

## **PERCEIVED VERSUS REALIZED BENEFITS IN E-COMMERCE ADOPTION**

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### **ABSTRACT**

*The Internet has revolutionized the capacity to share information across organizations, resulting in radical transformations of organizational practices for procuring supplies, delivering goods and services, and carrying out financial transactions. Organizations around the world are capitalizing on new technologies such as the Internet and World Wide Web to develop e-business. Evolving e-business models, integrated solutions and improved technological infrastructures are continuously changing the way businesses are conducted. Despite the hype of the Internet for e-business, the benefits realized from e-commerce adoption among firms are unclear in terms of perceived versus realized benefits. Using case studies in three organizations the writer examines the impact of perceived versus realized benefits in e-commerce adoption. The findings reveal that the type and focus of perceived versus realized benefits is unique for each organization. The paper also discusses the implications of this study to theory and practice including the lessons learned by these organizations.*

**Keywords:** Perceived benefits; Realized benefits; Business-to-business; Business-to-consumer; E-commerce adoption.

### **INTRODUCTION**

E-commerce is fundamentally changing the economy and the way businesses are conducted today (Barua et al., 2001). It forces firms to find new ways to expand the markets in which they compete, to attract and retain customers by tailoring products and services to their needs, and to restructure their business processes in order to deliver high quality products and services more efficiently and effectively (Chan and Davis, 2000; Shin 2001).

Benefits of e-commerce adoption include improved customer service, better inventory control, lower marketing and distribution costs, reduced cycle time, increased market reach, and reduced operation costs (Nath et al., 1998; Riggins and Rhee, 1998; Senn, 2000). Other benefits include global connectivity, high accessibility, scalability, interoperability, and interactivity (Turban et al., 2000; Rayport and Jaworski, 2001).

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Despite the economic slowdowns, e-business continues to grow (George, 2002). Yet, it is not certain if companies adopting e-commerce are actually realizing the benefits or are implementing e-commerce just to remain competitive. This study aims to explore and examine perceived benefits versus realized benefits that affect companies' decisions in e-commerce adoption. The writer examines a set of indicators that determine the extent of technology, operational and relationship-related benefits that companies experience. As such the research question developed for the study is: How and why do perceived benefits lead to realized benefits in organizations that have adopted e-commerce applications? The paper is organized into the following sections: (a) analyses of previous research pertaining to perceived benefits in e-commerce adoption; (b) description of the research method used; (c) descriptions of findings and discussions leading to contributions to theory and practice; and (d) conclusions, lessons learned and directions for future research.

## **PAST RESEARCH ON E-COMMERCE ADOPTION**

Business-to-consumer e-commerce is growing rapidly. A survey conducted in the year 2000 by the National Association of Manufacturers found that more than two-thirds of American manufacturers did not use the Internet for e-business (The Economist, 2000). On the other hand, business-to-business e-commerce on the Internet is the hype today. The Internet has provided opportunities for SMEs to trade with a wider circle of trading partners, inexpensively. For example, Nath et al., (1998) conducted a study on the impact of e-commerce adoption and they suggest that the Internet does contribute to benefits. Similarly, Senn (2000) in his work provided ways how Extranets can simplify and benefit businesses. Yet, studies comparing perceived versus realized (or actual) benefits received by firms that have adopted e-commerce are limited. The following sections discusses the distinction between perceived versus realized benefits.

### **Perceived vs Realized Benefits of E-Commerce Adoption**

Perceived benefits are defined as the gains or improvements derived from existing ways of operating business transactions using e-commerce applications. Realized benefits are actual benefits experienced by the organizations that have adopted e-commerce. They include profits that contribute to economic benefits (as in quantitative, objective monetary value) and establishing positive trading partner relationships including satisfaction and commitment (as in qualitative, subjective relational value). Perceived and realized benefits in this study are categorized as technology, operational, and relationship related benefits.

### **Technology Benefits**

Technology benefits relate to automated processes embedded in the e-commerce applications that contribute to direct savings in costs and time. Technology benefits

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aim to automate manual processes therefore improving administrative costs and reducing errors. The impact of technology benefits is measured as improved speed of delivery, and market reach (Murkhopadyay et al., 1995; Premkumar et al., 1994).

*Improved speed of delivery* - Speed of delivery refers to the time it takes for a firm to deliver its products or services to their business partners. If it was anticipated that the total time it takes to deliver the product will decrease because of e-commerce adoption then technology benefits are realized.

*Improved market reach* - Market reach is the ability of an organization to reach a larger number of trading partners and consumers. For example, Extranets allow a group of registered trading partners (usually buyers) to do business with a single supplier. Although, the Extranet application was implemented by the supplier, alternatively he/she is able to lock in the buyers as his/her trading partners.

#### **Operational Benefits**

Operational benefits refer to the quality of information flow, (such as timely, accurate, correct and complete) customer service derived from reduced administrative costs, from the automated processes. Operational benefits contribute to increased efficiencies and can be easily identified and measured in specific dollar amounts as realized benefits. For example, e-commerce systems such as; EDI, intranets, and Extranets assist buyer-seller trading partner relationships and improves supplier reliability by improving delivery performance, thus ensuring an acceptable quality and correct quantity of goods (Walton, 1997). The impact of operational benefits are measured in the following ways: reduced errors, improved quality in the flow of information, effective inventory control management, reduced costs, timely marketing, and improved cycle time (Doyle and Melanson, 2001; Turban et al., 2000; Vijayarathy and Robey, 1997).

*Reduced errors* - E-commerce transactions have reference numbers so that transactions reach the receiving trading partners in a correct, complete and accurate manner. By enforcing proper integrity mechanisms organizations are able to experience reduced errors.

*Improved flow of information* - Improved flow of information refers to the ability of e-commerce applications to provide compatible technology infrastructures and authorized mechanisms both internally and externally to accurately communicate information between employees, customers and trading partners. An operational benefit is perceived if the communication channel is able to transmit timely, accurate, and correct information thus enabling strategic decisions to be made.

*Better inventory management*-The daily production involves maintaining, organizing, and accounting for product inventory. Operational benefits are realized when the inventory control processes are made simpler or eliminated and at the same time are

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able to handle inventory thus ensuring that there will be no large stockpiles of inventory, while simultaneously reducing out of stock situations.

*Reduced costs* - The costs experienced by organizations in their daily business operations from paperwork, paying bills and making products or delivering services are largely reduced due to the automation processes of e-commerce applications. These include operational costs, administrative costs, and transaction costs. Operational benefits are realized when the total costs after e-commerce adoption are lower than the costs of operating the business before adopting e-commerce. Past researchers have noted that the Internet is an inexpensive, flexible, and efficient means for businesses to trade and communicate (Hruska, 1995; Nath et al, 1998; Raman, 1996; Riggins and Rhee, 1998; Senn, 2000; Zwass, 1996).

*Reduced time to market* - The time from the inception of an idea until the actual product is made available for sale in the market is the definition of time to market. An operational benefit is perceived if the organization is able to increase its production and provide services to their customers faster than prior to e-commerce adoption.

*Reduced cycle time*- The time it takes from start to finish producing one unit of product or the time it takes to provide a service from beginning through completion. An operational benefit is perceived if after e-commerce adoption the organization realizes reduced cycle times, which means they are operating more efficiently.

### **Relationship-Related Benefits**

Relationship-related benefits refer to positive past experiences that firms experience with their trading partners and consumers that permit organizations to communicate openly, share information, trust their customers and commit to long-term investments. Relationship-related benefits cannot be easily measured as they relate to subjective perceptions of their trading partner trust but they still play an important role in e-commerce success. Relationship related benefits are measured in the following ways: improved customer service, open communications, improved reputation, and increased trust among trading partners (George, 2002).

*Improved customer service* - Improved customer service refers to the quality of tasks that an organization performs to increase sales, retain its customers and improve the quality of services provided. A relationship related benefit is perceived if the level of satisfaction the customer (business or individual) experiences from conducting business with the organization is raised after e-commerce adoption. This in turn increases the customer's loyalty and purchasing behaviors. The degree to which the perceived service meets the customer expectations related to the service quality, that will in turn determine the customers satisfaction reflected in their trusting beliefs (Mcknight and Chervany, 2002).

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*Open communications* - Open communications refers to information transfer, among trading partners according to agreed standards and conventions. A relationship-related benefit is perceived when individuals within and external to the organization feel there is an increased communication level between the communicating parties. This can be seen through reduced time lapses between query and answer (i.e. being responsive), quality of communication is improved, and increased quantity of information that is being exchanged between the organization and outside party. High levels of communication permit self-disclosure about an organizations needs, priorities, prices, delivery, and terms of agreement and it also enhances an organization's reputation as being fair and equitable.

*Improved reputation*- The internal and external characteristics that companies possess refer to improved reputation may impact the company's business. Doney and Cannon, (1997) suggest that customers have initial trusting beliefs created by a transference process. Furthermore, information conveyed from third-parties regarding increased business performance and trustworthiness contributes to improved reputation (Papadopoulou et al., 2001). A relationship-related benefit is perceived if the internal and external perceptions of the company are improved after e-commerce adoption.

*Increased trust in commercial relationships* - Duncan (2002), suggests that trust among trading partners adopting e-commerce contributes to relationship-related benefits. Trading partner trust is seen in the following ways:

- a) Satisfaction in e-commerce performance;
- b) Consistency in the quality of products of services delivered;
- c) Accessibility as in having the ability to contact and reach their trading partners;
- d) Responsive as quickly responding and meeting the needs of the customers and/or trading partners inquires; and
- e) Commitment by investing in more efforts to continue their business relationships;

## **RESEARCH METHOD**

An in-depth case study was applied in three organizations in order to examine perceived versus realized benefits in e-commerce adoption. The research question examined in this study was; how and why do perceived benefits lead to realized benefits in organizations that have adopted e-commerce applications? The information gathered was analyzed using pattern matching followed by a cross-case analysis that enabled us to identify similarities and differences in the findings of three organizations. Yin suggests that: "multiple case designs have distinct advantages and disadvantages in comparison to single case designs... a major insight is to consider multiple cases as one would consider multiple experiments – that is, to follow a 'replication' logic" (Yin, 1989).

Organizations were chosen specifically on their willingness to participate and that they were currently pursuing an e-commerce strategy, including both business-to-

business e-commerce and business-to-consumer e-commerce. A semi-structured questionnaire was designed for this study for two reasons. First, semi-structured interviews allow for open-ended responses from the participant and secondly, they allow the interviewer to prompt the respondent for more detailed responses to the questions. This format allowed for richer explanations and reasons for complete and concise information to be gathered in an efficient and professional manner.

## **FINDINGS**

### **The Organisations Studied**

Table 1 presents the sample characteristics of the organizations and case study participants.

Table 1: Sample Characteristics of the Organizations and Case Study Participants

<b>Sample Characteristics</b>	<b>Case 1 Dakin Farms</b>	<b>Case 2 GMP</b>	<b>Case 3 NYISO</b>
Job Title	President	Chief Technical and Customer service manager	Manager of Customer and Technical services
Years of e-commerce experience	8 years	5 years	5 years
Organizational reach	Regional and national	Regional	Regional
Type of industry	Specialty food	Power (electricity) supplier	Power service provider
Size of organizations	SME	Large	SME
Main role of the organization	Supplier	Supplier	Buyer/supplier

#### **Case 1 – Dakin Farms**

Dakin Farms is a small family owned specialty food company that competes nationally against small local competitors and large companies such as Hickory Farms. In 1995, the President of the company made a decision to implement their first customer website. The website was aimed to provide information and not process any business transactions. He later found that the website was unsuccessful as he viewed the e-commerce strategy as a long-term investment and made decisions based on sound cost/benefit analysis. He updated his website in the year 2000 to include order information and e-commerce transactions. Now customers can go onto their website, place orders and pay for the orders using credit cards.

#### **Case 2 – Green Mountain Power (GMP)**

GMP is a small local company, which supplies electricity to businesses and individuals in northern and central Vermont. The Chief Technical and Customer

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Solutions Manager was involved in the implementation decisions and the maintenance of information technology systems at GMP. Their e-commerce strategy included both a business-to-customer (B2C) and business-to-business (B2B) e-commerce strategy. The B2C e-commerce strategy provides information to customers and processes transactions. The transactions supported on the website include manual meter reading entry, move in service orders, move out service orders and credit card payment of current bills handled by a third party.

The B2B e-commerce strategy included their tree trimming services that GMP contracts with a third party. The customer service representatives (CSR's) records a job order into the system and the tree trimming company then uses their website to track job orders, complete the jobs, and update the website. GMP is moving towards a full web-based access to all their systems and information for their employees internally, and externally for their customers and business partners as they are aiming towards real-time processing.

#### **Case 3 – New York Independent System Operator (NYISO)**

The New York Independent System Operator is a not-for-profit organization formed in 1998 as part of the restructuring of New York State's electric power industry. They coordinate daily operations and ensure the reliability of the New York bulk power system. The wholesale power market allows NYISO to administer an open, competitive, and nondiscriminatory wholesale market for electricity.

NYISO has created an electricity commodity market in which power was purchased and sold on the basis of competitive bidding. System dispatchers received bids for energy via the Internet from a variety of market participants such as; public and private power providers, power marketers, brokers, and retail service providers using a mathematical model to determine the most cost effective power distributions and costs for the market as a whole.

This is a new business model for the New York State's electrical power industry and NYISO is responsible for the operation of the state's transmission system, as well as, administering the wholesale market for electricity. To date, the wholesale electric bidding market is working well for NYISO and the Federal Energy Regulatory Commission (FERC) is considering expanding this idea and requiring regional wholesale electric markets. The Manager of Customer Technical Services was involved in the design and creation of the wholesale electrical commodity market since it began in 1998.

#### **Realised Benefits**

Table 2 presents the findings of realized benefits as an impact on the organization using a Likert scale as in low (0-3), medium (4-6) and high (7-10).

Table 2: Findings of Benefit Items in the Three Cases

<b>Questionnaire Items</b>	<b>Case 1 Dakin Farms</b>	<b>Case 2 GMP</b>	<b>Case 3 NYISO</b>
<b>Technology Benefits</b>			
Did your organization experience speed of delivery of the e-commerce transactions?	M-6	H-8	L-3
Was your organization able to retain your customers?	M-5	M-4	M-4
How significant was the impact on an increase in the market reach for your organization?	H-9	M-5	L-3
<b>Operational Benefits</b>			
Did your organization experience reduced error rates after implementing e-commerce?	M-5	M-5	L-3
Did your organization experience the quality of the flow of information exchanged affect your business operations?	H-8	H-7	M-4
Did your organization experience improved inventory costs?	M-4	M-4	L-3
Did your organization experience decreased costs (administrative, production and operating) costs?	H-7	H-8	M-4
Did your organization experience reduced time to market?	M-4	M-5	M-4
Did your organization experience reduced cycle time for producing products and/or providing the service?	M-5	M-4	M-4
<b>Relationship-related benefits</b>			
Did your organization experience improved customer service and reputation?	H-8	H-9	M-5
Did your organization experience open communication with your customers/trading partners?	M-6	H-7	M-4
Did your organization experience increase trust and confidence from your customers and trading partners?	M-6	H-8	M-4
Was e-commerce adoption a success in your organization?	M-6	M-5	M-4

## DISCUSSION

The findings provided evidence that Dakin Farms was able to realize most of their perceived benefits. They did realized benefits from their mail order business. By starting early they were able to work out the problems and bugs before it was critical for them to be operating on the Internet. Dakin Farms success was due to their persistence to get it right and the support of their top management. On the other hand,



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they found that it took longer than expected to retain potential customers to their website. Furthermore, they realized that it was a process of trial and error to learn the most cost effective way of increasing and retaining their customers.

Green Mountain Power (GMP) was also able to realize most of their perceived benefits. GMP found both their business-to-customer and business-to-business e-commerce strategy was a worthwhile investment and they are continually looking for ways to further leverage these strategies. They have also been able to implement the changes within the initial time frames set for the project. They identified their success by completing projects on time, in budget, and with all the functionality met on their new application development process, which they now use for all their projects. The one benefit they were unsure of was administrative costs. They anticipated a decrease in the volume of telephone calls coming into their call center, because of their website but were unable to measure this benefit effectively. The participants concluded that their overall number of calls have decreased since they have implemented a voice response system that updates hold messages for their phone systems and the website.

GMP's goal for the future is to have a complete web based access for their systems and information, including workflow management, outages, and all electrical maps regionally. This would allow any employee or business partner to access real-time information from anywhere. Based on GMP's past experience, knowledgeable employees, and focus on their corporate goals, GMP is in a good position to leverage the Internet to accomplish its future plans. They will continue to experience e-commerce success because of their ability to properly evaluate their benefits combined with their in house application development.

The manager of NYISO (a not-for-profit organization) did not specifically consider any of the realized benefits. He indicated his lack of information in two areas. First, the law mandated the wholesale market so they had to do it regardless of the perceived benefits. Second, e-commerce operations were new to them, as they lacked the technical knowledge and expertise. Thus, determining whether or not NYISO's wholesale electric power bidding market is a success or not was a difficult task. Despite this NYISO considers their project a success because it works.

They aimed to show how this wholesale commodity market can reduce the cost of electrical power to New York. The manager of NYISO indicated that the success of the project was due to the time and effort placed on doing it right the first time and identifying the risks associated with the project combined with the trial runs with some of the market participants.

### **Cross-Case Analyses**

The three in depth case studies were using e-commerce in different ways. Dakin Farms used e-commerce for business-to-consumer. GMP used it for both business-to-business e-commerce, and business-to-customer e-commerce and had plans to expand

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both of these areas to its fullest extent. Finally, NYISO operates a business-to-business e-commerce application.

The similarities in the organizations include; (1) All three companies did a fairly good job in properly identifying their benefits and realizing the benefits after e-commerce adoption, (2) They had the full support of their top management, (3) They were convinced that e-commerce was a sound business decision, and (4) They all adapted the strategy to fit their unique situations and did not attempt to copy what someone else already did.

### **Lessons Learned**

Dakin Farms acknowledges that the road to their e-commerce success was a bumpy trip but they felt that it was an overwhelming success. Success meant increased sales, growth, profit, and that future benefits can be realized. The President of Dakin Farms intends to add a Vermont attractions area to their website in order to increase their reputation. His plans include adding a picnic area and informational events about Vermont and Dakin's products which will be communicated on their website and through Vermont tourism brochures. E-commerce adopters who intend to implement any mail order business should use a provider of services over the Internet instead. Dakin Farms owes their success in e-commerce adoption to the commitment and support from top management together with realistic expectations.

GMP and NYISO also realized benefits and they indicated that any company considering to implement e-commerce needs to be cautious and thorough when collecting information and needs to establish clearly defined benefits that will be realized by the organization. The benefits need to be defined based on the organizations unique situation and should not be taken from what other organizations have realized. Then they need to weigh the benefits identified, and establish ways to enhance the benefits. They also need to train their employees and consider for any upcoming changes.

### **CONCLUSIONS**

This study examined perceived versus realized benefits in e-commerce adoption using three in depth case studies. Previous research in e-commerce adoption mostly focused on the competitive advantages. This study attempted to show the distinction between perceived versus realized benefits in three areas namely; technology use, business operations, and relationships with their trading partners. The findings provided evidence on the importance of top management commitment. This study contributes to theory by providing a scale of measurement for both perceived and realized benefits that future researchers can apply. The study contributes to practice by increasing the awareness of e-commerce practitioners on the importance of top management commitment, and maintaining relationships with their customers and trading partners. More importantly the lessons learned by these organizations is that

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e-commerce is unique for each organization and it is not something any organization can follow from their competitors.

Due to the fact that business-to-business e-commerce is in its formative stages in most companies in Vermont it was difficult to locate willing participants with experience. Further research should aim to extensively examine perceived versus realized benefits in e-commerce adoption in another setting in order to derive at more meaningful generalizations.

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