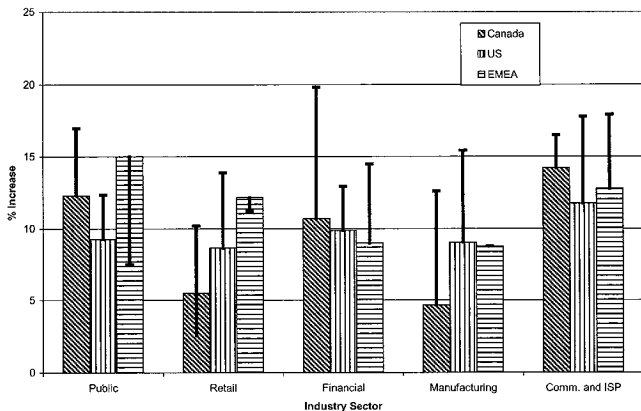
Within financial services, there was no significant regional difference in the increase in revenues experienced so far ($F = .834, p = .439$). However, Canadian

Table 1
Ranking of Type of Internet Business Solutions in Terms of Financial Impact^a

	Revenue Improvement			Costs of Goods Sold Improvement			Sales, General, and Administrative Costs Improvement			Total Type
	U.S.	EU	CDN	U.S.	EU	CDN	U.S.	EU	CDN	
Customer Service	31 (23%)	5 (24%)	32 (30%)	19 (29%)	0	20 (31%)	48 (27%)	0	31 (31%)	186 (27%)
e-Commerce	38 (28%)	6 (29%)	22 (21%)	16 (25%)	4 (50%)	8 (13%)	38 (21%)	12 (92%)	19 (19%)	163 (24%)
Customer Development and e-Marketing	33 (25%)	5 (24%)	28 (26%)	10 (15%)	0	12 (19%)	18 (10%)	1 (8%)	9 (9%)	116 (17%)
Human Resources	1 (<1%)	0	1 (1%)	0	0	4 (6%)	2 (1%)	0	4 (4%)	12 (17%)
Finance and Accounting	12 (9%)	0	13 (12%)	2 (3%)	0	8 (13%)	19 (11%)	0	13 (13%)	67 (10%)
Sales Force Automation	9 (7%)	1 (5%)	8 (8%)	6 (9%)	0	3 (5%)	30 (17%)	0	12 (12%)	69 (10%)
Supply Chain Management	9 (7%)	4 (19%)	0	8 (12%)	4 (50%)	4 (6%)	4 (2%)	0	7 (7%)	40 (6%)
Procurement	1 (<1%)	0	2 (2%)	4 (6%)	0	5 (8%)	18 (10%)	0	4 (4%)	34 (5%)
Total Observations	134	21	106	65	8	64	177	13	99	687

^aFigures in cells show number of respondents indicating area of highest financial impact (percentages in parentheses). Respondents were allowed one choice only. Shaded cells represent the most frequent response for each region.

Figure 2
Impact on Revenue by Region and Industry



firms expected significantly larger increases than either U.S. or EU firms after implementation of all IBS ($F = 4.436, p = .013$).

U.S. SMEs led the way in the manufacturing sector with revenue gains of 9.0 percent, closely followed by the EU SMEs with 8.7 percent. U.S. companies expected further gains once all implementations had been completed of 16 percent on average. Finally, Canadian SMEs in the retail sector experienced lower increases in revenue than either U.S. or EU firms.

The future expected revenue gains of Canadian SMEs matched those of the United States, but the EU firms lagged significantly behind those of U.S. firms (10 percent for the European Union versus 14 percent for the United States, $F = 3.748, p = .024$).

Discussion

At the outset of this paper, we posed the question: Does e-business matter to SMEs? Based on the evidence presented in this paper, the simple answer is: Yes. Although there were a number of important differences between international regions in terms of frequency of adoption and financial impacts, one fact was consistent—SMEs in all regions reported significant financial gains. Furthermore, these benefits affected both revenue growth and cost minimization. The largest financial impacts consistently came from the customer-facing IBS (customer development and e-marketing, customer service, and e-commerce), as opposed to internal and supplier-facing IBS (finance and accounting, human resources, procurement, sales force auto-

mation, and supply chain management). SMEs that have thus far taken a "wait and see" approach to IBS adoption might choose customer-facing solutions for an initial foray into Internet-based technology.

However, the data also reveal that there is a more complex answer. The net impact of IBS adoption by SMEs is positive, but those benefits are not evenly distributed across nations, technologies, industries, or firm size categories. There are clear laggards and leaders. For example, EU firms lagged counterparts in the United States and Canada along a number of dimensions, including the low frequency and significantly smaller magnitude of improvements in costs because of IBS adoption.³ Two important sectors, retail and manufacturing, appear to be lagging other industry sectors. Finally, internally and supplier-focused solutions appear to be lagging behind customer-focused solutions.

The data also revealed some surprising "non-results." For example, there were no significant differences among regions between small and medium-sized organization (for revenues, COGS, and SGA, the *F* statistics were less than 1). Our *a priori* expectation was that economies of scope and scale would make IBS adoption more lucrative for medium-sized firms.

Issues and Opportunities for Future Research

Methodologically, there are two limitations with this study: accounting for gains, and time lags between adoption and outcomes. International accounting standards and the perceptions of managers as to what constitutes revenue, COGS and SGA are not universal. Some respondents were more forthcoming than

others in reporting the root causes of improvement. Whether this is an issue with the research instruments or a cultural difference between regions in disclosing activities is unknown. In each of the studies, respondents were asked whether or not they kept regular metrics on IBS implementation and the majority reported that they did not. Therefore, it is unclear where estimates of actual and potential gains were systematically derived.

In the implementation of complex systems, there is a time lag between activity and outcome. We are uncertain as to how long initial and subsequent IBS adoptions take to work their way through to a company's results. In our reporting of the financial impact of IBS on some EU industry sectors, there was evidence that initial impacts could actually be negative as the costs of full implementation are absorbed (see Figures 1 and 2).

Potentially, new theoretical directions lie in understanding the decision-making process within the SME as it passes through stages of IBS adoption and implementation. We see three important issues in that process: strategy formulation, integration, and scaling solutions for firm size. First, we believe it is important to acknowledge the primacy of the entrepreneur/manager as the driving force, and examine her or his attitudes and incentives. Our finding that customer-facing applications had the greatest effect on performance and were the most frequently adopted IBS suggests that the technology is delivering results in alignment with the often reported entrepreneurial priorities focused on gaining market share (that is, McMahan 2001). As has been noted in the literature, most entrepreneurs are not

³The relatively large estimated gains from future IBS implementation efforts suggest that some of the difference between the EU and the other two regions may be the result of later and slower adoption rates.

good long-term planners (Shrader, Mulford, and Blackburn 1989), nor do they have the resources to engage in complex system implementations (Stansfield and Grant 2003), in contrast to the large companies examined in Carr's paper. How entrepreneurs formulate and implement an e-commerce strategy, given the large potential benefits, is an important question.

Finally, it appears likely that the innovation process producing the results could vary significantly in terms of needs assessment planning, decision-making, and implementation stages. Here again, a strong understanding of the mechanisms of adoption and implementation would be furthered by longitudinal case studies or repeated cross-sectional surveys.

From our analysis, we can conclude that Carr got it wrong—in at least one instance, IT *does* matter for SMEs as it is applied to e-business. Our data show clearly that the adoption of IBS by SMEs in Europe and North America leads to tangible benefits.

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