Strategic Management of Technology-Enabled Disruptive Innovation: Next Generation Web Technologies

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Abstract

Technology-enabled business innovation presents the potential to structurally transform enterprise and industry practice, but uncertainty remains as to how such transformations might be managed. The search for higher returns from technology-enabled business innovation will inevitably lead to the adoption and exploitation of powerful, but disruptive technologies that bring with them higher levels of risk. Disruptive innovation is placed into context through the literature and through examples of past IT innovations with disruptive impact. This paper examines how organizations could obtain improved management of the adoption of potentially disruptive future generation Web technologies. The Business Innovation Technology Adoption Model (BITAM) is applied to emerging Web technologies to help identify the nature and extent of their potentially disruptive impact on business practice and management strategies so as to better enable mitigation of business risk.

1. Introduction

Next generation web technologies present the potential for strikingly different business ventures as well as radically new ways of running existing organizations. Emerging technologies may be deployed rationally by organizations to help them to achieve competitive advantage; to transform relationships with customers, suppliers and business partners; to empower global business; and to redesign organizations. Next generation web technologies offer the potential to create fundamental and profound improvements to current business practice by sparking innovation to new heights. Rapid changes in global business models are leading to significant changes in the business environment: (i) businesses must assess and manage global impact across a wide range of dimensions, (ii) respond to increasing and more complex competition pressures, (iii) respond to increasing consumer power, (iv) respond to increasing supplier power, and (v) adopt and manage innovative, often times, disruptive technologies [12].

We view innovation as the discovery and implementation of new ways of creating value. Innovation is an organisational capability whose aim is to use a systematic approach to identifying opportunities and to generating ideas and refining them into high-value solutions [14]. In this context a capability enables an organisation to perform optimally in activities that typically require processes, people and technology [11, 14]. Capabilities derive from an explicit management strategy, and they deliver measurable results.

The structure of this paper is an overview of strategic management issues, a review of disruptive innovation, an introduction to next generation Web technologies - the Semantic Web and Web Services, an overview of the Business Innovation Technology Adoption Model (BITAM) [5] derived from a study of current generation Internet implementations, its application to Web technologies, post-application review, conclusions, implications and proposal of a research agenda for emerging Web technology adoptions.

2. Strategic Management Issues

Recent research involving senior executives of 261 companies in North America, Europe and Asia-Pacific, suggests that three out of four executives doubt whether their core businesses can survive without substantial change; 75% acknowledged the need to refine their core business; nearly 70% see the need to add a major core capability; 60% identifying that relationships with core customers require re-definition.

1www.bain.com/bainweb/publications/printer_ready.asp?id=18541
Apparently, achieving and maintaining competitiveness remains a major strategic challenge for management. Technology is significantly altering the nature of competition in many industries. The increasing rate of technological change and diffusion, the pervasiveness of information management technologies, and increasing knowledge intensity in business have lead to the need for organisations to be in a state of perpetual innovation [14, 6].

In the current global economic climate organisations must exploit their innovative capabilities to generate business growth and sustain competitive advantage. In practice one of the consequences of pursuing innovation is dealing with the disruptive effects of adopting powerful emerging technologies. For the purposes of this paper we take a resource and capability view of organisations and apply it to the strategic management of innovation. According to the resource and capability view an organisation is a collection of unique resources and capabilities that provides the basis for its strategy and that is the primary source of its returns [8].

Figure 1 below illustrates Shapiro’s finding that 80% of the “value decisions” are made in the first 20% of implementation of innovations. According to Shapiro [14] during the first 20% the focus is on strategy and architecture, and the remaining 80% is spent designing, developing and deploying the change. The lower curve in Figure 1 illustrates the where the costs are incurred.

The major challenge for innovating organisations is to ensure that the initial decision-making in the innovation process is as comprehensive, complete and accurate as possible since the vast majority of innovation costs incurred will stem from that decision-making. While this imperative is well-researched, the literature provides little assistance to organizations on how to improve the quality of the adoption decision-making for disruptive innovations.

3. Disruptive Innovation

Christensen [4] and others categorize innovation based on its impact into those sustaining the current competitive marketplace by enhancing existing products or services according to traditional measures of performance valued by customers and those that disrupt the marketplace by fundamentally altering ways customers think about product or service performance. Sustaining innovations are often pioneered by established companies but disruptive innovations usually come from newcomers — posing a deadly threat to even the most dominant of industry leaders. Technology-enabled disruptive innovations may be implemented top-down or bottom-up. Characteristics of top-down innovations are they: outperform existing products when introduced, sell for a premium price rather than at a discount, are initially purchased by the most discriminating and least price-sensitive buyers, and they move steadily to transform the mainstream. Conversely, bottom-up innovations initially present very undemanding applications that under-perform established products in mainstream markets, sell for less money than current offerings, tend to be ignored by the majority of buyers and traditional suppliers and gain footholds in lower part of market. As their performance steadily improves, they rise to redefine the entire market, eventually displacing industry incumbents [4, 3].

An example of top-down disruptive innovation is introduction of the Wang word processor (1976) and the most significant bottom-up innovation in our times is the Internet / World Wide Web (1990s). Other examples of disruptive technologies include: 1950s – mainframes; 1960s - mini-computers; 1970s-80s – PCs; 1980s - Spreadsheet software (VisiCalc 1979); 1980s – Fax; and in the 1990s - Mobile telephony. The Semantic Web and Web Services are poised to be disruptive technologies in the 2000s. In each case, application of these technologies resulted in fundamentally new products and services leading to structural transformation of business practice at that time.

These new technologies offered business new opportunities in operations, marketing, as well as products and services. For example, strategic innovation in operations involves changes in the way a business manages itself and its supply chain, and in marketing involves changes in customer management and distribution channels. The fundamental changes may not be applicable to all industries equally. Porter suggests that “the Internet's greatest impact has been to enable the reconfiguration of existing industries that had been constrained by high costs for communicating, gathering information, or accomplishing transactions”. Therefore, while disruptive innovation will have

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**Figure 1. Value Decisions early in the Change Life Cycle [14, p199]**
structural impact, the intensity of that impact may vary across industries..

4. Next Generation Web Technologies: Semantic Web and Web Services

The Internet is heralded as the most disruptive of 20th Century technologies for the impact it has had on organizations and industries to date [17], but further Internet-enabled innovation will be derived only from novel applications of the existing technologies. Current Internet capabilities are becoming increasingly limited in a dynamically developing world. For example, search engines are the only available means to find information and services at unknown locations but current search engines are inadequate. They return too many matches to keyword searches (e.g., 2.4 million responses to a Google search on ‘Web Services’), have high sensitivity to vocabulary, the results of a search are a set of Web pages, human involvement is necessary to interpret and combine results, and the results of Web searches are not readily accessible by other software tools. Even Web content that is generated automatically from databases is usually presented without the original structural information found in databases [1].

The underlying source of these shortcomings is that the meaning of Web content is not machine-accessible, i.e. there is a lack of semantics built-in to Web content. In order to overcome this difficulty new technologies around what is known as the Semantic Web are being developed. The Semantic Web is the Web with meaning embedded in the content. The Semantic Web allows meaningful information to be exchanged which leads to the potential of richer business communication and more powerful business software systems.

The current component technologies for the Semantic Web are the Resource Description Framework (RDF) Core Model, the RDF Schema language and the Web Ontology language (OWL). Based on the foundation of URIs, XML, and XML namespaces is a standardized query language, SPARQL, enabling the 'joining' of decentralized collections of RDF data. The current status of development (mid-2005) is third draft of the SPARQL Query Language for RDF; first public draft of the Simple Knowledge Organization System (SKOS), the SKOS Core Guide, SKOS Core Vocabulary Specification; a Quick Guide to Publishing a Thesaurus on the Semantic Web; and a growing set of best practices and deployment documents, applications and demos and Semantic Web tutorials. Specification of digital signatures for proof of identity by authentication of transacting parties, is well developed. A key next step in promoting data exchange on the Web, commenced in April 2005, is development of a standard rule language that could capture the logic required for interoperability [15].

In contrast to rapid development of the Semantic Web infrastructure, in mid-2005 the current status of Semantic Web applications appears fragmented and exploratory. In July 2005, the W3C Semantic Web Best Practices and Deployment Working Group reported new applications and functions including the 325 Project, with the goal to comprehensively document the year 325; Sesame, an open source RDF database with support for RDF Schema inferencing and querying; FuXi, a forward-chaining, rule-based system that includes reasoning capabilities; and a series of utilities including RDF Query Library, RDF Parser Toolkit and RDF Application Framework [15]. The future of this next generation Internet is assured once the infrastructure is in place. Its impact is likely to be highly disruptive for all information based services utilizing the Internet.

According to IBM [9, 10] “Web Services are a new breed of Web application. They are self-contained, self-describing, modular applications that can be published, located, and invoked across the Web. Web Services perform functions, which can be anything from simple requests to complicated business processes. …Once a Web service is deployed, other applications (and other Web Services) can discover and invoke the deployed service.” Web Services connect computers and devices via the Internet to exchange data and combine data in innovative ways. Web Services offer on-the-fly software generation through the use of loosely coupled, reusable software components. Web services are characterized by their great interoperability and extensibility based on XML, and they can then be combined in a loosely coupled way in order to achieve complex operations. Programs providing simple services can interact with each other in order to deliver sophisticated added-value services. Software can be delivered and paid for as fluid streams of services as opposed to packaged products [15].

Web services are based on a standardized infrastructure, a defined architecture and a collection of core technologies. Current infrastructure development activities include; document object model, a standard application programming interface to the structure of documents to enable programming reliably across platforms with languages; internationalization activity to ensure that formats and protocols are open to all of the world's languages, writing systems, character codes and local conventions; Web enablement for mobile technologies; a voice-operated web browser; and device independence to ensure seamless Web access with all kinds of devices including cellular phones, TV, digital cameras, and in-car computers [15].

Current commercial implementations of Web Services activities are enterprise specific. A range of enterprises provide web services capabilities for their
products and services to third-party developers. Organizations and capabilities include: Amazon (e.g., direct access to Amazon product information and using Amazon functions to help build websites); Google (e.g., functionality to query websites directly); IBM (e.g., process modeling and security modules), MicroSoft (e.g., software add-ins, drivers, updates and trial editions); Oracle (e.g., middleware services to deploy, integrate and manage applications to automate business processes); and Yahoo (e.g., comparison shopping, creating maps, search functions).

While Web Services contain substantial promise and their implementation are likely to be highly disruptive to industries supplying information-based services, several critical challenges remain:

1. Developing and distributing a critical mass of disparate application components for general deployment.
2. Securing applications in a service-oriented architecture because the characteristic loose coupling of components exposes existing security implementations' weaknesses.
3. New development and operations paradigms are required. Creating service-oriented architecture solutions means rethinking the practices currently in use to build systems, the skills in an organization, and the ways in which team members collaborate.
4. The reasoning behind good software architectures may not be apparent to designers when those architectures are selected for reuse, leading to introduction of process inefficiencies [10].

Combined with outstanding infrastructure developments, these challenges are currently inhibiting more widespread implementations of Web Services, as shown in the fall in CIO interest in Web Services from the number four technology priority in 2003 [7] to being out of the top 10 technologies of interest in 2004 (Gartner, 2005). The application area, however, remains of critical interest. The Gartner survey with responses from 1300 organizations in Asia-Pacific, Europe, Latin America and North America, across all major industry groupings identified four of the top 10 priority initiatives for 2005 relevant to Web Services. These included, managing in addition to developing an efficient and flexible IT infrastructure, transitioning the IS organization from functions to services and building IT-enabled inter-business processes [7].

5. Evaluating Technology enabled Business Innovation

In this section we analyse the potential of next generation web technologies using the Business Innovation Technology Adoption Model (BITAM) [5] as shown in the Appendix. BITAM was developed as an outcome of an investigation into the characteristics of successful Internet-enabled business innovation in six countries. In each county, five leading examples of Internet innovation were selected based on public recognition, industry awards and market leadership. The 30 organizations across six countries included both existing and start-up companies reflecting a diversity of business practice from many sectors, including books, music, PCs, travel, airline, construction, cosmetics, distribution, fashion, flowers, food, games, home maintenance and wine. In selecting firms, particular emphasis was given to investigating the Internet innovation experiences of firms that at that time had not already been highly publicized, e.g., ChaosMusic, Dymocks, E-Store, e-Beauty, easyJet, HomeToDo, NetFun, Thomas Cook, UPS, Velux, WebVan and WingOn. The research method included examination of documentation, interviews of key executives, surveys of customers and comparative analysis of websites. The BITAM model takes a necessarily multi-disciplinary, holistic approach to factors identified by examination of these innovations as influencing and contributing to their initial successes [5].

A prima facie application of BITAM to next generation Web technologies enables: (i) identification of key factors that promote or inhibit the adoption of implementations of emerging disruptive technologies, (ii) identification of relationships between the factors and their relative importance, and (iii) establishment of key factors that promote or inhibit similar implementations in different types of organisations. According to BITAM the key research questions in assessing the potential of next generation technologies are:

1. Which organisational factors influenced provision of emerging disruptive technologies and how?
2. What characteristics of the implementations influenced proposal and acceptance of that innovation?
3. What drives their consumers to, or inhibits their consumers from, performing Internet-based transactions?
4. Which environmental factors influence adoption and how?
5. What international/cultural factors influence adoption of emerging disruptive technologies?

Our objective is to extend current understanding of the drivers and inhibitors for the adoption of emerging disruptive technologies via a preliminary analysis using the BITAM. This research is analytical and exploratory. The research questions are broadly based and require a multiple methodology research approach to address the separate areas of research: innovation, stakeholders, and environmental factors. A major outcome of our preliminary investigation is the identification of a set of factors outlined in the
following section that influence the adoption of emerging disruptive technologies which may then be explored in a single, consistent and integrated empirical study.

5.1 The Disruptive Technology Drivers

Drivers have been categorized as initial and on-going. Initial drivers included:
1. The example of innovation pioneering organisations that have had success implementing the disruptive technologies and developed new organisational capabilities as a result. The experiences of NASA, SRI, DARPA, Google and other pioneers has lead the inspiration of others resulting in other organisations experimenting, learning about, and adopting next generation web technologies.
2. A perceived business opportunity or other opportunity.
3. Business threat to a traditional company.
4. Characteristics of the innovation champions. The champions experience and understanding of a business role for the next generation technologies. Champions’ leadership qualities, qualifications, entrepreneurial spirit and previous experience with business innovations. Champion’s clear vision of a viable business venture/opportunity or organization’s clear vision and purpose.
5. Strong strategic intent to pursue technology enabled innovation.
6. Champions or executive managers possess a willingness to explore the potential of next generation web technologies for possible strategic advantage or strategic flexibility. Determination to succeed is a strong driver of the process.
7. Potential for the innovation’s ability to reduce costs or generate income, e.g. through mass customization
8. Available funding/investment to support development of the innovation (Fig 1).

In summary, the initial drivers are awareness, a clearly stated objective and strategic intent, capabilities of innovation champions (or executives) and a benign investment climate. On-going factors that enabled successful implementation of the innovative ventures and sustained innovation are:
1. Acceptance by stakeholders, e.g. customers and suppliers.
2. Ability to secure or generate ongoing funding and investment to support perpetual innovation.
3. Management’s determination to re-evaluate their failing business model or business situation and secure a more profitable approach even if radical measures are necessary. Management’s willingness and capability to modify business strategies and implementation and deployment directions based on feedback from stakeholders and market experience.
4. Corporate strategy in a traditional firm.
5. The ability of management to recruit talented individuals with a solid track record of developing innovative technology enabled business solutions.

5.2 The Disruptive Technology Drivers

Initial barriers that need to be overcome include:
1. Uncertainty about the emerging disruptive technologies. The greatest obstacle to be overcome is a lack of understanding of the technology’s viability or strategic implications at board level and with major business partners. Lack of knowledge about how the technologies could be developed and used most effectively.
2. Uncertainty about adequate levels of acceptance by stakeholders.
3. Lack of skills. Particularly technical, design, development and operations skills
4. Lack of finance/investment – the adoption of emerging disruptive requires massive investment and the shift to perpetual innovation requires profound fundamental changes which move organisations from relying on static information systems to agile ones.

In summary, the major initial inhibitors are uncertainty, lack of skills, cost of investment. Barriers that can arise during implementation that can critically threaten success are:
1. Resistance from stakeholders at various levels can be experienced.
2. Difficulties with implementation of business strategies, e.g. a firm might rapidly outgrow its original target market, greater difficulties than expected may be encountered in the misalignment of stakeholder expectations, there may be a lack of clear linkage between corporate business strategies and the implementation of the disruptive technologies.
3. Lack of breadth in business skills with too much focus on marketing and not being aware of the range of other business skills necessary to run an innovative business. An excessive level of hype frequently accompanies initial implementations of emerging technologies, particularly bottom-up implementations striving for market acceptance.
4. Operational issues which might include the necessity to bring core functions in-house due to unsatisfactory experiences, the outsourcing of core functions to obtain best practice levels of performance, technical difficulties in developing, implementing and operating the disruptive
technologies, failure to maintain an ongoing program of innovation, and possible lack of assigned responsibility.
5. Ongoing funding for expansion and to cover operational losses.
6. Difficulty in obtaining continued financing and investment.
7. Lack of appropriate or reliable infrastructure.

6. Analysis of all factors across Categories

Having identified the major drivers and inhibitors, the next step is to overlay all factors across the research model (ie environmental issues, stakeholders, innovation and organisation). This will help identify the significance of multiple factors and assess the importance of a broader rather than narrower focus in investigating organizational adoption of technology-based innovations.

6.1 Environmental Factors

We expect next generation web technologies to suffer from the same kinds of environmental factors as those effecting Internet ventures which include:
1. Financial and other support for innovation.
2. Uncertainty about the emerging technologies and how they could be used most effectively (universally applicable to earlier adopters in a market). Particular uncertainties about development, skills required, and the technologies.
3. Stakeholder acceptance due to the powerful nature of the technologies.
4. Inter-organisational imperatives: The necessity to modify or revise a firm’s intentions or business approach to incorporate requirements from other organisations. This is dependent on the degree of integration with other organisations for mission critical business processes. Tight integration is where other organisations are critical for performance of at least some day-to-day core business functions.
5. Market factors: A strategy of international expansion to overcome limitations in the size of their local market could be adopted.
6. Industry and competitive factors:
7. Legal issues could become important mainly in their absence. Government authorities in many countries are exploring a legal framework for next generation web technologies, including legal support for issues of proof of identity, authentication and mechanisms to support trust.
8. Infrastructure necessary to support doing business with sophisticated emerging technologies.
9. International and cultural issues remain equally applicable as applications of Web technologies will be global. Internationalization is specifically included as a current activity in development of the Web Services infrastructure.

6.2 Organizational Factors

Organizational factors include:
1. Characteristics of innovation champion(s), executives, and management.
2. Perceived business threat or opportunity. Perceptions are frequently but not exclusively provoked or inspired by pioneers. Tim Berner-Lee (inventor of the World Wide Web) is the main advocate of the Semantic Web [2].
3. Uncertainty and lack of skills can lead to management being unsure about the exact nature of the perceived opportunity and skills required for its exploitation.
4. Business strategy or culture. Corporate strategy should incorporate emerging technology initiatives and ventures should be aligned with corporate. An organizational culture of innovation can assist the venture.
5. Operational issues. These include a range of difficulties such as inadequate operational performance; technical problems in developing, implementing and operating innovative systems; management failure to assign responsibility for the emerging technology venture or to maintain an ongoing program of sustained innovation; and the costs and challenges of attracting a critical mass of customers.
6. Organizational structure and tasks.
7. Inter-organisational roles and functions. Typically businesses are tightly integrated with other organisations in order to provide seamless levels of service.

6.3 Innovation Factors

To better understand success in innovation, Rogers [13] proposed that the innovation’s distinguishing attributes be identified. Our research model requires innovations to be analyzed across a range of issues including their compatibility, complexity, relative advantage, characteristics/features and perceived cost-benefit. Compatibility has little relevance since innovations generated by next generation web technologies required totally new and radically different business processes and operations. Complexity is rated high as is relative advantage on initial implementation but will inevitably this will declined over time as competitors established new business processes and operations. Perceived costs and benefits of next generation web technologies to the firms need to be determined. The costs will be related to the development of innovative capabilities. Benefits to the firm will be derived from the capabilities generated and the degree of alignment between those capabilities and the firm’s differentiating
business strategies. Comparison of the differentiating strategies and applications of the emerging technologies need to be undertaken.

6.4 Stakeholder Factors
Stakeholders are the individuals, groups, and entities who can affect, and are affected by strategic outcomes achieved and who have enforceable claims on an organisation’s performance [8]. Organisations have dependency relationships with their stakeholders, however not every stakeholder wields the same level of influence at all times. For example, customers seek benefits such as convenience, price, availability, quality, product range, trusted name and total cost of purchase (ie price plus delivery-related costs). Shapiro [14] has pointed out that customers do not want cheaper things, but expensive things that cost a whole lot less. The amalgamated barriers or costs that will confront consumers are: concerns about security, intelligent autonomy, and perhaps some uncertainty about the power of the next generation web technologies.

7. Conclusions and Implications

In response to the increasingly dynamic developments in globalizing markets, business leaders are increasingly being confronted by the necessity to acquire the organizational capabilities for continuous innovation. A major source of business innovation is due to novel applications of new technologies. Inevitably, business innovation will seek the high risk and potentially high returns accompanying deployment of technology-enabled innovations that may disrupt and transform existing business practice. Next generation web technologies such as the Semantic Web and Web Services represent significant potential for innovation because they, like the introduction of the World Wide Web itself, have the capacity to not only improve business collaboration throughout the value chain, but to fundamentally transform business practice.

Next generation web technologies offer unprecedented power and potential for improving business competitiveness and growth because they can enhance the agility of business decision processes. Keen [2004] has identified innovations that enable decision-making, particularly those capable of fusing people, processes and technology, as having the ability to transform the way business is conducted.

The Semantic Web adds meaning to information on the Web for the purpose of supporting both computer-to-computer and human-to-computer communication; Web Services are poised to transform the web from a collection of information into a distributed device of computation. Together, the next generation web technologies offer automated support for richer and more effective business communication between humans, processes, and technology which will lead to significant improvements in: (i) mass customization, (ii) business alliances, (iii) collaborative advantage - an important capability for business in this century, and (iv) new forms of collaboration, which may result in providing seamless experiences for customers, suppliers, and other stakeholders. In essence next generation web technologies can unleash the full potential of Web by automating business innovation capabilities and business decision making.

This paper examines how organizations could obtain improved management of the adoption of potentially disruptive future generation Web technologies. The Business Innovation Technology Adoption Model (BITAM) has been applied in a prima facie examination of emerging Web technologies to help identify the nature and extent of their potentially disruptive impact on business practice and management strategies. The objective is to assist organizations in their adoption decision-making by considering the innovations holistically rather than focusing solely on the technology, thereby better enabling consideration and mitigation of business risk.

The conclusion of this prima facie application is that; BITAM is applicable to next generation Web technologies; innovation enabled by these technologies is likely to be influenced by organizational drivers and inhibitors similar to those impacting Internet applications; the technologies may be applied in varying ways and that characteristics of the specific implementations will influence proposal and acceptance of that innovation; stakeholder drivers and inhibitors are likely to be similar to Internet innovations and satisfaction of related requirements will be critical to success; environmental factors are highly likely to influence adoption with particular attention to the legal issues relating to authentication, proof and trust; and that the importance of international and cultural differences has been explicitly acknowledged as it is an element of the Web Services infrastructure.

Implications for strategic management are that the business risk relating to adoption of potentially disruptive technology-enabled innovation, whether implemented with top-down or bottom-up strategies, may be mitigated by holistic examination of innovation, organizational, environmental and stakeholder factors. Examination of next generation Web technologies as a future instance of disruptive technologies suggests that concentration on the technology factors within the broader business context is critical. Strategic management should strongly resist pressure to consider these technologies in isolation as organizational, environmental and stake-holder factors are critical for successful innovation.

The implication for research into the disruptive impact of technology-enabled business innovation
utilizing emerging Web technologies is equally clear, but possibly more challenging. Academic research is primarily focused within specific disciplines. Both the initial study that lead to development of BITAM and this study have identified an imperative for multi-disciplinary investigations of technology-enabled business innovation in order to better understand the innovation within its essential context. Each of the five research questions listed in section 4 above, deals with an area of vital importance to success of the innovation. Each also represents a separate academic discipline. The challenge accepted by the authors of this paper and the future challenge for researchers is to establish multi-disciplinary teams with the capabilities to undertake multi-disciplinary investigations of multi-disciplinary, disruptive business innovations.

8. Appendix

Factors in the Business Innovation Technology Adoption Model, an Integrative Adoption Model for Business to Consumer Electronic Commerce [5].

**Environmental:**
- market (uncertainty, competition, concentration),
- inter-organizational imperatives
- legal
- cultural & international

**Organizational:**
- individual employee (education, tenure etc),
- structural (specialization, formalization),
- task (uncertainty, autonomy, variety etc)
- roles / functions (inter-organizational)

**Innovation:**
- compatibility, complexity, relative advantage, trialability, observability, usefulness, ease of use,
- distinguishing characteristics / features and perceived costs : benefits for each

**Consumer:**
Benefits and costs to consumers are obvious determinants of success in retailing. Prior studies indicate that purchasers considered the major benefits of Internet shopping to include:
- Increased customisation, e.g. “capability to treat customers as individuals”.
- Convenience in purchasing “anytime, from anywhere, to anywhere”.
- Increased range of products.
- Responsiveness in product delivery, e.g. “instantaneous distribution of digital products & services”.
- Cost savings through lower prices.

Major consumer concerns leading to unsatisfactory experiences included:
- Security
- Ease of use
- Poor levels of service
- Costs
- Product delivered did not meet expectations
- Consumers’ abilities to purchase on-line, their motivation to do so, and the opportunity to access on-line markets

9. References

[17] ‘The Internet and Business Performance’, OECD Paris,