t-Innovation: Using Information and Communication Technology to Achieve Strategic Innovation

*International Journal of Innovation and Technology Management, Autumn 2004*

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April 2004
Abstract

Much has been written about strategic innovators – organisations that develop uniquely differentiated strategies to target new ‘who-what-how’ opportunities. These organisations frequently achieve their success by moving beyond industry norms and sustaining innovations to achieve some form of architectural or disruptive advantage. By being able to overcome rigid mental models about the nature of competition and industry structure, these companies are able to create new value for themselves, their customers and their shareholders.

Our research into scores of strategic innovators has revealed an interesting trend. Over the past decade and a half, it has become apparent that many of the strategic innovators that we have analysed have utilised information technology as a platform for delivering unique and innovative value propositions. In recognition of this trend we decided to look more closely at the manner in which strategic innovators explore, develop and implement technology as an enabler of their business designs. In doing so we identified a group of strategic innovators that we christened the ‘t-Innovators’. We discovered that the behaviour of these t-Innovators in relation to technology adoption demonstrated a number of common themes:

1. t-Innovators focus on technology as a driver of value, not just as a tool for operational efficiency
2. t-Innovators are early adopters of technology in their industry, even if the technology is already dispersed in other industries
3. t-Innovators do not wait for complete technology solutions to fit their customer requirements – if needed they develop technologies themselves
4. t-Innovators use technology to enable architectural innovation
5. t-Innovators use technology to enable a rapid scaling-up of an innovative business design

This article discusses each of these elements with reference to strategic innovators in industries as diverse as computing, insurance and brokerage services.
Introduction

Much has been written lately about strategic innovators – companies that develop radical new strategies to attack entrenched competitors and create new markets in the process [Bower and Christensen (1995); Hamel (1996 and 2000); Kim and Mauborgne (1997), Markides (1997)]. These organisations achieve their success by moving beyond industry norms or ‘sustaining’ innovations to achieve some form of architectural or business model innovation, thereby disrupting established competitors and generating value for themselves, their customers and their shareholders [Christensen, (1997); Markides, (1998)].

Past research [e.g. Christensen, 1997] has shown that strategic innovators invade an existing market by emphasizing different product or service attributes to those emphasized by the traditional business models of the established competitors. For example, whereas traditional brokers sell their services on the basis of their research and advice to customers, online brokers sell on the back of a different value proposition, namely price and speed of execution. Similarly, whereas traditional airline companies sell their product on the basis of frequency, range of destinations and quality of service on board, low-cost, point-to-point operators emphasize price.

By emphasizing different product attributes, strategic innovators avoid head-to-head competition and develop new markets on the periphery of the mass market. This has been shown to be a key ingredient of their success [Charitou, (2001); Christensen, (1997)]. But what else could explain the success that strategic innovators have had in disrupting so many established markets? [Christensen and Raynor, (2003); Charitou and Markides, (2003)]. And how much was technology responsible for this success? [Collins, (2001)]. It is with these questions in mind that we embarked on a two-year research project to explore disruptive strategic innovation in more detail. The thrust of our research was to study in detail a number of strategic innovators from a variety of industries and try to understand the reasons behind their success. In the process, we studied and wrote case studies on twenty companies that we had identified as strategic innovators1.

Since our research is field based and examines only a small sample of firms, we can only offer tentative propositions on what we believe the answers to our research questions are. A different methodology with a larger sample must be employed to actually test these propositions. Notwithstanding these limitations, we believe that the strategic use of technology was one of the major reasons behind the success of the firms that we studied. During our interviews with the top management of these firms, it quickly became apparent that many of our sample firms had proactively utilised information and communication technologies (ICTs) as a platform for delivering their unique and innovative value propositions to new customers. In recognition of this trend we decided to look more closely at the manner in which strategic innovators explore, develop and implement technology as an enabler of their radical business designs. Through this analysis, we have identified a group of strategic innovators that we have labelled the ‘t-Innovators’. The behaviour of these firms in relation to the adoption of ICT demonstrated a number of common themes:

1. t-Innovators focus on ICT as a driver of value, not just as a tool for operational efficiency;
2. t-Innovators are early adopters of ICT in their industry, even if the technology they adopt is already dispersed in other industries;
3. t-Innovators do not wait for complete technology solutions to fit their customer requirements – if needed, they develop technologies themselves;
4. t-Innovators use technology to enable ‘architectural’ innovation;
5. t-Innovators use ICT to enable a rapid scaling-up of an innovative business design;

In this article, we discuss each of these elements with reference to strategic innovators in industries as diverse as computing, auto insurance and brokerage services. What is perhaps most surprising is that these innovators are not drawn from the world of e-business or ‘dot com’. The majority of these t-Innovators are large, established organisations in mature industries.
1. t-Innovators focus on ICT as a driver of value, not just as a tool for operational efficiency

"Companies generally spend about 85 to 90 per cent of their [IT] resources just keeping the lights on and only 10 to 15 per cent trying something new." Randy Mott, CIO, Dell Computer

Our study of strategic innovators has revealed that rather than using ICT primarily to shave cost from their existing business processes, t-Innovators use technology to target new or existing customer segments that could not be served efficiently using established business processes [Rosenblum, Tomlinson and Scott (2003)]. The focus is upon value creation rather than just operational efficiency. This is true for companies as diverse as Dell Computer, Enterprise-rent-a-car, Cemex (cement industry), Cisco systems and EasyJet (European airline industry). It is also true for Edward Jones, the world’s largest stock broking firm by number of offices [Bachmann, (2002)].

Edward D. Jones founded Edward Jones in St Louis, Missouri in 1922. After several decades of serving the St Louis market the firm expanded under the stewardship of Edward’s son Ted Jones during the 1960s and 1970s. By 1978 the firm numbered some 280 brokers, concentrated in Missouri and surrounding US states. Edward Jones growth throughout the 1960s and 1970s was based on its organisation around the specific social and economic need of a specific universe of consumers - namely the individual investor. These individuals were not typically the high net-worth individuals targeted by other brokerage firms, but middle-income Americans and small business owners. The firm was committed to satisfying the needs of these consumers with an offer of products and advice tailored for their needs and characterised by a conservative investing approach dedicated to customers interested in buying and holding. According to management guru Peter Drucker, Edward Jones was able to identify and serve a ‘market in contemplation’.

One of the key aspects of Jones’ approach was the single broker branch office. As major broking firms such as Merrill Lynch moved towards ever-larger offices during the 1960s and 1970s to achieve operational efficiencies and economies of scale, Edward Jones stood fast by its commitment to deliver personalised service through its single broker branch office network. Each Jones’ broker (known as an investment representative or ‘IR’) was supported by a Branch Office Assistant, but was largely responsible for building his or her own business. Jones became famous in the industry for its direct approach to customers, which included going door-to-door to meet local investors. A headquarters in St Louis that provided IR training, ongoing professional development, market analysis and clearing and settlement of trades, supported this highly decentralised model.

By the early 1980s Jones’ organisational processes were creaking under the weight of almost 1,000 individual offices, and it was becoming increasingly difficult to provide the necessary training, financial and trading data and communications media at a cost that would enable the organisation to remain competitive. Some within the firm believed that Jones’ had reached an upper limit in the number of IR offices, and that further expansion would be impossible without adjustments to the Jones’ business model. External consultants went so far as to suggest that the firm would need to move to multiple broker offices. “Many in the industry said the single broker office couldn’t survive” says current CIO Rich Mallone.

Jones’ response was to turn to technology and in 1985 the firm invested more than US$30 million (a substantial amount for a still relatively small firm) to move its entire broker network over to a hub-and-spoke satellite system. This new system enabled greatly improved data flow between St Louis and branch offices, as well as connectivity to a client/server computer system. Rather than wait for the development of off-the-shelf technology Edward Jones IS department developed its own software to enable this innovative approach. The satellite network enabled the firm to become the first US brokerage firm to implement an electronic messaging system (an early form of email) and importantly allowed Jones’ to commence its own video broadcasts from a purpose built studio in St Louis.

With a satellite dish on their branch office roof, brokers in small rural communities suddenly had access to real-time market data, video presentations by fund managers of many of the United States’ largest
mutual fund management companies (to which they could invite their customers) and enhanced communications with the St Louis headquarters and other Jones’ brokers. The cost of installing the satellite system did not vary by location, and it was also cheaper to operate, faster and more reliable than the landline technologies used by other brokerage firms. Says John Bachmann, Edward Jones CEO: “A Jones’ IR in Manhattan, Kansas was suddenly able to deliver the same level of service as a broker based in Manhattan New York. We were able to further commit to our promise to bring Wall Street to Main Street.” But perhaps most importantly, implementation of the satellite network had a huge impact on the productivity of Jones’ Investment Representatives – it enabled them to spend more time with their customers and to continue to deliver the kind of personalised service upon which the Jones’ model had been built.

The number of single-broker Jones’ branch offices reached 3000 by 1995, 7,500 in 2000 and is expected to exceed 8,000 by the end of 2005. Today Edward Jones’ is ranked first in number of offices in the US brokerage industry, has over 3 million retail clients and almost $2 billion in annual sales. The firm expanded into Canada in 1994 and the United Kingdom in 1997, leveraging its technology infrastructure to deliver the unique Jones’ model to both markets. The company has achieved this with an unwavering dedication to Ted Jones’ vision of serving the individual investor through a single broker office. The vision has remained unchanged, but Jones’ relentless pursuit of technology to deliver this vision has not. It will come as no surprise that the firm is currently undertaking a major project to explore next-generation broadband technologies that might enable the company to reach 10,000 branch offices globally by 2010.

2. t-Innovators are early adopters of ICT in their industry, even if the technology is already dispersed in other industries

Another key characteristic of t-Innovators is their willingness to experiment early in the implementation of emerging information and communication technologies [Hamel and Prahalad, (1991)]. They may not be the earliest adopters of this technology per se, but they are frequently the first to adapt this technology to the unique needs of customers within their markets. This was certainly the case with regard to Edward Jones’ adoption of satellite-enabled communications in the brokerage industry, and it is also true of companies such as Dell Computer, Cisco and Cemex that will be discussed later in this article. It is also true of another strategic innovator – Progressive Insurance.

Founded in 1937, Progressive Mutual Insurance Company grew steadily during the 1950s and 1960s by targeting high-risk insurers and offering innovative products and services such as premium payment in instalments and drive-in claims service. After becoming a public company in 1971, the company continued to experience steady growth throughout the 1970s and 1980s. In 1987, Progressive surpassed $1 billion in premiums and the company’s stock was listed on the New York Stock Exchange. Today Progressive insurance employs 19,000 people across the United States in more than 350 offices. More than 30,000 agencies sell Progressive, and net written premium in 2002 amounted to more than $6 billion. The company is now the fourth largest writer of private passenger auto insurance in the United States and the nation's largest writer of private passenger auto insurance through independent agents.

Value Creation at Progressive Insurance
• Underwriting profit of 4.8% in 2001, and an underwriting profit of 3.0% for the past five years and 4.5% for the past ten years
• Estimated industry results for the personal auto insurance market for the same periods were underwriting losses of 7.0%, 4.2% and 3.0%
• Return on equity was 13.5% in 2001, and averaged 12.6% over the past five years and 16.0% over the past ten years
• In the past ten years Progressive shareholders have realized compounded annual returns of 24.1%, compared to 12.9% for the S&P 500
• In 2001, the returns were 44.1% on Progressive shares and a negative 11.8% for the S&P 500.
Technology-enabled innovation has underpinned Progressive’s rapid growth since the early 1990’s and truly set Progressive apart from the competition. The company set a new standard for customer service in the early 1990s with the introduction of an Immediate Response® telephone claims service that was available 24 hours a day, 7 days a week. This was a dramatic departure from the past when claimants could only contact an insurer during business hours, or had to visit a branch office to make a claim. In 1992 Progressive also launched a cutting-edge auto insurance rate comparison-shopping service. One phone call provided customers with a Progressive quote and comparison rates for up to three competitors.

In 1995, Progressive launched progressive.com, becoming one of the first major auto insurance companies with a presence on the Web. By 1997, the company was offering automated real-time online sales of auto insurance to customers. Progressive.com received more unique visitors in the fourth quarter of 1999 than any other auto insurance company site. In 2001 progressive.com became the first Web site to introduce a feature that allowed policyholders to better understand the premium implication of a claim. All of these automated features allowed improved customer service, without a corresponding increase in call centre resources. They also enabled more time for Progressive’s insurance agents to generate income rather than spend their time chasing customer service enquiries.

But it has been the development of what the company calls “Claims WorkBench” that has perhaps most clearly differentiated Progressive from its competitors. Installed on a claims representative’s laptop, this proprietary software platform allows the Progressive rep to perform up to 20 separate transactions - in the field or at the scene of an accident. Rather than waiting days to assess a client's claim, Progressive endeavours to despatch a claims representative as soon as an accident is reported. With the help of a wireless modem and a laptop installed in one of Progressive's Immediate Response Vehicles (IRVs), representatives are empowered to settle many accident claims on the spot.

One software application installed on laptops provides a listing of parts for nearly every car on the road allowing for an immediate damage assessment. If additional data is required, the claims representative can connect to the Progressive extranet via wireless modem. Once the claim is processed it is sent remotely from the IRV to one of Progressive's claims centres, speeding up the overall claims process, which not only results in happier customers but also saves money. But perhaps most importantly, by enabling claims representatives to focus on inspecting accidents – rather than sitting behind a desk completing paperwork and responding to customer complaints about delays - Progressive also has many fewer staff than it otherwise would3. This means that the company has been able to continue to grow while simultaneously cutting down on high-cost support resources.

Progressive has not been the first company to utilise the information and communication technologies that supports its business – widely available tools such as the telephone, Internet, laptop computers and cellular connectivity - but it has certainly been an early adopter and innovative user of these technologies in the insurance industry. Similarly, Edward Jones was not the first organisation to adopt satellite for mass communication purposes – the television networks and the military did so much earlier. Jones was merely the first brokerage firm to recognise the power of this technology as an enabler of its own business model.
Cemex – t-Innovation in the Cement Industry

In the Cement industry, Cemex, the world’s third largest cement company has been widely recognised as a strategic innovator through the use of technology to deliver ‘just-in-time’ cement. Compared to the previous situation where customers were required to order days in advance, and were then provided with a four hour delivery ‘window’, Cemex has created business processes that enable same-day service and free unlimited order changes as standard operating procedure.

Originating in Monterrey Mexico, Cemex operated for decades in a Mexican market where the weather was unpredictable and the traffic chaotic. Labor disruptions could erupt spontaneously, and government inspections targeted construction sites on a frequent basis. Adding to this complexity was the fact that a freshly mixed load of concrete was never more than 90 minutes from spoiling in the cylinder on the back of one of the company’s trucks.

In 1994, Cemex launched a project that it called Sincronización Dinámica de Operaciones: the dynamic synchronization of operations (SDO). The goal of SDO was to free the company’s delivery trucks from fixed zone assignments, allowing them to roam an entire city or region. The company also equipped its trucks with transmitters and receivers connected to a GPS (global-positioning satellite) system, thereby providing its headquarter’s computer systems precise, real-time data about the location, direction, and speed of every vehicle in the Cemex fleet. Today, Cemex can use its computer system to triangulate this information against order destinations and mixing plants, all the while taking traffic patterns into account, to enable highly efficient delivery processes.

The company has been able to introduce the kind of guarantee that competitors can only dream about: If a load fails to arrive within 20 minutes of its scheduled delivery time, the buyer is refunded 20 pesos per cubic meter. That amounted to a discount of approximately 5%. With reliability exceeding 98% and with a vehicle efficiency that increased by more than 30%, Cemex can afford to offer a far more generous guarantee. But a rebate of 20 pesos has been enough to swamp Cemex’s competition, while leaving room to offer an even steeper discounts should the competition catch up.

Today Cemex is undoubtedly the best performing large company in the cement industry, and has expanded its technology-enabled model to the United States, Indonesia, the Philippines, Latin America and elsewhere. Its financial performance is the envy of the industry.

Value Creation at Cemex: Net Sales & EBITDA Performance 1998-2002

Cemex is a clear example of a strategic innovator that demonstrates all of the technology management behaviours of a t-Innovator:

1. Cemex focused on information and communication technology as a driver of value, not just as a tool for operational efficiency
2. Cemex was an early adopters of technology in the cement industry, even though the technology adopted by the company was already dispersed in other industries
3. Cemex did not wait for complete ICT solutions to fit its customer requirements – the company developed software to adapt and integrate existing hardware to its needs.
4. Cemex has used technology to enable architectural innovation that delivers ‘just-in-time’ cement
5. Cemex has used ICTs to enable a rapid scaling-up of its business design, first in Mexico and then in other developing markets. The company believes that its model is 30% more efficient than traditional industry processes, enabling rapid growth while restraining costs.
3. Innovators do not wait for complete technology solutions to fit their customer requirements – if needed they develop technologies themselves

t-Innovators are not only early adopters of information and communication technology – in many cases they develop this technology themselves rather than wait for a complete "off-the-shelf" solution to address their requirements. This is true of both Edward Jones and Progressive Insurance, but it is also true of other t-Innovators such as Enterprise Rent-A-Car. Widely recognised as a strategic innovator that has achieved remarkable growth (revenues increased from $3.7 billion in 1997 to $6.9 billion in 2003) through a concentration on delivering replacement and discretionary vehicles for families, individuals and people having their vehicles repaired, Enterprise Rent-A-Car has more recently developed technology to target the rapidly growing insurance replacement market.

Over the past decade Enterprise has been able to dominate the insurance replacement market through the development of a proprietary Automated Rental Management System (ARMS). This computerised system has enabled Enterprise to achieve massive and rapid growth in an emerging niche market, without overburdening the company's physical infrastructure. Since its inception in 1993, ARMS has been used to process more than 10 million rentals for more than 250 insurance companies.

ARMS is an Internet-based software application that enables insurance companies, Enterprise branches and auto-repair shops to manage the entire rental cycle electronically. When a customer has an accident and calls in a claim, the insurance claims agent logs on to the Enterprise ARMS extranet and automatically places a rental reservation for the customer. This is compared to what was in the past a tedious, paper-based, manual process often involving up to half a dozen phone calls to different rental office locations just to secure and process a replacement rental car. But ARMS is not limited to the rental process alone. The system is also connected to approved auto repair shops that are required to send regular electronic updates on the status of car repairs to customers and to the insurance company. It also tracks the collection of the repaired car and return of the rental car, automatically generating an electronic invoice that is sent to the insurance company.

The bottom line impact for insurers of taking excessive human interaction out of what was a cumbersome and time consuming process? Enterprise has calculated that an average of 8.5 phone calls are cut from each rental transaction. That's about 85 million phone calls since 1993 - more than seven million hours of employee time at an average of 5 minutes per call. The system also saves about half a day from a typical rental cycle, cutting between $36 million and $107 million from the industry's rental costs annually. ARMS also provides insurers with access to online data about their transactions on the system, allowing them to better review and manage the rental process. The system has also been extended to integrate body-shop owners.

The impact of ARMS has been impressive. The company's existing insurance rental segment was enabled to grow 42 percent between 1998 and 2001. Enterprise processed more than $1 billion worth of

| Growth at Enterprise 1963-2003: |
| Number of automobiles |
| 2003: 680,000 automobiles |
| 2002: 533,000 automobiles |
| 2001: 525,000 automobiles |
| 2000: 493,000 automobiles |
| 1999: 427,000 automobiles |
| 1990: 89,000 automobiles |
| 1980: 6,000 automobiles |
| 1970: 500 automobiles |
| 1963: 17 automobiles |

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transactions through the system last year (about one-fifth of total revenues) and ARMS is now used by 22 of the United States' 25 biggest insurance companies. Enterprise has been able to bring the previously labour-intensive replacement rental process online, generating efficiencies for Enterprise branches, streamlining operations for insurers and protecting its niche in the process. New users of the system can be added at incremental cost, with only minor adjustments to the Internet-based interface required for adoption of ARMS by insurers and auto repairers. All this for a development investment of $28 million in hardware, software and staff time and $7.5 million in annual maintenance.

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<tr>
<th>Fiscal Year</th>
<th>Revenue (billion)</th>
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<tr>
<td>2003</td>
<td>$6.9</td>
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<td>2002</td>
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<td>$4.2</td>
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Can Enterprise's competitors simply go out and buy ARMS off the shelf from a software vendor, just as they can purchase a CRM package, e-procurement solution or financial management package? Of course not - ARMS is a proprietary system developed by Enterprise's IS department, and if competitors want to replicate the system they will need to do so from scratch. Similarly, competitors have found it difficult to replicate the internally developed technology solutions underpinning the innovative business processes of Edward Jones, Progressive insurance, Cemex and Dell Computer.

4. t-Innovators use technology to enable architectural innovation

A component innovation refers to the improvement (minor or major) on a specific element of a system. This compares to an architectural innovation that refers to a change in the way the different parts or elements of a system interrelate to each other [Henderson and Clark, (1990)]. As Christensen (1997) has shown, it is those companies that can achieve some form of architectural innovation that are most likely to disrupt existing competitors and achieve some form of sustainable competitive advantage.

Our own research suggests that t-Innovators use information and communication technologies as enablers of architectural innovation. This is just as true for Edward Jones, which has been able to develop a unique business ‘architecture’ supported by ICT to serve individual investors, as it is for Enterprise Rent-a-car that has been able to utilise the Internet to develop a new business process to service the auto insurance industry. It is also true for a company that is recognised as a true strategic innovator in the PC industry – Dell Computer.

It is without a doubt that Dell Computer’s direct model has provided the company with a core advantage. When Dell pioneered direct sales in the mid 1980s it represented a paradigm shift in the computer industry. By having direct relationships with its customers Dell was able to eliminate the ‘middleman’, save time, reduce inventories and pass along cost savings quickly. By leveraging these direct relationships Dell has been able to provide key customer benefits that differentiated the company including customer-driven products and services, accountability and predictability, speed-to-market with the latest relevant technology and lower lifecycle costs.

Dell led commercial migration to the Internet, launching www.dell.com in 1994 and adding e-commerce capability in 1996. The following year, Dell became the first company to record $1 million in online sales. By moving much of its business model to the Internet between 1996 and today, Michael Dell believes that his company has been able “double the core advantages of the direct model”, an achievement that the company’s competitors have found difficult to imitate. Rather than having to increase its physical sales force to respond to increasing customer demand, Dell has been able to scale its ‘virtual’ sales channel at
relatively incremental cost. Premier Pages Intranet sites developed for different companies vary little, with the exception of the company logo at the top of the user’s screen and the type of products that company employees can access. On the supply side, Dell has established online purchasing, demand forecasting and supplier relationship management links.

These initiatives have enabled Dell to expand its Internet sales for major corporate clients at an impressive growth rate. Today, Dell operates one of the highest volume Internet commerce sites in the world. The company's Web site receives more than one billion page requests per quarter at 86 country sites in 28 languages/dialects and 29 currencies. Online sales represent almost half of Dell’s $35 billion in global revenues, and exceed 90% of sales in some regions. Since 1996 the company has actually experienced declining operating costs as a percentage of sales, and Dell has emerged as one of the only companies to generate consistent profits in the PC business.

While others are working to massively restructuring their outmoded business models, Dell is in the process of extending its use of the Internet to improve all business processes. And these technology-enabled business processes are continuing to help Dell achieve impressive expansion of the direct model that it pioneered in the 1980s.

Dell, Edward Jones and Enterprise rent-a-car are not the only strategic innovators to utilise ICT as a key element of their competitive advantage. Cemex, already mentioned above, has been able to develop new business architecture through its use of GPS navigation and cellular technologies. In Europe, the low fares airline EasyJet has disrupted the airline industry through its low cost model supported by direct Internet sales and customer service.

5. t-Innovators use technology to enable a rapid scaling-up of a business design

So far we have argued that t-Innovators use ICT as an enabler to target new customers; adopt these technologies early; develop technologies internally; and utilise ICT as an enabler of architectural innovation. But what is also apparent from our research is that t-Innovators use information and communication technologies to rapidly scale-up their businesses [Collins (2001)]. Edward Jones was able to utilise satellite communications to expand its broker network at a time when the company was facing the strains of organic growth, while Enterprise-rent-a-car was able to rapidly scale-up its service to the insurance industry through an automated Internet-based platform without the need to expand physical
assets such as call centres. As has been mentioned above, rather than having to increase its physical sales force to respond to increasing customer demand, Dell has been able to rapidly scale its ‘virtual’ sales channel at relatively low incremental cost. But let us turn to another innovator that has been able to achieve scale-up by utilising its own technologies as an enabler of rapid growth – Cisco Systems.

Cisco Systems was founded in 1984 by two Stanford professors, Sandy Lerner and Len Bosack who came up with an idea for an innovative company and a single product - the router. A router is a device that allows the electronic transmission of data across networks and the Internet. Cisco went public in 1990, and as customer needs changed to wanting an end-to-end network solutions provider, the company evolved through both internal development as well as acquisitions.

Through its highly innovative Internet sales and service model, Cisco emerged as one of the world's fastest growing in the world during the mid 1990s. The company quadrupled in size from fiscal 1994 to fiscal 1997 with as many as one thousand employees signing on each quarter. By late-2000 Cisco had over 35,000 employees globally and more than $16 billion in revenue. But how was the company able to scale-up so quickly without stretching its internal processes to breaking point?

Cisco recognised early on that its internal systems could not scale quickly enough to keep up with the pace of growth. A good example was sales-force training, about 95% of which was done in the classroom by 1997, but which was buckling under the strain of maintaining skills and knowledge development given the rapid pace of change in Cisco's markets, technologies and customers. A training group of just 50 people was responsible for training 4,000 internal Cisco salespeople, as well as the company's then 15,000 partner organizations and thousands of customers. Newly-hired sales personnel would travel to corporate or regional training sites for several five-day courses each year, with training delivered for one product line to the entire field in a classroom setting. This required up to 200 training session for each course to reach Cisco's worldwide audience. This approach represented a model for extended failure, since salespeople simply could not spend the necessary time in the classroom to keep pace with weekly product introductions. Cisco recognised that its future profitability and success would depend on a solution that could scale to meet the needs of its rapidly growing business and workforce.

In 1997 Cisco identified e-learning, that is learning enabled by the Internet, as a way to provide employee training without the expense or time-constraints of travel. After almost two years of development the Field E-Learning Connection (FEC), a single, online point-of-entry for the company's global sales force and support staff to plan, track, develop and measure their skills and knowledge, was launched in 1999. The Intranet system has links to over 400 learning resources, on-line and leader-led training courses, assessment exams, and learning roadmaps for the company's Account Managers and Systems Engineers. Accessibility is anytime, anywhere; with full accountability through online testing and certification. To complement FEC Cisco has also created learning portals for other key areas of its business, including manufacturing, worldwide customer service and company audit. In 1999 Cisco introduced video intranet training via its global broadband IP/TV network through which it can conduct a single update training session that reaches...
up to 4,000 people at once, worldwide. More than 80% of sales and engineering training was conducted online by the end of 2002.

Cisco's main motivation for embarking on the e-learning initiatives described above was to assist the company to deal with the dual challenges of explosive growth and rapid employee acquisition, as well as the desire to improve customer service by freeing employee time from administrative duties and face-to-face training. Cost reduction was also a goal, and by the end of 2001 the company estimated that it was achieving cost savings of between 40% and 60% when compared to instructor-led training. It is also important to note that e-learning is just one example of how Cisco has used ICTs to scale-up its business model. The company has also implemented initiatives for online sales and service, automated online expense claims, procurement, technical information, and employee benefits.

Like Dell, Cisco is perhaps best known for its Internet sales and service model. But e-learning and other internally focused technology innovations have been just as critical to the company as enablers of rapid business expansion. While the company's workforce contracted by almost 20% during 2000-2002, Cisco continues to develop interactive Internet applications for departments from human resources to manufacturing and finance. And despite the impact of the current economic downturn on the organization, Cisco remains a strong case study of the role of ICT in scaling-up through virtual rather than physical infrastructure.

Conclusion

While it is true that the vast majority of spending on information and communication technologies within established companies goes towards operational efficiency, our research indicates that ICTs can be key enablers of strategic differentiation and new value creation. But to deliver this value creation we believe that established companies must be bold with the way they approach technology. To be a true t-Innovator companies must be relentless in their pursuit of ICT to target new positioning opportunities [Markides (2000)] and must be willing to be an early adopter of these technologies even in the absence of industry reference points. Indeed, our research indicates that established companies are better off if they adopt technologies that may reside outside their own industries. t-Innovators should also be willing to develop technologies internally or in cooperation with partners to attain competitive advantage. Our research leads us to believe that any company that waits until a technology is fully adapted as an industry solution before adoption is unlikely to obtain any long-term competitive advantage from that solution. Aspiring t-Innovators should also look to technology as an enabler of architectural innovation, rather than merely a sustaining innovation that builds incrementally upon existing processes. Finally, t-Innovators are those companies that grasp the power of information and communication technologies as tools for rapid, virtually-enabled growth.
References

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<th>Early Adoption within industry</th>
<th>Development of proprietary technology solutions</th>
<th>Technology to enable architectural innovation</th>
<th>Technology to scale-up business design</th>
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<td>Edward Jones</td>
<td>Target a new mass customer segment – individual investor</td>
<td>Yes – Satellite system, software</td>
<td>Yes – software to integrate satellite with own communication needs</td>
<td>Yes – targeting individual investor through single-broker offices</td>
<td>Yes – overcame barriers to organic growth</td>
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<td>Progressive</td>
<td>Creating a new value proposition – speed of claims process</td>
<td>Yes - Internet, wireless technologies and proprietary software</td>
<td>Yes – software to link mobile claims agents to headquarters</td>
<td>Yes – eliminating steps in the claims process through virtual integration</td>
<td>Yes – achieved rapid growth while keeping variable costs low</td>
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<td>Insurance</td>
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<td>Cemex</td>
<td>Just-in-time cement</td>
<td>Yes - GPS, cellular technologies, software</td>
<td>Yes – software to integrate GPS and cellular technologies to own systems</td>
<td>Yes – new model for cement sales and distribution</td>
<td>Yes – After succeeding in Mexico, has taken model to Indonesia and elsewhere</td>
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<tr>
<td>Dell Computer</td>
<td>Direct model for PC sales and service</td>
<td>Yes - Internet</td>
<td>Yes – software to virtually integrate supply chain</td>
<td>Yes – virtual integration of supply chain</td>
<td>Yes – achieved rapid growth while keeping variable costs low</td>
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<td>EasyJet</td>
<td>Low-fares airline</td>
<td>Yes – Internet, e-tickets</td>
<td>Yes – adaptation of e-commerce software to own needs</td>
<td>Yes – direct sales to eliminate intermediaries</td>
<td>Yes – rapid customer acquisition while constraining overhead costs</td>
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<tr>
<td>Cisco</td>
<td>Internet sales and service</td>
<td>Yes - Internet, broadband</td>
<td>Yes - software to virtually integrate supply chain, e-learning platform</td>
<td>Yes – virtual integration of supply chain, remote sales force training</td>
<td>Yes – achieved rapid growth while keeping variable costs low</td>
</tr>
</tbody>
</table>
1 For our study, we examined companies that introduced strategic innovations in the following industries: banking; general insurance; life & health insurance; motor insurance; cement; car-rental; brokerage trading; personal computers; networking; movie theatres; ordering and delivery of groceries; airlines; FMCGs; and screen-based electronic trading systems.

2 Quoted from www.dell.com


4 This section has been adapted from FC Editor, ‘CEMEX- This Promise is Set in Concrete, Fast Company, Summer 1999

5 For a full description of the history and features of ARMS see ‘Enterprise Value Awards: Enterprise Rent-a-car Staying Ahead of the Curve’, CIO Magazine, Feb 1, 2002 Issue

6 We wonder whether ARMS, given its widespread acceptance by large insurers, might eventually become the industry standard for processing insurance rentals, just as SABRE has become the reservations standard in the travel industry. The question of course is whether Enterprise’s CEO and Chairman Andy Taylor would ever license the system to his competitors.

7 See Sandra Swanson, ‘Cisco Tends the Tree of E-Knowledge’, Information Week, 8 January 2001