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2.1 Meaning of Business Value.

The business value is derived from improving existing process within an organisation, improving product promotion through mass customisation and one-to-one marketing and offering new direct sales channel for existing products, reducing the cost of some processes (e.g., information distribution), reducing the time market, improving customer service through automated service and round-the-clock operation, and finally improving the brand image, by offering electronic access to customers.

It also includes transforming the way companies deal with customers, by accumulating knowledge on their detailed preferences and buying habits, targeting them with specific offers, and generally dealing with them in a personalized one-to-one way. Through the early adoption of electronic commerce, organisation also learn to deal with these new technologies, the organizational transformation they imply and the new processes which need to be introduced.

When organisation redefines the products, processes and business models using technology to fundamentally change the ways products are conceived, marketed, delivered and supported it is said to have derived the business value.
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2.2 Measurement of Business Value

The first idea that springs to mind is using a Web browser to buy something over the Internet. Ultimately, billions of dollars will change hands every year through this consumer model. Just linking your systems to partners' systems to smooth the business transactions between all parties involved does not necessarily mean your Electronic Commerce is actually providing any real value to your company in terms of saving money and improving business operations. Simply adding up the number of partners online and the number of transactions conducted does not always convince management that Electronic Commerce has added value to the company, or that Electronic Commerce enabling all the company's systems will necessarily pay for itself and add future value.

2.2.1 A New Channel

Electronic Commerce is a new channel of business for most companies and due to this, there are no standard measurements business can use to accurately measure the value of their Electronic Commerce initiatives. To start with, companies should ignore any benchmarks from other organisations. Comparing business processes with other companies provides limited value, as management cannot compare their systems with another entity. Benchmarking should be done as a set of "before" and "after" measurements of the same process in the same value chain in the same company if they are to show what real value the Electronic Commerce project has brought. Using the same set of measurements for both benchmarks is critical if senior management is to be convinced of the value Electronic Commerce adds. This may require reconfiguring and redesigning the criteria to be able to accurately judge the impact of Electronic Commerce. The Electronic Commerce project should not encompass the entire enterprise from the start. Starting small is key if Electronic Commerce is to deliver value, as is making sure the measurement criteria are focussed on the specific industry and value chains being measured. Companies should take a specific process and value chain that requires human interaction between all the parties involved, as well as intersystem transactions as a first step. Once the first project is delivering value, it will be easier to Electronic Commerce enable the next value chain with optimised criteria and time frames.
2.2.ii Bottomline Value

Since senior management will have to have the final say about the effectiveness of Electronic Commerce, it is also imperative to measure the bottomline value the project adds. By its nature, Electronic Commerce is most successfully described as a business integration-enabling strategy in areas such as supply chain management. Electronic Commerce's monetary value should therefore be measured as a percentage of these strategies' contributions to profitability and cash flow. Although the value to the business needs to be measured and experienced in the business processes themselves, an undervalued part of the whole Electronic Commerce strategy is often the value business partners gain or lose as a result of the project. It is not a matter of just getting data faster or more accurately, but the bottomline impact Electronic Commerce has as well. A company with various partners will not benefit if each partner insists on a different Electronic Commerce strategy and standards that are incompatible with the others. If business partners find no value in the project, it's given that they will not use the systems to their full ability, creating problems and even greater delays than old manual processes - not to mention the support issues involved. Some companies will simply have no choice, regardless of strategic and practical assessments. Several very large global companies have already mandated that they will only deal with suppliers via Electronic Commerce.

2.2.iii Competitive Advantage

Finally, competitive advantage is another critical measurement businesses forget in the rush to get themselves "online". To gain an advantage, companies need to create, not merely an Electronic Commerce project, but a platform that will allow them to easily integrate other proprietary applications into the platform and provide a value-added information delivery to partners. Successful Electronic Commerce implementations that have provided measurable business value have certain commonalities. They have changed business processes, standardised data types and definitions, agreed on Electronic Commerce interfaces (with a browser-based HTML, Java or XML interfaces becoming the norm), and modified their legacy applications. In the past, integrating Electronic
Commerce into an organisation has proved easier and projects have been more successful when run as part of a complete business strategy, as opposed to the natural temptation to relegate it to a technology-driven project. One caveat to consider: select an initial project that is not overly ambitious, and then go further. The benefit of the business approach is that the value will be defined in the planning stage, giving senior management all the business data they need to pledge their support to the changes in their own and partners' businesses.
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2.3 Measurement of the Impact of Electronic Commerce

Traditional macroeconomic methods and existing economic indicators may not apply to and cannot keep pace with the information economy's Internet speed, expanding markets, and changing industry structure. Thomas R. Spacek have described new capabilities, characteristics, classes of indicators that are being developed to measure, monitor, and forecast business activity within the emerging Internet-based economy at the global, country, industry segment, and individual company level. These are describe below.

2.3.a. New Capabilities.
2.3.b. Characteristics of Measurements.
2.3.c. Classes of Indicators.

2.3.a. New Capabilities

The Internet has been growing very rapidly for a number of years. Two of the major driving forces for its current and projected future growth are productivity improvements for businesses and government agencies and electronic commerce -- both business-to-business and business-to-consumer. Electronic commerce is a very small part of many countries' economies but is growing rapidly. There is increasing demand for capabilities to measure electronic commerce and its impact on individual firms, industries, and the economy of individual countries and regions of the world. In the Internet electronic commerce world, many traditional ways of organizing and measuring economic activity simply do not work. For example organizing companies or products by Standard Industry Classification (SIC) codes or other systems in common use does not apply too much of the new digital economy. There are many tools and methods available where monitors are placed at individual web sites to measure parameters of interest such as the number of hits, the total number of unique visitors, how long users are connected to the site, what pages they are visiting, whether purchases are made, response time and performance of links within a site, etc. Some of the tools also provide analysis of those parameters to gain further insights into, e.g., customer-buying behavior. A firm using such tools may find them very useful in helping the firm make various business and technology decisions regarding its site, but, for the most part, the value is limited to that firm. Other capabilities exist where monitors are placed on a large sample of PCs most often in people's homes to measure parameters such as which sites are being visited most often.
and exactly what the users are doing on those sites. Analyses of data from such tools are useful for such applications as helping advertisers decide where to place ads, providing inputs for establishing advertising rates for web sites, understanding what customers are doing and their purchase behavior across the sampled sites and by using statistical techniques across all sites, and thus to some degree measuring the impact of electronic commerce.

These later PC-based tools have several drawbacks, e.g., they may have sampling biases and may miss certain important segments of the buyer population, and e.g., purchases made from PCs at the workplace may have limited samples, if any. Hence there remain questions as to the accuracy of the results obtained from these tools. Some vendors in this category have faced severe criticism from individual web sites and from some members of the Internet advertising community for inaccurately reporting traffic on their sites, which may point to lack of sophisticated sampling and forecasting methodologies. An important advantage, however, of both of these types of tools is the detailed “click” data that is captured and made available for analysis.

In addition to web server-based and PC-based monitoring, other measurement methods include: software enabled in browsers, tracking capabilities embedded in software used by Internet advertising brokers, software embedded in routers, remote monitoring of web site performance, and information on electronic purchases collected by some credit card firms. Each method is suited for a particular application or set of applications, and each has its advantages and drawbacks.

2.3.b. Measurement Characteristics

2.3.b.i. Large-Scale Monitoring of Internet Protocol (IP) Networks

Problems in monitoring often include scaling. That is, a methodology may successfully apply to a small network, but may not easily or practically extend to large networks nor to a country nor to the world. The methodology being developed here is based on statistical sampling techniques and will apply to an individual company's web site as well as to a large extranet, an industry, a state, a country or the world.
2.3.b.ii. Remote Non-Intrusive Monitoring Techniques

The methodology being developed will allow for the collection of many modeling parameters without needing to install a device on PCs nor in routers nor on web servers nor on data lines.

2.3.b.iii. Real-Time Estimates and Analysis

Internet statistics are often based upon surveys or monitoring devices that capture data for later analysis. The capabilities being developed will, for the most part, capture and analyze data in real-time. As we will see in an example below, real-time availability may produce new useful applications even in cases where similar data available months later (say, based on analysis of survey results) may have little value for the application.

2.3.b.iv. Innovative Statistical Techniques

The methodology being developed includes efficient sampling methods, algorithms, and accuracy estimates. Note that most Internet measurements today do not produce accuracy estimates. It is also important to note that samples can be designed from the set of all IP addresses available in the public Internet, hence making it possible to generate very accurate results.

2.3.c. Classes of Indicators

Prior to embarking on an effort to define and test indices and indicators of Internet electronic commerce, we had two examples which although not sufficient to be a proof of concept did give us optimism that we could produce indicators. The first was a study we became aware of (but unfortunately do not have all the details because they were proprietary) which was done several years ago by a major interexchange telephony carrier. The study showed that for individual firms, as business telephone traffic increased (decreased), sales increased (decreased). Also the correlation varied by industry, but there were similar patterns among firms within a given industry. Based upon these results, we speculated that increased traffic to an electronic commerce web site may indicate increased revenues. In a second example we looked at a six-month average host growth rate in Hong Kong from November 1996 through mid-1999 produced by NetSizer. This appeared to be a leading indicator by several months of the beginning (June 1997) of the country's economic downturn when compared to the annual GDP
growth rate. In the longer run as Internet growth stabilizes, traffic growth may be a better
measure than host growth, but in countries with the Internet expanding very rapidly, host
growth may be a reasonable proxy for traffic. What we perhaps were observing was
investors, businesses, and entrepreneurs becoming more cautious and spending less on
getting into or expanding their Internet businesses as the economic downturn progressed.
Of course the host growth rate may not be a leading indicator, but perhaps appeared to be
one because it can be produced in real-time whereas measures such as GDPs, etc. are
often based on surveys which are typically analyzed and reported on months later. In any
case both of these examples gave us some optimism that we could produce indicators. A
key focus of the research upon which we have embarked is to define measures to monitor
and track Internet electronic commerce; indices against which to measure performance
improvement of a firm, industry, country, etc.; and indicators to predict performance
changes. For some applications, traffic growth may itself be an indicator. Most of the
measures, indices and indicators will likely include traffic or traffic growth as one of the
components along other data either produced by NetSizer (e.g., host counts) or obtained
elsewhere. Two of the several new classes of indicators we are pursing are described
below.

2.3.c.i Indicators for the Digital Economy

These measures, indices, and indicators will focus on Internet economic activity at a high
level. This new class of indicators will be analogous to indicators in the traditional
economy such a country's GNP, Leading Economic Indicators, the number of telephone
lines, the number of PCs, etc. An example of an indicator for a country might be a
weighted linear combination of two or more of the following NetSizer generated
measures: electronic commerce traffic growth within the country, web server growth,
growth of other types of hosts, Internet subscriber growth, and Internet traffic growth into
and out of the country. These could possibly be combined with other data such as PC
growth, growth in ASDL lines and cable modems, demographic information, etc. The
uses of indicators in this class include: a) tracking and measuring the growth of Internet
electronic commerce; b) measuring the impact of the Internet electronic commerce on the
overall economy; and c) predicting economic changes based on Internet economic
activity.
2.3.c.ii Leading Indicators of Corporate Business Activity

Indicators in this class will include Wall Street-like indices. These would be analogous to indices in the traditional economy such as the Dow Jones, Standard and Poors, and Heng Seng indices. This class of indicators will also include indicators for specific industries and for individual firms. Our current research is examining the relationship between traffic on the last network link between a router and an electronic commerce web site and revenue generation. The research is also attempting to isolate that portion of traffic that is attributable to revenue generation. The uses of indicators in this class include growth projections for a firm or portfolio, strategic planning, and competitive analysis.
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2.3 Recent Researches on Business Values

Researchers have gone through whole literature survey but have not found any research on business values. While there is only academic literature on the economic payoffs from Internet-based business initiatives, there is a rich body of studies in the domain of IT productivity and business value. Efforts to link productivity to IT investments in the past have been inconclusive, and hotly debated for over one decade. The systematic empirical demonstration of IT value, both at the firm and economy levels, has been hampered by measurement problems as well as the availability of reliable data. This led to the coining of the “IT Productivity Paradox”, Roach\(^4\), followed by an extensive stream of investigation by various IT researchers and economists. Barua and Mukhopadhyay\(^5\) classify research in IT productivity and business value into two categories: microeconomic approach based on production functions, and non-microeconomic approach relying on process-oriented or resource-based perspectives.

The production economics approach to study IT impact focuses on the relationship between output measures (e.g., revenue, market share, and units produced), and production inputs such as IT and non-IT capital, and IT and non-IT labor. The early production economics based studies suggested IT had insignificant or no returns from IT investments (e.g., Roach\(^6\), Baily and Chakrabarti\(^7\), Loveman\(^8\)). Subsequently, Brynjolfsson and Hitt\(^9\), Lichtenberg\(^10\), Lee and Barua\(^11\) and others showed using different secondary data sets that IT indeed contribute to firm productivity, while acknowledging output and input measurement challenges.

Several non-microeconomic approaches have been suggested that mainly investigate how IT investments influence performance measures. These “process-oriented” approaches attempt to explain the process through which IT investments lead to improved operational and financial performance (e.g., Kauffman and Kriebel\(^12\), Barua, Kriebel and Mukhopadhyay\(^13\)). Barua, Kriebel and Mukhopadhyay developed a two-stage IT business value model that builds on the notion of “business value linkages”. The two-stage model specifies that IT investments influence intermediate performance measures critical to a firm’s success, which in turn relate to higher levels of performance measures such as revenues, return on assets, and market share. This two-stage IT business value model has
been refined and extended by researchers including Mukhopadhyay, Lerch and Mangal\textsuperscript{14}, Davamanirajan, Mukhopadhyay and Kriebel\textsuperscript{15} and Rogawski and Adams\textsuperscript{16}. Bharadwaj\textsuperscript{17} proposes a theoretical link between IT capability and business performance, relying on resource-based view (RBV) literature in management. IT capability is defined as the ability of a firm to mobilize and deploy IT-based resources – IT infrastructure, human IT resources and IT-enabled intangibles – in conjunction with other organizational resources and capabilities. The basic premise of the model is that IT systems can be purchased or duplicated fairly easily. Thus IT investments alone cannot lead to superior performance, and firm level differences in various internal and external factors may affect the final performance outcome.

In this research, we address the measurement of business value within the domain of Internet enabled business initiatives. It is natural to ask if Internet related IT investments are different from investments in non-Internet technologies. The economic characteristics of the Internet and related technologies are significantly different from those of non-Internet IT applications Barua, Whinston and Yin\textsuperscript{18}. The Internet provides a global network infrastructure that is shifting business models, strategies and processes at an unprecedented pace. In the past, firms used expensive, proprietary and costly-to-maintain systems to communicate highly restricted data with a few members in the value chain. Thus a firm had to deal with a fragmented customer and supplier base, and often incurred high costs to expand the customer base or to interact with new suppliers. The cost of implementation and subsequent maintenance severely hampered the adoption of such proprietary systems. This was true for all systems facing customers, suppliers and internal constituents. By contrast, Internet technologies have significantly different impacts on customer reach and richness of communication, Evans and Wurster\textsuperscript{19}. Any customer with access to the Internet is able to gather information interactively regardless of time and location, (possibly) customize and order products/services, change orders dynamically, check order status, and seek online advice. More importantly, firms can extend site functionality, and offer new products and services without being constrained by physical customer interfaces. Such IT capabilities in the past were either nonexistent or prohibitively expensive to deploy. Even when firms adopted proprietary systems such as Electronic Data Interchange (EDI) to communicate with suppliers, the communication
was limited to the exchange of structured data. The Internet makes it possible to share customized and rich information on a real-time basis in an interactive environment using easily accessible, open networking technologies. Unlike EDI, the Internet makes it possible to support all phases of procurement including information search, negotiation and settlement. It also lends itself to relationship enhancing communications with suppliers. The above discussion suggests that a study of electronic business value has to develop appropriate measures of Internet based technologies, processes and performance. **We need** measures to capture characteristics of online systems and business processes that can help build and maintain customer and supplier relationships across the value chain.

To the best of our knowledge, this is the first study to provide empirical evidence of the much-anticipated relationships between electronic business initiatives and benefits. We developed multiple new constructs related to Internet technologies, processes, business partner readiness and operational excellence. The constructs turned out to be highly reliable and are likely to be used and extended in future research. The results obtained from this exploratory study suggest that the overall effects of both customer and supplier excellence on financial measures are significantly positive.

Further, the study also validates the linkages between operational excellence and driver constructs related to Internet applications and business partner readiness. While the process constructs did not turn out to be key drivers of operational excellence, we believe that in most firms electronic business initiatives are still in their nascent stages; more coordination and learning are required within the value chain for simultaneous adoption of Internet based business practices by all partners. This study should provide a valuable starting point for such future investigations. While subject to the usual noise and inaccuracy that are likely to accompany survey-based data with self-reported dependent variables, the large data set deployed in this study appears to be consistent and reliable based on a set of checks conducted by the data collection agency and us.

Future research in this area should focus on potential complementarities between the driver constructs and between operational excellence measures. In order to maximize operational performance, firms need to invest or commit resources in a set of key drivers in a synergistic fashion. Investing in IT alone may not translate into operational
excellence as evident from reengineering literature of the last decade. Theoretically it can be argued that a complementary set of changes in business processes in the entire value chain, informational and transactional capabilities of IT facing customers and suppliers, and readiness of customers, suppliers, and trading partners is required. A body of research in IT business value incorporating the complementarity framework is emerging both using production function and process-based view. For example, Brynjolfsson and Hitt (1996) show that higher levels of IT usage is associated with organizational architecture such as incentives, decision rights and skills, and conclude that “organizational practices are important determinants of IT productivity, and vice-versa.” While it is beyond the scope of path-analytic modeling to handle complementary relationships, more generalized econometric techniques can be deployed to study the presence of complementarities in a business value model.
References of Chapter 2


3. Thomas, R. Spacek. , Economic Indicators for the New Digital Economy: Measuring the Impact of Electronic Commerce, Internet and Global Information Infrastructure Initiatives, Telcordia Technologies (formerly Bellcore), 445 South Street, Room 1J-244R Morristown, New Jersey 07960, USA.


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