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## Creating, Capturing and Measuring Value From IT Investments: Could We Do Better?

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# Communications of the Association for Information Systems

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### Abstract:

Spending on IT continues to show long-term growth throughout the economy, reflecting an apparent belief in the economic benefits of IT. However, we also see organizations struggle in practice to demonstrate such benefits. Conventional thinking suggests that individual organizations can improve their performance in this area through better financial analysis of opportunities. But does this characterization of the solution reflect the real problem? Is there more value that can be achieved through IT at a macro level or are we simply seeing market competition with winners and losers? And will better understanding of the detailed financial consequences of IT systems enable businesses to improve decisions and achieve greater returns? This 2009 ICIS panel session reflected on the literature on IT value over the last thirty years, the future direction of research and the relationship between research and the needs of business in this area.

**Keywords:** outsourcing, IT Strategy, competitive advantage, IT business, economic theory, sociological theory, management theory

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Editor's Note: This article is based on the 2009 ICIS panel "Returns on IT Investments: could we do better?"

### I. INTRODUCTION

The extent to which businesses and governments have successfully created and retained value through the use of IT systems has been a long running debate in the IT research and practitioner community. While the issues have been thoroughly debated and researched over the past thirty years, we continue to see profound and challenging questions for IT professionals and researchers about the benefits of the technology that they implement, manage and study. Indeed, despite increased knowledge and experience of IT management, the challenges have become increasingly complex. This has led to new areas of research and new ways of thinking in practice which continue to push the boundaries of IT.

As a result, 2009 was an appropriate time to revisit the topic of IT value with a panel discussion at ICIS. This session aimed to take stock of what we have learned about IT value over the past thirty years, the future direction of research, and the relationship between research and the needs of business in this area. This article summarizes the discussion and aims to broaden the agenda for future research.

#### Background

Researchers and practitioners have been debating the value of IT systems ever since widespread commercial use of computers began. However, while the debate may be perpetual, it has evolved substantially over the years. We have long moved past the early debate on Solow's productivity paradox [Solow, 1987] and his contention that "You can see the computer age everywhere but in the productivity statistics." His observation implied that, despite massive spending on IT, it was not providing tangible benefits for the economy. This seemed counterintuitive, given the theoretical benefits that IT systems should bring, and researchers spent many years subsequently developing a range of evidence to show clear correlations between IT spending and economic value [e.g., Brynjolfsson and Hitt, 2003]. Indeed, Solow moderated his own view over time, as more evidence became available [Clement, 2002].

We have also moved past Nicholas Carr's contention that "IT doesn't matter" [Carr, 2003]. When everyone had the same IT systems in place, he argued, how could it be used to create sustainable competitive advantage? IT was simply a utility, like electricity, not a valuable resource. Given the spectrum of innovative applications of information technologies, few would stand by the argument today [e.g., Marquis, 2006]. Rather, it has become well established that it is not the technology itself that brings value. It is the way that it is combined with other resources that enables a business to gain strategic advantage through IT. This overcomes the point of ubiquity and standardization. Even if everyone has the same technology, they use it in different ways or have differing levels of skills to support it.

In 2008, Kohli and Grover summarized the key points that have been established by the literature. The evidence shows that IT value is a complex creation that is highly contingent and context-dependent. Numerous factors mediate IT and value and establishing causality for IT value is elusive. Distinguishing between IT-based value and IT-based competitive advantage, they also highlighted that:

- IT does create value but only under certain conditions.
- IT-based value manifests itself in many ways.

Building on this evidence, they argued that researchers, therefore, should focus their efforts, not on the simple question of whether IT creates value, but on understanding the conditions for creating value and the complementary resources needed.

Despite all the research, doubts persist in practice about how much value individual businesses and governments really achieve from many IT projects. The media continue to report stories of catastrophic project failures, especially in the public sector [e.g., London Ambulance Services Computer Aided Dispatch project, Beynon-Davies, 1995; National Offender Management System, UK House of Commons Public Accounts Committee, 2009]. Furthermore, businesses still apparently struggle to demonstrate tangible value from many IT projects.

At the heart of these doubts is the ongoing problem of measuring financial value from investments. Because IT creates value in complex ways, it is challenging to isolate and separate the value created by IT specifically. It can also be difficult to predict what value will ultimately be created by a new system.

This problem is reflected both at a macro and micro economic level. While researchers still find it difficult to pinpoint and capture fully the economic benefits of IT, individual businesses continue to struggle to apply established financial measurement techniques to IT investments, such as Net Present Value (NPV) and Return on Investment (ROI). Surveys and anecdotal evidence suggest that even where such techniques are used, managers may not fully trust the results. As a result, decision making frequently seems to be driven by leaps of faith or fears of the consequences of not investing, rather than confidence in the financial outcome.

### Panel Overview

To debate these issues, and look at the future challenges for IT value, ICAEW<sup>1</sup> organized a panel session at ICIS 2009 entitled “Returns on IT investments—could we do better?”

The panel was moderated by ICAEW’s Executive Director, Technical, Robert Hodgkinson. It was particularly important in the discussion to link research with the needs and views of practice. As a result, the panelists were chosen in order to provide a range of different perspectives on the debate both from the academic community and from business. Representing the academic community were Anitesh Barua (McCombs Business School, University of Texas at Austin), Laurence Brooks (Department of Information Systems and Computing, Brunel University) and Rajiv Kohli (Mason School of Business, College of William and Mary). Sean Worthington (Cisco Inc.) and Bob Zukis (PricewaterhouseCoopers) represented the business community. Brief background statements can be found about each panelist at the end of this article.

Each panelist took a distinctive position in the debate. However, there were a number of common themes, and, therefore, we have written this article as an integrated summary of the discussion, rather than summarizing the contributions of each panelist. We have highlighted some of the arguments of individual panelists, though, where appropriate.

## II. KEY QUESTIONS

The session posed the question: “Returns on IT investments—could we do better?” It is widely argued that yes, we can do better. However, is this really a correct characterization of IT in the twenty-first century? In order to establish whether this is a fair description, we need to challenge two broad assumptions.

First, there is an assumption that IT is failing to deliver the value that it should, and that businesses should be able to get more value than they are currently managing to do. While a popular assumption, evidenced by the number of project failures we see, it does imply massive failure on the part of management and the IT industry as a whole. Is this really the case? Is there lots of “lost value” which could be found through better management techniques? Or is some failure just an inevitable byproduct of economic progress as a whole, however painful for the individual business?

Second, there is an assumption that there are techniques that can help managers generate greater value from IT investments. This panel focused on financial measurement techniques, such as return on investment, as an example of relevant techniques. The thinking of accountants, the membership base of ICAEW, puts financial measurement at the heart of business success and the widespread failure to measure IT returns robustly can be seen as a serious problem. However, would better financial measures really help businesses make better decisions about IT investments?

The panel discussion debated both of these questions and considered the opportunities for doing better on IT returns.

### Is IT Failing to Deliver the Value It Should Be?

In the first question, the panel aimed to get to the heart of the problem, and indeed whether there is a problem at all - are businesses really failing to achieve the value from IT investments that they should? The fact that businesses seem prepared to invest more in IT every year would suggest that they believe in its value, as well as their ability to deliver it in practice. A number of arguments can be advanced which suggests that large amounts of value are not being lost by organizations.

It has often been argued that many of the problems in IT business value assessment are fundamentally issues of measurement, rather than value creation. That value cannot easily be shown through financial results does not mean that value has not been created. Measurement issues were certainly established in the early literature

<sup>1</sup> Institute of Chartered Accountants in England and Wales.

surrounding the Solow paradox [e.g., Brynjolfsson and Hitt, 2003]. There is also no doubt that IT creates value in complex ways, making it difficult to isolate for measurement purposes. However, this argument did not convince the panelists. Anitesh Barua, in particular, argued that we need to disentangle failures in measurement from failures in value creation itself and that we see both in practice.

It is also possible that much of the value that has been created through IT deployment has been passed on to customers in response to competitive pressure or retention efforts. In other words, value may be created, but not appropriated or retained by the party creating it. Furthermore, the modern enterprise depends heavily on its business partners (e.g., suppliers and channel) to add value to its products and services. As a result of such dependency, value is not automatically created when the focal firm invests in IT and business processes; rather, the value realized from an IT investment critically hinges on complementary investments of value chain partners.

Radio frequency identification (RFID) technology provides a good example of the challenges in this context. RFID creates value along a supply chain by providing greater visibility of inventory and demand. However, unless RFID initiatives generate returns well in excess of tag costs for suppliers, they may not have the incentives to be a part of such a project. This may be particularly true with low value products. Therefore, trying to isolate value within a single organization or within a narrow context is problematic and does not capture the overall value created by investments across a supply chain.

The failure of many IT projects could also be seen as part of the natural evolutionary cycle of any new technology, with individual failures simply being part of a learning curve. Businesses need to experiment with new technology, making trial and error an inevitable part of developing complex new technologies. There is bound to be substantial “noise” as businesses work out the best way to make use of them. Indeed, Marx [1894] summarized his observations of “the great difference in the cost of the first model of a new machine and that of its reproduction” and “the far greater cost of operating an establishment based on a new innovation as compared to later establishments” with the blunt observation “trail-blazers generally go bankrupt.”

While clearly no business wants to be a bankrupt trail-blazer, many failures could be seen as natural byproducts of the economic progress created by IT, especially given the highly dynamic nature of IT-based systems. Focusing on these as examples of “lost value” creates a false understanding of the progress that has been made, implying that IT systems are the same and can be deployed *en masse* across organizations.

Another argument against the failure of IT rests on ideas of market competition. There is rough and tumble in any market and it is inevitable that we see both winners and losers. It could be that IT is increasingly becoming a differentiating factor between businesses, and their ability to deploy it effectively is leading to success or failure in the marketplace.

This position is supported by the economic importance of technology throughout history. Technology has been strongly linked with economic growth and progress for many years. Many types of technology have enabled innovators to radically change their marketplace and move ahead of competitors, from weaving looms to production lines. However, this positive power has always been matched by a destructive tendency as progress marches on regardless of the cost to individuals or specific businesses. Schumpeter [1943] called this phenomenon “creative destruction,” where cycles of technological innovations lead to dramatic economic changes. Businesses that are unable to adapt to the new environment are ultimately destroyed and swept aside.

IT is a particularly powerful technology in economic terms as it is based on information. Information is at the center of what businesses do, how they communicate with different stakeholders and why they even exist in the form that they do [e.g., Williamson, 2002]. By applying technology to information, IT radically changes the economics of information. It reduces the costs of information in every context, making it economically viable to store, access, and communicate information in new ways, thereby transforming the opportunities for using information. It also increases the potential benefits from information through greater aggregation, accuracy, timeliness, and relevance, for example.

As a result, IT becomes a particularly powerful tool in the operation of all businesses and in the way that they create value for a range of external stakeholders. ICAEW identified six broad ways in which IT can be used to create value [ICAEW, 2008].

1. It can create substantial efficiencies in the way that businesses undertake their activities. Through automation and better coordination, many businesses have been able to achieve significant productivity improvements, enabling them to do things more quickly and with fewer resources.
2. It can improve the search process between buyers and sellers, or the users of a service. By reducing search costs and enabling businesses to reach new markets in efficient ways, it can open up radically new opportunities for businesses [e.g., Anderson, 2006].
3. It can reduce some of the constraints on businesses created by physical assets and high transaction costs. This has been seen in the growth of new business models based on outsourcing, increased globalization, and flexibility, as well as new opportunities to collaborate with other parties.
4. It can improve governance and control, by providing greater visibility of operations. This also underpins some of the changes in business models that have been seen.
5. It can enhance current value propositions, giving a better understanding of what customers want and improving their overall experience.
6. It can enable the creation of entirely new products and services, particularly information-based products and services. We are also seeing increasingly the development of platforms, whereby users define for themselves the value they want from the platform and use it accordingly.

This tremendous economic power, though, is matched by organizational chaos following implementation of IT. This has been reflected in businesses investing poorly or in failing to deliver individual projects, especially complex projects. In these cases, businesses have almost been destroyed by failures which have led to supply chain failures or other major financial losses.

We have also seen a range of industries reshaped due to IT, from travel agencies to the entertainment industry. While some well-known cases have managed to reinvent themselves [e.g., Encyclopedia Britannica, as described by Boudreau, 2000], others have been less fortunate. As a result, while there are tremendous opportunities to use IT to gain competitive advantage, there are also inevitably losers in this process.

On the panel, Bob Zukis emphasized the positive opportunities presented by IT. Based on the activities of his clients, he suggested that there has been a greater focus on IT value in practice since the financial crisis of 2008, which had challenged both IT functions and the wider business to work together more closely to maximize the positive impact of investments.

Building on this, he argued that in the future, the opportunities to differentiate one business from another through IT will increase dramatically. This is due to the collision of two factors:

- Increased opportunities to generate revenue due to the deployment of IT
- Reduced cost of delivery of IT

IT projects and ongoing costs have been blighted for many years by high levels of complexity, which has led to higher costs [PricewaterhouseCoopers, 2008]. As legacy systems have built layer upon layer of applications and infrastructure, IT environments have frequently suffered from duplication and inefficiency. This complexity has increased the costs of running IT, as most organizations have not been able to achieve economies of scale in practice. It has also increased the costs of changing existing IT structures and systems. As a result, radical new ways of using IT have typically come through new entrants, who have been able to build a suitable environment from scratch and not suffered from the complexity of legacy environments.

New ways of delivering IT services hold the promise of lower costs and organizational flexibility and agility. IT outsourcing (ITO) and business process outsourcing (BPO) have rapidly proliferated, changing our notions of traditional IT management.

However, as ITO and BPO have morphed from a pure cost-saving exercise into a key decision, involving strategic objectives such as faster time to market, the governance of ITO and BPO relationships has not matured. This failure has frequently limited the potential cost saving through these models in practice. Governance structures are important when dealing with the high levels of coordination and collaboration between clients and vendors that are necessary to cope with uncertainty in the business and task environments. Based on a study of over 130 outsourcing relationships, Mani, Barua, and Whinston [2010a] find significant misfit between the complex nature of the engagement and the simplistic, arms-length governance mechanisms often chosen by large and otherwise

successful client firms. It appears that many clients mistakenly believe that the straightforward contractual agreements and monitoring of easy-to-measure Service Level Agreements (SLA) that led to success in outsourcing deals where cost saving was the only objective, will continue to work for outsourcing of tasks characterized by high volatility and uncertainty [Mani, Barua, and Whinston, 2010b].

Barua, Mani, and Whinston [2008] further demonstrate (with data from 100 of the largest outsourcing deals in the world over a nine year period) that while simple outsourcing arrangements led to large gains in shareholder value for the client firms, outsourcing that involved high levels of complexity in coordination and uncertainty culminated in large-scale financial value destruction. The misfit between the outsourced task and the governance structure, and the subsequent value destruction, underscore the caution that must be exercised in choosing the kind of governance that can make such complex deals succeed.

### **Does the Use of Financial Measures Improve Decisions on IT Investments?**

Financial measurement is a powerful tool to help managers achieve the maximum value from investments. It provides an objective way to compare different investments and determine which are most likely to bring success to the business. It provides a focus to delivery activities and enables management to be held accountable for their decisions and actions. It also provides a way of setting expectations as to what will be achieved and generating confidence across different stakeholders. Therefore, where measurement frameworks are not employed, it seems likely that there will be less confidence, less realistic expectations and ultimately less value delivered.

IT seems to suffer badly in this regard. Surveys show that many businesses do not robustly apply financial measurement techniques to IT investments [e.g., Ballantine and Stray, 1998]. This result is supported by anecdotal evidence, which suggests that decisions on IT investments are not necessarily based on financial evidence. Rather, they are frequently driven by other factors, such as fear of the consequences of not investing and a need to keep up with competitors. There can also be a lack of common or agreed expectations around a new IT system, with different stakeholders looking for a wide range of benefits which cannot all be delivered. This mismatch of expectation can lead to a perception of underachievement with IT projects, with costs often overrun and benefits felt to be under-delivered.

The difficulties of applying financial measures stem largely from the nature of IT benefits. In particular, the benefits are interwoven with other aspects of the business, such as business processes and relationships with customers, suppliers and others. Given this context, it is hard to isolate and separate the impact of IT investments from other factors. It is also difficult to predict the way in which benefits will ultimately be realized. As a result, financial measures can be inaccurate and frequently do not capture the full impact of IT investments. Therefore, it could be argued that management should focus its efforts instead on nonfinancial measures, such as customer satisfaction, which may capture the impact of IT more easily and more fully.

The challenges of applying financial measurement, far from reducing, are likely to increase in the future. Financial measurement is straightforward to apply where the benefits are simple. Understanding and quantifying the financial impacts of productivity improvements should be achievable, for example. However, Rajiv Kohli argued that IT is creating value in increasingly complex ways which test the effectiveness and relevance of financial measures. By enabling novel business processes and enhancing intangible customer value, such as gathering data on customers' use of the product or the flexibility of the customer service processes, IT benefits become imprecise to measure in financial terms. Therefore, financial measures frequently underestimate IT's true contribution to the business and customer value. Furthermore, businesses are increasingly deploying IT to work in a collaborative manner in order to foster innovation and achieve greater business value through faster new product development and efficient business processes. As a result, value is spread across various business functions among multiple parties and may not reflect in traditional financial measures that focus on functional areas of a single firm's performance.

It is difficult for traditional financial tools to capture value in this context, with costs and benefits both mingled with other parties. This leads to a need for other nonfinancial measures, which can capture the value-creation process more fully. Although they will not replace financial measures, they are likely to become increasingly important.

Nonfinancial measures are not a panacea, though. There are a host of nonfinancial measures which can be used and businesses need to determine which measures are the most important. Furthermore, to be effective, a manager needs to understand the relationships between financial and nonfinancial measures. Nonfinancial measures should indicate where future financial value will be achieved. They are not an end in themselves. Therefore, a manager needs to understand how value is created and driven through a business, and the measures that can be useful throughout that process [Ittner, 2008].

Taking a different tack, it can also be argued that excessive focus on financial measures might potentially harm innovation and risk taking. Where benefits cannot easily be monetized, it may be difficult to get approval for projects. Recent evidence regarding CIO reporting lines supports this proposition [Banker et al, 2010]. While it is advantageous for a CIO to report into the CFO when the business strategy is one of cost leadership, it is not helpful where its strategy is based on customer differentiation and innovation. In these cases, reporting into the CEO, who may be less financially driven, is likely to lead to higher profits. This might suggest, therefore, that a strong financial emphasis hinders innovation and far from improving the use of financial measures, managers should be reducing reliance on them, especially in the context of IT investments.

Anitesh Barua argued that, in practice, focusing on financials typically means focusing on IT costs, which are easier to define than the benefits. This approach is also encouraged by industry practices that emphasize the total cost of ownership of technologies and benchmarking figures based on IT costs. However, while IT costs may amount to substantial amounts of money, especially in large businesses, they still typically represent only about 3 percent of revenue. Even when a CIO demonstrates a 15 percent reduction in IT costs, it amounts to less than one-half percent of the firm's revenue—not enough to be appreciated by the CEO or other C-level executives. Therefore, in comparison to the responsibility of other functions, managing a budget which represents just 3 percent of revenue may seem to diminish IT's importance.

Instead, Anitesh Barua suggested, IT needs to be far more focused on the value which it brings. Transaction and overhead costs, for example, represent up to 50 percent of cost of sales and are costs which IT can radically reduce [Strassman, 2005]. Therefore, where financials are emphasized, managers should focus on quantifying and highlighting value opportunities such as those around transaction costs, rather than the costs or total costs of ownership of the technology.

Despite the problems of applying financial measures, though, Sean Worthington argued strongly that financial measures are necessary to engage effectively with the rest of the business. In practice, finance is the language of business. Senior managers are ultimately interested in the top and bottom line and everything else is simply a relationship between the two. That is not to diminish the importance of nonfinancial measures. However, to engage credibly with senior managers in other areas, IT managers must become far more comfortable with the financial costs and benefits of IT investments.

Financial measures inevitably lead to greater transparency over the activities of IT as a whole. They enable investments from different parts of the business to be objectified and compared. As a result, what has often been seen as the “black box” approach to IT becomes unsustainable. IT functions must become more open about what they are spending and the value that they are bringing to the business if they want to be taken seriously by the board and senior management.

Sean Worthington did recognize, though, that managers have improved in their use of financial measures. IT is a young management discipline in comparison to many others and IT value is a particularly difficult area. However, as understanding and experience of IT investment have grown, there has also been a process of maturing. As a result, businesses are increasingly applying standard management disciplines and measuring IT costs, quality and value.

### III. EMBEDDING IT IN THE BUSINESS

An important theme throughout the panel discussion concerned the extent to which IT systems have become embedded in virtually all business processes today. Historically, IT was a back office function which supported largely administrative and management tasks. Today, it is increasingly at the centre of every business activity, moving it far beyond a traditional back office function. Customer and supplier relationships are heavily based on electronic communications and indeed many activities with third parties are becoming fully integrated based on integrated IT systems. While this is a common observation, it does have significant implications.

The panel described this phenomenon in very different ways. On the one hand, all businesses could be described as technology businesses, whether or not they realize it. Technology is increasingly at the heart of whether or not they succeed as businesses and therefore no business can afford to ignore or marginalize it.

Alternatively, it could be said that IT should not be at the centre any business, other than in pure technology businesses. Technology is simply an enabler to a business and increasingly we see businesses which fuse together business and IT. This is similar to the argument that there is no such thing as an “IT project”. All projects should be seen as business projects which have an enabling component of IT.

While from radically different ends of the spectrum in terms of language and emphasis, both positions are based on the same point, namely that IT is increasingly embedded in almost everything we do, and it is increasingly difficult to separate it out from the business or process or relationship which it supports.

### Implications for IT Practice

The relationship between the IT function and other parts of the business is widely recognized as central to achieving success from IT projects. All the panelists agreed that implementing a piece of technology in itself rarely creates any value. The benefits are typically achieved by all parts of the business doing things differently by leveraging the IT. A significant challenge for most IT projects, therefore, is that they require people in different parts of the business to change the way that they do things. The technical components may fall within the IT department. However, the success of the project is dependent on many other factors.

As a result, traditional governance structures for decision-making and accountability, based around functional authority, rarely work well for IT projects. Indeed, they have been at the root cause of many project failures as IT functions have decided which IT projects to undertake and subsequently become responsible for their success. However, it is broadly recognized today that this is not the best way to achieve value from projects. An approach which integrates different functions and brings together all the different skills required is widely promoted among researchers and practitioners. This is supported by increasing research into IT governance structures [e.g., Weill and Ross, 2004].

Particularly important is the question of accountability. IT functions can deliver the technical aspects of a project but do not have the authority to deliver the benefits. Those must be driven by individual business units or functions. However, in practice, accountability for achieving the overall value of IT projects often continues to sit in the IT function and it remains difficult to shift meaningful accountability into the business.

Looking to the future, this raises fundamental questions about the role of the IT function and IT professional. Where IT is an integral part of every major business process, what does the IT function bring to the table that is not covered elsewhere in the business unit or functional area? Leaving aside pure technical specialists, is the future of the IT profession to become increasingly marginalized and ultimately disappear as a separate entity?

One question from the audience asked about the future skills needed by IT leaders and their role within a business. Many argue today that IT leaders should not be technologists and indeed do not need technical skills at all. It is becoming increasingly rare, especially in large businesses, to see technocrats, or “geeks,” as IT leaders [Thibodeau, 2007]. Instead, IT leaders are often seen as mediators between the business and the technologists, connecting the needs of the business with the capabilities that can be provided through IT systems.

As a result, IT leaders typically build on general management skills, such as leadership and stakeholder management, economics, finance, and marketing. The panel also suggested that we may see more joint titles to reflect the merging of IT with other functions, for example, the leader for IT and marketing, or the leader for IT and operations, depending on the nature of the business and the key strategic role for IT.

Furthermore, what are the skills and roles of IT professionals? As technical jobs become increasingly outsourced, the organization retains what are essentially business-focused jobs, linking business needs with the capabilities created by IT. There may be little sense in keeping these jobs within a separate IT function. Instead, embedding these roles in business units may well lead to better integration between IT and the business and greater accountability for the success of investments.

Rajiv Kohli argued that the future of the IT profession lies in moving further toward the business, “claiming a stake” over business process. This means becoming deep experts in processes and understanding how IT can improve them. As a result, current skills and career models which are based on specific technical or application knowledge expertise may need to change.

Both Rajiv Kohli and Anitesh Barua also argued that separating the “I” from the “T” might provide some answers here. What really matters for businesses is the “I”, or the information and its availability to the right person, at the right time, at the right place and at a low cost. The technology is a means to achieving these goals by affecting changes in the economics of information.

Growing understanding of how information can change and improve the value proposition offered to different stakeholders will be central to organizational success in the future. Businesses increasingly have vast amounts of information on customers, for example, and all their interactions with the business. The real challenge is how to turn information into something of value. Most businesses are still in very early stages of working this out. The role of IT

professionals, in future, may be increasingly focused on the information flows and processes and identifying opportunities for new or greater value. This is also echoed in the growing focus of organizations on networking through social networks (akin to Facebook or Twitter), in which new relationships can lead to new opportunities.

### Implications for Research and Teaching

The debate on the role of IT specialists is also reflected in the academic world. A concern voiced throughout the debate, and indeed reflected in other discussions at ICIS, is that the IS discipline may be becoming marginalized and subsumed into other disciplines. This can be seen in many business schools, for example:

- E-marketing practices and the use of the Internet to engage with customers frequently sits in marketing schools, not IS.
- The use of IT to improve productivity and the study of outsourcing often sit in operations schools.

While this is not necessarily a bad thing, it does raise quite profound questions about the role of the IS research community and where it fits in. What skills and knowledge is it adding that go beyond these other areas? If the application and impact of IT is increasingly being studied by the functions which it affects, where does this leave the IS research community?

The IS community is already seeing the potential effects of the embedding of IT into the business, with student numbers down. IS may increasingly be seen as a useful topic, but not something to major in. Rather, it can support other majors, such as marketing or operations. In order for IS to have its place, it must continue to evolve and offer unique ways of creating value for businesses as the previous themes get subsumed into other disciplines. This pattern can be observed, for instance, in the IS discipline's research contribution to decision support systems and expert systems. Today, neither are major IS research themes but still play an important role in development of online applications such as choosing an automobile or planning a retirement portfolio. Some future areas for IS's contribution are data analytics, applications for mobile services, virtualization of business processes and integration of large amounts of distributed data (e.g. in creating national-level electronic health records).

## IV. BROADENING SCOPE OF RESEARCH

A second theme running through the discussion was the need to broaden the scope of research beyond the established financial and economic frameworks. This covered three broad areas:

1. Broadening current economic frameworks to consider the co-creation of value
2. Looking at different perceptions of value
3. Reflecting on the actual use and full consequences of systems

### Co-Creation of Value

First, existing financial frameworks focus on the creation of value within a distinct entity. A business, for example, spends money on an investment and expects to get a return from that. However, value is increasingly created beyond the boundaries of individual organizations. We see supply chains working together to create value along the whole supply chain. In this case, an individual party is investing only part of the whole sum and gaining only a proportion of the benefits. Businesses are also working together with others and collaborating in order to create value. Panelists raised a number of examples of value networks or the co-creation of value, such as RFID.

There has been research which has considered multi-party investments. This has focused primarily on the reduction of transaction costs, though, looking at the benefits of outsourcing arrangements, for example. The question of broader value co-creation has seen limited research [Kohli and Grover, 2008]. However, as the opportunities for collaboration grow and enable different parties to work together in novel ways to create value, the research questions also grow.

In these cases, we may need to look beyond the traditional ways of analyzing financial value. First, we need to better understand how value is created in these cases, and how parties can build relationships to accomplish this. There may also be barriers in protecting both existing and future intellectual property (IP). Capturing and apportioning value between parties is another important aspect. Alexy et al. [2009] argue that firms can benefit by finding a balance between protecting revenues (e.g., through IP) and creation and enhancement of capabilities. Clearly, the farther firms move from internal innovation to collaborative arrangements, the greater the need to examine a new set of metrics.

## Perceptions of Value

The meaning of value itself is multidimensional. The panel discussion focused largely on economic value and the ability of businesses to achieve financial benefits that are greater than the costs of a project. However, value is ultimately a matter of perception, and different stakeholders will have very different views as to what is valuable to them.

For example, users will have their own views of the value of systems. While there may be financial benefits for the business, a new system will often find resistance at the individual level because the users do not perceive any value to them from it. The system could add time to their activities. It may change the power relationship with managers, making information and activities more visible. It may ultimately threaten the jobs of the users, if the system is automating their activities. Alternatively, a system could be empowering to a user, making their job more interesting and reducing the time spent on administrative tasks. Whatever the individual perception, though, it will impact on the value generated overall.

Increasingly, we also need to look outside an individual business at perceptions of value. Particularly as businesses use systems and the Internet to engage with customers, adding to the overall experience and value received by them from the business, financial measures may be too narrow and internally-focused. Instead, the perception of value for the customer is likely to become an increasingly important feature in IT value. What do customers really value and how can IT help to achieve that?

There is a clear economic angle to the question of customer value. It has been argued, for example, that the customer has been the main beneficiary of IT developments, with reductions in the cost of supply chains and other efficiencies passed onto the customer, as well as significant improvements in customer service.

Going forward, the Internet is increasingly going to be the main mechanism for engaging with customers, building their loyalty and transacting with them. Determining in advance what will be valuable to them, and therefore what is worth investing in from a business perspective, is likely to become increasingly important. Value in this sense, though, is highly personal to individuals.

Customer value research is well established in marketing schools [e.g., Smith and Colgate, 2007] and greater attention is being paid to the role of the Internet here, and the new ways that it can enable customer engagement and value. Further integration with IS research may be helpful, though, to bring together ideas from many disciplines.

## Reflecting on the Use of IT

Technology creates value because it changes the way that people do things. However, this is not a simple or finite process. Technology is situated in a specific context and will be used very differently by different people. Use will depend, among other things, on the personality and experience of the individual in question, the social environment, and organizational rules. Furthermore, usage continually interacts with these factors and will change over time.

As a result, the value of a technology will be affected by actual and changing usage by individuals. There may also be unintended consequences that ultimately add to, or detract from, the value to individuals, businesses, and society as a whole.

Laurence Brooks highlighted the need for research to look beyond the economics of technology and understand better the real use of IT and its full impact. This builds on a very different theoretical perspective, namely that of Wanda Orlikowski and the “practice lens” approach [Orlikowski, 2000]. The practice lens focuses on understanding the actual use of technology rather than simply the technology as if it were a tangible artifact. That is, that we need to think of the technology-in-practice, rather than just technology per se. Further, there is a sociomaterial aspect to technology [Mol, 2002; Suchman, 2007], which involves seeing the “constitutive entanglement” of the social and the material in everyday life. In this way, neither the humans nor the technology are privileged over the other, but instead are seen as inextricably related.

The implication of taking the practice lens approach for understanding IT value, and focusing on technologies-in-practice rather than on technology per se, is that predicting performance impacts will be more meaningful if we look for returns on the “use” of technology, rather than only on returns on the technology. Orlikowski [2000] begins by looking at organizations as dynamic and showing emergent patterns. One way to understand this is through drawing on Giddens’ Structuration Theory [Giddens, 1984], which originates in the domain of sociology and aims to represent the societal implications of change. A usual assumption about IT is that at some point after development, it becomes static and, therefore, stable, with a set of inherent or built-in determinate and fixed capabilities or structures. This is contrasted with a core structurational idea that there are recurrent social practices, i.e., things which people typically

do over and again, until they become the accepted way of doing things in that context. The set of risks and resources instantiated in these recurrent social practices are called *structures*. Therefore, technology elements can be seen as structuring human action only when they are routinely mobilized in use. In this use, people modify the technology and their views/expectations of the technology. An important distinction is that technology itself does not directly embody structures, but technology elements can be seen as symbols and material properties instantiated in practice.

This frames what users do with technology not only as appropriation, but as “enactment.” Starting from human action, we can examine how it enacts on emergent structures, through recurrent interaction with the technology at hand. Therefore, the users’ interaction with a technology is recursive, such “users shape the technology structure that in turn shapes their use.” Technology structures are not external or independent of human agency, but virtual, emerging from people’s repeated and situated interaction with a specific technology. This is seen as the core idea behind Orlikowski’s conceptualization of “technology-in-practice.”

When people use a technology, people draw on the technology artifact plus their own skills, power, knowledge, assumptions, and expectations about the technology and its use. These all come from training, communication, and previous experiences. They also include the meanings and attachments (emotional and intellectual) that they associate with a particular technology, as shaped by their experiences with various technologies and their participation in a range of social and political communities. It is difficult to generalize technology use, as using an ERP is very different from a mobile phone or Facebook, although both would count as technologies. Equally, the first time one used a mobile phone, it was just like a landline, but without the wire, whereas today, the convergent technologies of Smartphones (see BlackBerry example below) mean that this is much more of an all around communicative, music playing, game playing, video watching, online shopping, lifestyle supporting experience. This is nothing like the old landline phone use that started all this.

Over time, people constitute and reconstitute a structure of technology use. In this way, the technology-in-practice can be changed, from changes in awareness, knowledge, power, motivations, time, circumstances, and the technology itself. Orlikowski identified three types of enactment:

1. Inertia—no evident change in process, technology or structure = reinforce and preserve status quo
2. Application—some change in one or more of process, technology or structure = reinforce and enhance status quo
3. Change—significant change in one or more of process, technology or structure = transform status quo

RIM’s BlackBerry version of a Smartphone is an example of a convergent technology, which is distinguishable by, among other things, its push e-mail technology. Orlikowski [2007] describes the use of these devices in a small private equity firm and the changes associated with the use of this technology. These incorporate significant changes to communication patterns, particularly around expectations (of contact, response, and responsibility), attitudes (toward each other and the technology), emotions, and holidays/family/non-work time. The changes in hardware and software capabilities are reflected in changes in the “norms” around communication, as well as the double-edged coin of increased flexibility and obligation. The ways that people related to their e-mail as a form of communication changed, as did their assumptions, and the way they and their family felt about it, as both liberating and an intrusion. This raises the question of how the value of that new technology would have been “measured” and how it was and is now valued by both the organization and the individuals involved in its use. The simple ROI is very obviously not adequate, but equally how does one make a case that others can relate to by saying, “Well, let’s wait and see what happens when people use the technology.” It has been suggested that rigorous and clear-case studies are useful, but obviously, someone has to go first, while contextual/organizational culture differences mediate against saying that what worked (or did not work) elsewhere would work here.

## V. CONCLUSIONS

At the end of the discussion, we took a straw poll of the views of the audience. The audience decisively voted along the lines that might be expected, namely that:

- IT is not delivering the value that it should.
- Financial measures should improve decision making on IT investments.

Looking to the future, the discussion closed on an optimistic note. There are many rich opportunities for businesses to create value through the imaginative and effective use of IT. Good businesses are likely to be able to distinguish themselves through good use of IT and move decisively ahead of competitors who make poorer use of IT.

We are also likely to see growing maturity of IT as a management discipline. As IT becomes increasingly central to every business process, greater transparency will be demanded and standard management processes will be applied.

However, the increased embedding of IT into the business will challenge our understanding of what the issues are and what the IT community should be doing to increase the value realized through IT systems. As a result, rather than solving the problems, there are likely to be many new questions which need further research.

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*Editor's Note:* The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that

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