

This report discusses five common issues at an enterprise's organizational or operational level related to information and communication technologies (ICT) that seem to foster growth or accentuate difficulties.

Issue One: Implementation issues with Software Delivery Options

The first topic I would like to discuss is implementation issues with software delivery options. Most organizations at some point and time will have a need to install and use some form of software in their organization. A well-designed software solution can transform costly time-consuming redundant repetitive task into quick, reliable and efficient processes. Word processor, database, presentation and spreadsheet software are common solutions to improve staff efficiency. Accounting, personnel, and custom business applications can often be critical to the success or failure of key business revenue generating processes.

Hughes 2008 outlines one of the implementation challenges of implementing software solutions is determining the best method of obtaining a new software application. Organizations can choose from developing in-house, purchasing an off the shelf commercial application, customizing a commercial application, open source application, ASP, Software as a service (SaaS), or cloud computing.

Each method has its pluses and minuses and interdepartmental enterprise managers must often work together to ensure that their selection meets both their business and IT needs. Open source, hosted and cloud computing applications can be more cost effective for small businesses with limited IT resources. Organizations with good development teams may prefer to develop in-house or customizable commercial software to ensure the solution aligns with their current business process. The terms SaaS, ASP, and cloud computing can be confusing as they all refer to software not located within the organization physical premise but there are technical differences between the three terminologies.

SaaS is a software application delivery model where the vendor develops and maintains the software application to be used by its customers via the internet. SaaS is often defined as a business model where software is provided to users on a pay as you go basis. An example of SaaS would be Microsoft Xbox Live service. Microsoft states on their website <http://www.microsoft.com/serviceproviders/saas/clients.mspx> that the Xbox Live network services provides, games, videos, movie trailers and other services to its members and connects gamers with more than 3 million connected members across more than 24 countries. Users typically pay a monthly subscription fee to access the service.

Software using the ASP model is generally focused on providing an organization with certain application processing duties hosted on a third-party ICT infrastructure. The model does not primarily focused on providing shared services to multiple users. This would be similar to an organization using a third party hosted payroll or accounting systems.

Cloud Computing refers to the ICT infrastructure or architecture that enables web applications to provide any number of users access to application services that deliver hosted solutions and services over the Internet.

Enterprise Project - Option B: Rudy Strong, University of Wisconsin Stout, Seminar in Information and Communication Technologies, ICT-702, Dr. Byron C. Anderson, Ph.D., April 5, 2011

According to Hall (2010), Gartner estimated that worldwide SaaS sales would reach \$9 billion in 2010, up 15.7% from 2009. The market is projected for stronger growth in 2011, with sales totaling \$10.7 billion. Personally, I am a little skeptical of the expected growth numbers in SaaS reported by Gartner. Cloud computing is certainly the latest buzz topic in the ICT community but adaptation rates by small and medium size business seem to be moving at a slower rate than the technological innovators may be willing to admit to.

In spite of the glowing expectations of cloud computing in a recent Pew study researchers found that many still expressed concern about the security of information stored in the "cloud", the willingness of cloud operators to handle personal information in a trustworthy way, and other problems related to control over data when it is stored in the cloud, rather than on personally-controlled devices (Anderson, 2010).

I think the Pew research re-iterates some of my concerns as well as concerns in financial industries and those concerned about protecting proprietary information. I see the biggest risk of implementing cloud computing solutions is the relinquishing of operational management and control of business critical applications and services to third party outside organizations. I think there maybe situations more or less appropriate for cloud computing solutions and business decision makers will need to choose carefully when and when not to seek out SaaS type solutions.

With all the many alternatives available choosing the right software delivery option that will provide a good long term Return on Investment (ROI) can be a difficult choice to make. The right choice should promote growth within the organization, while the wrong choice can be a significant expense that only reduces profit and revenue. Anderson states:

Technology experts and stakeholders say they expect they will 'live mostly in the cloud' in 2020 and not on the desktop, working mostly through cyberspace-based applications accessed through networked devices. This will substantially advance mobile connectivity through smart phones and other internet appliances. Many say there will be a cloud-desktop hybrid. Still, cloud computing has many difficult hurdles to overcome, including concerns tied to the availability of broadband spectrum, the ability of diverse systems to work together, security, privacy, and quality of service (Anderson, 2010).

I think the definition of living in the cloud can have different meanings. Some may consider accessing data via a mobile device as living in the cloud but if the data that is accessed is maintained on corporate traditional infrastructures and user are downloading apps to access that data that seems to me as less of a true cloud solution and more of a hybrid of traditional data access and cloud computing. I envision the pure definition of living in the cloud as 100% utilization of web services delivering all ICT services via internet type infrastructures. This to me would be the ultimate software delivery option and may be the only viable option in our distant future.

Issue Two: The ways in which revenues can be generated by web applications

Ecommerce organizations have web applications they have created or purchased that are used within their organization to generate revenue. Games and business applications can be sold on the retail market place and proprietary application can be directly marketed and sold to particular

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industries. If your web app provides a high tech valued best of breed service unique to the market you will be able to charge premium prices for the application.

In addition to the revenue generated by the sale of these applications additional revenue can be obtained by charging customers for additional licenses, maintenance and support fees. In my primary reference book used for this report, Exploiting IT for business benefit, the author Bob Hughes 2008 states that generally there are two basic ways of making money in ebusiness:

1. **Cost leadership** - By reducing costs so that you can reduce prices
2. **Differentiating your products** - Making them special in some way so that people are prepared to pay more.

I believe that these principles can be applied to revenue generating web applications. By reducing the development cost of your application, businesses can increase their revenue opportunities. Staff developers and marketing are typically two of the largest direct costs to developing a web application and can be difficult to control if organizations do not have efficient development and marketing processes. Complex applications can require a team of developers to produce a product marketable to large enterprise organizations. The pressure to get an application to market before a competitor's product can add pressure to the development process. Once you have a final product an unsuccessful marketing campaign could doom all your efforts to date.

Although not a web application, Microsoft's Vista operating system was released in 2007 and seemed to suffer from not being able to differentiate the product from their previous product Windows XP and their competitor's product Apple Mac OS X. Microsoft reported that sales in the division that produces Vista fell 16% in the previous quarter. User satisfaction has been underwhelming, and IT departments have largely opted to stick with Vista's predecessor, Windows XP (Goldman, 2009).

In 2008 Apple's entire advertising budget was \$486 million (Blakely, 2008). In that same year it had been estimated that over \$500 million had been spent by Microsoft on marketing Vista since its release (Browne, 2008). It is difficult to present concrete data that would show how effective had both campaigns really been but we do know that the Mac vs. PC campaign ran directly into the Vista launch and is recognized as being one of the most effective of its type. Apple not only helped slow sales for Windows, but Vista also never really recovered while Apple tripled their market share, according to Enderle Group analyst Rob Enderle (Digital 2010).

Hughes 2008 also discusses Product Differentiation which he defines as offering a product that is perceived as being unique in some way that customers might value. Hughes uses Apple as an example and states that Apple has clearly differentiated its desktop machines from other personal computers and has built up customer loyalty and thus can be less sensitive to competition on price. Typically an IBM windows clone PC can be purchased for considerable less than a Mac. At the height of the Mac vs. PC war in August 2008 Dwight Silverman, a blogger on <http://blogs.chron.com>, blogged that "a HP notebooks on sale at the local Target store the 14-inch model, the HP DV2946NR, sold for \$699.99 and packed 4GB of memory and a 320GB hard drive. Capacity features were twice that of the \$1,299 Mac Book and the HP shared graphics was 356MB compared with a meager 144MB for the Mac Book" (Silverman, 2008). I would conclude that there is significant

market data that would indicate that Apple has clearly delivered product differentiation consistently to its loyal customer's base.

Hughes 2008 also states that one of the fundamental characteristics of Cost Leadership is for businesses to supply a wide range of related products. Apple is also a good example of a company that has successfully grasped this concept. In 2010, Apple maintained its dominance of the global mobile application store market. The Apple App Store generated \$1.8 billion in revenue, giving it 82.7 percent share of the total market, down from 92.8 percent in the previous year. Apple's 2010 global revenue for the total mobile application store market increased by 160.2 percent to \$2.2 billion, revenue was up from \$828 million from the previous year (Kent, 2011). In June of 2010 Apple edged past Microsoft in market capitalization and emerged with a market value of roughly \$222 billion compared with Microsoft's \$219 billion (Digital 2010).

Apple is one of the most successful ever ICT organizations in the world today. The two principles Cost Leadership and Differentiating your products that Apple exhibits have led to their web, mobile and personal computer revenue generating success. These same principles can be utilized by all businesses small and large to execute in their organizations to help them generate revenue for their web applications.

Issue Three: Using the Internet to Generate Competitive Advantage

I believe that using the internet to achieve a competitive advantage in this day and age is a difficult task to achieve. In today's Internet market space even the smallest most novice entrepreneur can have an Internet presence without incurring significant expense. The difference between a business having an Internet competitive advantage or disadvantage is more dependent on your business model on how you utilize the Internet ICT infrastructure rather than just being part of the mass volume of web pages accessible by a Google search.

Hughes 2008 states that ecommerce focuses on the buying and selling of goods and services over the internet and is most commonly associated with B2C (business to consumer) transactions where businesses, such as www.amazon.com, sell goods to individual consumers. Hughes also states that sales transactions could also be B2B (business to business) where one business buys components from a supplier. Hughes defines ecommerce as just one element of ebusiness and is the term used to describe the wider use of internet and web technologies in a business environment (Hughes, 2008).

In his discussion of ebusiness Hughes correctly states that the internet is not the solution to every business problem. Below are the four characteristics of the web that Hughes list as the major ones that can be exploited by business applications to resolve some of the problems business face in today's global market:

1. **Global Reach** - The web can be accessed by millions of people worldwide.
2. **Time Independence** - A website can operate all day and all night and every day of the year.
3. **The Network Effect** - Network-based systems such as telephones and the railway become exponentially more valuable as more lines, junctions and end-points are added.
4. **Information Asymmetry** - The disparity in knowledge of the market and products between seller and buyer is known as information asymmetry and it is argued that the web has

moved the balance of knowledge in favor of the public as they can now more easily compare prices.

These are some of the key basic characteristics of the Internet that enterprise organizations can make use of to gain competitive advantages over their competition. Organizations can expand their sales market across local and international borders without making significant investments in staff and physical locations. The internet gives your customers 24x7x365 access to your goods and services. Year after year the number of computers and users on the Internet expands giving organizations a larger market to sell to without the organizations having to incur any cost or any effort to grow the market. If your product is best of breed consumers can use the Internet to find industry reviews, customer comments, and information on your competitors that can lead to increased product sales for your organization.

A Tunisian researcher Moez Bellaaj of the Institut Supérieur d'Administration des Affaires de Sfax, in Tunisia was quoted in eScienceNews.com as stating that "Online capability" is a new type of technological resource that represents a company's ability to use the Internet to share information, facilitate transactions, improve customer services, and integrate customer activities. Bellaaj also states that "Overall, technologically opportunistic firms are aware of technology developments and are more likely to invest resources in adopting Internet technologies and developing online capability (eScience, 2010).

Bellaaj carried out case studies on 86 e-commerce companies using standardized questions about companies engaged in Internet projects. Statistical analysis then allowed them to determine the strengths and weaknesses of the companies in terms of their Internet activities. An important theoretical contribution of the study is the finding that Internet-based capabilities combine with other complementary organizational capabilities lead to competitive advantage (eScience, 2010).

One example of an organization using the internet for competitive advantage would be the advantage Amazon.com exhibited over Borders in the market of selling books to consumers. Borders, whose market value has shrunk by more than \$3 billion since 1998, racked up losses by failing to adapt to shifts in how consumers shop (Kary, 2011). Although Amazon sales many other products and services they have been successful in using the Internet and other ICT technologies such as eBooks to beat out the competition and foster growth in their organization.

Borders was a laggard to accepting Internet and ICT technologies and toward the end they did adapt and made attempts to compete online with Amazon. Businessweek.com reported that Borders first ecommerce site debuted in 2008, more than a decade after Amazon.com revolutionized publishing with online sales. The world's largest online retailer beat it again by moving into digital books with the Kindle e-reader in 2007, a market Borders entered in July 2010 (Kary, 2011).

It certainly seems that Borders difficulty to understand and utilize ICT technologies in their marketplace was instrumental in their inability to compete with its competitors. By not recognizing early on the competitive advantage of the Internet their cost ran high while their revenues suffered and they begin to close stores. Lawyers for Borders stated that "Closing the stores right away is essential because the debtors are losing approximately \$2 million per week at the closing stores,"

and Standards & Poor's analyst Michael Souers said that "Instead of leading and being innovative, they were certainly a follower" (Kary, 2011).

Borders Group Inc., the second biggest U.S. bookstore chain, filed for bankruptcy in New York on February 16, 2011 after management changes, job cuts and debt restructuring failed to make up for sagging book sales in the face of competition from Amazon.com Inc. and Wal-Mart Stores Inc (Kary, 2011).

As Hughes 2008 stated earlier the Internet is not a cure for all business problems but to not realize the competitive advantage it can provide to an eBusiness enterprise organization can be extremely detrimental to achieving key strategic business goals and objectives.

Issue Four: Evaluating a New Technology

Over the last 20 years advances in technology have grown exponentially. Enterprise organizations must consistently evaluate new technologies to search for opportunities to use technology to help achieve business goals and objectives. Application technology is one specific area many businesses must spend significant time in evaluating technologies. Some organizations must decide on whether a desktop, web or mobile application would be the best solutions for their organizational and customer needs.

Hughes quotes Goodhue and Thompson 1995 as stating that once someone has started to use the application then there is still the question of whether it carries out the required task effectively. This can be judged by assessing the task-technology fit (TTF), the degree to which the technology is good at supporting a particular type of task (Hughes, 2008).

TTF is one method organizations can use to evaluate a new technology. TTF is a theory used in Information systems research to predict if end-users will agree that the technology being implemented will have a positive impact on user job performance and effectiveness. There are many different methods and theories for evaluating technology but what I liked most about TTF is that it takes into account the end users experience as part of the evaluation process. If the tasks the end users need to perform are not suited for the technology a TTF evaluation should help an organization to reach that conclusion.

Goodhue and Thompson (1995) developed a measure of task-technology fit that consists of 8 factors: quality, locatability, authorization, and compatibility, ease of use/training, production timeliness, systems reliability, and relationship with users. Each factor is measured using between two and ten questions with responses on a seven point scale ranging from strongly disagree to strongly agree. I could see a survey based system like this would be useful if a business had an experienced pilot group within the organizations that are subject matter experts on the organizational processes the technology will support and had spent time working with the new technology. This pilot team would be able to provide informed feedback in a TTF survey that would be valuable to the final decision making process.

Technology Acceptance Model (TAM) is another research process model that organizations can use to evaluate technologies. Usoro 2010 used a combination of TTF and TAM to explore the user acceptance and utilization of the tourism e-commerce websites. Usoro states the following about the TAM process model:

The model is most popular for determining computer acceptance (Agarwal & Prasad, 1999; Davis, 1989). TAM (see Figure 1) is grounded in established social psychology theories: the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980); and the theory of planned behavior (TPB) (Ajzen, 1985).

For organizations that spend millions and billions of dollars on implementing new technologies deploying a research team to determine the TTF or TAM value of a new systems or application may be a suitable option. For small organizations the process of evaluating new technology can be a much simpler process. Often with new technologies come high acquisition cost and high risk. Many organizations cannot afford cutting edge technology and/or are not willing to trust their key business process to version 1.0 technology. The evaluation for some organizations may end after a quick cursory Cost Benefit or Risk Analysis that clearly shows that a particular ICT implementation would be business prohibited in their near or immediate future.

If cost and risk are at acceptable levels organizations can also rely on vendor presentations, Industry trade shows and conferences, webinars, beta and trial testing, independent research, peer references and technical white papers to assist with their evaluation of new technologies. Gartner and Ziff Davis are two of the research firms that have years of industry experience and routinely provide data on new emerging technologies.

Gartner's opinion on identifying strategic technologies is outlined annual in their research papers. Gartner's vice president Carl Claunch was quoted as saying in a report on the Top 10 Strategic Technologies for 2011 that "Sometimes the decision will be to do nothing with a particular technology, in other cases, it will be to continue investing in the technology at the current rate. In still other cases, the decision may be to test or more aggressively deploy the technology" (Gartner, 2010). As with any research firm Gartner has its critics and I am sure there exist examples of them occasionally missing the mark but over the years I have read several of their industry, reports and more often than not they seem to be pretty consistent and reliable.

In the 2010 Ziff Davis annual report titled Emerging Technology Adoption Trends they attempt to provide useful decision making data into the hardware, software and infrastructure solutions being evaluated and deployed by business peers. Currier 2010 states that the Ziff Davis objective random surveying allows us to gauge activity levels for each kind of "hot" technology you may wish to consider. It also gives us a glimpse into the future, by comparing the level of active testing to overall usage. Cutter also recommends three key strategies for businesses to use when evaluating new technologies:

1. Focus sharply on the business outcome that another-wise risky new technology proposition represents. Risk is not risk, properly speaking, if it engenders the opportunity for a flexible, efficient organization that is poised for growth.
2. Understand using data such as you see in these pages, the relative strengths of the specific benefits you can expect from the various technology options available.
3. Manage the fact that the unknown remains the unknown. As our most-emergent list shows, technologies that exhibit the most promise and greatest interest can be poorly understood in their early stages, in terms of their strengths toward specific business goals.

The data in the Ziff Davis and Gartner reports and the strategies outlined are examples of approaches to choosing which new technologies may be well suited for a successful implementation in any organization. Predicting the next new hot technology can be a difficult task even for skilled and experienced research firms. I doubt that any business executive would base their future financial projections on usage or growth predictions based solely on research firm analysis. These documents do seem to focus on the new technologies and can serve as a starting point or complementary to all the other evaluations an organization can conduct when evaluating new technologies.

The final decision will often need to be made with consideration to many other factors such as staffing and support needs, scalability, and features and functionality. In the end the technology must fulfill a business need. The total evaluation process can be a challenging endeavor but the right selection can often lead to efficiencies that can foster growth in key business areas that contribute to increase revenue or cost reductions.

Issue Five: How CRM can be supported by IT

Customer Relationship Management (CRM) is a tool typically use by an organizational sales team to manage their customers. CRM applications can hold customer contact information and personal data on each customer in your organization. One simple task that organizations use CRM for would be to automate sending letters or email to customers at strategic points in time to engage them in new products or simply send birthdays and anniversary best wishes.

Over time a CRM database can grow to a huge size with thousands or even millions of records. For example, Fingerhut had four million names of repeat customers, each with up to 1,000 attributes, stored in a data warehouse that can hold 4.5 trillion bytes of data (Bull, 2008). There could be hundreds of data elements for each customer and maintaining and securing this critical data can be a full time task and best suited for trained experienced IT professional.

There may be business reason as well to integrate CRM data with other backend 3rd party applications and processes. Having a skilled IT Dept. familiar with your CRM data can allow an organization to quickly adjust their marketing and engagement campaigns to meet fast changing market conditions.

Hughes 2008 discusses in chapter 5 the motivation for data mining. Data mining is an analytical technique that can be very useful to businesses seeking to take raw CRM data and develop it into actionable marketing campaigns. Although statisticians and business analyst will often have the primary responsibilities in conducting data mining type task the data utilized is often stored in large data warehouse type systems. The data warehouse brings in another type of specialist: the database administrator whose background is IT (Hughes 2008).

I have seen different ICT technologies used in organizations to support ICT database and warehouse technologies. For large systems Oracle and Sun hardware with UNIX operating systems have been popular. Microsoft SQL has also been utilized for system needs more robust than an MS Access database solution. Typically, to support these systems in-house the IT department will need server specialist to support the hardware and operating systems, database professional to support database needs and developers for integrations and customization needs.

Enterprise Project - Option B: Rudy Strong, University of Wisconsin Stout, Seminar in Information and Communication Technologies, ICT-702, Dr. Byron C. Anderson, Ph.D., April 5, 2011

Hughes 2008 also states that data mining and data warehousing are not simply technical matters. They raise many issues at an organizational level and require staff with very different backgrounds to work together if the most effective use of the data assets of a business are to be successfully exploited. In support of Hughes statement I would add that the role of a IT business analyst would be well suited to help the business users gather, communicate, and document their requirements to the IT department for successful design and implementation.

Contrary to Hughes point that the IT department can help an organization with their CRM solutions Bull 2008 found that many organizations have few alternatives but to outsource a significant proportion of their CRM solution as they lack the resources to develop CRM software. Bull quoted that according to MacSweeney (2000) 60 per cent of in-house CRM systems fail. Bull concluded that the results of the study are cause for concern, for they support the findings of other surveys that show a high failure rate for CRM.

McAdams 2008 also recommends that organizations pick their battles carefully as CRM initiative are laden with snags that can challenge even the best IT manager and that a significant number of organizations chose to pass the lion's share of the chore to outsourcers. I have found that good IT Managers are skilled at implementing new technologies and are very well versed at supplementing their IT staff with outside consultants' capable of filling knowledge gaps when implementing complex solutions.

In addition to helping with the CRM Implementation there exist other operational needs of a CRM system that the IT department can provide critical support. Mobile access to CRM data was listed as a key factor in CRM implementations by McAdams 2008. McAdams said that in order for the sales staff or other departments to use CRM to get to know customers better, users will likely need a way to tap CRM applications remotely. It is the IT managers who make sure that CRM initiatives move along with the executives who will reap the most success (McAdams, 2008).

I believe that whether or not an organization chooses to outsource or purchase an in-house CRM solution the IT dept. can still contribute to the support of the implemented solution. Internal IT departments can assist with integrating outsourced CRM data with in-house systems and for purchased on premise solutions there might also be integration needs as well as vendor coordination for routine daily operational support and system upgrades.

For organizations that choose Microsoft Dynamics CRM solution, Microsoft offers training and a Certified IT Professional (MCITP) certification to validate IT staff technical skills and their ability to implement Microsoft Dynamics CRM.

Some CRM solutions are available for free, but the higher end enterprise solutions can be significantly expensive. Some CRM packages are designed for small and mid-size business as well and offer a good set of features and support at a reduced cost. Organizations will need to consider what features and functionality they need from their solution to choose which vendor product would be a best fit to fulfill their business needs. If the organizations IT Department can successfully support the CRM solution the cost of implementation, on-going support and system integration can be greatly reduced.

I believe that CRM and the four other issues discussed in this report clearly demonstrate that ICT can both foster growth in an organization as well as accentuate difficulties. The challenge for

organizations is to recognize which ICT technologies will add value and then develop a plan for successfully implementation. Business needs should drive decisions on which ICT technologies are worthy of revenue investments and commitments in time and staff resources. No ICT technology can fix a dreadful business plan or incompetent management. Organizations can use ICT as a tool to enhance sound business processes with the efficiency of technological automation.

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Enterprise Project - Option B: Rudy Strong, University of Wisconsin Stout, Seminar in Information and Communication Technologies, ICT-702, Dr. Byron C. Anderson, Ph.D., April 5, 2011

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