Internet Security
Jonathan Armstrong, Eversheds
Abstract: This article deals with the legal issues surrounding Internet security. It sets out the legislative framework in the UK embodied in the Data Protection Act 1998 and goes on to look at other areas of civil and criminal liability. The article expands on the civil liability aspects by looking at two recent US cases involving Target and being one of the first to illustrate the need to keep customer data secure and to respect the personal privacy of Internet users.

E-Tailor – Integration of 3D Body Measurement, Advanced CAD, and E-Commerce Technologies in the European Fashion Industry
James Clarke, LAKE Communications
Abstract: The E-TAILOR project (Integration of 3D Body Measurement, Advanced CAD, and E-Commerce Technologies in the European Fashion Industry (Virtual Retailing of Made-to-Measure Garments, European Sizing Information Infrastructure)) is the largest collaborative project in the European Fashion Industry and one of the largest projects in the Information Society Technologies (IST) programme under the Fifth Framework Programme of European research. E-TAILOR aims to develop advanced infrastructures, which will establish a new paradigm for Virtual retailing services of customised clothing (under Action Line 1.3.3. personalisation of goods and services and AL 1.4.3. real-time clothing simulation and visualisation). In addition to presenting the E-Tailor project, this paper will concentrate on work being carried out in relation to innovation and access Secure card applications being developed in E-TAILOR.

E-business and the Board
Stephen Mason, Fennemores Solicitors
Abstract: Like the telegraph and the telephone, the advent of the Internet means the way human beings interact with each other will alter and change. In many ways, it is difficult to foresee how the Internet will be used effectively by people in business. This paper will consider some of the issues and offer a personal view about how directors on the boards of companies should consider reacting to the ubiquitous nature of the Internet.

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Abstracts

Internet Security
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This article deals with the legal issues surrounding Internet security. It sets out the legislative framework in the UK embodied in the Data Protection Act 1998 and goes on to look at other areas of civil and criminal liability. The article expands on the civil liability aspects by looking at two recent US cases involving Toysmart and livings.com and cases in Sweden and Spain to illustrate the need to keep customer data secure and to respect the personal privacy of Internet users.

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Internet Advertising and Consumer Price Searching Behaviour
Kevin Lawler & Kin Pui Lee, Sunderland Business School

The late 1990s saw a phenomenal growth of E-commerce. Simultaneously Internet advertising has provided a new medium for advertising. The paper aims to critically examine the strategic motives behind Internet advertising for Internet retail prices. The analysis is closely related to the economic implications of the diversity in consumer's ability to acquire information relating to products and seller prices. The results of an elemental game model show that sellers can derive higher sales revenues when using either a strategy of continuously low or, a mixed strategy of high or low prices periodically. The model generates interesting results arising from the fact that some potential Internet consumers are often subject to the constraints of time and therefore employ search agents. Principal agent aspects of consumer price search are then examined and implications derived.
**Towards More Effective Measurement of Supplier Performance - Using Performance Measurement to Really Drive Continuous Improvement**

Adrian Morris & Stan Oliver, Institute for Automotive & Manufacturing Advanced Practices

This paper examines some of the more common performance measurement systems being used by UK customer companies. It compares the expected performance of suppliers, as predicted by supplier evaluation activities, with actual performance and suggests that the performance measures are neither reliable nor the best to drive forwards continuous improvement at the performance levels now being demanded. Due to a unique opportunity provided by Black and Decker Ltd., the authors have been able to compare three separate supplier performance measurement systems used by this company. The research was conducted using data from 124 suppliers to this Original Equipment Manufacturer (OEM) located in the N.E. of England. Through this work and research conducted into the mechanics of other supplier performance measurement systems, the authors have identified some weaknesses in both the tools themselves and the manner in which they are applied. Having done this, the paper goes on to suggest changes to the way in which suppliers are measured so that the customer company obtains a more dynamic picture of performance rather than the more discrete analysis that is currently performed.

It then goes on to propose an alternative strategy that the authors believe will provide a more detailed and dynamic view of supplier performance than the current methodologies.

**Succeeding in e-Business: Strategies for Defining and Mitigating Legal Risk**

Nick Covelli, IBM Canada Ltd

Just say the words Napster or MP3.com these days, and free downloading of music will probably not be the first thought that leaps to mind. Indeed, a rather different melody is being played in the courts. At issue is not just whether online music-swapping services violate copyrights. The more significant issue is one that has broader implications for e-business as a whole: do old economy-based laws apply in cyberspace? In many ways, Napster and MP3.com epitomize e-business. Both upstarts have fresh, unconventional, and audacious Internet-based business models. Their opponents, on the other hand, are entrenched industrial giants, unsure of what to make of their cheeky new rivals or how to fight back in the marketplace. It is classic David vs. Goliath, and it makes for compelling media coverage.
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Editorial

This current edition of the Journal contains several papers that should be of great interest to those looking to learn from the experience of others.

The spring edition of the Journal will be devoted to a special subject – a report from the 2001 Conference of the International Academy of E-Business. The Academy has been successful in attracting a wide range of papers from business and academia from which the editorial board will make a selection suitable for publication in the Journal. The topics to be addressed at the Conference include business models in the new economy, relationship marketing, strategic marketing and Internet advertising. The papers will provide an insight into the development of E-Commerce and E-Business in the Far East and the US and allow readers in the UK and Europe to benchmark themselves against the competition.

Andrew Slade
February 2001
Company Round-up

Make data management a priority
Companies need to have 100 per cent availability of data or face potential productivity losses, according to ‘Data Management: Data –The Forgotten Element of the New Economy’, the latest report from Europe’s IT analyst, Butler Group.

The report states that the arrival of the Internet and e-business has resulted in uninterrupted access to data becoming a key competitive factor. Anything less than 24x7 availability is no longer acceptable for many organisations, particularly those involved in heavily transaction-orientated environments where business is based on how fast users can execute transactions. At the same time, many companies are finding themselves in a situation where they are experiencing data growth at rates they can not sustain, leading to a surge in the amount of storage capacity that must be managed. Unless organisations begin to invest major budget in storage, serious data loss could ensue.

According to Susan Clarke, Senior Analyst at Butler Group: “Many organisations now accept that data is their most valuable asset, yet they are failing to take adequate precautions to guarantee the availability of that asset. The only way to determine whether a solution is cost effective is to compare it with the cost of losing that data. In the majority of cases, the ultimate price of losing vital data - the loss of the business itself - will always be greater than the cost of implementing adequate storage, back-up, and disaster recovery facilities.”

Storage problems can be addressed by using Storage Area Networks (SANs), and Network Attached Storage (NAS), which supplement existing architectures and offer more choices to improve performance, availability and manageability. However, implementing a new storage architecture will inevitably require high investment in terms of cost, expertise and time, due to the complexity of the task.

Commenting on the predicted growth of the storage market, Susan Clarke of Butler Group noted: “Storage is an area that has lacked investment in the past. We are about to see many more organisations investing in their storage infrastructures, so much so that by 2003, storage is expected to consume two thirds of the IT budget, providing new opportunities for vendors. No single company has a monopoly in this burgeoning area. Any one of a number of companies could emerge as the overall market leader.”

Contacts
This Report is produced in two volumes. The report costs £595 and can be purchased on-line at www.butlergroup.com or by calling Jane King on +44(0)1482 586149. Holders of Butler Group Press Passes can download this Report from Butler Group’s on-line Research Library

The Post Office unveils complete home shopping offer to e-delivery market
The Post Office unveiled its complete package of home shopping services – from warehousing to fulfillment, customer management to direct marketing expertise, and internet security - at the E-Delivery Expo and Conference in London.

The Post Office’s Marketing Director, Home Shopping, Nigel Moore, said: “The Post Office can now provide a one-stop shop for e-tailers, high street retailers, and manufacturers wanting to sell directly to customers, who need their distribution process taken care of from ‘end to end’. Royal Mail, Parcelforce Worldwide and Post Office branches are trusted brands of The Post Office, and experts in logistics and supply chain management with global reach.”
“The Post Office has exciting future plans in e-delivery to continue to meet customer demands for speed, reliability, choice of destination and timed delivery as well as managing returns, facilitating direct marketing, managing warehousing, on-line security and customer service.

“E-tailing is becoming a multi-billion pound industry and The Post Office is embracing e-commerce and demonstrating its leading position as an innovator in the industry.”

To meet the ever-exacting demands of both retailers and consumers, Parcelforce Worldwide last year launched time-slot deliveries to 9pm, now available throughout the vast majority of England, Wales, southern Scotland, and Northern Ireland. “The time-slot delivery choice provided an added dimension to the home shopping industry. Nearly 100 retailers, both catalogue and internet, are now offering this extended delivery service to their customers.”

A trial enabling consumers to nominate their local Post Office branch as an alternative address for the delivery of parcels, packages, and items requiring a signature is underway. Royal Mail's Special Delivery service is increasingly being used by internet companies specialising in light goods such as books and CDs because of its value for money, guaranteed delivery and online tracking attributes.

Contact
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Tel. 020 7250 2468 (24 hour)
148 Old Street, London EC1V 9HQ.

Coface and eCredit.com to explore joint market opportunities
Coface, the world’s largest private export credit insurance group and one of the UK’s top three credit insurers, has signed a Memorandum of Understanding (MoU) with eCredit.com, a leading global provider of real-time credit and financing solutions for Fortune 1000 companies, financial service organisations and e-businesses with operations in the United States, Europe and Asia/Pacific.

Under the terms of the MoU, Coface and eCredit.com will explore opportunities to offer enhanced eCredit.com and @rating solution options to clients of both parties.

Many of the world’s most innovative companies already use eCredit.com to manage their business-critical processes in the areas of credit, collections and leasing. The eCredit.com Global Financing Network intelligently connects businesses to financing partners and global information sources so that credit and financing decisions can be processed in real time at the point-of-sale.

As a result of the MoU with Coface, it is planned that the eCredit.com Decision Desktop (which enables its Fortune 1000 clients to analyse and manage credit requests), will incorporate a Coface credit assessment and debt protection component, based on Coface’s @rating product.

The MoU also proposes that Coface will join the eCredit.com Global Financing Network, (which links merchants and a broad mix of financial institutions to facilitate sales financing at the point-of-sale), as a provider of debt protection.

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Increasing rewards for the worldwide purchaser

Electronic business has opened up valuable career opportunities for professional buyers who are in high demand in this current era of e-commerce. Traditional organisations are reportedly finding it difficult to recruit professional purchasing people, as they are being lured away into the dot.com world, and have therefore had to increase the remuneration benefits they are offering to potential employees.

According to Purcon Consultants, who have recently issued figures showing the vast growth of opportunities for purchasing experts, salaries have been increasing rapidly. Rewards also include share options which have varying degrees of return, depending on the success or failure of the dot.com enterprise.

From a virtually standing start the company, which offers a recruitment service for the supply chain management industry, has increased the number of jobs in e-procurement positions more than four-fold.

According to Sarah Lim, Head of Recruitment at Purcon for the UK and Ireland, the number of opportunities had quadrupled by the end of 2000 against 1999 demand - with further opportunities developing in business to business and business to consumer sectors.

The push for professional purchasers has not just come from the plethora of internet companies, either. Many traditional Big Consultancy firms have been seeking high calibre candidates to bring their e-procurement businesses up to scratch and also train in e-business consultancy.

Typically salaries in this sector have ranged from £50k to £70k basic, plus associated benefits expected from blue-chip firms. Management grade roles have offered higher basic salaries, which have been around £80k or more.

But this isn’t to say that new e-businesses have not had a major impact on the purchasing industry. New and start-up e-Procurement consultancy businesses have offered upper quartile salaries to attract high calibre people - alongside the attractive share option deals which have rewarded many a ‘dot com’ risk-taker with valuable returns for their investment of time and commitment.

Salary levels within this area has been between £30k and £40k for operational buying staff through to £80-£90k to category leaders and business developers who typically have a customer relationship management focus to their roles.

The high levels of recent interest in purchasing people stems from the early beginnings of the e-business world where software and systems providers found it difficult to find the right selling messages to sell products to the purchasing community.

Dragnet E-Business shows SMEs how to optimise e-business customer contacts

Dragnet E-Business Limited – the UK’s fastest growing supplier of integrated and scaleable e-business solutions to the SME market - demonstrated how SMEs can take control of their own e-business functionality at the Softworld accounting and finance exhibition in March. Key Dragnet executives presented the latest strategies, directions and solutions to show how, by using the Dragnet E-Business solution, every e-business customer contact can be optimised. This will enable SMEs to streamline back-office business processes, maximise efficiency and deliver a higher standard of customer relationship management (CRM) to either the busi-
ness or consumer.

Mike Day, Managing Director, Dragnet E-Business, explains: “Without specialist IT departments, SMEs are often at a disadvantage and reject trading over the Internet because of the costs, manpower and time involved. The design of the Dragnet E-Business solution enables SMEs to reduce the expense of external IT support and unnecessary maintenance costs for everyday stock item and price changes. This provides companies with more control over their business as changes can be implemented immediately, increasing cost-efficiency and improving CRM by providing up-to-date information on the website.”

The unique Dragnet E-Business solution has been specifically designed to enable SME’s to add-on e-business functionality to their existing back-office accounting systems themselves, without having to employ expensive IT experts for every day maintenance, with immediate updates increasing CRM capabilities. By enabling SMEs to take control over their e-business they are now able to compete with the larger corporates at a fraction of the cost, time and complexity.

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Amethyst Group adds e-Capability to Autoflow
Autoflow has a long established and well earned reputation as an outsourced logistics company, initially within the automotive sector but increasingly for a broader range of high technology and leisure products. Autoflow can now provide the sound logistics core for complete e-service solutions and has become the delivery arm of the newly formed Amethyst Group.

“Our objective in creating the Amethyst Group and its e-service offering was to provide clients with total working solutions for their supply chain needs,” says Malcolm Hopkins, managing director of the Group. “The Internet has opened up exciting new potential and profit making opportunities and we can enable our clients to take full advantage of these. In particular, we can provide a total outsourced solution for traditional companies looking to enter the e-commerce marketplace for the first time, providing everything from the Internet storefront to product delivery and customer management services.”

Amethyst Group and Autoflow’s clients include Arbiter, Motorola, Sony, Warner Bros, ERF and Nortel Networks, to whom they provide a range of e-service solutions. Over the last two years Amethyst Group has made a significant investment to integrate core logistics systems with business-to-business and business-to-consumer software. Through this IT investment and Autoflow’s proven logistics capability, Amethyst Group can provide a complete internet enabled service from up-to-the-minute product visibility with real-time confirmation of stock availability plus order confirmation through to execution of immediate pick and dispatch.

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Commentary

Who's running your business's business?
IT Service Management plays a vital role in today's business and is too important to leave to the IT department alone, says Aidan Lawes, Chief Executive Officer of the IT Service Management Forum the not-for-profit industry organisation that seeks to promote industry best practice.

The Internet age demands that businesses cope with rapid and continuous change. Every delay, every glitch comes straight off the bottom line. Even if we aren't talking high-tech Internet solutions, we still need to understand in business terms the impact of the technology and any failings thereof. It doesn't matter if you've developed the slickest business application in the world, if it isn't accessible when and where it's needed and performing to the level required, then it's worthless.

Strong anecdotal evidence, supported by some empirical findings, indicates that 80% of customers using a web-site will walk away – never to return – if they are dissatisfied with the site's availability or performance.

How many people are put off from even using e-commerce because of horror stories in the press about security breaches? And how many of these subsequently turn out to be related to poor change management, lack of adequate testing or sloppy release control?

In sharp contrast, a recent study from the Gartner Group suggests that as much as 60% of the benefit that can be gained from any IT investment is directly impacted by the success or otherwise of the service management activities. Investing in efficient and effective service management is not an optional extra. It's fundamental to business success. Let's take some examples.

Superior SLAs: Meaningful service level agreements (SLAs) lay out unequivocally the service targets that are to be achieved – in business terms not techno-babble. The business needs a particular service in order to sell insurance, print and despatch invoices or pay the workforce. If it isn't available for any reason, the business doesn't care whether the network has failed, the server has crashed or the application's faulty. They just know that it impacts the business in some measurable financial manner - lost sales opportunity, delays in receiving revenue or a disgruntled workforce.

Problem management: Having a true proactive problem management function that seeks out root causes of potential or actual failures and prevents them from occurring or recurring returns a direct benefit to the business through reduced outages.

Change management: There is an old adage that the only constant is change. Standing still is rarely an option these days. A strong and effective change management function ensures that the right changes are implemented in the right way at the right time. No more vicious circle of poor changes causing problems leading to more change, etc. And the business pay-off? Perhaps it's bringing a new service/product to market ahead of the competition with a commensurate financial advantage.

Capacity management: Imagine a new service is planned. Early involvement of the Service Management team enables the capacity management function to identify resource shortfalls well in advance, investments can be planned and incorporated into budget cycles and
favourable terms negotiated. When needed, the right resources are there and ready.

These are just some examples. In reality, the Service Management processes are totally integrated - feeding off each other, supporting each other and all contributing to ongoing service improvement plans.

When thinking about service management, it is really not appropriate to focus on how much it costs to implement and maintain the processes. Rather the business should ask itself, what is the cost of not doing it properly? Quantify the cost of those lost orders, the extra overtime, the rework, the time spent handling complaints, the waste of staff time as they do things they’re neither trained nor paid to do.

So am I saying that IT departments aren’t doing service management? Not at all. It’s just that many of them are doing it neither completely, across all the disciplines with an integrated, holistic approach, nor as well as they could.

Best practice guidance is available through the IT Infrastructure Library (ITIL) from the CCTA and the new British Standard BS 15000; the two approaches being totally aligned and integrated.

BS 15000 is aimed at both providers of IT Service Management services and businesses that either out-source or manage their own IT requirements. It aims to assist specification for IT Service Management to ensure suppliers provide the right standard of service.

A ‘world first’

This is the world’s first formal standard for IT Service Management which lays out what needs to be achieved and how to set about achieving it. It complements the established DISC PD 0005 Code of Practice and the PD 0015 Self-assessment Workbook. Used together BS 15000 and PD 0005 provide a framework for comprehensive best practice.

BS 15000 specifies a set of inter-related management processes and is intended to form the basis of an audit of the managed service. Relationship management is addressed in this standard and is aimed at businesses that provide or require quality service.

Now there is a formal British standard, the itSMF is working on a formal certification scheme so organisations will be able to have independent auditors to assess their processes for conformity. In due course, organisations considering outsourcing will also be able to include BS 15000 compliancy as a requirement within their tender documents.

itSMF seminars and events are held throughout the year at major locations across the UK. Full details are available from the itSMF web site (www.itsmf.com). Events are also open to non-members.

The itSMF is the user group for the IT Infrastructure Library (ITIL) which is recognised as the de facto industry standard.

ITIL is currently going through a series of rewrites - and a number of new publications will be hitting the streets in early 2001. A full list of the publications available now can be found on the ITIL web site (www.itil.co.uk).
The public’s lack of faith in the Internet as a secure place for commerce has been one of the most limiting factors for e-commerce growth. Sites need to feel secure to end-users to allow them to trade online. There are also however legal considerations, which should not be overlooked.

The first starting point should be the Data Protection Act 1998 which came into force in UK law on the 31st March 2000. Most people will be familiar with the Act and the eight principles of good practice which form the cornerstones of a data protection policy. Of particular relevance is the 7th data protection principle which says:

“Appropriate technical and organisational measures shall be taken against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data.”

Most readers will be aware that the definition of ‘processing’ is a wide one as defined by s.1 of the Act:

‘processing’, in relation to information or data, means obtaining, recording or holding the information or data or carrying out any operation or set of operations on the information or data, including-

a) organisation, adaptation or alteration of the information or data,
b) retrieval, consultation or use of the information or data,
c) disclosure of the information or data by transmission, dissemination or otherwise making available, or
d) alignment, combination, blocking, erasure or destruction of the information or data;”

s.4 of the Act makes it a duty of a data controller to comply with the data protection principles in relation to all personal data with respect to which he is the data controller.

As well as the Data Protection Act 1998 there may also be additional regulation for certain types of Internet activity which will be relevant to a business’s e-commerce security policy. As an example in the UK it has been reported that the FSA have said that they intend to keep a close eye on the security practices of e-banking sites and they will call e-banks to account for any breaches.
All of this means that every organisation must have regard to the state of the art in technology and consider on a regular basis whether, given the nature of the data held, additional security measures should be brought into place. A data controller must also take reasonable steps to ensure the reliability and compliance of employees who have access to personal data and, as a result, an employee policy, properly policed, is likely to be mandatory. If data is processed on an organisation’s behalf by a third party, or transmitted outside the EEA then additional measures must also be put in place.

The UK Act is mirrored by legislation in other jurisdictions. One high profile case this Autumn concerned the Spanish version of Big Brother. In Spain, like in the UK thousands of applicants sent their details in to the TV company with the hope of taking part. Some of the personal details of around 1,700 applicants appeared on a fanclub website after an attack on the TV company’s server. In Spain, as in the UK, an attack like this offends against data protection legislation. It was reported that as a result the programme makers might face a fine up to $4m for its breach, together with civil actions from the unlucky contestants whose details appeared on the fan club site.

As well as the potential criminal liability that a breach of the 1998 Act brings an insecure website could also lead to civil liability. We have already seen the press activity surrounding the recent problems experienced by financial institutions with their online security and it is easy to imagine an aggrieved customer bringing proceedings against a bank for breach of the duties they owe to their customers. Potentially substantial civil damages could result if the customer concerned can prove loss. Even the frantic alteration of online banking terms which many banks have been engaged in may not stand up to judicial scrutiny. In the one recent incident a company reportedly offered £50 per customer to compensate for its security problems – a potentially tidy sum given that one customer claimed he could access 5,000 client details.

Customers could also start proceedings if they are unable to access a site. By way of illustration we can look at the reports from Sweden in December 1999 when a Swedish bank updated its system to cope with the Y2k change. BBC News reported that ‘millions of people’ might have had trouble shopping online or checking their bank accounts because of the problem.

As well as the problems faced from outsiders getting in in the US two cases have shown us that data must be kept secure, even perhaps from the purchasers of a company’s assets. The most high profile case concerned the collapse of the online retailer Toysmart.com. Toysmart had published a privacy policy on its site saying how it intended to deal with customer information. Its policy said that personal information voluntarily submitted by visitors to the site (such as name, address, billing information and shopping preferences) was never shared with third parties. In the UK a policy like this is effectively mandatory since the Data Protection Act 1998 came into force. Toysmart was sued by the US Federal Trade Commission (FTC) for attempting to sell customer information in breach of its privacy policy. This happened after Toysmart went down and attempted to sell its assets, including the personal data collected. In the aftermath of the prosecution two US senators have called for legislation to deal with this
specific type of complaint. Senators Patrick Leahy, (D-Vermont) and Robert Torricelli, (D-New Jersey) attached the proposal to a broader piece of legislation that seeks to reform bankruptcy laws. In a letter seeking support for their new Bill they said: “Customers have a right to expect a firm to adhere to its privacy policies, whether it is making a profit or has filed for bankruptcy. Our bill closes this loophole in the bankruptcy code and ensures that online and offline firms keep their promises to protect personal privacy.”

The case has also caused embarrassment to the majority owner of Toymart, Walt Disney Company. Reports in the US say that it offered to purchase the customer list to ensure that the data remains confidential. This led to the FTC agreeing to a sale, subject to stringent conditions which are likely to significantly affect the value of Toymart’s assets. The FTC’s concerns in the Toymart case were echoed by the collapse of another US Internet retailer, www.living.com. Living.com announced that it had entered into a settlement agreement with the Texas Attorney General regarding any future sales or transfers of living.com’s customer list. The settlement still requires the final approval of the court but under the terms of the proposed settlement the court-appointed bankruptcy trustee will oversee the destruction of customer personal financial data such as credit card and bank account details. While the bankruptcy trustee may then sell or transfer the customer list excluding those details she must first give notice to all of living.com’s customers and give them the chance to opt-out of the proposed sale. The settlement also requires the bankruptcy judge to approve the notice and opt-out form sent. Clearly as a result of the intervention the value realized by the sale of living.com’s assets is likely to be severely reduced.

All of these developments show us that security and personal privacy are likely to be keystones of an organisations’ development on the Internet. Every organisation needs to think carefully when it changes its site and to have a properly drafted access agreement to regulate its liability with its customers. E-commerce companies who disregard security or give it a low priority will find themselves in trouble, in prison or out of business.

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Biography


Jonathan is Chairman of Sheffield Business Club, a committee member of the South Yorkshire ICT Sector Board and is a member of the following organisations: The Intellectual Property Lawyers’ Association, Business Working Group CoMPRIS South Yorkshire, The Chartered Institute of Marketing and the National Computing Centre Legal Panel. He is also an experienced broadcaster.
1 Introduction

A number of initiatives have arisen recently in many European countries, evolving around the concepts of Made to Measure Manufacturing and Retail shopping via the Internet. The combination of these new services is now possible by the emergence of technologies, systems and practices, such as 3D whole body scanners, automatic body measurement S/W, 3D CAD systems for the customisation of existing styles, Virtual-try-on visualisation techniques and new smartcard technologies (multi-application Javacsards).

The main objective of E-TAILOR is to develop a comprehensive innovative platform enabling the integration of new specialised forms of clothing retailing (virtual-home shopping) with new high value-added services to the customer, namely the production of personalised garments at reasonable prices, in short time and with a close to perfect fit.

These new technologies promise a significant potential for the stimulation of the European clothing manufacturing and retailing sectors; however, significant impediments must be removed in order to achieve a successful launching of the related applications and services.

E-TAILOR is founded on a global approach, global in terms of tackling all problems, global in terms of establishing a critical mass of all major players, global in terms of it's methodological approach combining both R&D and real state-of-the-art applications (demonstrators). Figure 1 contains a schematic of the entire E-Tailor system.

E-TAILOR has the following technical/scientific objectives:

- To develop tools that will contribute to the solution of the sizing problem (non-uniformity of size designations, aggravated by the lack of compatibility of sizing systems and the growing number of countries in the EU).
of updated body measurement data on European populations), in the form of a European Sizing Information Infrastructure (ESII). ESII will serve as a unification platform ensuring conformity in the storage and processing of sizing data, acquired in future full-scale sizing surveys, organised either by the member states or by the EU. The specifications for the content and data representation formats of a European Anthropometric Database (EAD) will be defined in common by the E-TAILOR User Group, prominent Clothing Institutes and the relevant standardisation committee (CEN/TC 248/WG 10, for the development of a standard size designation system of clothing).

ESII will consist of:
- A European Anthropometric Database (EAD), linked to advanced tools for 3D body shape analysis, leading to the generalisation of body shapes and the production of a Library for Generic Body models of European populations.
- ESII will be embedded in a web-based Sizing Information Service for the European fashion industry.
- To develop a Customised Clothing Infrastructure (CCI), consisting of:
  - intelligent design systems, based on rules and practices of human tailors (computer version of the tailor’s brain)
  - Order clustering and specialised ERP ele-
ments for the optimisation of the entire supply and production chain for overall quick response and cost effectiveness.
- CAD interoperability standards

• To develop a realistic and efficient clothing simulation and animation platform, accessible by kiosks and via Internet, and enabling the customers to visualise realistic models of themselves (obtained from 3D scanners), wearing ‘real’ clothes with selected colours and accessories from the retailers collection (Virtual Try-on). This will tackle the need for specific interfaces required for Virtual shopping of clothing (the mirror or dressing room problem). The development of these tools will be based on existing state-of-the-art Virtual Reality systems used to dress and animate virtual mannequins. Further R&D will enable:
  - the dressing of customers 3D models with garment descriptions imported from CAD systems;
  - the displaying of clothes with texture rendering different aspects of garments (such as fabric texture, seaming, buttons, zips, etc.);
  - simple animation of the customers models, moving them to different positions, e.g. front, rear view, raising their arms, etc.

• To develop a generic 3D framework tackling the problem of inconsistent body measurements obtained from different scanners and related measurement software. Combined efforts of 3D scanner manufacturers and R&D centres will lead to the development of:
  - Generic body representations at various levels of symbolic abstraction for exportation to other applications, such as shape analysis, CAD systems and Virtual Try-on S/W;
  - Generic representations of measurement data, as well as suggestions for standard EDI messages for the communication of measurement data;
  - System independent measurement extraction S/W.

• To develop a comprehensive Customer Data Infrastructure (CDI) for the collection, storage and legitimate exploitation of customer data (including body measurements, personal preferences, etc.), thus tackling the problem of customer acceptance for the whole service and the problem of issuing multiple non-interoperable cards for the same customer.

• To integrate current state-of-the-art systems (3D scanners, MTM CAD, Virtual Shopping applications) in the form of across the value-added chain demonstrators. Demonstrators will, however, serve both as reference for the development of advanced systems, as well as testing and evaluation sites for new developments. The combination of R&D and Demonstrators will thus result in a new paradigm for comprehensive Virtual retailing services of customised clothing.

Since the project is so large and covers a variety of areas, The E-Tailor project is split into three sub-projects, the European Sizing Information Infrastructure (ESII), The Customised Clothing Infrastructure (CCI) and the Virtual Shopping Infrastructure (VSI). The following three sections will explain the sub-projects in detail.

2 Sub-project 1: The European Sizing Information Infrastructure (ESII) and related automatic body measurement technologies (3D scanners)

2.1 European Sizing Information Infrastructure (ESII)
The actual situation of the different size systems utilised by European clothing industry and
retailers is confusing and unsatisfactory. The size labeling is different from country to country. Up to now, there is no common size system available in the European Community. As the current sizes are not comparable between the countries, industry and retailers face enormous problems when they want to export or import garments within the European Market. This is known as a huge impediment to the further development of the EC Market.

In 1990, the European Commission stated in a paper that “it would be useful to carry out a measurement survey of the European population in order to build up a system of size normalisation available for the clothing industry and valid for all Member States.” In the face of the upcoming new MTM production the necessity has increased enormously. The objectives of establishing an ESII are:

• To develop a standardised framework and platform (infrastructure) for the deployment of a large scale European Sizing Survey (funded by external sources) for setting up a system of standard sizes to be used in the Member States
• To set up a Web-enabled European Anthropometric Database (EAD) in order to offer a new service to the European clothing industry and other interested industries
• To develop tools for standardised interpretation of anthropometric data (advanced shape analysis software, generic body models)

The ultimate target will be to organise and carry out a measurement survey in the European Community in order to get clear and extensive information about the distribution of the body measures in the population. A pilot technology proofing survey (approximately 1,000 persons) will test, populate and validate the European Anthropometric Database. The European Anthropometric Database (EAD) and the related innovative tools will offer a new service instrument to the European clothing industry, retailers, mail-order companies and other related industries.

2.2 3D Body Measurements and Systems
Existing whole-body scanners permit fully automated sizing surveys and rapid individual measurements for custom clothing applications. However, the different 3D data acquisition techniques, the different scanned data formats and the varying measurement application software, result in inconsistent measurements across various systems (hardware and application software dependencies).

The main objectives are:

• To assess current systems (3D whole-body scanners, automatic measurement techniques) with respect to measurement consistencies;
• To develop standard representations for 3D raw data and measurement data, generic 3D body models, enabling the development of configurable interfaces to CAD systems, shape analysis and Virtual-Try-on S/W;
• To develop body measurement software, which is system independent, with the aim of achieving, as far as possible, unified and reproducible results obtained from different scanning systems.

3 Sub-project 2: Customised clothing infrastructure
The successful launching of ‘made-to-measure’ services in the clothing industry is critically
dependent on the following criteria:

• The fitting of the garments should be much better than the fitting of mass-produced clothing;

• The process for adapting existing styles to personalised measurements (alteration of existing patterns) is mainly based on geometrical transformations, based on the body measurements. However, in a true made to measure environment, only a handful of people have the skills and knowledge necessary to custom tailor a garment.

• The additional costs and delivery times involved in customisation. The whole ordering, design, production and logistics chain involves significant additional costs, compared to mass production. The client would not in general be prepared to pay more than an excess of 20%-30% to buy a custom-made garment. Furthermore, he would expect his order to be fulfilled in less than a week (3-4 days).

The processes that affect cost and delivery times are:

• Order handling processes. MTM orders are essentially unit orders;

• Communication processes;

• Design and production processes. Pattern alteration, marker making, cutting, sewing, finishing, packaging and delivery have to be done to the unit and, therefore have to be optimised.

• Raw material management is also critical. Fabric management must also be adapted to unit manufacturing.

The combination of these requirements lead to the need for the design and implementation of intelligent pattern alteration systems and an IT system (MTM - ERP) to optimise the whole MTM supply chain so that:

• Fitting is close to what is expected from an experienced tailor;
• A fast response time (less than 4 working days) is achieved;
• A minimum inventory of fabrics and other material is kept maintaining a good service level; and
• Machine set-up times and material handling are minimised.

E-TAILOR’s Tasks to meet the above requirements are:
• The design and development of an intelligent pattern alteration system and a morphological editor, which will enhance the design and customisation capabilities of current MTM CAD systems;
• The development of critical components for a highly specialised (MTM focussed) Internet enabled ERP system. The following figure (Figure 3) illustrates the main elements of an integrated MTM MRP.
• Suggestions for interoperability standards, which will enable the exchange of data between CAD systems of different suppliers.

4 Sub-project 3: Virtual shopping infrastructure
Most of the existing clothing simulation and animation systems are either non-realistic, or too slow. They all require extensive user interaction and none of them permits clothing simulations on bodies of real humans, with real garments from the collection of a manufacturer, or retailer. Furthermore, data volumes and processing times do not permit simulations on the web.

4.1 Objectives. The objectives of sub-project 3 are:
• To create a realistic and functional virtual shopping environment in the form of a comprehensive interactive service to the customers at retail kiosks and on the web. The core innovative tasks relate to the development of advanced clothing simulation techniques and software, enabling the customers to visualise realistic models of themselves (obtained from 3D scanners) wearing ‘real’ clothes with selected colours and accessories from the retailers collection (Virtual Try-On software) and order with their customised smart cards;
• To integrate the Virtual Shopping Service with 3D scanners, CAD-CAM scanner-Web interfaces, Multi-application Smartcards and electronic catalogues.

The approach is to take the following as inputs:
• 3D human body modelled with 3D scanners.
• 2D garments from clothes CAD/CAM software.

To process the following:
• Assemble and seam the 2D garments to create a 3D garment;
• Dress the virtual mannequin with the 3D garment;
• Visualisation of the dressed mannequin for the web.

This approach requires the developments of interactive manipulation tools for 3D pieces of fabrics. The 2D garments are then imported into a 3D environment in two steps.

Step 1. From geometric 2D patterns to 3D physics-based pieces of fabric
This first step implies to import 2D CAD/CAM patterns, which only contain geometric and topological information (shape of the patterns, and seaming associations between patterns) and then convert them into 3D pieces of fabrics,
which requires to convert the 2D patterns into a data structure that can be supported by the fabric mechanical model. The basic aspect of that process is constrained by the discretisation needed to perform the mechanical model simulation:

1. 2D CAD/CAM importation
2. 2D patterns discretisation
3. 2D patterns physical, texture, colour properties assignments

Step 2. Assembling fabrics and pieces on the virtual mannequin - automated mannequin dressing
The approach is similar to the one used by tailors when they assemble 2D paper patterns onto a mannequin. They use pins to assemble the paper patterns directly onto the mannequin. For that purpose, there are some specific features (lines) on the mannequin that allow the tailor to know where to pin which pattern of paper. The result is a “dressed” mannequin, although the
The garment was directly assembled onto the mannequin. Similar features will be added onto the 3D scanned body in order to allow a direct placement of the 3D patterns on the mannequin. Once the garment is assembled and the mannequin is dressed, the physical simulation will give its precise shape to the garment, so that it fits to the mannequin it is attached to. Different postures of the mannequin can be chosen.

In Sub project 3, the project is developing a Smart card-based Infrastructure for Customer Data Collection and Handling. The smart card market in Europe has matured and grown significantly in the last few years. A number of proprietary electronic purses, telecommunications payment cards and loyalty schemes are available. There are a number of significant manufacturers of smart cards in Europe and hardware and software innovation continues rapidly. In the E-Tailor project, participants will develop and trial software/hardware components for the delivery of smart card mediated point of sale applications. It is foreseen with the widening of e-Commerce, the point of sale will move out of the retail unit and into the home, work place and public spaces through a variety of telecommunications enabled devices. It was decided to store on a smart card as the Secure Personal Data Storage (SPDS) because it will give a citizen full ownership and control of personal data, thus addressing privacy issues. An alternative would be to store the data in encrypted form and allow access by supplying a decryption protocol using a smart card.

The research and development undertaken in E-Tailor will feed into Smart card-based products with the following competitive features:

- Facilitate multi-application smart card applications for payment, transport, individual authentication etc.
- Be portable across a wide range of hardware/software architectures including embedded devices and main-stream e-commerce applications
- Be portable across a wide range of point of sales venues – phones, PDA’s, kiosks, public communications terminals and PCs
- Abide by emerging standards for smart cards, embedded systems and e-commerce applications to ensure maximum portability of our intellectual property.

5 Acknowledgements

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6 References


Biography

James Clarke is a Project Manager with LAKE Communications in Ireland. James has an MSc. in Applied Mathematics (1992) and a B.E. in Electrical Engineering (1986). He is currently a Project Manager co-ordinating the company’s activities in the IST E-Tailor project. James is
responsible for both Hardware and Software design and development. From 1995 to 1999, he was Project Manager of the ACTS BrOadband Urban Rural Based Open Networking (BOURBON) project carried out for the European Commission. The BOURBON project addressed the issues of providing cost effective, scaleable access to advanced services over Asynchronous Transfer Mode (ATM) networks for Small and Medium Enterprises (SMEs) involving nine European regions with operating testbeds ranging from ATM to ISDN. From 1986 to 1994, he worked at Grumman Corporation where he was involved in researching and designing computer software for design analyses of prime power systems for aircraft and spacecraft. He later became the Team Leader in a group called Software Engineering Support Environment (SENSE). The goal of the SENSE department was to provide software engineering support for engineering disciplines such as Power Systems Engineering, Radio Frequency Design Dept. etc.
CASE STUDY

The premise
The Internet is here to stay, so whether you develop a capability now or in the future, you will need to consider how you are going to use it. Even if you are using the Internet for a particular purpose, such as the transmission of electronic mail, you will find that you will need to widen your use of the Internet in due course. The pressure to make such changes will come about by internal and external demands, as well as the need to re-shape part or all of your business within the parameters of the virtual environment.

Given the Internet will not go away, you have three essential tasks:

• What to do about it.
• How to go about doing what you plan.
• What effect the changes will have on the board and the organisation of the company.

Each of the above headings will be considered in turn below.

What to do about the Internet
If your response to date has been to do the minimum, which may mean you have e-mail installed or a web site containing an electronic version of the corporate brochure, do not despair. Your aim should be to tread carefully. The early spin of the dot com sector was over in a flash in the early part of 2000, and although some electronic companies may remain over-valued today, nevertheless bricks and mortar companies have time to reflect and consider how to develop a practical and effective way forward.

Resources
Responding to the Internet demands resources. You should establish what resources you have and how much you are prepared to devote to the development of an effective virtual presence. The emphasis must be on the effectiveness of your Internet presence, otherwise you will be wasting your money. It is crucial to ensure adequate time and investment are given to develop your response. If you fail to devote sufficient resources to your internet strategy, the results will be glaringly obvious to the entire on-line world.

Think before you react
Many commentators repeat the slogan that there is not enough time to think. “Just do it”

Keywords: E-business, Planning the future, Methods of change, Avoiding legal risks

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E-business and the Board

Abstract: Like the telegraph and the telephone, the advent of the Internet means the way human beings interact with each other will alter and change. In many ways, it is difficult to foresee how the Internet will be used effectively by people in business. This paper will consider some of the issues and offer a personal view about how directors on the boards of companies should consider reacting to the ubiquitous nature of the Internet.

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is a phrase that easily trips off the tongue, but is full of empty rhetoric that means nothing. Even in the fast moving world of the Internet, doing without thinking is a disaster. You should give yourself time to react to the changes that have already occurred in the virtual world. Consider the mistakes and successes of others. Ask your customers and employees what they want or think they might find useful from the Internet. Consider the board and management issues, because both groups of people will be affected by the changes to the business.

Deciding who is to lead the project
It may be that the people employed in the business are already working longer hours than you wish. To ask somebody in the organisation to be in charge of your e-business development may be asking for trouble. Passing a major business development to an over-stretched individual with few resources and little or no understanding of the new environment may be considered foolhardy. However, it might be that you should consider charging one, two or even three key employees with the task of thinking about how you enter the virtual world. Consider giving a wide brief and six months free time to a small number of your key employees to give some thought to the issue. The alternative, which can be as effective, is to employ an outsider to help formulate and develop a policy. If you consider this option, you need to attract a person who is willing to find out what makes your business tick, where the profits are made, how your business ethos attracts customers and why customers keep on buying from you. An outsider will understand how your company works in a different way to the way you perceive the business. This can produce original thought and offer solutions that better match your business model.

Before you even give thought to your future business model, ask yourself further penetrating questions, such as whether you want to get into the virtual market yet. If you do, establish the practical problems that exist, such as how the provisions of the recent Consumer Protection Regulations will shape your returns policy if you deal direct with consumers. When you intend to enter the Internet market, consider what is the most appropriate way of using the new technology, the third generation of mobile telephones and the arrival of digital television.

The business model
Consider your e-business model carefully. There are many types of model to consider. Some or all of these may affect you, depending on the nature of your business. In essence, the core objective is to ask what you want to achieve, not what technology is available. By making sure the technology is subordinate to the aim, you will be less easily diverted from your main proposition. It is crucial to be aware of the competition; ask yourself whether your on-line needs can be or should be separated from your traditional business model and speak to your suppliers, staff, customers, analysts, shareholders and alliance partners.

Ask key questions: What commercial needs will you be addressing? Do you aim to reduce your costs? Will you be looking for ways of gaining new customers? Do you wish to consider trading with others for mutual benefit? What and to whom do you intend to offer in the virtual world?

Your e-business may well bind you to those that supply you, whilst e-procurement will bind you to your suppliers. The e-commerce model
may be the most difficult to develop, because there are so many factors to take into account to get the delivery right for the customer.

Essentially, you must consider the payment system you wish to offer; how to provide payment facilities for children (if they buy your product or service) and how to develop a delivery model if you do not have an infrastructure in place. There are many different models in place, and you may wish to consider the range of options and test their effectiveness before choosing the most appropriate.

Do not be afraid of changing your business model. You can go it alone, as Tesco have done. Their virtual presence is tightly intertwined with their real presence. Alternatively you can enter the market by the way of shopping malls, which Marks and Spencer are beginning to do. Finally, Wal-Mart have chosen a different model, by setting up a separate entity with a venture capitalist company to take their Internet ideas forward. Neither Tesco nor Wal-Mart make a profit, but both have established a virtual identity by different routes and have, to a certain extent, succeeded in retaining a visible market presence.

**How to go about it**

To a certain extent, this part of the analysis is linked to the notes mentioned above. You must consider what resources you are going to devote to the electronic business. If you decide to develop solutions in-house, you must consider involving as many people as possible - employees, managers, board members, suppliers and customers. The aim is to open up responses from everybody, because you do not know where the best ideas will come from. If you ask for external help, it will be crucial to ensure the consultant is committed to involving everybody in the business chain. Tight budget controls and a realistic timetable with a built-in overrun are probably essential.

Whatever model you choose, you should seriously consider the backbone of any electronic system you develop. First, you must consider whether it should be developed in-house or outsourced. Whichever you choose, you must have automatic back-up in parallel in case of failure. When you develop a web site, pay attention to such practical, but crucial issues as ease of navigation, how effective your home page is, what links you agree to include, how the customer is to order from you and whether you are going to offer on-line service and support.

Project management should not be ignored. Although it is recommended that you give time to consider what you should develop and how to revisit your business model, speed should, eventually, take the process over. For instance, decisions, when made, should be made quickly. Whoever directs the project, they should be of such a disposition that they can cope with a project that will inevitably have a high degree of uncertainty and chaos attached to the process. It is crucial, therefore, that there are high-level board contacts with the project leader.

**The project**

First, the objectives and potential achievements will need to be set out. Before this can be done, you will have to establish what drives the business. In the process of development, the aim should be to expand the horizons of everybody in the business. The electronic world should aim to extend further into your organisation than you may originally felt was appropriate, although you should not allow for too many developments, otherwise the project will never be finished.
may be appropriate to develop some ideas later, after the core system is in place and working. This means you will need to think about re-engineering your entire organisation and educating everybody to consolidate the effectiveness of the result. Setting out what drives the business, who the customers are and what the customer needs can help to establish the objectives.

Second, a framework can be established to implement the objectives, covering the scope, activities and practical issues that should involve everyone. Finally, the operating framework should be taken into account. The internal and external electronic infrastructure should be complimentary and add to the overall success of the project in leading the business forward.

The Board
There are three phases that should be considered when tackling the virtual revolution. The first phase is a high-level consideration of the risks. Establish, by means of an audit, what the company uses electronically. Set out the risks, both practical and legal, and evaluate the level of risk. Having completed this exercise, you should identify what effect the risks have on the effective running of the business. Your aim should be to reduce the risk to a minimum.

Phase two permits you to begin to plan for the future. Consider integrating your electronic hardware and software. Evaluate procedures and streamline systems where the process of integration permits you to do so. Limit lines of authority in the electronic structure to ensure people are permitted to do more than undertake the functions within the scope of their job. Implement effective, but not necessarily multiple, communications in place for the board, senior management, employees, suppliers and customers. During this process, permit everybody in the organisation the time from work to think the unthinkable. This can be out of hours or during the working day. However this is managed, those taking part must feel secure that they will not suffer for their suggestions. The aim is to create a dynamic process of re-designing the working environment. By undertaking these exercises, the business will go through a re-evaluation that can cause fundamental changes to the business model that may increase returns accordingly.

Phase three is a time of consolidation. Carry out another audit to measure the differences between the two phases. Encourage everybody in the business to establish best practice in the new environment. In particular, you should aim to reduce the quantity of the workload to increase the quality of the employee work experience, which should lead to greater satisfaction of the customer. Do not fall into the present dot com trap of encouraging customers to send e-mails to you and then failing to answer them. Have telephones that are answered by real people who know the product and are familiar with your procedures.

The exercise is aimed, ultimately, at getting the customer to feel they are the first person your business is concerned with. Beware the present e-commerce model that seeks to get the technical issues right whilst failing to provide the customer the service they are led to expect.

The future and the Internet
The Internet is in a constant state of flux that is controlled by millions of people the world over. Business can only hope to identify opportunities and develop an effective infrastructure that will cope with the dynamic nature of the virtual
world. Used as a tool to modify your business, you should aim to remain independent of its influences.

The main characteristic of the Internet is its fluidity. Power is dispersed to the mass of users. Design constantly changes and is different from country to country. Do not fail to understand that culturally, the Internet is not a massive English-speaking world. Each culture has different likes and dislikes in web site design, and you are not going to sell to speakers of other languages by producing web sites in the English language only. Some commentators suggest the future is a world where the English language is used everywhere because of the Internet. Beware of this attitude. It is a form of cultural imperialism that you should avoid. If you fail to grasp that other people wish to use their language on the Internet, just as they do in their daily lives, you will not sell to them. Remember that mass international travel has been with us since the mid 1960’s, yet we can visit many countries some forty years later where English is not spoken as a matter of course. This will not change.

Users will continually make new demands on the Internet, and software will have to be constantly developed to cater for these needs. Failure of any board to take this message up as a challenge to development your business may be considered to be negligent.

Now is the time to develop the skills to cope with the electronic environment. Your business will be affected by the virtual world. It is a matter or establishing how to incorporate your business into the new environment. The dynamics of key relationships will alter, such as relationships between the buyer and the seller. Incidentally, do not think the person in the middle of the transaction will fade away, but be prepared to incorporate different ways of selling into your virtual world.

It is the responsibility of the board to lead the way and consider how to ensure people remain loyal whilst changes occur. Try to think beyond the box, and re-define your relationships in the company. Develop networks of like-minded people that help develop and improve the business generally. Your aim should be to control the process and the dynamics of change, channelling the collective efforts of the people that make up your business into a planned and co-ordinated vision of the future.

A final note of caution. This article has not considered the legal issues relating to the virtual world. Care should be taken to ensure you get advice from a lawyer that is aware of the nature of the Internet, together with its successes and failures, before taking decisions. Involving a lawyer familiar with the Internet at an early stage in the proceedings help to define the legal limits of the business model. Failure to consider the legal ramifications until the project is almost finished will cause increased expenditure, wasted time and the possibility of failure. Finally, make sure you have flexible legal agreements in place with all the players in the development of your plans, including software and hardware companies. Many projects have failed because of the early promises made prove to be hollow, and dealing with the aftermath of failure is time consuming and costly in legal fees, which is to be avoided if possible.

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Biography
Stephen Mason spent nine years as an ammunition technician, including bomb disposal, in
the army before taking his first degree as a mature student. He subsequently qualified as a barrister and practised at the bar before specialising in e-business, IT and commercial law with Fennemores Solicitors. He has given a substantial number of seminars on e-commerce, has written the legal commentary of the revised version of the Risk Management chapter of the Encyclopedia of Information Technology Law and more recently has drafted ten e-commerce precedents that will be available on a business portal in the spring.
Internet Advertising and Consumer Price Searching Behaviour

Abstract: The late 1990s saw a phenomenal growth of E-commerce. Simultaneously Internet advertising has provided a new medium for advertising. The paper aims to critically examine the strategic motives behind Internet advertising for Internet retail prices. The analysis is closely related to the economic implications of the diversity in consumer’s ability to acquire information relating to products and seller prices. The results of an elemental game model show that sellers can derive higher sales revenues when using either a strategy of continuously low or, a mixed strategy of high or low prices periodically. The model generates interesting results arising from the fact that some potential Internet consumers are often subject to the constraints of time and therefore employ search agents. Principal agent aspects of consumer price search are then examined and implications derived.

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Introduction

A milestone in internet advertising was reached in November 1994 when banner advertising was released on the net as viewerships exceeded 20 million. Since then advertising has become popular and is now utilised as a mass medium for advertising. Accompanying the growth of Internet advertising is the increasing use of the Internet and the phenomenal development of e-commerce. By and large, the fundamental driving force behind booming Internet activities has been the unrelenting process of rapid market liberalisations in the world telecommunications industry since the mid 1990s, alongside improvements in technology, particularly in the transmission of data. A decade ago, few would have expected that the globe could be wired up such that the international exchange of information/data could be cost effective and efficient. The Internet medium has virtually unlimited space, so this results in low costs for locating and publishing information. These advantages favour the continued growth of the new advertising medium. The rising trend in levels of Internet advertising is seen in the growth of Internet advertising revenue (Table 1).

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<th>Year</th>
<th>On-line Advertising (US$million)</th>
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<td>1995+</td>
<td>40</td>
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<td>1996</td>
<td>266.9</td>
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<td>1997</td>
<td>906.5</td>
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<tr>
<td>1998</td>
<td>1,265*</td>
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<td>2000</td>
<td>6,500**</td>
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Source: Internet Advertising Bureau (IAB) 1999, +www.Internetnews.com/  * First three quarters total only, ** Forecast value
The volume of advertising expenditure on the Internet increased many times in the relatively short period since 1994 and future spending is expected to reach $6.5bn per annum in 2002. Volumes of Internet advertising and e-commerce are closely related. The Internet trade covers a wide range of consumer activities, and future trends are buoyant (Table 2). The explosive growth in Internet activities is clearly illustrated in the booming transaction values on the Internet (Table 3). However, on-line activities are not only restricted to consumers. In recent years, business-to-business e-commerce have increased dramatically, representing 65% of overall e-commerce in 1998. This is expected to rise to 78% in 2002.

The large on-line usage and tremendous development potential for business and entertainment provides for ever-increasing growth in the aggregate volume of Internet advertising. Even though there are vast differentials in the number of on-line users in different countries, the sheer scale of influence is increasing and is seen in the growth of Internet hosts (Table 4).

### Table 2: On-line Trading Trends in OECD Area (2000-2005)

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<td>All</td>
<td>100</td>
<td>500-600</td>
<td>32,000</td>
<td>168,000</td>
<td>425,000</td>
</tr>
<tr>
<td>Consumer</td>
<td>-</td>
<td>-</td>
<td>11,200</td>
<td>-</td>
<td>93,500</td>
</tr>
<tr>
<td>Business</td>
<td>-</td>
<td>-</td>
<td>20,800</td>
<td>-</td>
<td>331,500</td>
</tr>
</tbody>
</table>


### Table 3: Transaction Values Via The Internet (US$ million)

<table>
<thead>
<tr>
<th>Region</th>
<th>Compound Annual Growth (%)</th>
<th>Hosts 1993-96</th>
<th>Distributions of Internet Hosts in January 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>111.0</td>
<td>0.6</td>
<td>0.097</td>
</tr>
<tr>
<td>Asia</td>
<td>136.9</td>
<td>6.3</td>
<td>1.014</td>
</tr>
<tr>
<td>Europe</td>
<td>63.8</td>
<td>21.9</td>
<td>3.53</td>
</tr>
<tr>
<td>LAC*</td>
<td>152.4</td>
<td>1.0</td>
<td>0.161</td>
</tr>
<tr>
<td>Pacific</td>
<td>84.5</td>
<td>3.7</td>
<td>0.596</td>
</tr>
<tr>
<td>North America</td>
<td>90.0</td>
<td>66.5</td>
<td>10.71</td>
</tr>
</tbody>
</table>

Source: Kelly and Petrazzini (1997), * refers Latin America and the Caribbean
Inspection of Table 5 indicates that the comparative number of on-line populations in different regions in 1999, which is now reaching a total of 150 million. This overall number is expected to reach 300 million by 2005 representing just less than 5% of the forecasted world population\(^{(21)}\).

This cumulative and progressive growth in the new advertising channel should alter the balance between key marketing variables, such as products, distribution and prices. In strategic terms, Internet advertising should help eliminate entry barriers in previously insulated and protected markets. Thus small entrants may take advantage of the low costs of the on-line medium for promotions which should relax more resources for marketing activities. According to Ling et al.\(^{(22)}\), even though the direct effects of Internet advertising on sales are still fairly small, the medium can be effective in assisting cross-media advertising. It is now a fact that TV or press advertisements carry a web site address to facilitate the search for more specific Internet advertising information. Chote\(^{(23)}\) argues that the unprecedented pace of Internet development has created enormous entrepreneurial possibilities. Moreover, Bakos\(^{(24)}\) argues that e-commerce tends to reduce market power. Copeland\(^{(25)}\) and Hopper\(^{(26)}\) use the airline industry to demonstrate how the electronic marketplace helps to increase price competition and consequently reduces the market power of sellers. Moreover, the development of the Internet marketplace increases consumption choices and product mixes. Hence, as advertised information (supply) increases in the global marketplace, increased competition should exert an increased-downward pressure on market prices. This common perception motivates consumers who search for bargains by surfing the Net. Ironically, on-line retailers can utilise pricing strategies to reinforce pricing messages and increase sales revenue. In the following sections, we analyse the strategic aspects of Internet advertising. A game theoretical analysis is employed to analyse strategic moves and potential outcomes for Internet pricing games. The game models consider business to consumers configurations and principal agent games for B2C E-commerce. The contribution of this paper is twofold; i) to consider the impact in markets of using software agents for consumers choosing to buy goods and services from quality and discount retailers, ii) to assess the principal agent issues raised by interaction between consumers and search agents in the realm of

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<tbody>
<tr>
<td>Africa</td>
<td>1.0</td>
<td>0.8</td>
<td>1.03</td>
<td>1.14</td>
<td>-</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>14.0</td>
<td>19.3</td>
<td>26.55</td>
<td>26.97</td>
<td>44.7</td>
</tr>
<tr>
<td>Europe</td>
<td>19.75</td>
<td>31.7</td>
<td>33.39</td>
<td>36.55</td>
<td>44.3</td>
</tr>
<tr>
<td>Middle East</td>
<td>0.4</td>
<td>0.75</td>
<td>0.78</td>
<td>0.88</td>
<td>-</td>
</tr>
<tr>
<td>Canada &amp; USA</td>
<td>64.0</td>
<td>70.0</td>
<td>87</td>
<td>88.33</td>
<td>137.0</td>
</tr>
<tr>
<td>South America</td>
<td>1.25</td>
<td>7.25</td>
<td>4.5</td>
<td>4.63</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.4</strong></td>
<td><strong>129.8</strong></td>
<td><strong>153.25</strong></td>
<td><strong>158.5</strong></td>
<td>-</td>
</tr>
</tbody>
</table>

Source: NUA Internet Surveys (1998-99)
B2C E-commerce. Thus we focus in areas that Vulkan(35) rightly considered to be an area of interest to economists.

II. Information and price searching

Imperfect information and knowledge in markets are the prime factors restricting the implementation of rational economic decision making by consumers in the real world. The specification of common knowledge is a key feature in advanced economic models. The notion of “economic rationality” was developed to facilitate economic reasoning based on assumed pure information conditions regarding markets. A pioneering study in this field goes back to the work of Clark(6) who raised the issue of “bounded rationality”, as a class of rational economic behaviour based on the degree of imperfect market knowledge. Economics Nobel Prizewinner of 1978, Herbert Simon(29), argues that bounded rationality is an inescapable feature of the human condition. This places limits on consumers/firms decision making capacities in terms of processing information. As the Internet medium develops and associated activities reach higher volumes, economic agents acquire more information and have better access to wider information sets. Hence, the state of “bounded rationality” improves with more efficient exchanges and access to market data. Ironically, this may create another serious informational problem; namely, information overload. Houlder(13) argues that the problems regarding information overload on the Internet era arise from the lack of knowledge management systems. This implies that, the key problem is not one of knowledge, but the problem of how to filter diverse information sets when making decisions. Antonelli(2) argues that the key distinction between information and knowledge is that the former needs to be processed to generate meaningful and localised knowledge. Given this view, the concept of “bounded rationality” for the Internet era differs from its original meaning. Technically the lack of processed information becomes a focal attribute behind the logic of “economic rationality”. However, economic search in both the pre-Internet and current periods sought to solve the informational problems and induce rational consumption and production decisions.

Price discovery and product information are both useful messages embedded in the content of advertising. According to a survey conducted by Greenfield on-line(11), from a panel base of 1 million people, the use of the Internet for shopping and price comparisons received very high response rates, 70% (Table 6).

Theoretically, widespread price data would make Internet consumers more sensitive to prices due to the ease of comparing “value for money”. Whilst the intensification of product information should certainly create more microsegments for diverse product categories, this enhances the proliferation of product differentiation. Small entrants may utilise “low price low quality” regimes to undercut dominant players, while other new players may try to fill market gaps, by lengthening the product segments with intensive product differentiation. The former invades existing markets by attracting price sen-

<table>
<thead>
<tr>
<th>Medium</th>
<th>Survey Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-line</td>
<td>70</td>
</tr>
<tr>
<td>Local Shops</td>
<td>71</td>
</tr>
<tr>
<td>Catalogue</td>
<td>40</td>
</tr>
<tr>
<td>Visiting a Mall</td>
<td>46</td>
</tr>
</tbody>
</table>

Table 6: A Survey On Internet Shopping

Source: Greenfield On-line (1999)
itive consumers. The latter aims to create an environment for new niche sub-markets by changing consumer perceptions and creating new types of purchase patterns via the Internet. Due to the potentially vast and affordable advertising space on the Internet, product differentiation processes can be intensified both horizontally among similar product groupings and vertically executed for various quality levels. Since there are huge capacities available for relatively low costs, Internet advertising raises the number of potential strategic games regarding product quality. Applications of game models to analyse strategic choices for product quality is immensely difficult as it relies on the subjective values of consumers regarding quality. In fact, starting from the early stages, on-line shopping applications of smart agent technology has focused on markets of standardised products and simple buying processes such as CDs and computing software. The product quality aspects of these consumables can be easily understood by consumers without over-the-counter inspection. Price variations among different sellers become the crucial determinat of a purchase. In this standardised product marketplace, the influence of direct product differentiation is not significant. Vulkan argues that the scope of influence created by increasing product differentiation will be significantly reduced as economic agents follow a pre-specified search plan on price. However in the context of E-commerce the successful sale strategy for B2C type E-commerce needs to consider time constraints on buyers. In what follows we consider a game where retail web sites via advertising strategies seek to create market segmentation between time constrained and non-time constrained consumers. Conventional wisdom would argue that the use of search agents will reduce the scope of product differentiations on the Internet. It is possible that it could be the case for future generation of search agents where they may conduct negotiations. For the present moment for B2C E-commerce particularly in chain store retailing there is considerable scope for further market segmentation strategies and product differentiation. In the next section, we will consider two Internet retailing formats which exemplify the possibilities for advertising strategies designed to segment the market.

III. Internet retailing pricing strategies: Pure vs mixed strategies

In terms of pricing strategy, firms aim to compete with rivals with strategies that can be modelled systematically. This model assumes consumers aim to search for particular groupings of products with similar quality attributes. The model divides pricing strategies into two basic categories, namely continuously low pricing (CL) and high:low (promotional) pricing (HL) via Internet advertising. Both of these two pricing strategies seek to capture appropriate market segmentations for Internet users. Thus Internet users can be classified as non-time constrained and time-constrained consumers. Firms practising (CL) and (HL) are mutually exclusive in every time phase. For ease of analysis of the implications of the game model, firms choosing (HL) are seen as the direct rivals of firms using (CL). Certainly, there exists strong competition between firms within strategic groupings (CL) and (HL) respectively. However, this game model aims to focus on the competition among the (CL) and (HL) firms in various markets who compete for consumers classified as time constrained and non-time constrained. A key to this model is that

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[35] Vulkan
since common knowledge is restricted, it is possible that, in a given period the lowest prices are available at a (HL) web site rather than a (CL) web site. This can be found by consumers who are not time constrained given sufficient search effort. Thus non-time constrained buyers who search a wide spectrum of price offers regardless of the time and transaction costs involved can always get good deals. The aim of the game model is to see whether sellers see opportunities undercutting rivals by playing either (CL) or (HL) strategies to attract buyers. Pricing strategy is an important element complementing Internet advertising strategy. Indeed, pricing strategy becomes more flexible for everyday use as menu costs fall. Bakos(3) shows that as menu costs fall, there is more room for practising diverse pricing strategies.

IV. A game model: B2C interactions
The game structure for the pricing strategies namely (CL) and (HL) is shown in the game tree Diagram 1, which indicates the decision process at different stages for competitive firms. At the top of the game tree, a firm needs to decide the type of strategic position for future price strategy in stage 1. In stage 1 strategic decisions unfold. Then, in the second stage, sellers need to locate the choice of message types, namely (HL) or (CL) according to the players’ strategic motives. The game model should be viewed as a multi-stage game of interaction between any pair of rivals. Stage 2 of the game implies that each rival must choose either to be (CL) or (HL). This choice implies that a specific type of information to be communicated via the advertising message. For example the message could focus on good value on the shopping packages or savings (I) on typical baskets (CL) or, may emphasise the availability of good deals in general. These may or may not contain specific price information. In stage 2 the sellers simultaneously choose prices and implement communication strategies.

The (HL) seller communication strategies involve advertising specific deals (D). The (CL) seller by contrast advertises specific savings on baskets that the buyer can get compared with the (HL) seller. Thus, if both firms choose to be (HL) in the pervious stage they announce specific deals in stage 2. If one seller chooses to be (HL) while the other goes for (CL) the former advertises deals whereas the latter advertises low prices. Finally, neither can announce (CL) because it is not credible. Two (CL) sellers in a given product space cannot both claim to have lower prices. Another way to conceptualise the Internet sellers game is to allow two sellers to decide sequentially in stage 1. Thus if the first chooses (CL) the second mover must choose (HL). However, if the first mover chooses (HL) the second mover can be (CL) or (HL). Either formulation leads to identical results. This description of the sequence of decision which includes the fact that sellers simultaneously decide on advertising messages in stage 1 and communicate prices in stage 2 implies that the appropriate corresponding equilibrium attained is the Nash equilibrium. In this game consumers are not informed about all prices at their time of choice. Consumers have therefore bounded rationality. Time constraints prevent endless search. However, we require that consumers are not surprised by equilibrium price at either sellers location. Consumers expectations of this type are called rational expectations. (Diagram 1.)

The payoffs resulting for sellers 1 (CL) or 2 using (HL) are determined by relative prices. Whilst the payoff resulting for the seller choosing
the (CL) strategy arise from the “best prices” in Internet marketplace. The term “best” prices are not necessarily the lowest ever prices on the Internet, because considering that the number of potential suppliers is huge and that prices can change quickly between rivals. However, there will exist a range of “fair” market prices, which should be low enough to be perceived by buyers, as the “best”-given time constraints. Promotional prices are not necessarily included within the “best” price groupings. They are specified with reference to models representing the cost savings for consumers who are not able to conduct substantial search and are willing to view the promotional deals as “good” deals.

This game model dramatically reduces the complexity of the real world situation to stylised abstraction. In reality, intermediaries or agents are used to act for prospective consumers to carry out necessary screening processes and
assist buying decisions. Hence, the game model can be improved by including search agents. The major economic implications of search agents are that they transform the time-constrained consumers into non-time constrained buyers. This means that previously time-constrained consumers are able to engage agents to search for the “best” prices. As agents need to be rewarded by a payment, there exists a trade-off for consumers who want to increase payoffs (utilities) by getting lower prices given the extra costs of paying fees to agents. Generally, as agents gain expertise and enjoy economies of scale in providing services, the cost savings by utilising agents may exceed the extra costs/fees paid for an agent, especially, when consumers have bounded rationality and limited knowledge of product offerings and seller data or, when consumers value time on a progressively expensive scale. A major disadvantage of using agents is that, unless the information concerning the preferences of consumers is truly revealed, there may be problems in searching for preferred products. Moreover, if commissions are used for rewarding agents working for search companies, the design of the commissionary scheme may affect search outcomes if agents subjective opinions play a crucial role in the selection of targeted products. These weaknesses are uncontrollable in the model. However they remain crucial to the welfare implications for consumers. Moreover, assuming that consumers possess rational expectations repeat purchases and the experience of buyers should in the end conform to the models prediction. In the next section we consider B2C game models relating to the principal/agent issues inherent in modern search agent configurations. The game that follows will try to identify issues for consumer search strategy in the agent of information search game which is typical of many B2C internet formats.

V. Principal : Agents aspects of search agent consumer game

In long-run economic relationships, players may believe that current behaviour has an impact on each other’s future behaviour, and for this reason they may rationally become more cooperative (a getting-even Nash Equilibrium) or more aggressive, depending on the kind of linkage between present and future behaviour. During several stages in the game players develop reputations for cooperation or cheating. This is rational behaviour. Players’ beliefs about each other may derive from past experience of interactions. Regarding internal informational structures, there might be something that a player tends to reveal to others who are involved in the game. Other attributes may be concealed. Generally, players might try to let rivals know about strengths, but normally try to maintain uncertainty regarding weaknesses. The study of repeated games with incomplete information provides a theoretical framework for analysing these features. This type of environment essentially captures the nature of buyer and search agents game in internet product markets. Such games generally fall into the class of endogenous learning situations in a dynamic environment.

The game developed here can be described as follows:

\[ Q = (N, S, \{(X,Y,u) - E\}, g) \] .[1]

Let \( N \) be the non-empty set of players and \( S \) be a non-empty set denoting the set of possible states of nature. For each \( i \) in \( N \), let the non-empty set \( X \) and \( Y \), denote respectively the set of
moves that a player can choose and the signals that player may receive, in each round of the game. Given these sets, we must specify an initial distribution \( g \) in \( \mathfrak{p}(Y \times S) \), a transformation function \( p: X \times S \rightarrow \mathfrak{p}(Y \times S) \) and for every player \( i \), a payoff function \( u_i: X \times S \rightarrow \mathbb{Q} \), where \( u = \text{utility} \).

The interpretation of moves by players in the game, as the game is played a finite sequence of rounds, is conceptualised as follows. At the start of each round, some state \( S \) is the current state of nature. For each player \( i \), new information about the state of nature is summarized by a signal in \( Y_i \) that each player gets at the beginning of each round. As a function of the signals received in the current round and all previous rounds, each player now chooses a move in \( X_i \). The probability that \( \Theta \) is the state of nature in the first round and that each player \( i \) receives the signal \( Y_i \) at the beginning of the first round is \( g(Y_1, \Theta_1) \).

In any round \( z \), if the current state of nature is \( \Theta \) and the moves of the players are \( X_\Theta = (X_\Theta) \) in \( X \), then \( U_i(X_\Theta) \Theta_\Theta \) is the round-\( z \) payoff to each player. The symbol \( p(S_{\Theta z}, \Theta_{\Theta z} X_\Theta, \Theta) \) is the conditional probability that signals the state of nature at round \( z + 1 \) and will be \( \mathfrak{p}(Y_{\Theta z}, \Theta_{\Theta z}) \).

VI. A Principal: Agent game for repeated consumer/search agent behaviour

The model has principal/agent features and develops Nash Equilibria. Players can be principals (consumers) or search agents.

Players:
[A] Internet consumers (Principals)
[B] Search Agents

Order of play in game
(1) Nature chooses the ability of Search Agents/Agents to be high or low
(2) Internet consumers (Principal) give contracts to Suppliers/Agents
(3) Agents accept or reject contracts
(4) Internet consumers (Principal) and Search Agents accept contracts, or one or both reject offers
(5) Search Agents report product/service quality types to Internet consumers (Principal)
(6) The game returns to (2) and repeats

Internet consumers get utilities and search agents have payoff functions, which may be profit related, depending volumes traded or utility. The game encapsulated is a finite game with clear principal/agent features.

A common agency model of principals and search agents, with respect to the potential termination of consumers contracts between consumers and search agents makes the following scenarios possible: in a finite game, agents and buyers (principals) cooperate up to the \( K-1 \) stage of a \( K \) stage game then the incentive to ‘cheat’ occupies player behaviour as their power is in ascendant at this stage. Four breakdown scenarios are shown in Figure 1. Terminations of contracts by either player can be expected or unexpected.

Principal-Agent aspects for Internet consumers - supplier/agent games are as follows:

The two key players; Internet consumers and search agents, constitute the principals and the agents, \( F \). The principals/agents are interested in successful outcomes for purchases/sales (\( \mu \)) which have utility and profit functions.

\[ \mu = (\mu, t) - c \]
where \( c \) = search agent costs
\( t \) = agents’ reports on product characteristics/service quality

The search agents \( R \) have the following utility/profit function:

\[ R = (\mu F_i, \mu F_i, t) + c \]

where \( c \) is an search agent's reward in aggregate terms

\( F_i = F_1, F_2, \ldots F_n \)

A Nash equilibrium consists of a pair which indicates subgame perfection

\[ (cF_i (\mu F_i), \mu F_i (\mu F_i)) \text{ or } (cF_i (t, F_i), \mu F_i (t, F_i), (cF_i (t, F_i), \mu F_i (t, F_i)) \]

where \( t \) is the search agents announcement of his type to the principals such that each principal maximises contract orders. Principal \( F_i \) only observes the reports on supply or continuation decisions.

VII. Time costs and strategic values for B2C games

This model generates interesting implications because potential buyers are subject to the constraints of time and money. The search for desirable products with reference to these constraints is a costly activity since time is valuable for

Figure 2: A B2C Game Tree Showing Contract Terminations in Different Internet Environments

Note: B= cooperative environments; C= competitive environments; Ch= cheating outcomes
agents. Agents face search costs in obtaining and processing information regarding product decision-making. Consequently, opportunities arise for new types of intermediate products which create value for consumers. For instance, the rebundling of services and products which are traditionally offered by different industries.

For instance, Anderson Consulting’s Bargain-Finder helps users to get the best price at web-based stores quickly. However, within the context of Principal-Agent analysis, utilising intermediate agents may introduce inefficiency or create other incentive problems. These Principal-Agent problems are circumvented if the utility of consumers is truly revealed, and buyers apply the Revelation Principle. However, this is a problem and breakdowns are likely in either environment.

The use of time constrained buyers in this analysis is important. This is because time constraints prevent continuous collection of information. This increases the level of uncertainty in making buying decisions. The agents’ valuation of time motivates time constrained consumers to select optimal levels of search according to their preferences. The differences in agents’ valuations on time enable advertising agents to execute pricing strategies matching trade-offs between time and prices. Economic agents and decision makers in successive time periods modify decisions in the light of new data. This enhances the power of economic agents in responding rationally to the uncertainty attached to buyer behaviour. However, sellers in the Internet marketplace may utilise varying pricing strategies to manipulate states of consistency regarding the distribution of high and low prices. Hence firms using (HL) strategies may create puzzling effects for consumers, as products periodically offered may be cheaper than (CL) offers. The availability of these pricing strategies automatically increases the search time required for potential consumers to look for bargain prices. When more product data gets advertised on the Internet, the cost of search increases. This imposes bigger time costs or trade-offs on time constrained consumers on the Internet. This may motivate time constrained buyers to settle for higher price equilibria, trading off time saved against higher relative prices. In Simon’s (ibid) terms such consumers are acting with bounded rationality and satisficing.

Undoubtedly, decisions regarding picking sellers are more easily reached if products are homogeneous. In a world of widespread product differentiation, firms try to offer maximum utility at keen prices. For instance, tour packages advertised by travel agents usually claim their prices are the best. Their packages basically are very similar in general, but usually consist of different types of accommodation, varying lengths of stay, departure times or catering services. These variations make it difficult for travellers to compare expected the utilities provided. These variations mean that the practice of price discrimination by intermediate agents reduces search costs and provides expertise wherever appropriate to ease and speed decision making. Indeed, the emergence of E-commerce increases competition and reduces the power of dominant market players in extracting consumer surplus. In the long-run, there are strategic measures sellers can develop to avoid loss of power in the market. There are three strategies, namely intensification of product differentiation, emphasis on product attributes other than price, and raising the complexity of pricing strategies. The third strategy is the focus of study here and an example of this
practice is the ever-changing fare structures of airlines\(^7\). To protect monopoly profits, monopolistic or oligopolised firms have strong incentives to reduce the ability of buyers to compare product offerings, especially in terms of the price-quality mix. A major fascinating aspect of the Internet is the enlargement of the information rich community and increased search potential. The aim of using Internet technology for E-commerce is to increase the efficiency of transactions. Ironically, some sellers especially those with enhanced market monopoly power, may seek to make search processes more difficult. In effect this process raises entry barriers in the short run.

In oligopolised markets, price competition always generates detrimental effects on profits. To avoid intense price competition, particularly relating to entry games, firms employ various non-price strategies to attract buyers attention. However, in a B2C game where firms experience buyers/sellers supplier chain relationships, the increased information available on the web is likely to intensify principal agent features of the games and sudden unexpected contract terminations particularly in finite repeating multi-stage games. The game model shows multiple Nash-Equilibria which are sub-game perfect for cheating strategies by both players in the end game.

**VIII. Conclusions**

The paper has shown that the multi-period game model reveals that, pricing/advertising strategy to be viable and credible requires specific types of seller configurations to match consumer expectations regarding price and price-quality relationships. In particular the game model demonstrates that however the pricing pattern of consumers and sellers is configured, a key role for search intermediaries by time constrained consumers is essential. Indeed as the Internet and the volumes of E-commerce grow, so will the number of search agents. Search intermediaries are crucial for consumer welfare expectations in the context of a principal/agent problem. Buyers will operate with an increased bounded rationality envelope but these will usually "satisfy utility" rather than "maximise". To maximise utility in the classical sense would require consumers to operate with "global rationality", However in the context of HL:CL price regimes, this would be impossible.

The principal/agent game shows that consumers who are time-constrained still face problems relating to the nature of the asymmetric nature of knowledge in the internet retailing game.

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(24) NUA, NUA Internet Surveys, Review


Biographies
Kevin Lawler is Reader in Industrial Economics at Sunderland University and has several students doing PhD’s on E-business. Dr. Lawler’s primary interest in E-business stems from his interest in Micro Economics and Game theory. Recently he chaired an international conference in Brussels on E-business. Dr. Lawler holds a visiting appointment at the department of Economics and Finance in the University of Durham.

Kin Pui Lee possesses a BSc in Applied maths and statistics and an MA in International Financial Analysis. He is presently writing up his doctorate, which is focused on complex monopoly in UK brewing at Sunderland University.
1.0 Introduction
The increasing emphasis being placed upon the contribution of bought in components to product costs is putting the purchasing functions of many companies under increasing pressure to identify and develop closer relationships with fewer, better suppliers. In order to achieve this aim many companies will adopt a strategy of ‘supplier development’. The primary aim of these activities has been identified as product quality improvement\(^\text{a}\). However, the increasing pressure of low cost competition based in one of the emerging economies has shifted the agenda onto one of cost with companies such as Nissan and Rover demanding, and getting, significant cost reductions from their supply base. The key problem for these companies is the one caused by the conflicting goals of the various departments involved in purchasing\(^\text{a}\). The quality department will be measured on the performance of the supplier’s materials. The purchasing department are more likely to be measured on purchase price variance, percentage cost reductions, etc. Whilst there will be a responsibility to ensure quality, this may be conveniently pushed onto another department. This sort of sub-optimisation cannot be in the long term interests of the organisation.

With such difficulties in mind many companies developed various programmes of assistance and assessment to help to co-ordinate their supplier development activities. Often these pro-
grammes use price, delivery and quality as their main measures. Some programmes such as the Nissan Motor Manufacturing (UK) Ltd. one expand these measures to include design and management, the so called QCDDM (Quality, Cost, Design, Delivery and Management) type programme. However, when times become hard there should be no doubt as to which of these measures carries most weight: it is cost. However, the cost of a product has many elements. Attempts to quantify this may be seen in the various Total Acquisition Cost (TAC) initiatives that have been implemented by various organisations. These programmes attempt to place a cost upon quality levels, delivery performance, manufacturing efficiency, stock holding necessary, etc. This may then be added to the purchase price of a component or product to establish its ‘true’ cost. These programme often gather data from the various departments within an organisation that either use the suppliers components or services, e.g. manufacturing, quality, purchasing, design, expediting, etc. Each department will rate the supplier and these ratings are used to calculate the final TAC. Such programmes are by and large heavily bureaucratic and so tend to fail if applied across the board to every product or component purchased, the authors have no detailed evidence for this statement except for their own experience. In addition few of the departments have any factual data and scores may be biased if a particular personal relationship is either good or bad. Scores may also be biased by the last problem that occurred regardless of how long ago this happened. Although TAC may give a useful guideline to performance with established suppliers when considering new suppliers the buyer is faced with having no reliable data on which to base a TAC calculation. In cases like these organisations usually resort to using some form of vendor assessment or qualification.

2.0 Vendor Assessment

Many companies adopt some form of supplier evaluation or vendor assessment to assist them with the task of selection. This evaluation may take the form of a simple questionnaire asking the prospective supplier about their systems and quality control procedures, etc. It may, on the other hand, take the form of an in depth study of the potential supplier, such as the Black & Decker 21st Century Audit, the Ford Motor Co. Q1 and Q101 standards. Such studies may take several days, at the end of which the supplier company should have a clear idea of what is expected of them and an agenda for change to achieve this. Unfortunately, with the exception of the ‘big three’ US Automotive manufacturers - Ford, GM and Chrysler have collaborated upon the evaluation standard known as QS9000 - there does not appear to be any common means of assessing a supplier’s potential for reliable high quality service in use currently. Each company appears to have created their own tool to assess potential suppliers and, whilst there will always be an argument for customising such tools to meet one’s specific requirements, it appears strange that each OEM has chosen to re-invent the wheel as it were. The underlying philosophy behind these activities does appear to have some element of commonality however, with ISO 9000 often forming a common base. Such actions should therefore improve the performance of the supplier in question and bring with it specific benefits in terms of cost and reliability to the OEM. Therefore it should follow that the customer company should enjoy the benefits of
dealing with fewer, better suppliers that cause them less problems and positively contribute to the overall well being of the whole organisation. However confidence in the reliability of these assessments varies between the supplier and the buyer with the buyers having a high degree of confidence and the suppliers having very little confidence in the findings of such assessments. This finding mirrors that found by one of the authors, when he examined the results of 124 supplier assessments and compared the predicted performance, based upon the assessment score, with actual performance. The approach adopted was to collect relevant data upon an OEM (Black and Decker, Spennymoor, Co. Durham, UK) and its supplier base. This included supplier evaluation data, actual quality performance data and the results of the company's on going supplier improvement programme known as Supplier of Excellence (SOE). This information was then compared to indicate whether or not a correlation existed between any of them. This allowed the author to draw certain conclusions regarding the effectiveness of such activities.

The 21st Century Quality Audit (21stC) takes the form of a detailed questionnaire designed to gather data upon the company's quality assurance systems and philosophy so that Black and Decker could make an informed decision about whether or not to use the supplier in question. The audit emphasises the use of Statistical Process Control (SPC) as the major method of quality assurance. In theory this makes sense as, through knowledge of on going capability, Black and Decker should be able to obtain some measure of confidence that a supplier understands and controls his/her process adequately. As will be shown however, theory and practice do not always tally and the results of such surveys must be interpreted with care.

It may be clearly seen from Figure 1 that there is no correlation between 21stC scores and reject rates measured in Parts Per Million (PPM). Thus it would appear that the 21stC is an inadequate tool for predicting future supplier quality performance and may require either replacement, modification and/or a change in its role within the Black and Decker supplier quality assurance programme. To this end Black and Decker decided in the early 1990's to augment the results of the 21stC with a more broadly based tool known as the Supplier of Excellence Programme (SOE). This programme allows each relevant department within Black and Decker to score each supplier's performance during the last quarter. The results, each department's score, for each supplier are then compiled and weighted to produce a final score, presented as a percentage. It can be seen from Figure 2 however, that there is no correlation between SOE and PPM rates as measured during Qtr. 1 of 1995.

It might be tempting to conclude from this data that neither of the two evaluation tools were particularly useful. However, the time line analysis of reject rates started in 1993 (Figure 3) shows a marked improvement in the overall PPM rates over the same period as SOE and 21stC have been running. In interviews with key purchasing and quality staff at Black and Decker however, the author has been able to establish that although in theory the 21stC could have been used as a development tool, it hardly ever was. 21stC was primarily used to highlight perceived deficiencies with a supplier and provide a list of required changes. The purchasing engineers concerned rarely had enough time to...
Figure 1: 21st Century Evaluation Score Vs Supplier PPM Reject Rate

Source Data: Black and Decker for the period Qtr.1 1995

Figure 2: Supplier of Excellence Vs. Supplier PPM Reject Rate

Source Data: Black and Decker for the period Qtr.1 1995
assist in addressing these issues themselves however, due to the high levels of firefighting. Suppliers were left very much to their own devices and were expected to address these issues themselves. Due to the relationship that Black and Decker have with their suppliers many took up this challenge, although it should be noted that this was merely a paperwork exercise for a significant minority: the suppliers choosing to comply to the least possible extent. This would certainly go some way towards explaining the lack of correlation between the performance measures so far evaluated.

The sharp drop in rejects seen during 1993 in Figure 3 was largely due to a special team that was formed to tackle the key problems. As can be seen this strategy has had a dramatic effect. The team was disbanded in 1994 and its members devolved back throughout purchasing. The rate of decrease in the rejects slowed at this time but this is likely to be due to the “Pareto effect” in that most of the major contributors to the overall reject rate had been adequately dealt with. The slower improvement in reject rates has continued but interviews with purchasing engineers have revealed that they do not feel that improvements are normally made as a result of 21stC. Instead SOE suggestions, specific reject incidences and new product introductions are tending to provide the driving force for continual improvement. If this opinion is true then one would not necessarily expect to see a positive correlation between 21stC and SOE either. However, when viewed by commodity section, Figures 4 to 6, it is possible to discern a positive correlation.

![Image of chart showing 6 months average PPM reject rate trend]
The apparent differences in the level of correlation may indicate some inconsistency between the sections in applying one or both of the tools. Figure 6 is typical of the pattern exhibited by the other commodity sections. This may point towards the underlying problem experienced by all such tools: they do not provide the direct link between actual performance and the indicators of anticipated performance. This is to be expected as much of the assessment is the assessor’s own interpretation of how well or badly a company is performing against set criteria. Thus the predictors correlate with each other but not with actual performance.

Although it might be tempting at this point to come to the conclusion that all such assessments are some sort of corporate “navel gazing” exercise, the reader should be reminded that the improvement in quality levels are very real indeed. It is also obvious however, that in order to carry forward a medium to long term supplier development strategy it will be necessary to provide a more direct benchmark by which to measure progress.

3.0 A review of current performance measures

A review of the current purchasing and performance improvement literature recommends several performance measures with regard to suppliers. Typically these may be condensed to the QCDDM measures. Usually it is only quality, cost and delivery that are considered to be of primary importance. In each case the actual performance measure is most likely to be an attribute, e.g. parts per million (ppm), percentage or number of late deliveries, etc. In the service sector nearly all of the quality characteristics measured will be attributes, and despite the advice of key texts many Six Sigma measures are also attributes, defects per million opportunities (DPMO), ppm, etc. There are of course good

![Figure 4: 21st Century Score Vs Supplier of Excellence Score (Commodity Section 1)](Source Data: Black and Decker)
Figure 5: 21st Century Score vs. SOE Score (Commodity Section 2)

Source Data: Black and Decker

Figure 6: 21st Century Score vs. SOE Score (Commodity Section 3)

Source Data: Black and Decker
reasons for this. Many of our traditional performance measures are attributes. Attribute data are easy to understand and collect: visualising the number of defects is easier than visualising a particular Cpk value for the uninitiated. This phenomenon has been identified as one of the reasons why the service sector has failed to adopt measurement based quality management approaches. As many senior managers do not come from a technical/engineering discipline then it is hardly surprising that this is the case for other industries. Many engineers tried and failed to make non technical departments understand process performance using standard statistical measures such as Cpk, etc. Most adopted the attribute based measures so that they might communicate in a common language. Sadly attributes, in this context, have some key weaknesses.

3.1 Some Problem with Attributes
As has been discussed earlier, when attributes are used as Key Process Output Variables (KPOVs) it is often difficult to make a direct link between them and their corresponding, attribute based, Key Process Input Variables (KPIVs). Thus although we measure an input and expect a particular output this does not always happen, for instance the number of SPC applications does not necessarily indicate an acceptable process performance.

In addition to this, as the attribute frequency decreases then the probability of detecting small process changes also decreases unless the sample size is increased. Thus if, the proportion defective, is 0.01 (1% defectives) then a sample size of at least 300 would be needed to have a 95% confidence of detecting a defect. Such sample sizes are usually too big to be practical. Many organisations therefore choose to monitor 100% of the incoming material at the place where it will be used: the assembly line or process. Should the part not fit it will be discarded and logged. For small parts this is a nuisance but large sub-assemblies may cause the line to stop if they are found to be defective. Severe penalties are imposed for such stoppages, Nissan charge offending suppliers approximately £18,000 per minute of line stop time. Obviously such financial penalties tend to focus the mind somewhat. However, because no information regarding the underlying process has been gathered, there is always the possibility that a customer company applying such a strategy might react in an inappropriate way: every defect is treated as a ‘special cause’. Dr. Deming states that variation may stem from one of two types of cause: the first is known as common cause variation and describes the background noise within a process. The only way to reduce this is through concerted management action. The second is known as special cause variation. This describes specific incidents such as tools breaking, machines being incorrectly set, unexpected weather conditions, etc. The effects of special cause variation may be reduced or eliminated through specific actions. These are often carried out at the lowest practical level within the organisation, the operator. By treating every problem as if it were a special cause, much time may be wasted through ineffective corrective actions: increased material checks at goods inwards rather than solving the root cause of the problem with the next supplier in the chain.

A final problem with attribute data is that, once the attribute frequency falls into single figures, it becomes less useful when trying to target hard pressed resource. What is needed is a way to
differentiate between common and special causes; target precious improvement resources; reduce the number of measures being employed and anticipate true process performance before switching on a new supplier.

4.0 A potential way forwards
So far we have examined the effectiveness of vendor assessments and identified possible reasons for the apparent discrepancy between anticipated performance and actual performance. It has been proposed by the authors that this may be due to the heavy use of attribute type measures. If this is so, could variable data be a more appropriate solution and if so how should it be used?

Given that using standard statistical expressions, such as Cpk and s, have been tried and failed, then using this strategy again is unlikely to bear the desired fruit. What is needed is a common language and a set of measures that will both satisfy the purchasing professional and the quality/manufacturing professional. It is the authors' opinion that such a language exists in the form of Total Acquisition Cost. The basis for the cost calculation being considered in this paper is process performance rather than the more bureaucratic methodologies to be found in many purchasing text books. We are seeking to link process performance, in terms of nearness to target and process spread, directly with cost. This would provide the buying organisation with the ability to reliably compare the performance of competing suppliers and drive continuous improvement. As the methodology to be proposed does not use attributes, by choice rather than by necessity, then it will be possible to guard against “dynamic conservatism” or “on the day quality” due to the direct link between predictors and actual performance measures.

The methodology being proposed is based upon the Quality Loss Function developed by Dr. Genichi Taguchi. Taguchi realised that traditional tolerance based quality models were a very crude representation of the true dynamics of a quality system (Figure 7).

In the tolerance based model all production within the tolerance limits is not only good but of identical quality. If simple pass/fail criteria are used then there is no other way to describe this. Once product begins to cross the upper or lower specification limit, however, suddenly everything changes and becomes 100% bad. Of course we know that this is simply not true, otherwise our organisations would not have concession procedures. Taguchi also realised this. He knew that if the product were close to the target dimension then it would be better than one near the edge of the acceptable tolerance. He realised that the quality of the product worsened the further it deviated from the nominated target. He also determined that the quality worsened at a predictable rate: a rate that could be determined with a simple quadratic equation. Taguchi then realised that by using a constant he would be able to directly link the performance of a process with a quality cost that he refers to as the quality loss. Taguchi states that all the products that an organisation produces will carry with it a loss due to the variability of the process that produced the product. This quality loss will be experienced by the producer as:

- customer dissatisfaction,
- increased warranty rates,
- long term loss of market share,
Figure 7: The Tolerance Based Quality Model

Figure 8: The Quadratic Loss Function
For our purposes it may also be used to estimate the cost of doing business with key suppliers in the same way that traditional Total Acquisition Cost is sometimes used.

Using the quadratic quality model, the need to be close to target becomes more obvious to everyone. We may define any point upon the curve shown in Figure 8 using a simple quadratic equation. The use of a constant, $k$, will allow us to express the result in monetary terms. By expressing quality levels using monetary values it is possible to compare even unlike products with one another and apply the same measures to a product throughout its production sequence. In addition money, when used as a measure, provides a common vocabulary throughout an organisation.

Any point upon the curve shown in Figure 8 may be defined using the following formula:

$$L(y) = k(y-m)^2$$

Where:
- $L(y)$ is the loss in pounds sterling;
- $k$ is a constant and equals $A_o/(\Delta o)^2$;
- $\Delta o$ is the tolerance allowed;
- $A_o$ is the cost of repairing the product once it has reached the customer;
- $y$ is the actual value of the dimension being measured;
- $m$ is the target dimension

This version of the formula is fine for individual products, but becomes unwieldy when examining large batches of components. In cases like these it is more common to express the Loss function using the following equation:

$$L(y) = kf^2$$

Where $\sigma$ is the population standard deviation of the material under investigation.

Thus provided we have access to some basic statistical information, such as process average and spread (standard deviation) we can use this to create a variable process measure that has meaning to everyone. Let us illustrate this with a simple example.

Suppose we have a supplier who provides us with a component which has the following characteristics:

- Tolerance $\pm .5$mm (1.0mm total)
- $\sigma = 0.17$ ($\pm 3\sigma = 1.02$mm)
- Cost to repair if found faulty by customer £25
- Cost of component £1.05

The average loss that each component will carry due to process variation will be:

$$L(y) = 25/(1)^2 \times (0.17)^2 = £0.72$$

Thus the Total Acquisition Cost of each of these components may be expressed as the purchase price plus the quality loss.

$$\text{TAC} = 1.05 + 0.72 = £1.77$$

This figure will change as the process improves or degrades. Thus the organisation will have a dynamic, real time picture of the process. This contrasts sharply with standard TAC programmes which tend to remain static for periods of 6 to 12 months due to their complexity. This picture may be used in a number of ways:

- To track the effects of process improvement activities;
4.1 Tracking Improvement Activities
Suppose the supplier improves his/her process so that $\sigma = 0.125$.

The new Quality Loss $L(y)_n = 25 \times (0.125)^2 = \£0.39$

Thus our improved process has a TAC of £1.44.

4.2 Targetting Process Improvement Activities
Let us look at the improved process from section 4.1 and compare it with another process having similar process capability, i.e. 63 ppm, $C_{pk} = 1.33$. If we have a limited resource, as most organisations do, which process do we choose to improve first?

Let process A be the one considered in section 4.1. Thus:

$L(y)_A = \£0.39$

Let process B be our other process, where:

$A_o = \£2.50$

$\Delta_o = +/- 0.25mm$

$L(y)_B = 2.50/(0.5)^2 \times (0.125)^2 = \£0.16$

Thus the Loss function helps us to target our resources more effectively.

4.3 Comparing Sources of Supply
When using anecdotal data regarding suppliers it is common, in the authors’ experience, to build a false picture of the performance of some suppliers at the expense of others, particularly when the share of the supply is not evenly split. In cases like these the buying organisation needs to be able to clearly differentiate between supply sources. All that is needed is some process data from each supplier. This may be gathered by either the customer or the supplier, provided one can be sure that there is no fiddling of the figures, and a direct comparison may be made.

Similarly a potential supplier may be compared with an existing one. In this case one would select a part of similar complexity and compare process data. Once again, because the data is variable then predictions of process performance should be more reliable.

4.4 Setting Appropriate Manufacturing Limits
Although the design tolerances may set the functional limits for a process, it is often necessary to work within these to ensure fewer defects. If we assume that:

$A = \text{the internal cost to repair} = \£2.50$

$\Delta = \text{the manufacturing limits to be set}$

as $L(y) = A_o/\Delta_o^2 \times (y-m)^2$ and as we do not wish the quality loss to exceed the internal repair cost then we can set $A = L(y)$. In addition we do not wish the process spread to exceed the manufacturing limits so:

$(y-m) = \Delta$

We may now solve the equation to find $\Delta$ our manufacturing limit.

$\Delta = \sqrt{\frac{A}{A_o} \times \Delta_o}$

$\Delta = \sqrt{2.5/25 \times 1} = 0.32mm$

or $ +/- 0.16 \ mm$
In order to satisfy their customer it is now up to the supplier to begin working towards satisfying these new limits.

5.0 Conclusions
The use of supplier evaluation tools can provide an invaluable aid to a purchasing department in improving its supplier base. However the tool must be flexible and reliable enough to effectively support continuous improvement. If this is achieved then we will provide a consistent, world-wide standard benchmark for performance. There are of course many questions left unanswered and this is an area that requires more research. One question is to what extent an organisation should go in determining the external costs. Another is to what extent the use of such techniques inhibits or accelerates supply chain development in terms of quality, cost, etc.

It is noted that the proposed measurement technique does not take into account the weight that many companies put upon design capability, etc. On the other hand use of the technique will not exclude such factors in either sourcing decisions or supplier evaluation. It will merely enhance the results of such processes.

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Professor Stan Oliver has spent over 15 years in academia, working in engineering and ergonomics education and research. He graduated with a Bachelor of Science Honours Degree in Mechanical Engineering going on to qualify with a Master of Science Degree in Materials Engineering.

He has spent over 20 years in the automotive industry, having worked in many areas of engineering research, design and manufacture, reaching the position of Technical Director and is an active member of the I.Mech.E., SAE and the Ergonomics Society.

In 1986 he was appointed Automotive Programme Director for the new Automotive Engineering Degree at the University of Sunderland and appointed Professor in Automotive Engineering & Ergonomics in 1997. He was awarded the Institution of Mechanical Engineers prestigious Clayton Hinton Fellowship in 1998 and was appointed Director of the Institute for Automotive & Manufacturing Advanced Practice (AMAP) at the University of Sunderland in 1999.
Succeeding in e-Business: Strategies for Defining and Mitigating Legal Risk

Abstract: Just say the words Napster or MP3.com these days, and free downloading of music will probably not be the first thought that leaps to mind. Indeed, a rather different melody is being played in the courts. At issue is not just whether online music-swapping services violate copyrights. The more significant issue is one that has broader implications for e-business as a whole: do old economy-based laws apply in cyberspace?

In many ways, Napster and MP3.com epitomize e-business. Both upstarts have fresh, unconventional, and audacious Internet-based business models. Their opponents, on the other hand, are entrenched industrial giants, unsure of what to make of their cheeky new rivals or how to fight back in the marketplace. It is classic David vs. Goliath, and it makes for compelling media coverage.

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I. Introduction
One of the assumptions underlying the Napster and MP3.com business models is that cyberspace is a no-holds barred frontier where anything goes. Old business and legal paradigms, so this assumption goes, do not apply. Accordingly, as the Napsters and MP3.coms of the world flock to the Internet, many overlook legal issues - many of which are deemed critical for success in the old economy.

However, that assumption about e-business and the law has been strongly refuted. In the Napster and MP3.com cases, the courts have sent an unequivocal message: there are laws governing e-business, and running afoul of these laws will land you in as much hot water as doing so in a traditional marketplace. Therefore, if you select your e-business initiatives with only business and technology issues in mind, you may be headed into a morass of legal liabilities.

So what e-business legal course should be followed in somewhat uncharted waters where lines of responsibility and culpability may be murky? How do you recognize the legal considerations, and after determining the smallest proportion of legal risk possible, assure that this risk is mitigated? Fortunately, there are existing strategies and solutions to help you. It is the goal of this paper to provide a roadmap for identifying relevant legal risks in e-business and defining strategies to manage them.

II. Legal issues
Certainly, the Internet is a brave new world where traditional legal and business concepts do not apply easily. However, this does not mean that those old concepts - and new ones - do not apply at all. On the contrary, old legal concepts such as contract laws and consumer protection regulations continue to apply, albeit with less certainty. In the traditional business world, companies often sell their products in a particular geographic setting to a particular target audience. The Internet, though, gives a company both a global presence and a harder-to-identify market. Meanwhile, new legal concepts are taking shape to address this uncertainty, as well as novel issues that uniquely arise in the context of the Internet.

So what are some of the legal issues that e-
business should worry about? The most common legal issues include: governing laws and forums; domain names and trademarks; defamation; the collection and use of personal information online; digital signatures; the taxation of online sales and income; dissemination of copyrighted material online; redress mechanisms; Internet security; the applicability of advertising regulations to online ads; tariffs and export controls in cyberspace; links, frames, and meta-tags; and cooling off periods for online consumers - to name just a few.

When termed concretely, the complexity and significance of these issues becomes more apparent. For instance, if you are an “e-tailer” who operates a web site that is accessible worldwide, are you subject to domestic and foreign consumer protection regulations? If you collect personal information from your online consumers, what obligations, if any, does the law impose on you to protect that personal information? Since transactions in cyberspace are paperless, would e-mail constitute admissible evidence of the transaction in a court of law? If you operate a web portal, do you need permission to add links to other web sites? If you sell advertising space on your web site or post public messages are you responsible for the content? If you broadcast programmes on your web site that are subject to foreign copyright laws are you subject to the jurisdiction of foreign courts? If you offer to sell goods and services online, is a contract formed when your customer clicks a button on your web site or when you receive the acceptance on your end? If you sell software that is downloaded from your web site, are your sales subject to tariffs and export controls if your customers are located abroad? What about sales taxes and income taxes? Who can tax the revenues from the sale of a product bought in Australia from a British company’s web site, if the product originally resided on the company’s computer in the USA and was sent via a server in India through the company’s web site to the consumer in Australia? The answers to these questions either remain unclear or differ from jurisdiction to jurisdiction.

Some e-business-related cases further demonstrate the complexity and significance of e-business legal issues. For instance, State of Minnesota v. Granite Gate Resorts, Inc., 1996 WL 767431 (D. Minn.) elicited a ruling that advertisements carried on a web site operated in Belize were subject to Minnesota advertising regulations on the basis of evidence that the web site had been accessed by computers in that state. In Stratton Oakmount, Inc. v. Prodigy Services Company, 5 Computer Cases (C.C.H.) #47,291 at #67,772 (N.Y. Sup. Ct. 1995) it was held that an Internet service provider that exercised content guidelines was liable for a defamatory message posted in a public space on its web site by a subscriber. And just this autumn, the World Intellectual Property Organization sent a clear message to ‘cybersquatters’. The WIPO ruled that a resident of the U.S. had to turn over the domain names wallstreetjournal.com and wallstreetjounal.com to Dow Jones & Co., the holders of the Wall Street Journal trademark. As these cases show, the success or failure of your e-business initiative may rest on how carefully you avoided legal liability.

All this legal complexity and unpredictability is hardly ideal to stimulate e-business. Some legislation has been passed to change this. For instance, the Communications Decency Act has since overruled the Stratton case in the U.S. New legislation in the U.S. and Canada on
Internet privacy and the validity of digital signatures have also brought more clarity. However, there is still far to go. This has implications for how e-business is done, and how e-business legal issues are managed.

III. Lessons learned

During final arguments in MP3.com v. Universal Music Group, MP3.com's attorney argued that any damages in excess of $7.5M would be a 'death sentence' for his client. When U.S. District Court Judge Jed Rakoff subsequently ordered MP3.com to pay Universal Music Group upwards of $250M - on top of the $120M already paid out to other music companies in out-of-court settlements - many investors moved frantically to dump their MP3.com stockholdings. When news of the decision reached Wall Street, MP3.com's share price plummeted 27% from the morning's opening price, or off 91% from its 52-week high.

So what did it all mean? On one level, Judge Rakoff was sending a clear message to new economy businesses that the old economy laws still apply. In his decision, the judge wrote that while Internet companies "may have a misconception that, because their technology is somewhat novel, they are somehow immune from the ordinary applications of laws of the United States, including copyright law. They need to understand that the law's domain knows no such limits." Contrary to what MP3.com's management may have assumed, cyberspace is not a Wild West in which the new economy functions in a legal vacuum.

The implication of this message is important on another level. Not only is it imperative for new economy companies to have a business model based on business, process, and information technology components, it is crucial to understand the legal components as well. In their book, Law of Electronic Commerce, Benjamin Wright and Jane K. Winn stress the importance of including due consideration of online legal issues when undertaking e-business initiatives. They write:

Any decision to modify existing business practices through the use of the Internet should be made in light of a review of the expected costs and benefits... While the law of electronic commerce may be unclear in certain areas, this uncertainty is not unique to electronic commerce, but simply gives rise to an element of business risk to be analyzed with all the other business risks.

MP3.com has now settled out of court with Universal Music, agreeing to a strategic partnership. After incurring upwards of US$300 in total settlement costs, though, one must question the wisdom of an e-business strategy that was premised on the legally-illiterate assumption that intellectual property rights are irrelevant online. Perhaps if MP3.com had better understood the legal aspects of e-business from the start, rather than dismissing old economy laws as irrelevant in cyberspace, as it seems to have done, then MP3.com would have thought twice about offering online music-swapping services in competition with the music companies. Either of two scenarios would have likely occurred. One, MP3.com would have decided that the business model was not feasible after all. Or, two, it may have decided to pursue a modified business model under the auspices of a serious legal risk management plan - such as a strategic alliance with a record company like the one they have entered into now from the brink of ruin.
The lessons from the MP3.com experience are valid for e-business, generally. Regardless of whether you offer an online music-swapping service, an e-tail web site, or a public message electronic bulletin board, you should understand the legal risks before you leap into e-business, and then mitigate those risks that you have deemed as acceptable.

David R. Cox, the Bank of Montreal’s Chief IT Strategy Officer, identifies three strategies to manage e-business legal risks. One strategy is to foster a favourable legal climate for e-business. As soon as the court decisions started to go against them, both Napster and MP3.com started to lobby the US Congress for new legislation that would favour new economy businesses.

The problem with this strategy is that it involves diversion of considerable resources towards the fight for an uncertain outcome that will likely be resisted by old economy businesses, which, like the recording industry, tend to be larger, more entrenched, and better connected on Capitol Hill. For this reason, any strategy to mitigate e-business legal risks must also include more direct steps. The first of these is to use technology to manage legal risks. There is a wide range of IT solutions that are already widely used to mitigate risks, especially privacy and security risks. The other step is to create the necessary legal relationships and workflows within the e-business. Not only is an effective organizational structure imperative to manage the legal risks, so is a clear definition of related roles, responsibilities, policies, procedures, and content.

In sum, there are really three lessons that can be derived from the case law. The first is that e-business is about law, not just business and technology. Secondly, it is about understanding the relevant legal issues. Thirdly, it is about managing the legal risks and deploying the right resources. Ignore any one of these lessons at the peril of your e-business initiative.

IV. Solutions
A. Overview
Fortunately, the publicity surrounding the Napsters and MP3.coms of the business world is waking-up more and more companies to the need to consider e-business legal issues. Cyberlaw firms are doing brisk business, and even Requests For Proposals to consulting firms now occasionally require frameworks to define, assess, and manage legal risks. Irrespective of whether it is lawyers or consultants who are asked, the significance is the same: the lessons from the case law are finally being heeded in corporate circles.

So what should the lawyers and consultants do to help their clients convert those lessons into effective practices? The short answer is to preach due diligence and the leveraging of effective e-business solutions. Just as there are solutions for marketing and supply chain, there are solutions for security and privacy, to dealing with intellectual property, to business consultants who can develop everything from a legally feasible e-business strategy to record retention processes. This entails the development of both a legally feasible e-business strategy and an e-business governance framework that effectively and efficiently controls the client’s legal risks.

B. e-Strategy
A conventional e-business strategy asks ‘how will my company exploit e-business to achieve strategic goals?’ To arrive at an answer, several standard considerations are made, covering
such factors as competitive threats, market opportunities, and the impacts and requirements of business, process, and IT infrastructure. A superior e-business strategy, though, would additionally factor in legal considerations. What is the legal environment in which e-business operates? What are the opportunities and risks presented in that legal environment? What would be the potential legal impact of a proposed e-business initiative? What are the legal requirements? Without a definition and assessment of the legal issues, even the most innovative e-business initiative may go awry, buried beneath a costly quagmire of litigation and bad press.

An e-business legal issue seminar should be part of the initial stages of any e-business strategy formulation. The seminar could consist of a simple overview of the potential legal issues and of the best legal risk-management practices and policies in e-business. The audience may include business executives, counsel, and risk management personnel, all from the client’s organization. The purpose of the seminar would be to identify critical success factors from a legal perspective. This preliminary definition and assessment of legal issues would have the benefit of alerting the client to the importance of weighing the legal issues, validating the conceptual feasibility of the proposed e-business initiative, and forming a good starting point for managing legal risks.

If the e-business initiative was deemed conceptually feasible, both from a legal and risk management perspective, the next step would be an assessment of the hard legal requirements. Workshops could be held to determine high-level legal impacts, with the goal of contributing to the overall SWOT analysis and capability gap analysis. This would have the benefit of linking the legal issues to the business, process, and IT infrastructure issues, and clarifying the requirements of a legally sound e-business initiative. Once defined, the legal considerations can be critical inputs for the overall assessment and planning of the business strategy and IT design.

In the final stage, a plan for deploying the right resources ought to be formulated. This would clarify strategic roles and responsibilities, policies, and procedures for the transition to a fully operational, low-risk e-business, and identify the overall resources required to make all these elements align effectively. Legal risk mitigation would be underway from Day One.

C. e-Governance
Once an e-business strategy has been developed, a governance framework is often developed to bring together all the components of new initiative. The point of this is to lead and control the deployment of the e-business initiative, making sure the structural and operational elements align successfully. Conventionally, an e-business governance framework focuses on business, process, and IT.

To internalize the legal risks associated with an e-business initiative, it is necessary to go beyond convention and to focus on the legal issues as well.

Think of the elements of an e-business governance framework, such as the organization structure, roles, responsibilities, procedures, policies, and content, running in parallel vertical bands. Running horizontally across each of these bands is e-business law. The choice and location of the e-organization does not only rest on business models, but also on legal factors. Roles need to be determined not just for whom will manage web site content, for example, but who will control that content to ensure it is...
legally compliant. Procedures need to be designed for verifying digital signatures, not just for practical business purposes, but to ensure statutory guidelines are followed. Policies need to be defined for collecting consumer information online within the parameters of legal regulation. And so on. Due regard to the structural and operational legal elements will reduce the overall business risks.

To identify the governance elements of a given e-business initiative that involve legal aspects, reference must be made to the legal issues that were identified during the e-business strategy development. The legal issues can then be matched with each of the governance components. In other words, roles, responsibilities, procedures, policies, and such can be planned and formulated for each legal issue, if appropriate. Once this is done, best legal risk-management practices need to be identified for closing capability gaps. Among these best practices, reference ought to be made to statutory and judicial sources, plus model codes of practice and guidelines. Intergovernmental organizations and industry associations have produced many codes and guidelines that would serve as useful starting points. Where practices will not do, though, technology solutions will need to be sought instead. Only when a combination of clear practices and technology are in place for managing the legal aspects of the e-business initiative and deploying the necessary resources, in addition to all the other aspects, will a company be truly ready to deploy its e-business initiative.

VI. Conclusion

The benefits of incorporating legal considerations into an e-business strategy and governance framework are considerable. One important advantage is that legal certainty is increased within the company. An e-business initiative is not jumped into blindly, but with eyes wide open. This leads to the paramount advantage: by targeting the legal aspects of the governance components, legal liability is minimized and the impairment of overall business objectives is much less likely. As management at MP3.com found out, there is nothing that cools investor ardor as fast as a public lawsuit. Identifying potential legal issues in advance enables the company to adopt the best legal compliance practices to reduce exposure. Limit, minimize and mitigate are the operative words.

Napster and MP3.com learned the hard way that the consequences for not considering the legal aspects of e-business can be dire. Even if they do survive the legal entanglements in which they both find themselves, they will have done so by unnecessarily incurring exorbitant costs. When legal fees, settlements, wasted energy, negative publicity, and lost investment are tallied, it would surely have cost both companies a relative pittance to have engaged a few lawyers and e-business consultants before pursuing inherently flawed, legally infeasible business models. Indeed, both cases are a clear wake-up call to anyone engaged in e-business: the legal stakes are high and you better be prepared.

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Biography

Nick Covelli, BA (York University, Toronto), LLB (Osgoode Law School, Toronto), MSc (London School of Economics), is an e-business consultant with Business Innovation Services, IBM Global Services, Canada. His views are not intended to reflect the views of IBM.
Glossary of E-commerce Terms

A
Advance Shipping Notice (ASN)
Document sent from the supplier to the customer outlining details of the shipment and delivery details - the electronic version of this document is known as the 856 document.

Advanced Research Projects Administration Network (ARPANET)
The network developed in the 1960s by the United States Defence Department which was the forerunner to the Internet - designed as a network which would survive nuclear attack.

Analog
Data communications transmission technique which works by using a sweeping voltage or frequency, rather than the digital method of switching between two voltages or frequencies.

ANSI ASC X12
The American National Standards Institute, Accredited Subcommittee X12 - creates the format and syntax rules for the variable length X12 standard and the format and content for all business transactions that can be converted to EDI.

Authentication Token
Means of authenticating a user, they operate using techniques such as challenge/response or time-based code sequences.

B
Binary File
File made up of a series of binary digits (bits), the codes that the bits make up identifies the data (i.e. text, graphics).

Bits Per Second (bps)
The speed at which binary digits are transmitted.

C
CCD
Cash Concentration and Disbursement - used in banking to transfer funds from one account to another electronically.

Challenge/Response
A method of authentication - the server challenges the user at random intervals. Once challenged the user’s machine must respond with an authentication token.

Connectivity
The ability of a system to be connected to other systems or devices.

Cyclic Redundancy Check (CRC)
An algorithm used to detect transmission errors. The algorithm generates one or two characters based on the data being sent which are transmitted. When the data is received, the same algorithm is applied at the receiving end and the results compared - if they match then the data has been transmitted without error, but any mismatch indicates that a data transmission error has occurred.
E
Electronic Data Interchange Association (EDIA)
An organisation to promote and provide a common platform for global EDI activity.

F
Full Duplex
The ability for data to be communicated in both directions at the same time.

Half Duplex
Data communication which can only occur in one direction at a time.

Hypertext
System used by the Word Wide Web. Documents are displayed as text whereby words within the text are links to other documents which can be accessed by simply clicking on that word – these words are known as ‘hyperlinks’.

Hypertext Transport Protocol (HTTP)
Protocol for transferring hypertext files across the Internet.

I
Interchange
The transfer of data from sender to receiver in one complete transmission. An interchange uses a header segment and trailer segment to determine the start and end of the data.

Internet Protocol (IP) Address
Unique number used to identify every network interface on a system connected to the Internet. Also known as a dotted quad as it is made up of four parts, each part separated by a dot.

L
Leased Line
Telephone connection set up between to locations which are connected permanently – often used to connect LANs to the Internet.

Logging
The process of recording information about network events.

M
MODulator DEModulator (Modem)
Device used to convert digital computer signals into analog signals which can be transmitted down a telephone line, the receiving modem then converts the analog signals back to digital signals which the computer can interpret.

N
Netscape
One of the most widely used Web browsers.

O
Offline
Activities which take place when the computer is not connected to another computer or network.

P
Protocol
The set of operating rules which apply to data transmission. The rules are formal and standardized.

S
Secure Sockets Layer Protocol (SSL)
Protocol to allow secure electronic commerce
transactions to take place over the Internet.

**Synchronous Transmission**
Method of transmission using timing signals to control the sending and receiving of characters.

**T**

**Telnet**
Service which provides access to remote computers from a local terminal, allowing the remote computer's features to be used as if the local computer was directly connected to it.

**Trojan Horse**
A program which appears normal, but is designed to attack a system.

**U**

**UNIX**
Family of Operating Systems designed for a multi-user environment.

**V**

**Value Added Network (VAN)**
A service for providing EDI mailbox services to receive and store documents, also provides communications protocol and line speed matching between different systems.
Notes for contributors

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Internet Security
Jonathan Armstrong, Eversheds

Abstract: This article deals with the legal issues surrounding Internet security. It sets out the legislative framework in the UK embodied in the Data Protection Act 1998 and goes on to look at other areas of civil and criminal liability. The article expands on the civil liability aspects by looking at two recent US cases involving Tysan Technologies and Lincoln and cases in Sweden and Spain to illustrate the need to keep customer data secure and to respect the personal privacy of Internet users.

E-Tailor - Integration of 3D Body Measurement, Advanced CAD, and E-Commerce Technologies in the European Fashion Industry
James Clarke, LAKE Communications

Abstract: The E-Tailor project (Integration of 3D Body Measurement, Advanced CAD, and E-Commerce Technologies in the European Fashion Industry) is the largest collaborative project in the European Fashion Industry and one of the largest projects in the Information Society Technologies (IST) programmes under the Fifth Framework Programme of European research. E-TAILOR aims to develop advanced infrastructures, which will establish a new paradigm for virtual retailing services of customised clothing (under Action Line 1.3.5 personalisation of goods and services and 1.4.1.3.1 real time clothing simulation and visualisation). In addition to presenting the E-Tailor project, this paper will concentrate on work being carried out in relation to innovation and access smart card applications being developed in E-TAILOR.

E-business and the Board
Stephen Mason, Fennemores Solicitors

Abstract: Like the telegraph and the telephone, the advent of the Internet means the way human beings interact with each other will alter and change. In many ways, it is difficult to foresee how the Internet will be used effectively by people in business. This paper will consider some of the issues and offer a personal view about how directors on the boards of companies should consider reacting to the ubiquitous nature of the Internet.

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