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FEATURE

Information Technology and Value Creation

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Abstract *- Information Technology (IT) has revolutionized the way business is done around the world. But the question remains, who benefits from IT? Does using IT create value for an organization? The answers discussed include the idea that it is the consumer who gains the most. Also, even if IT does not create value, attempting to do business without leveraging IT will result in serious setbacks, which make IT not an optional component of business. And whether one interprets the results of IT as advantages or disadvantages for society, the option of going back to a world without computers really does not exist.*

Information Technology and Value Creation

Since the beginning of recorded history, individuals have organized society in order to gain profit (economic or otherwise). The early records of the establishment of Babylon and other civilizations in the Middle East attest to this. Business today continues to seek to organize society (or a portion of it) in order to make a profit; looking to trade products or services for economic advantage.

Particularly since the advent of the industrial era, businesses have leveraged new technologies in seeking to maximize their return on investment. In the 1700s it was the steam engine, in the 1800s trains, then in the 1900s cars, trucks and airplanes have changed the way business is done. For the last 50 years or so, information technology (IT) has been used by businesses seeking to improve their profit.

Very few would question the fact that IT has drastically changed the way we do business today. The ability to rapidly process large numbers of transactions, search through large volumes of data, and instantly communicate allows organizations to operate in new ways. The real question that we need to address is: Does IT really create value? And if so, for whom?

What is "Value"?

In order to address this question, we must first define value. As Warren Buffet has stated and investors have quoted ever since (see for example

Etheredge, 2003, p. W366), "Price is what you pay. Value is what you get." According to a dictionary, value is "worth in usefulness or importance to the possessor; utility or merit" (American Heritage Dictionary, 2000). In order to have value, therefore, some party must believe that it is useful or important. Not only should it be useful or important, but if we are to create value, the value perceived must be greater than the amount paid. Otherwise, there would be no value creation: there would merely be a business transaction, where there is no additional value added.

Who Benefits from IT?

Who receives value from an organization? Organizations generally have many stakeholders, and most organizations also have customers. The typical for-profit business organization will have one or more owners, employees, suppliers and customers. Even non-profit organizations have owners (the constituents). No organization is exempted from the fact that to remain viable in the long-term it is imperative to satisfy the ownership (otherwise the owners will cease to operate the business) and the customers. A club or foundation may not have customers, but it still has to achieve the goals for which it was designed.

We must conclude then, that if IT is to create value, the owners, employees, suppliers or customers must benefit from it. In 1996, Hitt and Brynjolfsson from MIT published what is seen by many as a key article on the whole issue. They argued that there were three different measures for valuing IT: productivity, business profitability, and consumer surplus. Productivity and business profitability are of interest to the owners of the organization and the consumer surplus is of interest to the consumer. The study focused on the impact of investment in IT across organizations, and sought to determine if investing additional resources in IT enabled companies to have larger profits. There was no discussion or consideration of the value of IT provided to either the employees or the company's suppliers. Hitt and Brynjolfsson found clear indications that investing in IT was important to the survival of the business. Those businesses that did not invest enough (to "keep up with the Joneses") lost market share and were significantly less profitable than those that did. However, the results presented do not support the belief that spending more on IT can produce increased profitability. Rather, the evidence indicates that investing in IT is a necessity if companies are to remain competitive, but that beyond a certain level of spending (varying by industry), additional spending in IT does not produce additional positive financial results for the business.

How Organizations can Value IT

IT should not be valued based on the operating results of the organization, but rather based on financial market analysis (Bharadwaj, Bharadwaj & Konsynski, 1999). Analysis shows that financial markets do place a value on

IT, particularly with a longer-term view. This would argue for IT being a long-term investment, with value accrued not in the short-term, but over time. This research should be considered in the light of the late 1990s dot-com era, where any company that was "investing" in technology was rapidly increasing their stock market valuation. Looking at today's market valuation of companies, it is quite possible that the results would actually be opposite (almost as a backlash to the dot-com bust), where the companies investing heavily in technology are undervalued.

More recently, an article titled *IT doesn't matter* (Carr, 2003) argued that IT did not provide value to organizations. The fundamental premise is that IT has become a commodity that can quickly be replicated by competitors and adapted by other organizations. Carr does not argue that IT is not useful, or that it should not be used. He does not argue whether or not IT creates value, but rather that the competitive advantage gained through IT is only a passing advantage, which can be outstripped by competitors.

The answer to the question of whether IT adds value or not depends on the perspective of the person making the judgment. For consumers, if IT causes the price to be lower than it would be otherwise, it has added consumer surplus (see Hitt & Brynjolfsson, 1996). For owners of for-profit businesses, it is the increased equity that matters (either directly through profit, or at least market valuation). For the constituents of non-profit organizations, value is defined in terms of being able to do more with the same resources (financial or human). For employees, the value is gained through workplace improvements (easier work, more time off, etc.). Suppliers benefit when the cost of doing business is lowered, thus improving their profit. Let us look at each one of these groups.

Looking first at the owners, the results are not encouraging, in that there appears to be no competitive gain from investing in IT other than merely keeping up with the competition. What has not been addressed, however, is whether the whole industry might be more profitable than in the past, or if possibly even though a given industry is not more profitable, those businesses investing in IT may be more profitable than those not investing in IT. At this time, we have not found any studies which address this issue.

There is no question that during the last few years there have been large productivity gains in the workplace. This has been well documented, particularly in the US, particularly by the Bureau of Labor Statistics (n.d.). For the past decade, overall US productivity has increased steadily at an average rate of over 2.7% per year. According to a review of the evidence in 2001 by the Federal Reserve Board (Stiroh, 2001), much of this increased productivity should be attributed to IT. There is little question that this increase in productivity could result in additional value to the owners of for-profit businesses and the constituents of non-profit organizations. However, because

most organizations are using IT to enable productivity gains, competition often means that the organization itself may not gain much benefit, but rather the consumers benefit from the increased productivity (Hitt & Brynjolfsson, 1996).

Suppliers have undoubtedly benefited from the possibility of having rapid electronic communication with their customers. Using today's technology, suppliers are able to rapidly set up links with the customers, even receiving orders electronically and confirming all financial and logistical details of the transaction. However, have the suppliers really gained from this? In reality, customers can access a much larger pool of suppliers, often driving purchase costs down. So the supplier wins some (lower costs), and loses some (lower selling price), and is essentially put into the position of having to invest in IT in order to stay in business.

Employees are probably the least thought of in the analysis of the value created by IT. IT has dramatically changed employees' work, with constant connections, instant communication, and an expectation of immediate responses to what before could wait hours, if not days or even weeks. Employees are able to get more done, but the drive to get even more accomplished is there, and therefore the stress increases significantly. At the same time, the flexibility allowed by IT (telecommuting, flexible schedules, teleconferencing) does have the potential to improve the quality of life for employees. In essence, this leaves the employees with some potential gains, and some potential losses, but no clear value gained.

Customers have clearly benefited from using IT to locate lower prices for the goods. Online shopping services have made it much more convenient to find the right product at a reasonable price. In the same way as the average shopper goes to a shopping center to do all their shopping in one stop, on-line shoppers take advantage of the internet to find their desired products. The advantages of convenience in terms of schedule (shopping is possible at any time) and location (it is possible to shop worldwide) does create value for the consumer, even if the price is no better (and often it is better). Additionally, we must recognize that through the increased productivity from IT many items are available today at a lower cost than they would otherwise be.

On the other hand, consumers are faced with making much more complex choices in terms of product. They are no longer limited to their local suppliers, but now have the breadth of the whole world. As price becomes the driving factor, brand loyalty may decline, and relationships may cease to be as strong, leading to more disputes and dissatisfaction. In essence, consumers have profited through the introduction of IT, yet in many cases they may also experience significant negative effects from it, including information overload and a loss in the time available to process information, requiring almost immediate decision-making.

So, who has derived value from IT? Everybody has gained some, and lost some. Few would want to return to an era without IT, yet daily we hear people in the office complaining about technology that does not work or that has "caused" a problem. The truth is that the large benefits have gone to the innovators: those who have used IT to enable new ways of doing things. IBM was dominant, and ceased to be after the PC revolution, when others innovated faster than they did. The creators of the Blackberry™, Google™, Amazon™, and other technology-centric companies have profited handsomely (certainly creating value for their owners). Significant value is not created through mere replication of others' implementations (though that replication may well ensure the survival of the organization). The value is in the people, and the creativity with which they are able to apply technology to solve problems or provide opportunities. In some cases, we did not know we had a "need," until the technology became available. Think of innovations such as the Apple iPod, or Amazon's case of ensuring one-stop shopping for all kinds of books (later expanded to other areas).

Does IT Really Create Value?

Without a doubt, IT helps process more information accurately. This may produce better decisions, or at least decisions made on more accurate information. The data so far would suggest that organizations must invest in IT to survive (Hitt & Brynjolfsson, 1996), and since survival is a positive outcome, we could say that IT does create some value.

The answer to the fundamental question of whether IT really creates value must be a relative one: everybody gains, and everybody loses something. IT helps us find information quickly and make more accurate decisions. It also creates problems such as information overload and stress when decisions must be made much more rapidly. In some cases, IT does create value; in others it is a breakeven proposition. To some organizations, investing in IT is actually a hindrance to value creation. As long as we as a society value instant communication and instant gratification, IT will be seen positively. As consumers we appreciate what IT can do for us. But can we live with the consequences of it?

Are We Better Off with IT?

Is society better off with IT? While IT has created value for various segments of the economy, has IT created value for society? It is clear that society today would not be what it is without IT. Because of IT many things happen faster, many routine tasks are eliminated through automation, freeing up time for other activities.

Are these changes positive? Like all changes, these changes have caused certain individuals to be uncomfortable. Automation has made the unskilled employee often unnecessary. Those who are not IT literate find themselves in unskilled service jobs, if they can find any employment at all. IT also means that in today's connected environment, work (in the form of e-mail, cell phones, etc.) never ends.

The truth regarding the value of IT to society at large is really a function of the values of society. Some sectors of society find that IT has created an enormous amount of value. But what one segment of society appreciates, another will not. It is evident from the rapid worldwide expansion of IT in today's society, however, that many value what IT brings. Or at least they fear what would happen if they were forced to live without it.

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