Innovation nuclei in SMEs involved in Internet B2C e-commerce.

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Abstract

The research carried out aimed to illuminate how innovation arises and spreads within an SME internal environment. SMEs are an area where innovations can be readily identified and the company size makes tracking the spread of innovations possible. B2C e-commerce was chosen because the sector is smaller and thus more manageable than B2B. The period chosen (1997-2003) was a period where companies, especially SMEs, had to deal simultaneously with technological change, market change and organizational change and this called for a good deal of innovation and innovation management. Since IT is used to enable both business and marketing innovations it provides a good thematic link between the areas of innovation and Internet marketing. Thus innovations, especially in Internet marketing and advertising, were analysed further and compared to popular predictions.

An empirical analysis of nineteen innovations from SME case companies in several EU nations revealed the importance of a hitherto underrated type of innovation similar to inspiration and here called 'Diversity Innovation'. It is postulated that it is 'Diversity Innovation' which is the major driving force in SMEs, because SMEs are typically cut off from invention innovation. Furthermore – by using simple algebra – it was seen that it is the transaction costs associated with communication that are the limiting factor for 'Diversity Innovation'. The logical consequence of this is that the major management challenge for growing SMEs occurs around size 50 employees. This is in stark contrast to conventional nomenclature, which ignores this important division and lumps all 10-99 employee companies together as 'small enterprises'.

The analyses also showed innovation nuclei – the persons around whom the innovations crystallized – to be individuals with multiple specialist backgrounds. This is interpreted as again pointing towards the importance of transaction costs for communication between specialists, because transaction costs are lower when the individual is multiply specialized. Trans-nationals (trans-migrants, 'foreigners', here called CED's; people culturally and/or ethnically different from the people in the SME's home nation) were especially prominent amongst innovation nuclei and it is speculated that this group had been exposed to especially high retraining pressures.

CED's in small companies active in immature markets experienced little difficulty in gaining acceptance for their innovations. Conversely, CED's in companies within mature markets experienced great difficulty in spreading innovations within their environment, and the most likely explanation is because of the large distance (the 'Innovation Gap') between the CED involved and the leadership/consensus group, as defined by Adaption-

Innovation theory. Indeed, in mature markets, initial innovations by CED's provoked a Trickle Down effect, this rebound often taking the form of disenfranchisement of the CED involved, who saw their ideas transformed into a consensus group concept, from which they were excluded, resulting in de-motivation and the consequent restriction in the generation and spread of innovation in the corporate environment.

Whilst qualitative and semi-quantitative techniques were used in research into innovation, research into Internet Marketing were analysed by quantitative techniques and showed that many generally assumed popular concepts are misleading. Results at variance with accepted wisdom included:

- Market transparency on the Internet is quite restricted and open to manipulation by suppliers.
- There was no evidence that URL submissions to web search engines will improve sales.
- There was no evidence that communication between the company and those clients requesting information, improved sales.
- There was no evidence that 'chat' or other peer-to-peer web facilities improved sales.
- Returning customers are few and it is their satisfaction with the product, not with the web site, that determined if they return.
- A very high background rate of random hits, as opposed to customers, makes analysing web statistics a fruitless task. Conversely sales statistics can be used to prioritise which products are given good web coverage.
- Bulk e-mailing of offers may be a less successful method for achieving sales than a web site is.
- On-line payment is not a great advantage because third-party payment gateways and even the company bank, mostly fail to support the small merchant.
- Intermediation amongst SME partners lacks adequate support, but dis- and re-intermediation is not rapid.

1997-2003 was a time when Internet knowledge was scarce and popular predictions from this period were chillingly wrong for SMEs. Those companies where such knowledge was part of their core competencies – and thus may have relied less on popular predictions – succeeded most, but overstepping core competencies, or where the leadership/consensus group kept them rigidly partitioned from the necessary technical knowledge, resulted in potentially serious negative consequences. To avoid this it is suggested that SME management should include a two-way 'innovation pipeline' for companies with around 120 employees or more.

1. Summary & structure of this work

1.1. The questions posed

The Internet is regarded as an innovative meta-cluster consisting of three mega-clusters - inventive, innovative and entrepreneurial. The application of the Internet to e-commerce (the 'entrepreneurial cluster') is examined in three case studies, where all are within the SME/micro-business definition and involved in B2C e-commerce. None of the case companies involved were founded on 'inventive innovation' (e.g. patents), although their original business idea may have contained elements of 'creative innovation', thus they depend largely on everyday 'diversity innovation'.

Although this work is primarily empirical and data-driven, it does pose the following questions:

1.1.1. Innovation:

1. How does innovation arise and spread in SMEs in the Internet 'entrepreneurial cluster'?
2. What have been the barriers to the adoption of these innovations?
3. Can the results be explained by a generic theory, which, in turn, could result in a generally-applicable model?

1.1.2. Internet marketing:

4. Are there 'markers' for the successful adoption of e-commerce by SMEs and/or are there any danger signals?
5. Can SMEs confidently believe popular predictions when adopting Internet marketing?
6. Is disintermediation relevant for SMEs in the Internet 'entrepreneurial cluster'?

1.2. Summary of findings.

In contrast to much of the existing literature, the work described here involved thoroughly assaying the case companies for innovations in the adoption of Internet e-commerce – failed and successful – followed by the use of General Systems theory to rigorously prove the value of the uncovered innovations at three distinct levels. The findings pertain to:

- Source of innovation
- Barriers to innovation spread
- Successful adoption of Internet e-commerce

1.2.1. Diversity innovation

It was discovered that it is 'diversity innovation' (similar to 'mutual inspiration') which is the major driving force in SMEs. 'Diversity innovation' is a hitherto only hinted at form of innovation and is new insomuch as it uses neither creation nor invention. This makes it especially important for small businesses, because SMEs are typically cut off from invention innovation.

It is postulated – based on simple algebra - that it is the transaction costs associated with communication, which are the limiting factor for 'diversity innovation'.

The discovery that 'diversity innovation' is the major driving force in SMEs, plus that it is the transaction costs associated with communication, which is the limiting factor for 'diversity innovation', implies that the major management challenge for growing SMEs occurs around size 50 employees. This is in stark contrast to conventional wisdom and nomenclature, which ignores this important division and lumps all 10-99 employee companies together as 'small organisations'.

Results clearly identify the multi-skilled as being over-proportionally innovative (in the 'diversity innovation' sense) and it is speculated that this effect could be due to lower transaction costs for inter-specialist communication in these individuals.

Amongst the group of multi-skilled people, trans-national multi-skilled people were identified as being extra over-proportionally innovative (in the 'diversity innovation' sense) and it is speculated that this is due to additional flexibility learnt during their international experiences. Some hitherto unsuspected consequences for Human Resource Management are discussed, including highlighting that the business imperative of integrating innovation into existing organizations in mature markets may well lead to conflict with the dominant consensus group (see 'barriers', below), which in turn negates the premises of Transaction Cost theory and works against the best interests of the company (in the sense of Williamson's "*guileful behaviour*").

1.2.2. Barriers to innovation

The realization that Diffusion of Innovation theory cannot be applied in an SME environment led to the replacement of Diffusion of Innovation theory with Adaption Innovation- and Trickle Down theories, which were found to better account for the empirical results.

Hitherto, Transaction Cost theory does not assume that all people will act opportunistically all of the time, merely that some people will act opportunistically some of the time and, furthermore, that one can not *a priori* know who is an opportunist and who is not. This work, however, identifies the dominant consensus group (in practice, middle management) in existing organizations in mature markets as being over-proportionally active in defending their 'realm' against innovation. This represents the explicit linking of Transaction Cost theory to ICDT theory *via* Asset specificity and to Trickle Down theory *via* opportunism (in the sense of Williamson's "*guileful behaviour*"). Furthermore it was seen that the above-mentioned negative 'trickle-down' rebound effects can already be identified at a much lower company size (120 employees in existing organizations in mature markets) than previously thought.

1.2.3. Internet marketing

Empirical data from Internet marketing and advertising were analysed and the results clearly show that an uncritical acceptance of popular predictions can significantly raise transition costs for SMEs entering the Internet arena.

The adoption of e-commerce was more successful where Internet competencies were closely related to the company's core competencies. Success was found to be more likely when the company possessed the ability to use 'diversity innovation' and/or was active in immature markets, i.e. situations where competencies are more flexible. Overstepping core competencies, or keeping them rigidly partitioned from the necessary technical knowledge, resulted in potentially serious negative consequences.

Dis-intermediation was found to be no more relevant for SMEs in the Internet 'entrepreneurial cluster' than reported in the literature for SMEs in other business areas (i.e. of low importance).

1.3. Research structure & justification.

In order to answer the questions posed, a case study approach was adopted. The use of case studies was pioneered by the Harvard School of Business in the late 1960's and they are generally recognized as being the nearest that humanities and social science researchers have to field work. Qualitative studies have, however, have been supported wherever possible by strict numerical and quantitative data.

A high data quality was firstly demanded insomuch as the case companies had to have unbroken records spanning several years. These records consisted not only of complete web logs, but also separate statistics for business pipelines for both the Internet sales and sales *via* bulk e-mailing, where there were clearly distinct from sales *via* other channels.

Since case studies consist of ethnological surveys, a coherent analysis of the case companies' corporate strategies was needed. Innovations are context-dependent and in order to appreciate the innovations documented, a background is needed of where the case companies stand in order to provide support for the ethnographical techniques used because without them essential information on the culture of the business (the ethnological background), may be lacking. The picture developed using case companies A, B & C is contrasted with data from the 'control' case companies D, E and F (which were either not SMEs, or not involved in e-commerce).

A further control iteration was provided by publishing the 2004 results in book form (Mellor, 2005a) and allowing the case companies to comment and give feedback on the text.

Chapters, tables and figures are numbered sequentially throughout this work in order to provide continuity. Each chapter is provided with a short conclusion summing up the essence of the findings presented. Literal quotes are italicised and code presented in Courier 10pt.

1.4. Abbreviations & definitions.

A-I: Adaption-Innovation.
B2B: Business to Business.
B2C: Business to Customer.
C2B: Customer to Business.
C2C: Customer to Customer.
CED: A human Culturally and/or Ethnically Different from those around him/her.
CEO: Chief Executive Officer.
CGI: Common Gateway Interface.
CMS: Content Management System.
CPM: Cost per Thousand.
Customer: A human successfully completing a financial transaction.
DoI: Diffusion of Innovations.
DSO: Data Source Object.
EDI: Electronic Data Interchange.
ERP: Enterprise Resource Planning.
EU: European Union.
FTP: File Transport Protocol.
GS: General Systems.
HRM: Human Resources Management.
HTML: Hyper Text Markup Language.
HTTP: Hyper Text Transfer Protocol.
ICDT: virtual Information, Communication, Distribution & Transaction.
IT: Information Technology.
LAN: Local Area Network.
PERL: Practical Extraction & Report Language, a server scripting language.
R&D: Research and Development.
RTF: Rich Text (file) Format.
SAH: Stay At Home; a human not significantly culturally and/or ethnically different from those around him/her.
Six I (also 6I): Integration, Interactivity, Individualization, Independence of location, Intelligence & Industry restructuring.
SME: Small and Medium-Sized Enterprise.
SMTP: Simple Mail Transport Protocol.
TCP/IP: Transmission Control Protocol/Internet Protocol.
TCT: Transaction Cost Theory.
TD: Trickle Down.
TLD: Top Level Domain.
TQM: Total Quality Management.
UNIX: A common server platform.
URL: Uniform Resource Locator (the mechanism for addressing resources on the Internet).
VCS: Virtual Communication Space (see ICDT).
VDS: Virtual Distribution Space (see ICDT).
VIS: Virtual Information Space (see ICDT).
Visitor: A resolvable HTTP request.
VTS: Virtual Transaction Space (see ICDT).
XML: eXtensible Markup Language.

2. Introduction

2.1. Background

Notions of corporate strategy emerged in the 1960s. This has resolved to two poles, the rationalist (e.g. Ansoff, 1965) and the incrementalist (e.g. Mintzberg, 1987). Since then the works of Drucker (e.g. Drucker, 1985) and Porter (e.g. Porter, 1980) stress innovation and the opportunities which arise from new technology, shifting industry boundaries, developing new products and modifying barriers to entry. Both Teece (1998) and Pisano (1996, see also Teece & Pisano 1994) have outlined the positions, paths and processes large corporations should take as parts of an institutionalised innovation strategy. In keeping with this 'big players' approach, the vast majority of studies on innovation have concentrated on major corporations (e.g. Etllie, 2000 and Baden-Fuller & Pitt, 1996) and how they turn e.g. R&D into value. However such 'big player' approaches – using Microsoft, Motorola, Monsanto (as well as the 3M Corporation) or a host of other highly structured giant companies - result in causal ambiguity since the relationship between innovation (most often seen in company results or corporate PR) and the actual pinpoint source of the innovation, is poorly understood.

The work outlined here does not follow the 'big player' tradition. This is not research about managed innovation in the technological breakthroughs leading to new computers, jet engines, motorcycles, services etc. It is not about how deHaviland lost its Comet, or how EMI lost its CAT scanner, *etc*.

One often hears of 'innovative companies' (e.g. Shepard, 1967), but how do they become innovative? This work aims to drill down to the very basis of innovation and trying to see exactly when an innovation occurred, how it came about and how it spread in the first few days or weeks of its existence. These innovations could be administrative (e.g. in restructuring, in marketing, etc) or technical (Daft, 1978). The jumping off point could easily be Tidd *et al* (2001, p 45). Who state "*Success in innovation appears to depend on two key ingredients – technical resources (people, equipment, knowledge, money etc.) and the capabilities in the organization to manage them*". Unfortunately Tidd *et al* (2001) do not follow up on this theme and indeed Atherton & Hannon (2001) again remark that there has been "*a paucity of research*" on how innovation can arise and spread in small companies.

This work investigates the 'everyday' innovation, which is often the result of diversity between individuals. The innovation it documents is the 'micro-innovation' which allows small (and typically under-capitalized) companies – SMEs and micro-businesses – to gain temporary advantage (e.g. Stock *et al*, 2002), and thus (hopefully) remain the economic basis of our society ('hopefully', because self-employment & entrepreneurship can, for the individual, be welcome alternatives to the Galbraithian vision of a world dominated by large corporations, see e.g. Galbraith, 1967).

Small and Medium-sized Enterprises (SMEs) are well known as the drivers of employment. For example, Gregory (2003) reports that since 1983, SMEs have created more that 78% of all net new jobs in Canada and that small businesses (fewer than 50 employees) alone account for 42.5% (6.7 million jobs) of total Canadian employment. Similar statistics, varying only according to time and assumptions, can easily be gleaned from e.g. the European Union web site, where, amongst others, the EU Report on the implementation of the European Charter for Small Enterprises (2005) states: "*Small businesses play a central role in the European economy. Some 25 million small businesses, constituting 99% of all businesses, employ almost 95 million people, providing 55% of total jobs in the private sector*".

Today, many of these new small firms are involved in IT, Internet and e-commerce. Increasingly their competitive advantage is driven by differentiation, their ability to provide unique and superior value in terms of quality, special features (e.g. product aggregation or bundling, etc) or after sales service etc (Porter, 1990). In this segment, additional income can traditionally be attributed to Schumpeterian (entrepreneurial) factors because imitation does not occur instantaneously. This is because SMEs typically do not have resources to constantly monitor their competitors, so innovations spread by e.g. the rotation or replacement of staff within a branch, and is hindered by the general difficulty in imitating knowledge assets. Thus the innovating SME may develop products and or business routines (knowledge assets) and there is a period of temporary excess returns before competitors eventually imitate these (Meade, 1984). This margin, however, can obviously be eroded – perhaps seriously eroded - by transition costs (switching costs alone may call for a significant staff re-training budget), which in turn highlights the importance of skilful IT project management and strategy.

However developing competencies in IT strategy has not been easy: Internet B2C e-commerce has grown from zero to present levels in one decade. During this time companies offering their products on the Internet have had to experiment with finding the right formula in an area where there were no written rules or theory to guide them. The financial resources available, especially for SMEs, often fell in the range from 'low-budget' to 'no-budget'. Simultaneously the wishes, demographics and Internet skills of their customers were undergoing a chaotic evolution.

Thus this was a period where companies, especially SMEs, had to deal simultaneously with technological change, market change and organizational change. This called for a good deal of innovation and innovation management. At this point many micro-businesses also sprang up, using the new technology to exploit previously unattractive market micro-niches (Mellor, 2003a).

In the context of innovation, Ricardian (scarcity) rents may reflect difficulty in expanding competencies. This is the case where e.g. knowledge underpins a competitive advantage. In the years 1994 to 1999 knowledge of the Internet and its function was a scarce resource, and thus companies in possession of this knowledge asset had a Ricardian advantage, whilst those without, were at a disadvantage. This means that knowledge assets, innovation and flexibility have been the main factors in any companies' ability to develop a functioning Internet sales channel (i.e. Ricardian and Schumpeterian factors can work together, or as Palmer (2004, p 4) puts it; "*The availability of ... labour inputs may be quite critical and in times of shortage ... an organization must adapt its production process if it is to continue meeting customers needs...*").

Therefore it is relevant to pose the question; how does innovation arise and spread within such an SME internal environment? According to Atherton & Hannon (2001) there has been "*a paucity of research*" on how innovation can arise and spread in small companies, because studies on SMEs tend to concentrate on e.g. product development. These authors then go on to produce a "*general process framework for innovation in smaller businesses*" using interview techniques in five case studies. However the above-mentioned work still concentrates on capacity building, rather than tracking innovations developmentally over time.

In order to find satisfying answers it is obviously appropriate to identify and measure such innovations, divide them into, e.g. everyday (incremental) innovations and more radical innovations, and then track how they moved vertically in an organization, and horizontally between peers and between organizations. Clearly innovations can be compared across business areas because it has been known for many years that innovations can reasonably be compared across different branches and indeed that branch is not important for the success of innovation (see Dwyer & Mellor, 1993, who – in a study of 180 companies – revealed that companies adapt their product innovation strategies to allow for industry and market conditions).

Clearly the type of innovation used can also be broken down into categories, including, firstly, business innovations, i.e. which innovative business models and strategies have been successful. Examples of this include disintermediation and/or the re-definition suppliers - and perhaps even competitors - as partners, *etc*.

Another, second, category is marketing: Internet marketing had largely to be 'invented along the way' and there is still a wide diversity of marketing tools available (although a Darwinist may otherwise have guessed that only the successful innovations survived). In contrast to most previous studies, which are much more theoretical e.g. Lockett & Brown (2003), this work uses concrete Internet statistics and concrete sales statistics. Having measured the success of some Internet marketing innovations, it is interesting to compare them to populist 'guru' predictions and to see if these could be a suitable framework for understanding technology adoption by SMEs, as well as contributing to progress in the field of Internet marketing *per se*.

Another, third, category is technology: Internet technology has developed a long way since 1994, where 'flat' HTML on a UNIX virtual server was normal, with server-side and client-side functionality provided by PERL (normally *via* CGI) and JavaScript respectively. Technology has become more user-friendly since then, but also more expensive (space in a UNIX 'web hotel' costs around 50 dollars/year, conversely newer technology, for instance a Win2000 server set with MS-IIS5 and a content management system consisting of MS-CMS2001, MS-CS2002 plus SQL2000, costs around 50 000 US dollars in software licence alone), which could add tremendously to the investment volume needed to upgrade web sites, so the often under-capitalized SMEs have had to use the cheaper existing technology innovatively and be very careful with new outlays.

However it is also clear that technology has been used to 'enable' the business and marketing innovations described above. So technology innovations are both basic, as well as overlapping with the areas described above. This provides one good thematic link between the areas of innovation and Internet marketing.

Clearly the Darwinian pressures on SMEs make this area one where innovations can be readily identified, as well as the companies' size, makes tracking these innovations possible. B2C e-commerce has been chosen because the area is smaller and thus more manageable than B2B. These innovations, especially in Internet marketing and advertising, are furthermore analysed and compared to popular predictions.

2.2. The theories used.

2.2.1. Introduction.

The origin of innovations is defined by the innovations fulfilling criteria pertaining to General Systems theory, namely personal, corporate and at systems level:

- Subjective at an individual level. The people involved can remember the occurrence (or find it worthy of remembrance - that is, it has impinged upon their consciousness), agree upon the facts, and still find it innovative.
- Concrete for the organization. A positive financial impact can be seen or implied, even where this cannot be exactly calculated.
- Systems level (general/global). They help in our non-subjective, abstract and academic understanding of the field, e.g. marketing.

However innovative ideas arising from innovation nuclei need to spread. DoI theory describes how innovation can spread in a system, which, while not being infinite, has large boundaries. Furthermore within these boundaries ideas and participants are free to interact. Thus DoI theory can be used to describe how e.g. shopping on the Internet diffuses, but not (or at least not 'as is') to examine how ideas arise and are spread within small enterprises. For spread within confined spaces, often partitioned by departmental boundaries, TD theory was used, but was found to only work satisfactorily where super- and sub-ordinate groups could clearly be defined. Conversely A-I theory, due to finer calibration, could explain all the results, and furthermore identified the origin of TD theory effects as occurring in cases where the gap between the innovation nuclei and consensus group was very wide, meaning that change agents/change aides (as defined by DoI theory) were lacking. Results are discussed in the light of TC theory. The theories and their relevance to the broad areas of this thesis are presented in table 1.

Theory	**Application to Innovation**	**Application to Internet Marketing**
A-I theory	Central	Scant
DoI theory	Cannot be used in SME environments	Yes
GS theory	Very relevant	Yes, but too often forgotten
ICDT theory	No	Yes
TC theory	Very relevant	Very relevant
TD theory	Very relevant	Less relevant

Table 1: *Overview of the major theories used in this work*

The theories are presented briefly below, in alphabetical order.

2.2.2. Adaption-Innovation theory

Adaption-Innovation theory (Kirton, 2003) is founded on the principle that all humans are both able to solve problems and are creative. This is in

agreement with other authors (e.g. DeBono, 1996). However the style with which this is accomplished varies and is postulated to lie on a spectrum between highly adaptive on one end, and highly innovative at the other end. More adaptive individuals prefer their problems to be within a given or consensual structure, whereas those at the innovative end of the spectrum are more tolerant of ambiguity. Put briefly, the theory says that adaptors seek to solve problems within the existing, comfortable, structure, and only subsequently seek to alter the structure if and when that becomes necessary. Conversely, innovators are more willing to alter the structure first, in order to let the solution grow.

Key assumptions of Adaption-Innovation theory include:

- That all normal humans (*Homo sapiens sapiens*) solve problems (and are, therefore, creative); thus creativity is a subset of problem solving.
- Problem solving is the product of cognitive functions operating within a given environment. Cognitive functions influence behaviour and produce stable characteristic patterns. The various aspects of personality are derived from this operation, of which Adaption-Innovation is one.
- One element of cognitive function is the so-called 'Cognitive Effect', which is made up of Cognitive (preferred) Style and Cognitive Level (potential or capacity, e.g. IQ).
- Cognitive Style: Individual people differ in the amount of structure they require in their psychological environment and in the degree to which that structure is consensually agreed with their companions. Thus they differ in the way they feel comfortable in tackling any problem, allowing for different levels of importance of the outcome (or, put plainly, levels of reward and punishment).
- These differences in style are set early in childhood development; they are highly stable and can be described by a cluster of related, entrenched (programmed), characteristic personality traits.
- The elements in Cognitive Effect are unrelated (uncorrelated) with those of Cognitive Style. Cognitive Style can not be correlated to Cognitive Level (potential) or any elements in Cognitive Resource (e.g., manifest capacity). All elements of cognitive function have a two-way interaction with the environment (that is they are influenced by the environment).
- All the main elements of cognitive function are associated with the cognitive processes. These include: problem solving, learning & memory, motive; as is social environment and group dynamics.

This means that when people with widely differing creative styles meet, they are very likely to disagree about how to make changes in their personal or working lives. Furthermore, groups of either preference are likely to try (either intentionally, or unwittingly) to marginalize or exclude people in the immediate environment who don't share their preference. Thus, to some degree, A-I theory is an extension of the well-known

general phenomenon called ‘homophily’: The tendency of individuals to like other people that they perceive as being similar to themselves.

Kirton (2003) claims to have calibrated this effect on a scale or axis (‘dimension’) of innovation, thus making it possible not only to cleanly differentiate between people who share different styles, but also to clearly differentiate between those who have the same style, but are far apart in the degree to which they partake of that style. However it must be said that Kirtons ‘Occupational Research Centre’ (www.kaicentre.com) describes the associated psychometric instrument – ‘KAI’ - but demands a £2,350 course fee to reveal what this consists of. Furthermore, course participants are contractually obligated not to reveal details. Thus Kirtons’ claims, strictly speaking, are un-scientific because repetition & confirmation by independent scientists is not possible.

But assuming Kirton is correct, how is it that there ever can be any agreement about change?

1. Firstly because the majority of us are in the middle of the range of styles and
2. Secondly because of what Kirton (2003) calls ‘coping behaviour’.

Common sense tells us that we are able to adopt a behaviour that is out of our preferred style, when we regard it as essential. This coping has a cost in energy, discomfort and relative ineffectiveness, which in turn feeds an increasing desire to return to that which, for that individual, is most comfortable and sustainable. If ‘coping behaviour’ means a marked departure from a persons’ basic style, especially over a long period of time, then coping can become chronic and a probable source of psychological and psychosomatic illness.

Although A-I theory insists that no style is better than the other, it is clear that the industrial, business and administrative needs that a company or society has for continuity, precision and regularity, favours (or even demands) a highly adaptive style. For an adaptor, ‘success’ tends to mean ensuring that the current system is actively responding to perceived need, improving its performance, and extending it's scope with the least disruption.

However, for innovators ‘success’ is likely to mean being able to put forward new ideas that open up new horizons. Thus, in the long run, the probability of an individuals ‘success’ in an organisation, particularly large ones like whole societies or cultures, is strongly weighted in favour of adaptors and that many innovators must therefore learn to live with rejection (not surprisingly, as innovation is often based on discontinuities, including ‘creative disruption’).

This imbalance in favour of the greater general acceptability of an adaptive style may in turn leave innovators marginalized and feeling that there is something fundamentally wrong with them. The recurring lack of acceptability of their offerings may well result in a low or unsteady self-esteem, when actually the root may be a stylistic difference, of which they are unaware.

This paradox is nowhere more obvious than in present-day business conditions, especially for large organizations having to cope with simultaneous hyper-competition, market fragmentation and technology change, resulting in the demand that innovation ("*Companies need to innovate if they are to grow and prosper*", Kotler & Trias de Bes, 2003) be actively promoted and incorporated into adaptive environments – with the tacit understanding that precisely these environments are profoundly unsuited for innovation.

2.2.3. Diffusion of Innovation theory

A broad social psychological / sociological theory called Diffusion of Innovations (DoI) theory purports to describe the patterns of adoption seen, to explain the mechanism of spread, and to assist in predicting whether and how a new invention will be successful. It is expressed in general terms by Rogers (originally published in 1962, 3rd Edition 1983) and, more specifically for IT, by Davis (1989).

DoI theory is concerned with the manner in which a new technological idea, artefact or technique, or a new use of an old one, migrates from creation/construction/invention to everyday use. According to DoI theory, technological innovation is communicated over time through particular channels, which consist of the various members of a social system. DoI theory is largely (or, 'at best') a descriptive tool, weak in its explanatory power, and even less useful in predicting outcomes. Furthermore, it is doubtful as to whether it can give rise to readily refutable hypotheses. However it may provide guidance as to how to accelerate the rate of adoption. DoI theory states that the stages or levels through which an innovation passes are:

1. Knowledge (exposure to its existence, and understanding of its functions);
2. Persuasion (the forming of a favourable attitude to it);
3. Decision (commitment to its adoption);
4. Implementation (putting it to use); and
5. Confirmation (reinforcement based on positive outcomes from it).

Early adopters are generally more highly educated, have a higher social status, are more open to both mass media and interpersonal channels of

communication, and have more contact with change agents. Mass media channels are relatively more important at the knowledge stage, whereas interpersonal channels are relatively more important at the persuasion stage. Important characteristics of an innovation include:

- Relative advantage (the degree to which it is perceived to be better than what it supersedes);
- Compatibility (consistency with existing values, past experiences and needs);
- Complexity (difficulty of understanding and use);
- Trial-ability (the degree to which it can be experimented with on a limited basis);
- Visibility (the results can be readily observed).

Different adopter categories exist according to their adoption on the time scale. Classically the time scale used is correlated with overall use, on a Bass Curve (see Mahajan *et al*, 1990) rising to 100% of all possible adopters (which is not necessarily 100% of the total population) having adopted that innovation. Examples of such a curve are given in Figures 9 & 10 in chapter 2.3.3. Adopters are classically categorized as:

- Innovators (venturesome);
- Early adopters (respectable);
- Early majority (deliberate);
- Late majority (sceptical);
- Laggards (traditional).

Earlier adopting individuals tend not to be different in age, but to have more years of education, higher social status and upward social mobility, be in larger organisations, have greater empathy, less dogmatism, a greater ability to deal with abstractions, greater rationality, greater intelligence, a greater ability to cope with uncertainty and risk, higher aspirations, more contact with other people, greater exposure to both mass media and interpersonal communications channels and engage in more active information seeking. Their classification as ‘innovators’ is therefore in agreement the A-I theory nomenclature.

Important roles in the innovation process include:

- Opinion leaders (who have relatively frequent informal influence over the behaviour of others);
- Change agents (who positively influence innovation decisions, by mediating between the change agency and the relevant social system);
- Change aides (who complement the change agent, by having more intensive contact with clients, and who have less competence credibility but more safety or trustworthiness credibility).

Amongst these, probably the most important is the Change Agent. The change agents' functions are to:

- Develop a need for change on the part of the client;
- Establish an information-exchange relationship;
- Diagnose the client problems;
- Create intent to change;
- Translate this intent into action;
- Stabilise adoption and ensure smooth change-over;
- Shift the client from reliance on the change agent to self-reliance.

Innovation decisions may be optional (where the person or organisation has a real opportunity to adopt or reject the idea), collective (where a decision is reached by consensus among the members of a system), or authority-based (where a decision is imposed by another person or organisation which possesses requisite power, status or technical expertise). Thus the adoption of innovation may be different not only in different organizational cultures, but also between different national cultures, if the culture in question is e.g. highly authority based, or highly collective etc. This may be partly the reason why several Japanese management techniques, like *kaizen* and *hoshin kanri*, find only low degrees of acceptance in the UK, despite their proven good performance.

2.2.4. General Systems theory

General Systems theory (GS theory) was first described in 1936 by the Hungarian biologist Ludwig Von Bertalanffy (for review see Von Bertalanffy, 1976). GS theory is applicable to systems with any number of variables – perhaps even with infinite variables - of either continuous or discrete character. The importance of the interactions in the systemic approach is proposed to make it possible to distinguish between the variables of input generated by the environment and the variables of output generated by the system ('action & reaction'). However GS theory is more than 'prod it and see if it moves':

- In some cases, the value of the variables of output will be directly dependent upon the value of the input variables. However these will normally be trivial, rather mechanistic cases that could have to be treated without using General Systems theory.
- In other cases, different outputs resulting from the same input must be explained by the existence of different internal states within the system and changes in these internal states force us to take temporal transition into consideration: These processes could be either deterministic or probabilistic.
- In cases of more systemic interest, the output of a system reacts on its input, through a feedback loop, which produces a non-linear

process. One example of such output could be hysteresis-like curves similar to those described for Chaos theory (see e.g. Williams, 1997).

The reason why systems theory is important to business is because company resources (including Human Resources) are linked to the source of finance (or other allocation of resources) by a feedback loop. Flowing from resources to finance is information (cause of change), provoking changes in the flow of enabling power back to resources (effect of change). Large and highly structured companies may use various methods to determine flow volumes, including 'Balanced Scorecard' or 'Data Envelope Analysis' etc. However in SMEs of the type studied in this work, more simple methods are predominant, ranging from 'Discount Cash Flow' to 'Seat of Pants Navigation'.

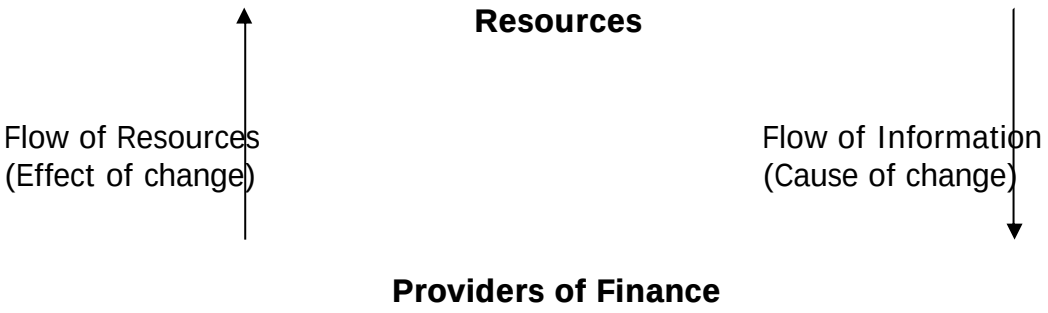


Figure 1*. Review of General Systems theory*

Using the idea of systems provides a framework for communication. It assumes the pathway;

1. Concept (Constructs and construct relationships) ->
2. Definition & Process ->
3. Consequences.

GS theory furthermore assumes that relationships are causal in nature.

2.2.5. Marketspace & ICDT theory

Rayport and Sviokla, (1995) gave rise to the concept that products (and, indeed companies) move in a virtual space (market**s**pace instead of marketplace). This was refined by Angerhahn (1997) in the publication "The ICDT model; towards a taxonomy of Internet-related business strategies". Those wanting a readily-understandable review may see Leong (1998). ICDT stands for: virtual Information space, virtual Communication space, virtual Distribution space and virtual Transaction space. A company must be established in all four virtual spaces before it

can be said to be established in the virtual marketspace. This being said, the entry into all four spaces is not normally simultaneous, but rather an evolution, typically starting in the information space (e.g. a simple HTML web site presenting information about the company, and perhaps products). ICDT is normally depicted as 4 extra (virtual) spaces surrounding the traditional market place thus:

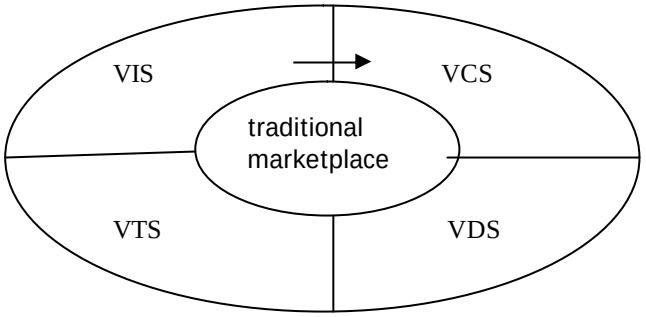


Figure 2: *Review of ICDT, the four virtual spaces.*

VIS: VIS stands for Virtual Information Space. In B2C e-commerce this is often the space that companies inhabit first. At its most primitive it is used as a 'virtual billboard' where companies relatively cheaply can advertise and inform about themselves and their products/services.
VCS: VCS stands for Virtual Communication Space. In VIS communication is overwhelmingly 1-way, from the company to the customer. In VCS space companies use new channels to enter into 2-way relationships and exchanges of ideas with their customers, perhaps even enabling cross-customer contact. Technically, the possibilities include e-mail, chat rooms, bulletin board systems etc.
VDS: VDS stands for Virtual Distribution Space and represents a new digital distribution channel or network. Clearly not all products can be distributed virtually (furniture etc), but VDS may still be useful in distributing help programs, support and extra service (for example how to assemble the furniture).
VTS: VTS stands for Virtual Transaction Space. This space focuses on business-related transactions, and not only customer-facing (payment gateway etc) transactions, but also transactions in the enabling process, e.g. supply chain management. These spaces are also sometimes represented in an 'onion skin' fashion, because the outsider sees firstly the VIS, and only by delving deeper do the VCS, and subsequent layers, become obvious.

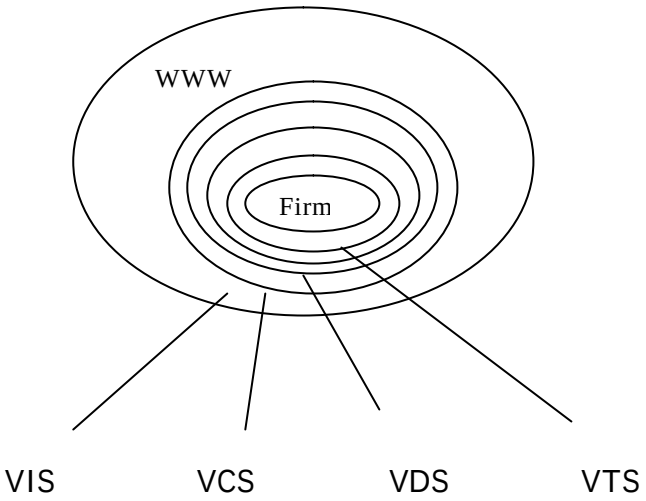


Figure 3: *Review of ICDT, the four virtual spaces, seen concentrically.*

Because of taking account of Transaction Cost theory ('Asset specificity') each virtual space is divided into four, product classification categories, according to level of sophistication on the vertical axis, and level of customisation on the horizontal axis. Typically each product or service offered will be then scored according to these categories.

High	Advanced, generic presence	Advanced, customized presence
Low	Simple, generic presence	Simple, customized presence

Low **High**

Level of customization >

Figure 4: *Review of ICDT, levels of specificity and customisation in the four virtual spaces.*

Problems with ICDT include that it totally lacks any kind of quantitative aspect, and indeed the representation of the 4 virtual spaces as being equally important may be misleading for any specific company or analysis. Analyses are often subjected to bounded rationality, and are only forward-

looking in the value system, ignoring possibilities or changes that Internet could cause in the value chain (see Leong 1998).

2.2.6. Transaction Cost theory

Transaction Cost theory (TC theory) aims to explain why economic organisations – firms, companies etc. - take the form they do (Williamson, 1995). In particular it tries to explain the particular structure of a firm and, most importantly, the extent to which organizations must integrate vertically.

TC theory assumes that firms are profit maximising, and that profit maximisation involves costs minimisation. Williamson argues that to achieve rational profit maximisation, organizations must minimise their total costs, which in turn are made up of both production and transaction costs, stressing that transaction costs (and all that entails) are easily as significant as the perhaps more easily accountable production costs (which Williamson envisions as being analogous to the cost of building and running an 'ideal machine').

TC theory assumes rationality on the part of owners and/or managers with regard to profit maximisation. Thus, before going further, Williamson's assumptions should be briefly discussed, because they underpin the theory. It is important not to confuse Williamson's assumptions with Williamson's variables (see later). The assumptions are:

1. Bounded rationality: Bounded rationality refers to the fact that people have limited memories and limited cognitive processing power. They also get tired and make mistakes. Humans can not assimilate all the information at their disposal and can not accurately work out the consequences of the information that they do have.

2. Opportunism: Opportunism refers to the possibility that people will act in a self-interested way ("*with guile*" as Williamson puts it). An extreme form of this is putting self-interest before the economic interests of the organization. That is, people may not be entirely honest and truthful about their intentions, or they might, for example in price negotiations, attempt to take advantage of unforeseen circumstances that gives them the chance to exploit the other party.

Self-interested behaviour is assumed in traditional economic theory, but guileful behaviour, "*human nature as we know it*", as Williamson also puts it, is not built in, neither is putting self-interest before the economic interests of the organization. Certainly criminal acts like lying, deceit, fraud, theft embezzlement etc. are left out completely. However, as

shown during the investigations as to the origin and spread of innovations (this work), this assumption leads to internal inconsistencies in TC theory.

Transaction costs, on the other hand, are those costs that are incurred by departures from perfection (sometimes called ‘friction’) in the economic sector; the ideal machine would be a perfectly efficient market. Such a theoretical market requires that full information be available to all parties at all times, as well as perfect competition between the parties involved. Departures from this perfection (these departures are sometimes called ‘market failures’) can result in companies incurring higher costs when they buy or sell goods or services. For example, the lack of information about any alternative suppliers may well lead to a firm paying too high a price for a good. In the same theme, lack of information about a customer's creditworthiness may result in a bad debt. These are transaction costs.

Under some circumstances transaction costs may be lower if the transaction takes place in an open market, whilst in other situations, costs will be lower if managers co-ordinate the transaction (a hierarchy). Williamson's major contribution to economic theory rests in his specifying the variables that determine whether the lowest transaction costs under various circumstances will occur in a market, or a hierarchy. These variables are:

1. Frequency
2. Uncertainty
3. Asset specificity

Transactions can be frequent or rare; have high or low uncertainty; or involve specific or non-specific assets. According to the theory, these three variables will determine whether transaction costs will be lowest in a market or in a hierarchy.

The effect of frequency on transaction costs is strong, but it is not interesting where the frequency of transactions is low. Uncertainty is perhaps more interesting; the issue here is how difficult is it to foresee the eventualities that may occur during the course of any transaction. One obvious factor in this is the length of time over which the transaction will take place. Transactions that take place ‘on-the-spot’ will have relatively little uncertainty, because one doesn't have to predict the future. On the other hand, transactions that involve a commitment over some time have some uncertainty built in to them. Thus e.g. a partnership like a joint venture takes place in a manager-mediated hierarchy, not a market. Uncertainty also causes problems because of the danger of opportunism. How do the partners know they can trust each other? Some rely on reputation, but reputation is still a form of gossip.

Asset specificity is perhaps the most important element in TC theory. It is argued that where transactions involve assets that are only valuable (or

are much more valuable) in the context of a specific transaction, then the transaction costs will tend to be reduced by vertical integration. Or, to put this the other way around, transaction costs are likely to be lower in a hierarchy than in a market, when transactions involve highly specific assets.

Thus the costs to a buyer to complete a purchase (i.e. the price) are composed of both production costs (the physical or other primary processes necessary to create and redistribute the goods or services being produced) plus the coordination costs, which in turn include the transaction costs of all the information processing necessary to coordinate the work of the people involved as well as the machines that perform primary processes.

In a market with many buyers and sellers, a buyer can theoretically compare different possible suppliers and select the one that provides the best combination of characteristics (such as design and price), thus presumably leading to a minimization of their costs (see Malone *et al*, 1987). However, the coordination costs are still relatively high, because the buyer must still gather and analyse different packets of information from a variety of possible suppliers (Note that Williamsons 'hierarchies' reduce coordination costs over those incurred in a market by eliminating the buyer's need to gather and analyse a great deal of information about different suppliers).

Since the essence of coordination involves communicating and processing information, the use of the Internet and other IT tools seems likely to decrease these costs. However, how much the Internet can contribute to decreasing transaction costs inside organizations is also limited, especially when taking the costs of transition – including switching costs - into account. This is again described under Williamsons' variable 'Asset specificity'.

Asset specificity on the Internet is most often equated with the complexity of product description, which in turn refers to the amount of information needed to specify the attributes of a product in enough detail to allow potential buyers to make a selection (see ICDT theory, chapters 2.2.5 & 2.5.4). Products with complex product descriptions are less likely to be sold easily on the Internet because the coordination costs for a market would be higher, whilst products with standardised descriptions are easily purchased *via* markets as their descriptions are relatively simple and thus have low coordination costs for the buyer and seller.

2.2.7. Trickle-Down theory

The major theory concerning innovation between social groups is the Trickle-Down theory (Simmel, 1904). Originating from the world of fashion

it is based on observations that 'fashionable' people adopt goods which are unusual and thus can be represented as 'better' (leading to them – probably both the good and the person - being perceived as more desirable), yet they are surprisingly rapid in disposing of exactly these goods when they are perceived to become common. In its most basic form, TD theory states that two conflicting groups act as a motive force for innovation, where socially subordinate groups seek to establish parity by imitating the clothing, attitudes etc of the super ordinate group. The super ordinate group, in turn, abandons these status markers with alacrity and is therefore continually being driven to invent new ones in order to preserve the difference in status. TD theory has been modified by McCracken (1988), who noted firstly that the direction of diffusion is not actually 'down', but up, and who added complexity ('trickle across') by introducing groups of intermediate social standing (gender, age and ethnicity) into the equation. Despite the 'down' in 'trickle-down' actually being a misnomer, it has, however, been generally retained (also in this work).

Please note that Simmels' Trickle Down theory should not be confused with 'trickle-down economics', an economic theory which advocates letting businesses flourish, postulating that increased profits will ultimately trickle down to lower-income individuals and the rest of the economy (for an overview, see Sowell, 2000).

2.2.8. Short conclusion

The realization that Diffusion of Innovation theory cannot be applied in an SME environment led to the replacement of DoI theory with Adaption Innovation- and Trickle Down Theories. Kirton, writing almost exactly a century after Simmel, mentions neither Simmel nor Trickle Down and this is perhaps amusing because these two theories are not only extremely similar, but they complement each other: Kirton provides a relatively fine grained 'map' of adaptive *versus* innovative behaviour in populations (Kirton, 2003, fig 12, p252) in a way which Simmel never could have hoped for. Simmel, conversely, who was ignorant of the distribution and size of the ruling consensus group, concentrates on the clash between the super- and sub-ordinate groups (which Kirton mentions, but fails to explore in depth, preferring to suggest 'bridging' behaviour, aspects of which are explored in chapters 5 & 6 of this work).

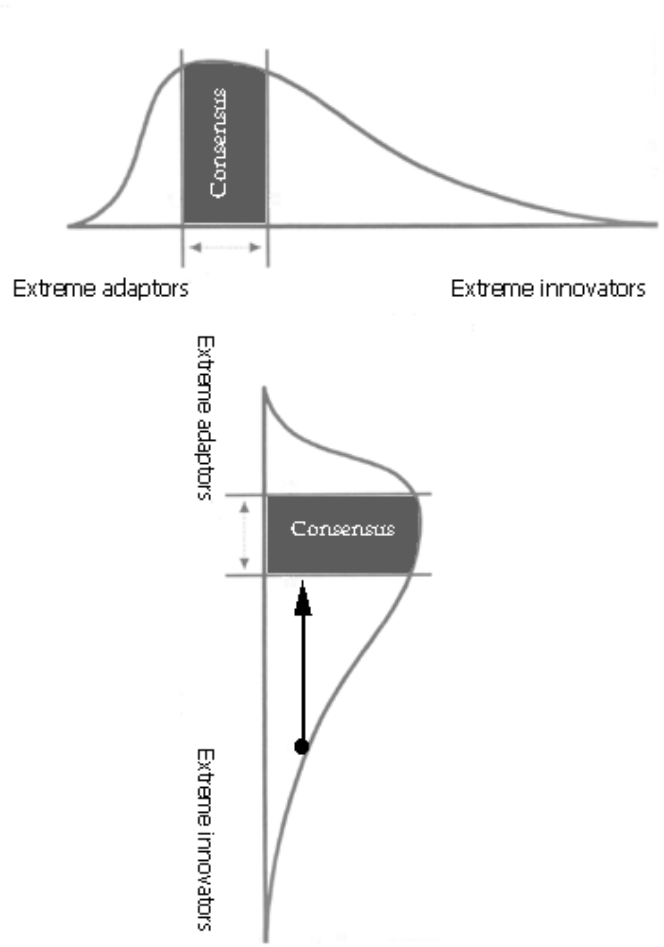


Figure 5: *Showing the number and numerical distribution of adaptors and innovators in a human population (original data from Kirton, 2003), classified according to their innovative abilities. The lower part shown the same data rotated and the bold arrow illustrates input from sub-ordinate innovators; a 'trickle down' challenge to the ruling group (Figure from Mellor, 2005b).*

Only when these two theories are put together, is it possible to see that the repercussions could point to the heart of Williamsons' Transaction Cost theory. In order to test this, General Systems theory provides a robust and rigorous framework against which empirical results can be examined.

2.3. Innovation

Often one hears the terms discovery, invention and innovation used as synonyms, however they are quite distinct. Discovery is a new addition to knowledge. These are (normally) in the physical, biological or social sciences. Theoretical knowledge is obtained from observations and the experimental testing of hypotheses whilst practical knowledge is obtained from practice: e.g. the practical knowledge acquired by a workforce in making new machinery operate well. Invention is a new device or process. Most inventions are minor improvements and do not qualify as patents. To qualify as a patent, an invention must pass a test of originality (i.e. is different from previous inventions). Only a small percentage of patents have any economic value. Those that do, tend to be those, which are immediately applicable. An example of this is the Phillips screw (patented by the Dutch Phillips concern - and perhaps the Worlds most lucrative patent), which made two crosswise grooves in a screw head instead of only one. Robot arms can grip this screw, thus opening whole assembly lines to automation. Innovation is a better way of doing things. An innovation improves performance in goal-directed behaviour (e.g. re-election politics, personal lifestyle) as measured by any applicable or relevant criterion (e.g. profit maximization).

Invention is not innovation. One simple example of this difference could be spreadsheet programs like Excel. The invention is the computer and its various parts, including the software (e.g. Excel). However using spreadsheets to plan hourly work in an office is an innovation. Invention is promoted by discovery (esp. in biology) whereas innovation is promoted by invention (esp. in industrial engineering and business). As explained by Rothwell (1992) either new opportunities arising out of research will find their way to the market place (technology push), or the market signals a need, which leads to new solutions (need pull). As science advances it creates opportunities for new inventions. However to develop economic value, massive knowledge can be needed (e.g. modern aeroplanes needed the development of the whole science of aerodynamics). To make a profit out of this (e.g. commercial airlines), the innovation has to be applied. This is often in the form of entrepreneurship.

For invention, intellectual property rights (IPR) apply. There are 3 major forms; patents, copyright & trade secrets. Without these rights competitors would immediately copy the originators ideas, but without the initial costs, their ‘product’ would always be cheaper - so taking up new ideas would always be guaranteed economic suicide! Laws around IPR change with time (e.g. copyright originally covered books, but now also covers software).

Innovation is often about better performance. Here there are no formal rights. Thus imitators copy anything appearing promising. Thus an innovation is tied to a timeframe. Innovation is measured by 'benchmarking' - comparison of your performance with the rest of the world. An extreme example of protecting an innovation is the trade secret. For example, all the ingredients used to make Coca-Cola have been known for many decades, but the exact formula for the drink was a closely guarded secret until recently. Many companies are simply entrepreneurial, being flexible or specialized enough to re-combine known inventions, processes or innovations for a new market, without themselves having made a spectacular invention, or a revolutionary new innovation.

The word entrepreneur comes from the French "*entre*" meaning 'between'. The root of the verb *entreprendre* can be traced back to around 1200. By 1500 a noun form appeared and soon thereafter both the verb and noun entered the English language. Already in 1730 'entrepreneur' was used to mean a self-employed person with a tolerance for risk (see e.g. the Irish-French economist Richard Cantillon (1697-1734) as well as John Stuart Mills' 1848 classic "Principles of Political Economy"). Towards the beginning of the industrial revolution Jean-Baptiste Say further expanded this definition to include the possession of managerial skills. Today an entrepreneur means a middleman or go-between (see also the works of the US economist F. K. Knight, (1885-1972), Kirzner, I. M. (1985) also provides a useful review). The entrepreneur has simply had an idea about how to do things better, or how to position him/herself in a moneymaking process (the 'value chain'), and manage this process to a successful conclusion. Similarly in German the word "*unternehmensgrunder*" (enterprise-founder) is used, or "*iværksætter*" (someone who starts something) in Danish.

All change is a source of innovative opportunity. Drucker (1985) says this includes:

- The unexpected
- The incongruity
- Process need
- Changes in industry or market structure
- Demographics
- Changes in perception, mood, meaning
- New knowledge

Thus entrepreneurship often uses change and innovation to modify the value chain. This is often accompanied by another phenomenon, 'creative destruction'. Typically with the introduction of new technology (in the following example, the Internet) a new business situation is created, by destroying the old. Luckily for the small entrepreneur, existing large firms are seldom capable of making major shifts in technology. For example, why did railroad firms not open automobile factories? The management of

existing firms has invested enormous amounts of man-years in understanding their particular business whilst they have little expertise in the 'new(er) technology'. In the case of the railroad companies, their knowledge of the old prevented them from appreciating the new (or perhaps the emergent technologies were firstly in a humiliating infant state, leading them to be overlooked until too late, e.g. the first 'automobile' was a steam-driven prototype not able to exceed 3 mph, a then-laughable alternative to swift steam locomotives). Even though innovation is now more widely appreciated in management, the present-day example of the telephone companies struggling to master and dominate the mobile market shows that the transition is not simple. This underlies the need for understanding how innovation spreads through organizations and cultures.

Innovation and entrepreneurship are often associated with the terms 'value chain' and 'creative destruction'. These terms will be illustrated using the following simple (and indeed rather trivial) example where I was present and observed at first hand.

Company Z offers training in computers and computer software (programs). Many other firms who wish to upgrade the skills that their staff have (or should have), regularly send groups of their staff on such courses. Company Z knows from experience that the trainees need a book about that subject that they are learning, but that if they simply recommend the book, then most of the trainees will turn up to lessons without it. Therefore Company Z buys enough copies to give to the trainees, and simply puts the price of the book on the bill that the trainees firm pays for the course. The books come from a publishing house in the USA (here called Publisher X). Normally these books are imported to Denmark by Firm P, who then puts on taxes, and resell them at a profit to Company Z. However Thomas, who is a trainer employed by Company Z, notices that Publisher X has recently started a scheme on the Internet, selling books in bulk at 40% discount. By buying on the Internet, Thomas does not have the overheads that Firm P has, so he can sell the exact required number of books to Company Z at a lower price than Firm P can. By cutting out Firm P as supplier, and by using Thomas instead, Company Z can either pass on the savings to the end-customer, or absorb the increased profit. Either way, the publishers (Publisher X), Thomas and Company Z are happy, whilst Firm P has been cut out of the business of selling X's books to Z.

This example clearly illustrates:

A. Innovation in response to changes in industry, technology or market structure.
B. Entrepreneurship (Thomas is the new entrepreneur).
C. The 'value chain'. The value chain is the inter-linked series of business events connected to the rising perceived value of the books, from X

(where they are relatively cheap), to the end-customer (where they are relatively expensive). The books rise in price (reflecting their investment value to the owner at that point, however notice that no value has been added to the book(s) *per se*) as they pass along the value chain from X to Thomas (or P), to Z, to the end-customer,

D. Creative destruction, which is what Firm P has suffered.

(NB. The expression 'value chain' is also used in an intra-organizational sense, referring to a bundle of factors, affecting value from when a product enters the firm, to when it leaves it. Obviously in such cases, in contrast to above, 'Added Value' is an important factor. Furthermore, several 'value chains' may make up a 'value system', see, e.g. Porter, 1990).

In the above example, classical disintermediation has not fully occurred, because Thomas now intermediates. Classical disintermediation would have occurred if Company Z had chosen to cut out Thomas as intermediary, and ordered directly themselves (but Company Z was not as entrepreneurial as Thomas was). Disintermediation is discussed further in 3 and 5.

Large organizations have felt the need to 'formalize' the acquisition of innovation, and there exist several theories as to how to do this, e.g. Boisot (1998) and Stacey (1996). However these theories are largely unknown amongst SMEs (e.g. Barrow, 1998). Indeed the evolution of these two types of organization (large businesses, and thus more the B2B market, as compared to the small enterprises and B2C market) is quite different. Large organizations often have the philosophy 'what must we do in order to be stronger and exist well into the future' whilst small organizations try to survive tomorrow in the sure knowledge that if they do not, then they will quickly be replaced.

2.3.1. What is innovation?

In his review of the literature, Van Grundy (1987) made the distinction between innovation and creativity, and several other researchers (e.g. Thompson, 1965; Shephard, 1967; Zaltman *et al* 1973; Pierce & Dalbecq, 1977) define innovation as excluding creativity. Other examples include "*first or early use of an idea*" (Becker & Whisler, 1967), "*the adoption of means or ends that are new*" (Downs & Mohr, 1976), "*the adoption of change that is new*" (Knight, 1967), "*an idea, practice or object that is perceived as new*" (Rogers, 1983) and "*adopted changes considered new*" (Daft & Becker, 1978).

There may be many, who have difficulty with accepting change that is not new, or something new appearing with change having happened, or ideas

not being creative. Kanter (1983) states that "*innovation is the generation, acceptance and implementation of new ideas, processes, products and services*" and adds that "*innovation involves creative use as well as original invention*". Thus it appears:

Invention + application = innovation
Creativity + application = innovation

So which is more important, invention innovation or creativity innovation (or a third factor)? Porter (1990, p 74) states that "*companies achieve competitive advantage through acts of innovation*" and again later (Porter 1998) that "*much innovation is mundane and incremental, depending more on a accumulation of small insights than on a single major technological breakthrough*". The finding that the sum of many incremental innovations can have a large impact is also supported by other research (e.g. Bessant, 1999). This implies that invention actually plays a minor part. Indeed Valery (1999) stated *"innovation has more to do with the pragmatic search for opportunity than with romantic ideas about serendipity or lonely pioneers pursuing their vision against all odds*".

Thus it would appear that to enhance innovation, one must simply apply creativity. This idea has been important in spreading the works of e.g. Edward DeBono. For example DeBonos' book "Serious Creativity" (1996) starts with the words "*If I were to sit down and say to myself I need a new idea here ... I could quietly and systematically apply a deliberate technique of lateral thinking ... and in 10 to 20 seconds I should have some new ideas*". All humans think and are to some degree able to solve problems. Why then are not all humans creative (by self definition)? To postulate that they have not read DeBonos books is not a satisfying answer. The worst complication is that creativity is neither precisely defined nor measurable. Parkhurst (1999, p 18) produced probably the best definition of creativity by stating that creativity is "*the ability or quality displayed when solving hitherto unsolved problems, when developing original and novel solutions to problems others have solved differently, or when developing original and novel (at least to the originator) products*". This definition is still imprecise, because, for example it lacks quantitative measures of how original a product (be it a poem, a painting or a patent) must be to qualify as the result of a creative process. Furthermore it opens a significant overlap between creativity and 'mere' problem solving.

In sum, it appears that significant creativity belongs to a middle layer of innovation ('creativity innovation'), and that there exists a layer below, which depends on the simple diversity existing between humans ('diversity innovation'). To put it simply, talking to somebody with a different background may deliver the problems solution right in your lap, without any significant degree of invention and/or creativity. This idea contradicts classical Taylorism (the view that workers have few skills and it is

sufficient to give them specific tasks and orders) and is more in line with TQM. For example the Barden Corporation (quoted in Chaston, 2000, p 133) receives 50% of its suggestions for improvement from the factory floor workers.

Thus it becomes obvious that innovation – like invention – is time dependent; clearly in 2005 inventing the steam engine and applying it to the cotton industry is not an innovation. However innovation – in contrast to invention – is context dependant; Henry Ford copied production processes that he had seen at Chicago meat plants and 'simply' applied them in the motor industry (Chaston, 2000), creating an assembly line out of a disassembly line. Indeed, later it will be shown that in 1998, packaging information for downloading from a web site was 'old hat' for software developers, but led to an important innovation in the travel industry.

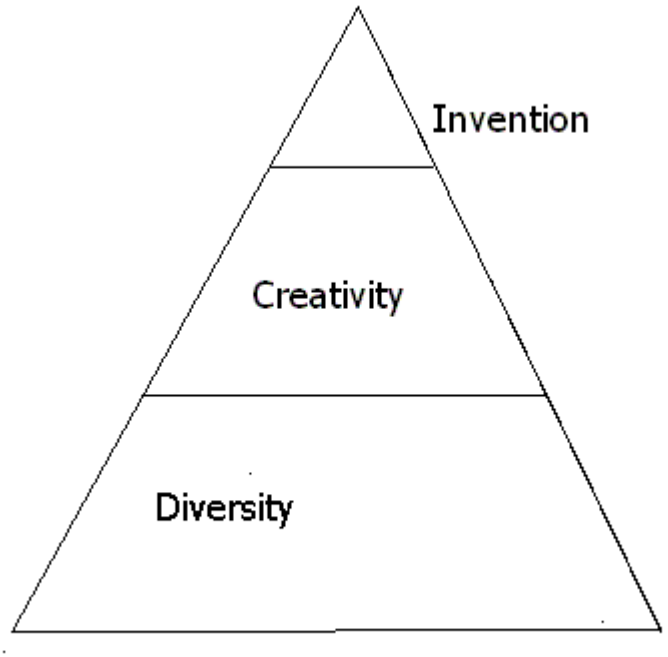


Figure 6: *illustrating that innovation can come from 3 sources, the application of invention, the application of creativity, and the application of diversity, where the 'mundane' diversity is responsible for the majority of everyday problem solving (incremental innovation) and invention is responsible for the few radical innovations.*

The traditional economic perspective of the Schumpeterian hypothesis (see Schumpeter, 1942) addresses the relationship between company size and the efficiency, or productivity, of the innovative process, especially as to whether there are economies of scale in innovation. For example; Palmer (2004) reports that L'Oreal have 28 000 patents, Proctor & Gamble have over 30 000 active patents and that IBM applies for typically more that 3 000 patents each year. Clearly this is a pipeline production where a

few patents more or less may not matter. So there appear to be economies of scale in invention.

Equally clearly, this addresses only those innovations (technological and perhaps radical/vertical innovations) at the apex of the pyramid, because there cannot be economies of scale in e.g. diversity innovation. Quite the opposite; if x is the number of 2-way communication connections and y the number of nodes (people involved), then, when Y > 3:

$$x = \frac{y * [y-1]}{2}$$

Or, that for e.g. company C (120 employees), 3 540 communication possibilities exits. Taking 5 minutes each, talking continuously and without any break, this would take 595 hours or 16 man-weeks of working time, and this is just for employees to talk to each other for 5 minutes, excluding that any employees got a chance to repeat conversations or do any work. Each further employee would take 10 man-hours to talk to existing employees for 5 minutes each.

The research described here points out that it is these transaction costs associated with communication, which is/are the limiting factor for diversity (horizontal/incremental) innovation. Indeed previous work on business growth consulting (Mellor, 2005b) has used this to point out that changes in company management structure must occur around company size 50 employees.

2.3.1.1. The concept of invention innovation (as used in this work)

Invention innovation is defined here as the application of an invention or discovery. Invention innovation tends to be vertical and radical. The vast majority of SMEs – including those studied in this work - are not built around a new technological (and thus patented) breakthrough. However, a glimpse at the Yellow Pages will show that very many have some form of protection on either their image or products (registered trade marks etc.). Thus these forms of protection are secondary and normally only serve to confound base imitators. Therefore they are not considered further here.

2.3.1.2. The concept of creativity innovation (as used in this work)

Here it is not the point to explain phenomena such as Shakespeare, Beethoven, Michelangelo or Aristotle. Creative innovation is used here in the sense of being the tool used to achieve differential advantage at the market place. Both Greiner (1972) and McDonald & Christopher (2003) say that the company begins with 'creativity'. Originally this meant in part the creation of a company (by definition creative, however probably in itself a mundane task). Here it is taken as being the central business idea. In the context of SMEs it may mean "*why not open a (theme) restaurant*" where "theme" is a word of your choice, 40 years ago it could have been 'pizza', now it could be e.g. 'Alaskan'. For established companies it may be e.g. "*we build boats to keep water out, so why not build water tanks, to keep water in*". Certainly the individual entrepreneurs often mentioned in standard textbooks about entrepreneurship, e.g. Anita Roddick (Body Shop) and Richard Branson (Virgin), achieved fame and fortune not by applying new technological inventions, but by applying creativity. The same goes for organizations, e.g. Marks & Spencer, Tesco *etc*.

Creativity innovation is not central to this work because the SMEs studied are already established (i.e. have been created).

2.3.1.3. The concept of diversity innovation (as used in this work)

Diversity innovation is most often a peer-to-peer phenomenon, i.e. horizontal and incremental innovation. It can be best summed up as 'sometimes the answer just falls into your lap'. A typical environment could be simply an informal talk with someone from a different background. One shoe manufacturer made expensive shoe soles using a plastic-injection moulding technique. A cheap retailer came along with a large order, the problem was that the existing moulds featured the expensive name brand 'built-in', and new moulds would cost so much that outlay (around one man-year wage) would exceed the profit on the new order. When the chief engineer found out about the problem, he simply taped over the logo part of the mould and '*hey presto*', nameless soles for a fraction of a euro! Diversity innovation is about being nimble and flexible so the company can add value and service its customers without 'having to re-invent the wheel'.

Utterback (1994) showed that companies often start with a 'product innovation' (here referred to as 'invention innovation', or as is somewhat the case in SMEs, 'creativity innovation') but after introduction, the impact of the 'product innovation' grows less, and 'process innovation' becomes more important. An analogy is the invention of the light bulb, a great breakthrough where the first light bulbs were produced by craftsmen

using a process involving many hundreds of steps. Clearly 'process innovation' (here in relation to SMEs referred to as 'diversity innovation', although other types of innovation may be involved) was an important factor in automating this process so as to ensure that satisfactory light bulbs could be produced to an acceptable price.

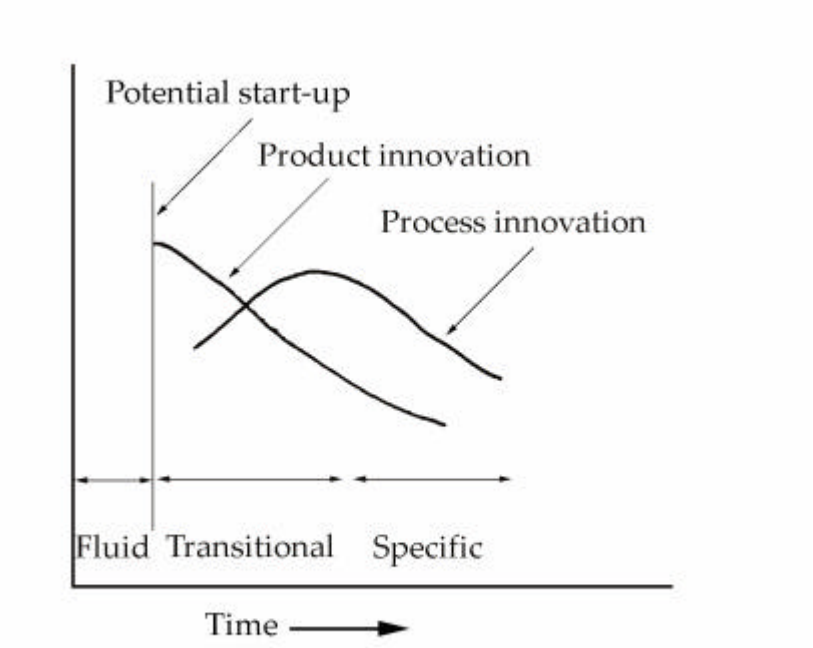


Figure 7: *Change in type of innovation with time: Ideas in a 'fluid' phase crystallize into an innovative product. If appropriate, a company can be set up at this point. However the effect of product innovation decreases and the focus shifts to process innovation in a transitory stage. Eventually the two curves come closer and parallel, the so-called 'specific phase. Modified from Utterback (1994).*

Diversity innovation, however, is more than production innovation, because diversity innovation encompasses not only technical improvements, but also improvements in business models, marketing and many other areas. Analogously to Utterback's model, the majority of SMEs could be imagined as sitting on the right-hand curve. Thus how they lever diversity innovation (product innovation, here expressed as Internet entrepreneurial marketing) is of primary importance in their survival.

2.3.1.4. Summary of types of innovation (as used in this work)

Radical innovation is an intellectual jump, which changes a whole area. An example of this is the steam engine of the 1770s, which revolutionised industrial production, resulting in the price of cotton cloth falling to 0.1% of what it had been. Vertical innovation reflects the mobility of ideas at a systems level, i.e. between the social strata of a society.

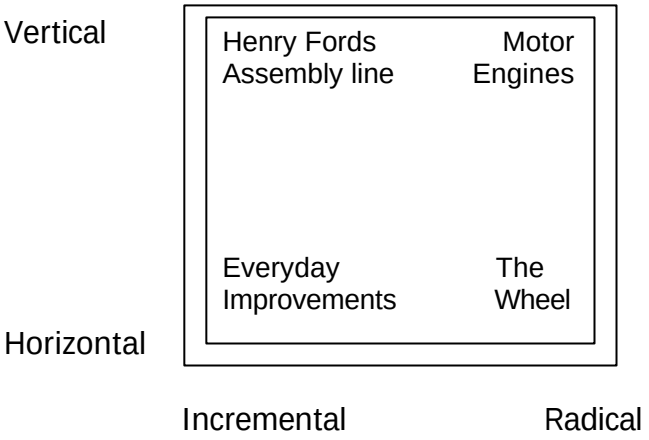


Figure 8: *Types of innovation: Matrix showing some examples of vertical & horizontal innovation, and incremental/radical innovation (taken from Mellor, 2005b).*

2.3.2. Innovation throughout history.

The development of highly sophisticated cultures depends on two phases. Firstly, the food supply must grow. As soon as the food supply is sufficient, that people don't have to scratch their living from the soil every day, then they can experiment with things in their environment. The second phase is social mobility, perhaps protected by laws and customs, which make positive innovation possible.

By 8000 BC, humans had begun to use agriculture, as opposed to being purely hunter-gatherers. For the first time people were able to use relatively permanent settlements, and this, together with the greater productivity of their efforts, enabled them to devote more time to non-subsistence activities. As population grows, more hands are available for labour tasks and, as Adam Smith pointed out, division of labour involves specialization. Specialization leads to greater efficiency and technological progress. Indeed pottery, requiring less labour to produce than stone containers, was in use around 2000 years later. However hunting, gathering and farming were complementary activities for many generations. Perhaps migratory bands or hunting expeditions would replace shelters of skins and tree branches with dugouts or wooden shelters, followed by sod houses and eventually houses of sun-dried mud brick (see e.g. Cameron & Neal, 2003). Experience in making bricks may have been cross-fertilized with pottery skills. As potters refined their art, they invented the potters' wheel, preceding the use of the wheel for transport. Such invention and innovation progressed by almost-imperceptible increments. This type of progress is thus called ‘incremental innovation’. In spreading from village to village and from farmer to farmer, we can also speak of ‘horizontal innovation’. In this situation, innovation is

spread between peers, i.e. people with common problems, and without large differences in social status, caste etc.

Going hand-in-hand with incremental innovation is radical innovation, and with horizontal innovation, is vertical innovation (Mellor, 2003a). Radical innovation is an intellectual jump, which changes a whole area. An example of this is the steam engine of the 1770s, which revolutionized industrial production, the price of cotton cloth fell to 0.1% of what it had been. Vertical innovation reflects the mobility of ideas between the social strata of a society. Paradoxically, to illustrate what vertical innovation is, it is best to take an example where it was lacking.

The peak of the classical civilization was the Roman Empire. The city of Rome itself may have had one million inhabitants at its height, a feat not repeated until 2000 years later in London. Roman society was highly stratified, with the nobility dedicating themselves to leisure and religion, and their sons to the arts of war. Roman roads stretched from the Caspian Sea in the east, to present-day Portugal and Britain. However, these roads were used for communication by messenger and for strategic use (chariots and armies), but hardly for commercial traffic. Commerce was left to inferior classes (even foreigners). Great progress was made in philosophy, mathematics and art, but not in the applications of science, e.g. steam-powered trinkets, the waterwheel and the windmill had all been invented by 100 AD. But Roman ingenuity manifested itself in roads, aqueducts and domed buildings, not in laboursaving machines. The nobility was well able to design advanced works as an intellectual exercise, but they lacked both the experience and inclination to experiment with the means of production, because labour carried the stigma of menial status. Slaves did the productive work. But even if the slave class had had any opportunity to improve technology, they would have reaped few (if any) benefits from their inventions, either in terms of higher incomes, or as reduced labour. The decline of the Roman Empire may partly have been due to this lack of technological creativity.

This lack of incentive for the slave labouring class, and thus lack of vertical innovation, is the reason why societies based on slavery may produce art or literature (which may even be considered to be radical innovation), but such a society cannot produce sustained economic or technological growth.

This is in sharp contrast to today's Internet world, where high degrees of anonymity rule, often you don't know if the person you are talking to is black, white, old, young, male or female. All barriers are down and everyone is equal. And those straight and wide Roman roads are now optical backbone connections, carrying millions of dollars of value every minute.

The degree of progress in society is dependent on the ability of its members to think rationally. Discovery started as a rationalization of myth, for example the rationality expressed by William of Occam. William of Occam was a British intellectual teaching in Köln between ca 1280 and 1347 and the origin of 'Occams Razor' (also called 'law of parsimony'), which is a mixture of various literal quotes including;

Entia non sunt multiplicanda praeter necessitatem – "Entities should not be multiplied more than necessary", *Quando propositio verificatur pro rebus, si duae res sufficiunt ad eius veritatem, superfluum est ponere tertiam* - "When a proposition comes out true for things, if two things suffice for its truth, it is superfluous to assume a third" and *Pluralitas non est ponenda sine necessitate* - "Plurality should not be assumed without necessity". Or, to put it more succinctly; "Of two competing theories or explanations, all other things being equal, the simpler one (and the one not invoking divine or supernatural intervention), is to be preferred". Incidentally, especially the bit about "*not invoking divine or supernatural intervention*" got Occam excommunicated, illustrating, along with Galileo and others, the perils of introducing innovation into adaptive environments (see e.g. 2.2.2).

Britain's liberal immigration policy, from around 1500, under the reign especially of Henry VIII, was a magnet in attracting those individuals who confronted intellectual, social and/or religious barriers elsewhere in Europe. The peak was in the late 1700s when the Industrial Revolution in Britain coincided with the 30 Years Embargo due to the Napoleonic Wars, leading to a refined industrial society needing only markets (selling opportunities) to expand explosively (incidentally leading to 'gunboat diplomacy'). Compulsory universal education (from 1888), plus free university education (from the end of the 1940s), kept Britain in high gear until the 1960s.

Thus innovation is essential to development and human progress. As Mellor (2003a) puts it "... *innovation is essential to development and human progress. Innovation builds on education and intellectual freedom. Innovation goes hand-in-hand with incentives*..." Indeed, history shows that the status of innovation is low in societies based on static sources e.g. the Soviet 'State Capitalist' system based arguably on the communist manifesto or puritan societies based on strict interpretations of the Bible (e.g. in the case of Galileo and others).

The literature on technological innovation has not explicitly explored diversity as a source of innovation because it mostly has been developed in a one-country context (Schmookler, 1966; Abernathy & Utterback, 1975; Rosenberg, 1976; Freeman, 1988; Nelson & Winter, 1982; Van Hippel, 1988). One further major debate concerns the relative contributions of 'demand pull' *versus* 'technology push' (see Rothwell, 1992).

2.3.3. The adoption of innovation in populations.

A broad social psychological / sociological theory called Diffusion of Innovation (DoI) theory purports to describe the patterns of adoption, explain the mechanism, and assist in predicting whether and how a new invention will be successful. It is expressed in E. M. Rogers' book "Diffusion of Innovations", 3rd Edition 1983 (originally published in 1962) and by Davis (1989) in his 'Technology Acceptance Model', which is especially relevant for IT and may help explain e.g. the penetration of Internet marketing (see 2.5) because of its potential applications within information technology ideas, artefacts and techniques.

DoI theory is concerned with the manner in which a new technological idea, artefact or technique, or a new use of an old one, migrates from creation/conception/invention, through to its use. According to DoI theory, technological innovation is communicated through particular channels, over time, among the members of a social system or market segment. DoI theory is at its best as a descriptive tool, less strong in its explanatory power, and even less useful in predicting outcomes, but may provide guidance as to how to accelerate the rate of adoption.

To borrow an analogy from chemistry, lightweight molecules or atoms vibrating or moving with a high energy (ideas) are introduced into a population of other molecules or atoms. Clearly they interact with many of these, donating, by collision, energy to the recipient. The recipient molecules are thus also imparted movement. However the recipient population is heterogeneous, thus recipient molecules or atoms may be moved more (or less) according to their molecular or atomic weights. Some are able to move very fast (in DoI parlance, early adopters), whilst at the other extreme there may be those who move only sluggishly (in DoI parlance, laggards). Some of those who, early on, absorb high levels of energy, may bounce into laggards and help speed them up (in DoI parlance, change agents).

DoI theory states that the stages through which a technological innovation passes are:

- Knowledge (exposure to its existence, and understanding of its functions);
- Persuasion (the forming of a favourable attitude to it);
- Decision (commitment to its adoption);
- Implementation (putting it to use); and
- Confirmation (reinforcement based on positive outcomes from it).

Early adopters are generally more highly educated, have a higher social status, are more open to both mass media and interpersonal channels of communication, and have more contact with change agents. In Trickle-Down parlance, these may represent a super-ordinate class. Conversely, in IT terms, they may simply be technology fans. Mass media channels are relatively more important at the knowledge stage, whereas interpersonal channels are relatively more important at the persuasion stage. Important characteristics of an innovation include:

- Relative advantage (the degree to which it is perceived to be better than what it supersedes);
- Compatibility (consistency with existing values, past experiences and needs);
- Complexity (difficulty of understanding and use);
- Trial ability (the degree to which it can be experimented with on a limited basis);
- Observability (the visibility of its results).

Different adopter categories exist according to their adoption on a developmental time scale. Classically the time scale used is correlated with overall use, on a Bass Curve (see Mahajan *et al*, 1990. For recent review of developments, see Bass, 2004). The shape of the curve, where N is the number of adopters at time t, is given by the formula:

$$N_t = N_{t-1} + p\,(m - N_{t-1}) + q\,\frac{N_{t-1}\,(m - N_{t-1})}{m}$$

The three parameters used in the equation are:

- m = the market potential; the total number of people who will eventually use the product
- p= the coefficient of external influence; the likelihood that somebody who is not yet using the product will start using it because of mass media coverage or other external factors
- q= the coefficient of internal influence; the likelihood that somebody who is not yet using the product will start using it because of 'word-of-mouth' or other influence from those already using the product.

The standard Bass curve, which normally uses average values of p and q of 0.03 and 0.38, respectively, looks like this:

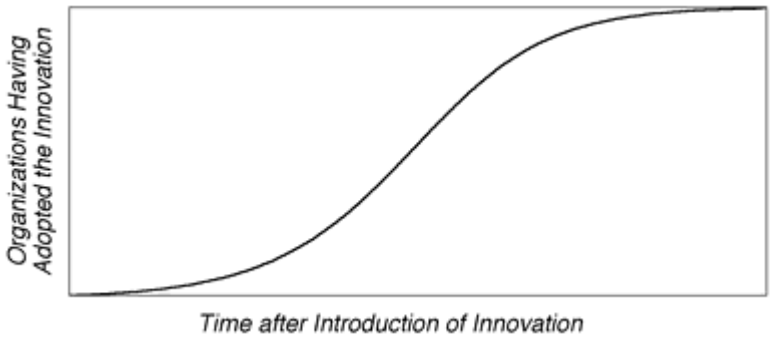


Figure 9. *A hypothetical Bass curve illustrating the spread of an innovation amongst a population with time.*

Adopters have been categorized as:

- Innovators (venturesome);
- Early adopters (respectable);
- Early majority (deliberate);
- Late majority (sceptical);
- Laggards (traditional).

Earlier adopting individuals tend not to be different in age, but to have more years of education, higher social status and upward social mobility, be in larger organisations, have greater empathy, less dogmatism, a greater ability to deal with abstractions, greater rationality, a higher intelligence, a greater ability to cope with uncertainty and risk, higher aspirations, more contact with other people, greater exposure to both mass media and interpersonal communications channels and engage in more active information seeking.

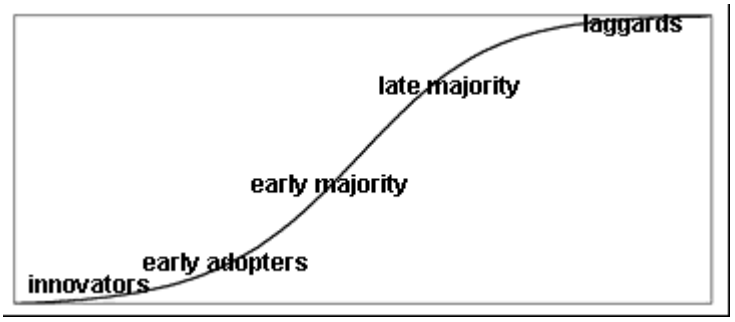


Figure 10. *A Bass curve illustrating the positions of personality types, from the venturesome (innovators) to the laggards (traditional).*

However it has been pointed out that adopters may be aware of potential benefits, but delay adoption until the benefits are judged to be sufficient (for overview, see Meade, 1984).

One drawback with the Bass curve is that it is strictly increasing; it implies that once an innovation is introduced, it will automatically spread as given by the line of the curve, i.e. it should never be, that the curve (or actual diffusion) can go down. This is not the case and reflects that the Bass curve is hardly dynamic. Other forms of presentation are therefore also known. That which probably has the widest acceptance is plotting, not the degree of acceptance, but the number of adopters, against time on a Bell (or 'Gauss') curve. This has the added advantage of clearly illustrating the '*innovation chasm*' (Moore, 1995), where the early adopter market becomes saturated before the early majority market takes off.

Important roles in the innovation process include:

- Opinion leaders (who have relatively frequent informal influence over the behaviour of others);
- Change agents (who positively influence innovation decisions, by mediating between the change agency and the relevant social system);
- Change aides (who complement the change agent, by having more intensive contact with clients, and who have less competence credibility but more safety or trustworthiness credibility).

The change agent functions are to:

- Develop a need for change on the part of the client;
- Establish an information-exchange relationship;
- Diagnose the client problems;
- Create intent to change in the client;
- Translate this intent into action;
- Stabilise adoption and prevent discontinuance; and
- Shift the client from reliance on the change agent to self-reliance.

Innovation decisions may be optional (where the person or organisation has a real opportunity to adopt or reject the idea), collective (where a decision is reached by consensus among the members of a system), or authority-based (where a decision is imposed by another person or organisation which possesses requisite power, status or technical expertise). Thus the adoption of innovation may be different in different cultures, if the culture in question is e.g. highly authority based, or highly collective etc. Thus one could imagine differences in adoption of one innovation according to the market; e.g. USA, Middle East, Scandinavian or Japanese.

However DoI theory cannot be applied to the spread of innovations in restricted environments, like SMEs. This is because it assumes that people and ideas can interact in a random Brownian manner, but inside companies free space is lacking (i.e. diffusion is limited), due to e.g. departmental barriers. This lack of free space means that unrestricted

Brownian motion between people and between ideas and people is not allowed. Thus DoI can be applied to large populations (e.g. the adoption of Internet shopping amongst the population generally), but it is not applicable in studying the spread of ideas inside small organizations. Indeed, it may not even be applicable to the spread of innovations between different companies, since many simply imitate (Arundel *et al*, 1995). An example is the banking business; innovative banks started to introduce revolutionary concepts including credit/debit cards, cash vending machines and Internet banking. Each of these innovations exhibited a long lag phase, where proof-of-concept was established. Adoption then spread by imitation of the concept, with extra time lags caused either by conservatism or by the time needed to circumvent proprietary rights *etc.* Thus adoption was not the theoretical smooth curve like figures 9 and 10 (earlier this chapter; 2.3.3), but was by a random block-wise process until all banks interested in these systems had adopted them (see Gopalakrishnan & Bierly, 2001).

2.3.4. 'Championing' – a way of spreading innovation in companies

As reviewed by Schilling (2005), a number of studies have suggested that companies should encourage a senior member of staff to champion new product development. This, it is assumed, will ensure that the project can sustain momentum and surmount the hurdles that will inevitably arise. Indeed Roberts (2001) reported that 68% of US companies, 58% of EU companies and 48% of Japanese companies reported, used senior managers to champion such innovation projects.

Whilst it appears reasonable to believe that championing is a widely adopted tactic, from the data presented in this thesis, one cannot believe that it is the most efficient tactic. This view is partly supported by the work of Markham and collaborators (Markham *et al* 1991; Markham & Griffin, 1998; Markham 2000). To sum up, Markham and co-workers found:

1. Products with champions were more likely to be successful in the market, but the factors determining market success were largely beyond the champions' control.
2. Champions are more likely to support projects that will benefit themselves (including their own productivity bonus), or make work easier for their department.
3. Champions can arise from all levels of an organization, not just the senior levels, but those from senior levels are not significantly more successful.

4. Champions are marginally more likely to have a technical background, than e.g. a marketing or general management background.

Although championing does bring innovations into the dominant consensus group, it is also realistic to believe that senior managers who use their reputation, resources and energy to overtly champion a cause will find it hard to cut their losses, whilst their very seniority may simultaneously make others in the company unwilling to challenge the senior champion, even after it has become apparent that the project will not live up to expectations.

2.3.5. Innovation in a macroeconomic context

Adam Smith founded modern economics with the publication of "The Wealth of Nations" in 1776. Smith argued that market economies generally serve the public interest and that the state should therefore not interfere with the functioning of the economy. Another influential economist was Thomas Malthus (1766-1834) who argued that population growth would lead to starvation and that this starvation would be most spread amongst the least successful, i.e. the lower class. However several economists pointed out that there was food enough, but that the lower classes lacked the means to pay for it. Prominent amongst the opposition to Malthus was David Ricardo (1772-1823), who argued that unemployment was the result of wages being too high. Ricardo was supported by Jean-Baptiste Say (1776-1832), who stated that general overproduction and prolonged unemployment were impossible. Indeed ‘Say's Law’ states that "*supply creates its own demand*", or that the production of goods generates sufficient income to ensure that goods are sold. John Maynard Keynes (1883-1946) later argued, like Malthus, that unemployment was primarily due to failure of demand. However he reasoned that the state should intervene by increasing spending in times of slump. This view prevailed until the 1970s, when both unemployment and inflation were increasing and the management of demand policies seemed to have no answer. At this time focus switched to supply and the role of money. Monetarism is primarily associated with Milton Friedman, who looked back at the quantity theory of money. The quantity theory of money is at least 500 years old (indeed Dobson & Palfreman, 1999, suggest it began with the Chinese philosopher Confucius - born 551 BC). The theory states that changes in the money supply lead to changes in price levels and wages, but have no effect on output and employment:

$$MV = PY$$

Where M stands for money supply, V for the velocity of circulation, P for price levels and Y for real output. Thus if money circulates quickly, less

will be needed to sustain price levels. However if V is constant, then changes in M will affect P. Thus the quantity theory of money is also the theory of inflation.

Amongst these mainstream theories, the role of entrepreneurship received relatively little research and was rather overlooked. This is probably because it is not amenable to mathematical modelling, and thus the supremacy of the large corporation remained the dominant theory (see e.g. Galbraith, 1967). However Joseph A. Schumpeter (1883-1950) had introduced entrepreneurship theory (in the innovation context which we now know) and practice long before this time. Schumpeter's book "*Theorie der wirtschaftlichen Entwicklung*" (1912; see Schumpeter, 1942) directed the attention of economists away from static systems and towards economic advancement. Schumpeter believed that the innovation practiced by entrepreneurs allows economic systems to avoid repetition; especially repetition of old mistakes, and thus progress to more advanced states. Schumpeter also popularised the work of Nikolai Kondratieff. Kondratieff (1935) developed the theory that technology stimulates industries in waves lasting approximately 50 years (the Kondratieff Cycle), consisting of around 20 years to perfect and that uses a series of related technologies, followed by 20 years where the growth industries appear to be doing well (see also Burns & Mitchell, 1946), but what looks like record profits are actually repayments on capital in industries that have ceased to grow. This perilous situation can turn to crisis, often precipitated by a relatively minor panic, and crash. There follows a long period of stagnation during which new, emergent technologies cannot generate enough jobs to make the economy grow again. Completed Kondratieff Cycles include the 'steam/agriculture' cycle (1820-1870), 'rail/coal/textile' cycle (1870-1930) and the 'auto/rubber/petroleum' cycle (1930-1980). Kondratieff also predicted that the content of previous cycles cannot be repeated, thus earning himself execution at the hands of Stalin, who had just instigated an 'agricultural reform' in the USSR.

However Schumpeter and Kondratieff may still have gone relatively unnoticed if it had not been for the works of Peter Drucker. In the text "Innovation and Entrepreneurship" (1985) Drucker contrasts the employment situation in Europe and in the USA. The USA was booming whilst Europe showed the symptoms of being at the stagnation end of a Kondratieff cycle. Drucker argued that the difference was due to the entrepreneurial culture in the USA. The effect was that within 5 years most European governments (and the EU) had passed legislation setting up initiatives to promote innovation and entrepreneurship.

It should, however, be noted that Drucker does not see IT, especially in the USA, as being the start of a new Kondratieff cycle. Drucker notes that actually few jobs are created in 'high tech' firms, and rather that IT is an enabling technology, making it possible for Small and Medium-sized Enterprises (SMEs) in a range of different branches to profitably exploit

niches which otherwise may not be profitable. The EU (2005) states: "*Small businesses play a central role in the European economy. Some 25 million small businesses, constituting 99% of all businesses, employ almost 95 million people, providing 55% of total jobs in the private sector*" and it has been estimated that, in the Canada, SMEs are responsible for creating around 70% of all jobs and indeed represent the most efficient use of economic resources (Gregory, 2003.). Thus innovation and entrepreneurship are hard to model and thus hard to predict. However they probably make up a large part of the economy.

2.3.6. Is the Internet an innovation?

Is the Internet - including its applications like the World wide web - an invention, an innovation or even a cluster of innovations (Chin and Moore, 1991)? Some authors e.g. Prescott and Van Slyke (1996) prefer to simply refer to "*Technology Cluster Innovation*". In chapter 2.1 aeroplanes were briefly mentioned and indeed this industry consists of 3 major parts, each of which consists of subsections:

Branch	Products	Application and exploitation
Aerodynamic and engineering research.	Many different types of aeroplanes, helicopters, rockets etc.	Many different airline companies with different target groups

***Table 2**. Division of the meta-cluster 'Aerospace' into three mega-clusters according to the inventive character (e.g. based on patents) at the left, the mostly innovative in the centre, and the entrepreneurial applications on the right.*

Clearly even this superficial overview shows a meta-cluster consisting of 3 overlapping mega-clusters, ranging from mostly inventive, through mostly innovative, to mostly entrepreneurial (although organizations on the left side of the table, like Boeing, are also entrepreneurial). Clearly the exercise can be repeated for the Internet:

Branch	Products	Application and exploitation
Hardware and software engineering/research.	Many different types of protocols, HTTP, SMTP, FTP etc for Inter, intra and extranets etc.	Many different e-commerce companies with different target groups

***Table 3.** Division of the meta-cluster 'Internet' into three mega-clusters according to the inventive character (e.g. based on patents) at the left, the mostly innovative in the centre, and the entrepreneurial applications on the right.*

And again here, a mostly inventive ‘Technology Cluster’ can be distinguished from an ‘Innovation Cluster’. One should be careful with the innovation cluster, as it cannot be easily thrust into one classification box because each user and organisation can use the same innovative product in different innovative ways. Finally e-commerce fills out a large part of the ‘Entrepreneurial Cluster’.

Obviously the Internet is an unusually dynamic innovation and very deserving of study, but its dynamic nature and complexity means that extra care is required.

2.3.7. Short conclusion

The two classically known sources of innovation are the applications of either invention, or of creativity. Here it is postulated that a third source exists, the application of diversity. This ‘diversity innovation’ (largely) and ‘creativity innovation’ (to some extent) are major contributors to ‘incremental innovation’, most often progressing horizontally. Invention innovation is rarely applicable to SMEs, creativity innovation features largely in the first stages of founding an SME, whilst diversity innovation – similar to an everyday inspiration – is immensely important in retaining flexibility in changing and fragmenting markets, especially in relation to emergent hyper-competition.

2.4. E-commerce.

2.4.1. What is e-commerce?

"*Never do anything a machine can do for you*" is an old adage, which is not a call to be lazy, but rather a cry for efficiency. Human labour costs money, typically 2-3000 dollars a month. A new PC costs a fraction of that to buy and is written off over a period of typically 3 years (that is, the actual cost for a company making a profit is zero), so why not let machines do the mundane, repetitive tasks and let humans get on with the interesting, expertise-demanding work? This realisation has lead to the revolution called e-commerce during the last 20 years

The terms ‘e-commerce’, ‘e-business’, ‘digital economy’, ‘Internet shopping’ and many others, are often used loosely and interchangeably. In its most basic form, e-commerce covers the paperless exchange of information using a variety of methods. These can include Electronic Data Interchange (EDI), which has been used in retailing and automobile

segments for several decades (Timmers, 2000). Transactions include invoices, purchase orders, shipping notices, money transfers etc. The Internet and related TCP/IP based systems, has added another dimension by not only supporting application-to-application exchange, but person-to-person and person-to-application forms of exchange. Kelly (1998) suggests that e-commerce possesses four attributes:

- Exchange of digitalized information between parties.
- It is technology-enabled.
- It is technology-mediated.
- It includes supporting activities that are intra- and inter-organizational.

Based on DoI considerations (figures 9 & 10, chapter 2.3.3), e-commerce is likely to increase as users become more proficient, and this has been supported by several national and international studies (Korgaonkar & Wolin, 2002; Sexton *et al*, 2002).

2.4.2. Types of e-commerce

E-commerce can be broken down into four quadrants according to the position of the player(s) involved:

	Businesses	**Consumers (or Customers)**
Businesses to	**B2B** Representing the spectrum of commerce that can occur between companies, e.g. between Ford and its suppliers, and its outlets.	**B2C** Internet retailing, e.g. Amazon.com (books) or Dell (computers) amongst the new ('dot.com') wave, or traditional retailers opening an Internet sales channel ('clicks and mortar').
Consumers (or Customers) to	**C2B** Consumers can join together and present themselves to businesses, e.g. bidding for airline tickets on priceline.com	**C2C** This reflects the added value offered by e.g. auction or exchange. One example is e-Bay

Table 4*. A matrix illustrating the four combinations of business & consumer, note that this matrix excluded e-government because e-government theoretically does not involve profits, being supposedly used mainly to minimize opportunity costs.*

Phillips (2003) estimates roughly that B2B is responsible for 80-90% of all e-commerce, and B2C for most of the rest, with C2B and C2C only occupying very minor market niche positions. The degree of overlap between these categories can be quite extensive, e.g. Amazon.com uses B2B to their suppliers to fill B2C orders, as well as offering space on their web site for customers to buy and sell their used books (C2C).

Unfortunately, studies on e-commerce adoption by SMEs has, to date, been rather theoretical (e.g. Lockett & Brown, 2003).

2.4.3. The adoption of e-commerce

In his preface to the book "The death of e and the birth of the real new economy" (Fingar and Aronica, 2001), Brian Maizlish states:

"E" is dead, because e-business is no longer an option, rather every business must be an e-business.

However this glib generalisation covers the fact that e-commerce has changed the business landscape. In the 1960s uncertainty amongst the 'smokestack' industries led to widespread diversification. The strategy was to have a finger in many pies, so nothing much could go wrong. This went so far that many giant corporations ended up with divisions in rubber, in electronics, in chemicals, in steel, in coal, in insurance *etc*. However it soon became obvious that quite different sets of skills were needed to profitably run each division. This led to a process of divestment, where the new mentality dictated; "*do what you are good at*". This shift meant that each industry had quite a narrow focus. It was built on the assumption that there only are a certain number of industries. Thus understanding and controlling these will lead to optimal performance.

The e-commerce revolution of the 1990s created new business areas. It showed that it was possible to make business where no previous industry or business existed, instead of just commercialising technology or developing products.

Thus B2C e-commerce can be divided up as follows:

1. Those new organizations that are active in e-commerce in a business area which previously did not exist. Examples are Hotmail and Yahoo.
2. Those (mostly new) organizations that are active in a business area which previously did exist, but have used e-commerce to radically transform and improve the business area. Examples are Amazon and e-Bay.
3. Those (new and old) organizations that use Internet as a marketing channel.

Clearly there is a 'winner and loser' aspect to this categorization. Take for example a hypothetical company in category 3. Not having an Internet presence is rapidly becoming a non-option as customers get used to the convenience of Internet. Will opening a 'brochure ware'-type web site attract new customers, or will channel conflict and 'cannibalisation' occur as old customers simply switch channels? Benefits can be calculated using the equation:

$$G = IR - [CC + IC]$$

Where G stands for Gains, IR stands for total Internet revenue, CC stands for cannibalisation costs and IC stands for Internet costs (which in turn are composed of hardware costs minus depreciation, software costs, overheads and salary costs etc). For simplicity, externals like interest rate (in case the web site was financed by a loan) inflation, opportunity costs, etc are excluded.

Clearly the result of the equation may be low, or even negative. Some companies avoid this dilemma by offering different selections on-line and in their physical stores, for example Coop Danmark offers exclusive goods only on-line (thus CC = 0) and leverages their good distribution position by delivering goods ordered on-line to the customers nearest physical supermarket for collection by the customer (Outzen-Jensen, 2003). Others, for example Progressive Insurance, largely eliminated their physical presence and put their effort into on-line initiatives (in this case, progressive.com).

2.4.4. The importance of e-commerce.

Definitions of e-commerce abound. If a person goes to the dry cleaners to pick up the sweater they left there 2 days before and pays with cash or cheque, then this is not an e-commerce transaction. However if a person goes to the travel agents and orders a airline ticket, even if they pay with cash, then a partial e-commerce transaction has taken place, because the travel agent has booked with the airline through an e-commerce system (and obviously the e-commerce 'content' is higher if the transaction is performed on-line). Thus to put a figure on e-commerce it may actually be more simple to work out the total value of non-e-commerce transactions, like the 'sweater' example above, and subtract that from total commerce!

In 2000 the consulting firm McKinsey & Company used a 'rule of thumb'. They reckoned that cleaning up internal systems would save a typical company 10%, entering into B2B e-commerce relationships with supplies would save a further 10% and establishing B2C relationships would add to profitability with another 10% (Nickless, 2000). Although clearly the percentages will depend on business branch and consultancy, it seems

obvious that e-commerce can and will add considerably in microeconomic terms in many parts of the world. This view is supported by the establishment of several B2B hubs, first steps towards a 'frictionless economy', where buyers and sellers exchange data electronically. These include:

- Covisint; (Ford, DaimlerChrysler and General Motors)
- GlobalNetXchange; (Sears & Roebuck, Carrefour and Oracle)
- Altra Energy Technologies; (US power suppliers)
- CheMatch; (chemicals and plastics)
- Automated Credit Exchange; (the banking and insurance branch)

However e-commerce may be more important on a macroeconomic scale. Alan Greenspan (Chairman of the US Federal Reserve) believes that e-commerce has sped up the reaction time of companies to ebb and flow in supply and demand:

A couple of decades ago inventory data would not have been available to most firms until weeks had elapsed, delaying a response and, hence, eventually requiring even deeper cuts in production ... (now) ... businesses can perceive imbalances at a very early stage - virtually in real time - and can cut production promptly in response to developing signs of unintended inventory building. (Greenspan, 2001).

However B2C e-commerce can also significantly expand a company's customer base. Machlis (1998) reported that over 50% of customers buying at B2C web sites are new to that company and Amazon.com has reported sales to over 160 different countries, clearly these are new customers, unreachable if not for the Internet (and it is not bad if new customers just turn up, since an old marketing adage states that it takes 5-8 times more to sell to a new customer compared to an existing customer). Furthermore it could be argued that companies like Schwab and American Express entered the on-line trading market in response to competition from start-ups like E*Trade, Datek Online and Ameritrade etc.

Additionally, some companies like Amazon and Yahoo, are staking out large tracts of 'cyber-turf' without having a clear picture of how it will ultimately be used. For them (and for everybody else), cyber-turf is uncharted territory, presumably representing potential customers, but it is their gamble as to whether it actually represents sales.

B2C web sites are said to exist at several levels or 'generations' according to their level of sophistication. There are 3 - 6 generations, according to author; here 3 are used (see e.g. Mellor 2001). Quite simply,

1. The early generation (1) involves a 'visiting card on the web'. It is improbable that anyone has ever sold anything using this type of

web site, but businesses are rarely aware that this level of web site involves only expenses.

2. The middle generation (2) is used to signify the stage where businesses are investing significantly in web-sites, they may have several, they may be paying a web-master to put their catalogues on the web, certainly someone is busy receiving a lot of e-mails from customers. To put it plainly, they are using Internet just as they are using other advertising media (newspaper ads, direct mailing etc). This means extra marketing costs because they haven't cut down on the other media; Internet is an extra, plus a heavy investment in support personnel.
3. In the 3rd generation, the Internet 'moves in'. Orders no longer are e-mailed to a secretary, but are programmed directly to the warehouse, catalogues are no longer printed, only printed out if needed, communication is e-mail and intranet, the firm has gone over to electronic business and nobody is doing anything a machine can do. This level often corresponds with the organization reaching level 3 in B2B processes. At this time Business Process Re-engineering, BPR (e.g. Rummler & Brache 1995, Peppard & Rowland 1995), may be employed to reflect these new processes and thus to make the organization more efficient.

The generations of web sites		
1st generation	Costs; domain name, hosting etc.	Returns; nothing
2nd generation	Costs; extra personnel and advertising.	Returns; medium
3rd generation	Costs; large initial investment	Returns; high

Table 5*. Three generations of web site (modified from Mellor, 2001).*

As can be seen in figure 11 (below), the internal processes are fronted by Client-Server applications, progress through ERP and Call Centre applications, to end up in Legacy Systems. This is clearly a complex process, and is often the reason why such IT projects are subject to delay and rarely hold their budget.

Enterprise B2C processes can be summarized as follows:

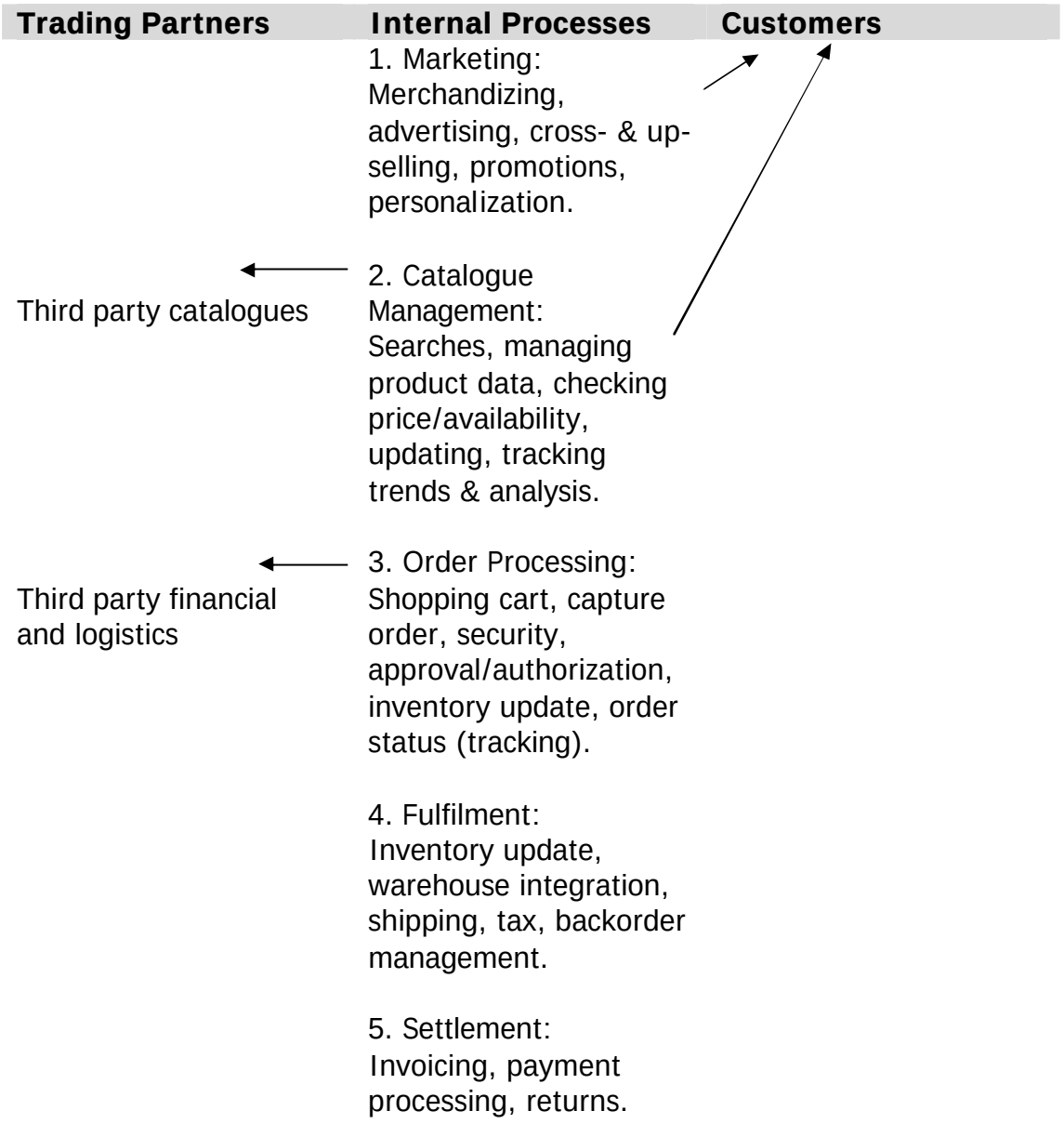


Figure 11. *Enterprise e-commerce, ranging from customer facing (top, also denoted by arrows), to internal functions. Common third party outsourcing denoted by horizontal arrows.*

2.4.5. Short conclusion.

E-commerce is an intricate and expensive business. SMEs in Internets 'entrepreneurial cluster' have thus to make the most possible use of innovation, especially innovation in Internet marketing. Since invention is largely inaccessible to such SMEs and the creative innovation phase has passed, these SMEs must put a significant amount of effort into leveraging diversity innovation in IT and Internet if they are to survive. Because

transition costs can be very significant, SMEs must possess some degree of technical expertise plus sound judgement based on this, if they to avoid financially-crippling mistakes.

2.5. Internet advertising & marketing

Marketing and advertising products purely on the Internet is very difficult (Mellor 2003b). Products should be advertised *via* as many channels as are open, which can vary a lot between companies. Experience shows that a 'mixed media' approach is the one that results in the best branding. A good example of 'mixed media' is the bus company where the companies URL is shown in enormous letters on the side of the buses, but there are many similar examples involving billboards or TV spots. Clearly, if one has sufficient money to invest in TV/Radio spots, billboard advertising, or large adverts in national newspapers, then ideas for mixed media will not be lacking. However in SMEs, cash is short and the definition of advertising must include:

"An investment of limited size in one area, resulting in a higher income in another area". (Mellor, 2003b).

So the problem is not initially to have a good idea and set the ball rolling, but rather to design a project which contains sufficient realizable checks and feedback mechanisms so as to make it possible to calculate almost-exactly how much revenue (profit) a specific advertising campaign has actually generated. Marketing is not 'rocket science', but still the target is to achieve an approach giving maximum returns for a minimal outlay. Without the possibility of 'balancing the books' then advertising policy can quickly be reduced to a simple matter of burn rate.

2.5.1. Finding information on the Internet

In order to sell on a web site, customers have to find the web site. Amongst billions of files, how to customers find the one which contains the product they want? Most use a search engine, which is a database-enabled remotely accessible program allowing keyword searches for information on the Internet. There are several types of search engine; the search may cover titles of documents, URLs, headers, or the full text, some, like AltaVista, also allow searches for image and sound files. These can be divided into:

- Submissions search engines,
- Indexing search engines and
- Meta search engines.

'Pure' submissions search engines are technically simple and have often only local relevance (e.g. jubii.dk) - they match an URL to a low number, often around 5, of keywords, which the client submits.

Indexing search engines send out small programs ('spiders', 'agents' or 'robots', or just simply 'bots'), which crawl around the web. What they are allowed to see is defined in a file 'robots.txt' placed on the web site root. Suggestions as to keywords may be placed in meta tags in the HTML files, and/or submitted on the search engines site directly. Some local search engines have agreements with the local TLD authority whereby the search engine is automatically notified of a new domain name under that TLD, e.g. Kvasir.dk (now defunct) was continually updated by dk-hostmaster.dk, allowing a complete and up to date indexing of all DK web sites. Many believe that the best indexing search engine is google.com. Meta search engines simply submit queries to other search engines, that is, they do not do their own indexing. The best-known meta-search engine is metacrawler.com. Exactly how search engines record information is often hard to see, and how they process information is a closely guarded secret, and what and how they present returned information ranges from the alphabetical to the mysterious. No two search engines are completely alike, and those web bureaux who specialize in getting web sites to the top of search engine results will swear that it is exact and wide science.

2.5.2. Advertising on the Internet

Advertising on the web takes a number of forms, e.g. advertiser-supported sites like Hotwired and CNN, or entry portal sites like Yahoo. However, independently of type, there is no assurance that companies will generate revenues from advertising on the Internet. This is largely because the Internet advertising industry lacks standards. Four major areas lacking standards include that there are no established and reliable principles for measuring traffic *versus* customers, that there is no standard way to measure consumer response to the advertisement, there are no standards for pricing, and fourthly that the general complexity (pop-ups, pop-unders, intermercials etc) are an obstacle to the standardization process.

A common form of advertising is 'banners'. Such advertising consists of two parts, the 'banner advertisement' and the 'target communication'. The 'banner advertisement' is a small, rectangular graphic image between 120 to 500 pixels wide by 45 to 120 pixels high, placed on a HTML page on a host web site and linked to the 'target communication', typically a HTML page on the sponsors' web site (see Alpar *et al*, 2001). Banners typically provide little information beyond the identification of the sponsor and an invitation for the visitor to click on the banner for further information. Conventional marketing segmentation theory would predict that banners placed on general interest pages have lower click-through rates (and therefore cost less) than advertisements that are consistent with the content of narrowly focussed pages (e.g. pages returned after a specific

search). DoubleClick (2002) estimates that 4% of web visitors click on a banner the first time they see it (first exposure), falling to 2% for the second and third exposures, and to under 1% after four or more exposures, and indeed banner advertising campaigns are known for their low click-through rates (Goldsmith & Lafferty, 2002).

Paid links are a different form of passive advertising, and may be seen as a textual form of banner advertising. Directories may contain large numbers of paid links, which may also occur as 'disguised advertisements'. One example of this may be that a visitor searches a directory using a certain keyword, which returns the paid link at the beginning of the results list, despite that this link may not actually be the most relevant for the search request parameters.

The earliest web-advertising model was the flat fee model, such as a fixed cost per month without any specifications about the amount of traffic delivered. More recently, pricing models are often based on CPMs (Cost per Thousand impressions or exposures), but fees based on actual click-throughs are also found (Prasad *et al*, 2003). Novak and Hoffman (2000) compared advertising prices for various media and found that on-line advertising was significantly more expensive than other media:

Media	**CPM cost (US dollars)**
Internet	36.6 (av.)
Newspapers	18-20
Magazines	8-20
TV	6-14
source, Novak and Hoffman, 2000	

Table 6*. Comparison of price of various advertising media. Anecdotal reports from Bruner (2005) implies that CPM prices for Internet are rising.*

Not surprisingly, advertisers and sponsors wish to use Internet technology in order to refine pricing models. They are interested in paying for activity on their web sites (the 'target communication'), including finding out how many people actually buy a product (and thus pay for the advertisement). Hosts for advertisements, however, argue that that they cannot be held responsible for the effect of an advertisement, drawing an analogy to e.g. newspaper advertisements, where the same charge applies, regardless of whether they lead to sales or not. However moves are being made to outcome-based pricing. This may include inducing a visitor to type their e-mail address into the advertisers' mailing list. Prices for such outcomes are typically around 0.5 US dollars per e-mail address. Similarly some companies run an affiliation/referral model, e.g. Amazon, where the affiliate places an advertisement on their web site and queries from customers are received at Amazon with the affiliates ID attached to the URL as a name-value pair. These values are written to a cookie on the

client hard disk, which is retrieved and read upon the customer placing an order, thus enabling Amazon to pay a correct referral fee to that affiliate, should the visitor make a purchase.

Thus the problem common to most forms of Internet advertising is the lack of correlation between visits ('hits') and sales (e.g. Rettie, 2001). Those who do not believe that hits and turnover are essentially unrelated, should simply put the terms 'free', 'porno', 'sex', 'girls' and 'XXX' in their web site meta-tags: Hits will treble, but sales will not.

Therefore marketing theories have been developed as to product classification and their suitability for sales on the Internet. In principle, selling on the Internet rests on the implication that transaction costs (Williamson & Masten, 1999) are lower. Transaction Cost theory (TC theory, see 2.2.6 for a pure review or below – 2.5.3 - for a review of TC theory in relation to Internet marketing) helps to explain why economic organisations takes the form they do (Williamson, 1995), and in particular tries to explain the particular structure of a firm, most importantly, the extent to which it will integrate vertically. This is important in our considerations of Internet suitability.

2.5.3. Transaction cost theory & the Internet

TC theory assumes that commercial organizations (firms, companies, *etc*) are profit maximising, and that profit maximisation involves costs minimisation. It assumes rationality on the part of owners and/or managers. This is a dangerous assumption and may well be at variance with reality when considering that many SME owner/directors behave in rather eccentric ways. Consider the 'bleak house' scenario (e.g. Ram, 1994) supported by statistics from work tribunals and generally exposing widespread poor employee relations in many SMEs.

TC theory also stresses transaction costs as well as production costs. In the economic sector, the ideal machine would be a perfectly efficient market with full information to be available to all parties, plus perfect competition. Departures from this perfection will result in firms incurring costs when they attempt to buy or sell goods or services. For example, lack of information about alternative suppliers might lead to paying too high a price for a good and this is an example of a transaction cost, and part of the rationale behind EDI and, later, ERP. Williamson argues that companies should want to minimise their total costs, which are made up of both production and transaction costs. As explained previously (2.2.6) Williamsons' variables are:

1. Frequency: Transactions can be frequent or rare.
2. Uncertainty: Transactions can have high or low uncertainty

3. Asset specificity: Transactions may involve specific or non-specific assets

According to the theory, these three variables will determine whether transaction costs will be lowest either in a market or, alternatively, in a hierarchy and this, in principle, could well determine which goods should be offered on the Internet and, if so, how.

An example of costs relating to frequency could be 'visiting card' (or 'first generation') web sites, which generate no Internet transactions (at best these are a signpost to traditional sales channels) and thus incur only costs.

Uncertainty is a more interesting factor. The issue here is how hard is it to foresee the eventualities that might occur during the course of the transaction. One obvious factor here is the length of time over which the transaction will take place. One example reported in this work (see 4.2.8) was a travel agency in South Africa, which could not have on-line flight booking & payment because SA banks demand that a paper photocopy of the customer's passport accompany credit-card transactions. Thus the agency enticed prospective customers with on-line descriptions, after which the customer had to go to a local travel agency to book a flight. Obviously this gave the local agency opportunity to sell the customer their own product. Thus transactions that take place 'on-the-spot' will have relatively little uncertainty, because one doesn't have to predict the future, the result of this is that many Internet web sites strive to shorten transaction time by having in-built on-line payment facilities, mostly provided by third parties (see 4.2.8.1. In this respect uncertainty also causes problems because of the danger of opportunism. How do the partners know they can trust each other? This is the basis of approved payment gateways, e.g. e-Trust, Verisign etc. as well as the references for sellers found on e-bay, and a host of other examples.

Asset specificity is often quoted as being the most important element in Williamson's theory. He argues that where transactions involve assets that are only valuable (or are much more valuable) in the context of a specific transaction, then transaction costs will tend to be reduced by vertical integration. Other things being equal, transaction costs are likely to be lower in a hierarchy than in a market, when transactions involve highly specific assets. This forms the basis for decisions about e.g. whether to offer goods on the company's own web site, or through a portal. If the degree of integration is judged sufficiently high, then companies or branch organizations may decide to open their own portals.

The costs to a buyer to locate a purchase are composed of identification costs (e.g. searching on Google or other search engines), production costs for the good itself - the physical or other primary processes necessary to create and redistribute the goods or services being produced – as well as

coordination costs (include the transaction costs of all the information processing necessary to coordinate the work of the people and machines that perform primary processes). The latter may include peripherals (e.g. marketing offers from third parties – “now you have bought a snorkelling holiday, so click here to get discounted goggles from our partner”).

In a market with many buyers and sellers a buyer can theoretically compare different possible suppliers (see however 4.2.1) and select the one that provides the best combination of characteristics, such as design and price, thus presumably leading to a minimization of accumulated total costs (see Malone *et al*, 1987). However, the coordination costs (e.g. identification costs) are relatively high, because the buyer must gather and analyse information from a variety of possible suppliers (e.g. the channels shown in table 6). Williamsons' ‘hierarchies’ reduce coordination costs over those incurred in a market by eliminating the buyer’s need to gather and analyse a great deal of information about different suppliers. But since the essence of coordination involves communicating and processing information, the use of the Internet and other IT seems likely to (theoretically) decrease these costs, by e.g. the use of supply chain management (e.g. in product aggregation & bundling), branch-specific portals etc. However how much the Internet can contribute to decreasing transaction costs is also limited. This is described under Williamsons' variable ‘Asset specificity’.

Asset specificity on the Internet is most often equated with the complexity of product description, which in turn refers to the amount of information needed to specify the attributes of a product in enough detail to allow potential buyers to make a selection. Products with complex product descriptions are less likely to be sold easily on the Internet because the coordination costs for a market would be higher, whilst products with standardised descriptions are easily purchased *via* markets as their descriptions are relatively simple and thus have low coordination costs for the buyer. The application of this truth to Internet is found in ICDT/Marketspace theory – books have standardised descriptions (a Harry Potter book bought at the local shop is identical with that book bought from Amazon). At the other extreme no one would buy e.g. a full-size locomotive over the Internet. The problem lies between these extremes; two holidays from two different companies may both be labelled ‘African Safari’, but one may be twice the cost of the other, meaning that the information content is all-important for a purchase.

Thus as stated by Bakos (1991, 1997), Internet marketplaces are changing the constraints imposed by these (production and transaction) costs and thus are fostering new types of intermediaries that create value by aggregating services/products that traditionally were offered by separate industries. These may be portals or similar which, in some cases, result in disintermediation (the displacement or elimination of market intermediaries), enabling direct trade with buyers and consumers without

agents (see Wigand, 1997). Alternatively they may use Supply Chain Management techniques (e.g. XML) to bundle products.

2.5.4. The virtual marketspace & the Internet

The above has given rise to the concept of marketspace instead of marketplace (Rayport and Sviokla, 1995). Angerhahn (1997) refined the concept that products (and, indeed companies) move in a virtual space in the publication "The ICDT model; towards a taxonomy of Internet-related business strategies". ICDT stands for: virtual Information space, virtual Communication space, virtual Distribution space and virtual Transaction space. A company must be established in all four virtual spaces before it can be said to be established in the virtual marketspace. This being said, the entry into all four spaces is not normally simultaneous, but rather an evolution, typically starting in the information space (e.g. a simple HTML 'visiting card'-type web site presenting information about the company).

ICDT is normally depicted as 4 extra – virtual – spaces surrounding the traditional market. The Virtual Information Space, in B2C e-commerce, is often the space which companies inhabit first. At its most primitive it is used as a 'virtual billboard' where companies relatively cheaply can advertise and inform about themselves and their products/services on a first generation 'visiting card'-type web site which points towards the other marketing channels (telephone number etc). As pointed out above, the transaction frequency resulting from this type of presence is near zero, so despite investments being relatively low, they consist mostly of costs as opposed to benefits.

In VIS communication is overwhelmingly 1-way, from the company to the customer, however in VCS space companies use new channels to enter into 2-way relationships and exchanges of ideas with their customers, perhaps even enabling cross-customer contact. Technically, the possibilities include bulk e-mail, chat rooms, bulletin board systems etc. However, as discussed in 4.2.2, such features may incur significant costs with little benefit.

VDS stands for Virtual Distribution Space and represents a new digital distribution channel or network for an enterprise. ICDT considerations have helped create a new marketing discipline called 'usability studies'. In usability, information is presented in easily-readable quanta: Instead of a client ('user') clicking on a certain product and being presented with a seemingly-endless detailed document, information is structured in layers consisting of 'teasers' and a 'read more' link. This way the user can judge if they are on the right path before they delve too deeply into the material. Return possibilities are provided by a 'breadcrumb trail' showing

where the user is and horizontal mobility may be provided by ‘read similar’ links.

Clearly not all products can be distributed virtually (furniture etc), but VDS may still be useful in distributing help programs, support and extra service (for example instructions on how to assemble the furniture). Virtual Transaction Space goes a step further by focussing on business-related transactions, and not only customer-facing (payment gateway etc) transactions, but also transactions in the enabling process, e.g. supply chain management.

Taking TC theory into account, each virtual space is divided into four product classification categories, according to level of sophistication on the vertical axis, and level of customisation on the horizontal axis. Typically each product or service offered will be then scored according to these categories and the analysis repeated for each product. In practice however most existing companies know from their sales statistics (conventional marketing channels) which of their products sell best. Thus ICDT can be use to ‘fine polish’ their descriptions so that they are better suited to Internet sales.

2.5.5. Short conclusion.

Customer-facing (B2C) e-commerce focuses around the problem of asset specificity and the attempt to lower co-ordination (transaction) costs. The related ICDT theory largely fails to be of significant practical help because the relative importance and volume of VIS and VCS are often unknown, except in the cases of very simple (or otherwise well-known e.g. highly branded) products. This is investigated further in chapters 4 & 5.

3. Methods & materials

3.1. Data sources.

3.1.1. Choice of case companies.

Twenty-five disparate companies distributed throughout all the EU countries were asked between 1997 and 2001 if they wished to participate in this survey. Initially these companies corresponded to a 'judgement sample', found by asking in the small web development community, which SMEs were investing heavily in Internet B2C e-commerce.

Although these twenty-five companies were active in quite different branches, they had in common that they offer B2C Internet retailing of products in the price class from around 100 Euros to around 1000 Euros, and had done so for at least three years (that is, there were aspects of 'stratified sampling'). Data from the fourteen companies agreeing to participate was screened and found to be sufficiently complete in only three cases. These three companies were active in three different European countries. Therefore a further fifteen companies in the remaining countries were approached in 2002 (some of the original sample had indicated other companies which may be interested in participating, i.e. there were aspects of 'non-probability' sampling within the various strata). Of the two agreeing to participate, none were found to possess the required degree or completeness of data.

Thus three suitable companies (case companies A, B and C) were found from forty candidates. At this point screening was stopped because screening a further forty was not practical. However contacts made during the screening process did lead to the later inclusion of companies D, E and F. All participating companies were guaranteed full anonymity.

It should be noted that all of the three SMEs selected had similar pricing strategies, i.e. goods were the same price bought on-line or off-line, there were no reductions for e.g. first-time customers or other marketing discounts (e.g. special penetration strategies).

My preliminary findings on innovation were available in a provisional form at the end of 2004, so in order to test these, the case companies were presented with the data (Mellor, 2005a) in January 2005 and the case companies were revisited for their reactions and comments during spring 2005.

To test if the findings on Internet marketing (1997 - 2003) had stood the test of time, they were reviewed again in the light of subsequent general developments in summer 2005 (see 6.4).

3.1.2. Overview of data sources.

Following the post-2000 Eurosat definition, Company B belonged to 'micro-organizations' (1-9 employees), Companies C, D and E belonged to 'small-organizations' (10-99 employees), Company A belonged to 'medium sized organizations' (100-249 employees), and Company F belonged to 'large-organizations' (500+ employees).

Thus companies A, B & C are primary case companies, whilst D, E & F fall outside the primary target ('SMEs involved in Internet B2C e-commerce') group and function as 'control' case companies.

An overview of the three on-line companies selected is given in Table 7. All companies have been guaranteed anonymity so, to protect confidentiality, the three companies involved have been designated by letters. All 3 companies sell high-involvement products (services) with a high degree of intangibility. The three companies involved have given full access to their Internet statistics and to their Internet-related sales statistics, for the periods shown.

Company	Type/ employees	Area of Business	Start of Internet presence	Average product price range (Euros)	Period during which statistics have been made available for this study
A	SME /120	Travel Agency	1994	700 -1000	1997-2000
B	Micro-Business /1	Astrology & Partner Matching	1994	100-350	1997-2000
C	Private College /40	Adult Education	2000	200-800	2000-2003

Table 7: *Business overview over the three data sources.*

All 3 web sites were HTML on UNIX platforms. This means that the log file raw data was collected by the same method in all cases. None of the web sites distributed cookies. All 3 companies report a server up-time of over 99.5%. An overview of their Internet presence is given in Table 8.

Company Identification	Top Level Domain	Approx. maximum daily hit rate during the period studied	Marketing and business strategy.
A	.DK	19000	'Clicks and Mortar'*
B	.DE	350	Pure Internet
C	.ORG.UK	1000	e-learning

***Table 8**: Key factors in the Internet presence of the three data sources*
** see Pottruck & Pearce (2000) for definition.*

During the period covered in this study, Company A accepted on-line orders but did not accept on-line payments directly, whereas Companies B and C employed third-party mechanisms for accepting on-line credit card payments. All three companies accepted off-line business.

3.1.3. Geographical, seasonal & language considerations.

Company A services the whole of Denmark and southern Sweden. The web site is mostly in Danish with some English. Company A reports that annual selling curves exhibit a marked polarity, with high activity in the winter months ('winter break' travel, bookings for summer holidays) and low activity in the summer months, when the customers are away on holiday.

Company B sells services on a regular year-round basis in countries representing the developed world. The web site is in English and German.

Company C admits students immediately upon registration, but still reports a faint seasonality with peaks in February and August, the traditional semester starting months. Company C's marketing is focussed on emerging countries, especially the Middle East. The web site is mostly in English, with some Arabic.

3.2. Internet statistics

Internet statistics were collected by UNIX log-file analysis. Further details about such analyses can be found in the report of Wu and Chen (2002).

Company A used the freeware www_stats (ftp.ics.uci.edu/pub/websoft/wwwstat), whilst Companies B and C both used licensed versions of Webalizer (www.mrunix.net/webalizer). Because all three web sites run on UNIX platforms, there were no differences in the format of the raw data. Compatibility was checked by taking a sample of the log files from Company A, analysing it with a demo version of

Webaliser, and comparing these results with the results obtained from Company A's own www_stats program. No significant differences were found.

Both of these programs, www_stats and Webalizer, reset ‘visits’ to zero at 00.01 o'clock on the first of each month. This is a clear source of systematic error because e.g. a visitor visiting a web site on the 27th and 28th of a month is counted as one, whereas the same person visiting e.g. on the 31st and 01st of the following month is counted twice. This factor is however acceptable because:

- It is the *de facto* standard
- It is the same in all 3 web sites studied
- Sales statistics follow the same principle, i.e. returning customers are counted as plural sales.

3.3. Logging of sales

Customer buying over the Internet business channel was recorded as sales of product units, i.e. the number of invoices sent. Thus e.g. returning customers are not counted as one individual. Because of Company A's lack of on-line payment system, customers ordering at the end of a month may receive an invoice dated the following month. Therefore, in the case of Company A, sales months are calculated from the 5th of a month to the 4th of the following month.

A further minor source of error is the possibility of multiple customers counting as one product unit sale. This is possible in the case of Company A where one sale may represent one individual or more individuals (group travel) and in the case of Company B, where one sale may represent one individual or two individuals (partner matching). This was because the only statistics available concern the number of invoices sent.

3.4. Interview techniques

Bansler & Havn (1994) suggested that researchers need to deal with interviewees in their environment, and not solely on a technical basis. This is especially important when dealing with innovation, because, as stated in various places in this and other works, innovation is time and context-dependent. This technique includes (Blomberg *et al*, 1993, p 125-126);

- First hand encounters. A commitment to study the activities of people in their everyday settings.
- Holism. A belief that particular behaviours can only be understood in the everyday context in which they occur.

- Descriptive rather than prescriptive. Describe how people behave, not how they ought to behave.
- Members point-of-view. Describe behaviour in terms relevant and meaningful to the study participants.

Therefore case companies were not polled by questionnaire (see e.g. McDaniel & Gates, 2005), but rather after initial telephone contact, all case companies were visited for extended periods in order to understand the context in which the company operates and the everyday context in which the innovations arose (Blomberg *et al*, 1993, Klein & Myers, 1999). Each visit lasted typically 2 weeks, during which several meetings took place and repeat visits or other contact extended over typically 2 years. The understanding of the business context, i.e. why the innovations were important at that particular time and in that particular context, should be seen against the business backgrounds presented in chapter 3.6.

Data was collected starting with mediator-led (myself) group discussions with broad questions. Gradually the scenarios became more coherent and the employment of a semi-structured open-ended technique made it possible to explore any emerging issues. Several days later, protagonists were interviewed individually, following and linking the themes coming out of the previous discussions (Taylor & Bogdan, 1984). Interviews were recorded on audiotape according to Jordan & Henderson (1994) and translated, where appropriate, simultaneously with transcription. All translations are my own.

In one case, interviews related to one innovation showed significant divergence between interviewees. This conflict occurred in regard to a banner advertising campaign; briefly whether the company had bought 250000 click-thoroughs (in which case the campaign may have been a success), or if the company had bought 250000 exposures (in which case the campaign would certainly have been an expensive flop). The manager involved had suddenly died, and the conflict could therefore not be resolved. Thus this innovation and interviews relating to it, was dropped from the data set.

Several days later this phase of the data collection process was concluded at each company by my giving an oral presentation. Above establishing trustworthiness, this served to ensure that relevant topics had been included, no significant omissions had been made, and that the data corresponded with the groups' view of reality. Because of the intervening time, transcripts were submitted to the case companies in 2003 for final review and approval.

3.5. Other methods

- Automated submissions (keyword submission) to search engines were achieved in all cases using Trellian SubmitWolf4 (www.trellian.com).
- HTML files conformed to the definition of HTML3.2.
- FTP was accomplished using WS_FTP95_Lite (www.ipswitch.com).
- E-mails were sent using GroupWise (Company A) or Eudora (Companies B & C) in plain text. Successful e-mails refer to the number sent minus those returning a mailer daemon error.

3.6. Overview of the case companies

A coherent analysis needs to be seen in relation to corporate strategies, which in turn may, or may not, be in line with the interests of the various individuals concerned. Thus in order to fine tune an appreciation of the innovations documented in chapter 4, an appreciation is needed of where the case companies stand. This is done by mapping cross-functional flow charts, by a Porter-type 5 (or 6) forces analysis, by mapping the companies' products according to the criteria of ICDT and 6I, and by pointing to areas of dis/re-intermediation. Finally, such analysis is needed in order to provide support for the statement that ethnographical techniques have been used, for without the above-mentioned analyses, ethnological background, the culture of the business, may be lacking. As stated by Klein & Myers (1999), the analysis requires a critical reflection on the social, historical and economical background of the research setting.

3.6.1. Elements of the analysis.

For each company the types of analysis listed in table 9 will be presented. Where applicable, this will include pre- and post Internet situations:

Traditional	**After Internet/e-commerce**
Cross-functional flow chart	Cross-functional flow chart
Porter	Porter
ICDT	ICDT
6I	6I
Areas of dis/re-intermediation	Areas of dis/re-intermediation

Table 9*. Overview of the analyses used.*

A cross-functional flow chart (see Andersen, 1999) is a further development of a traditional flow chart. The point is to produce a graphic map of events in a process. Thus a cross-functional flow chart seeks to illustrate the connections between the organizations various activities, which, in turn, normally correspond to the value chain. The areas of activity (normally corresponding with departments) are plotted on the X-axis. The Y-axis can represent time, costs, growth in value, type of value etc., but is not normally given concrete values because branching points (multiplication or fragmentation of value) gives rise to problems, i.e. the calibration of one column may not correspond to that of another.

A 'Porter analysis' refers to Porters 'Five Forces Framework' (Porter, 1985). It is based on the observation that the ability of a firm to create and sustain profits will depend on how many other firms are operating in the same market niche, how easy it is for other firms to invade that territory, and on the bargaining power of suppliers and buyers. Industries are likely to be unattractive if they consist of many rivals, easy entry, several close substitutes, powerful buyers and suppliers. Thus by using a Porter analysis the entrepreneur can assess the market and avoid unattractive markets. Michael Porter formalized this intuition about determinants of 'industry attractiveness into what he called the 5-forces framework.

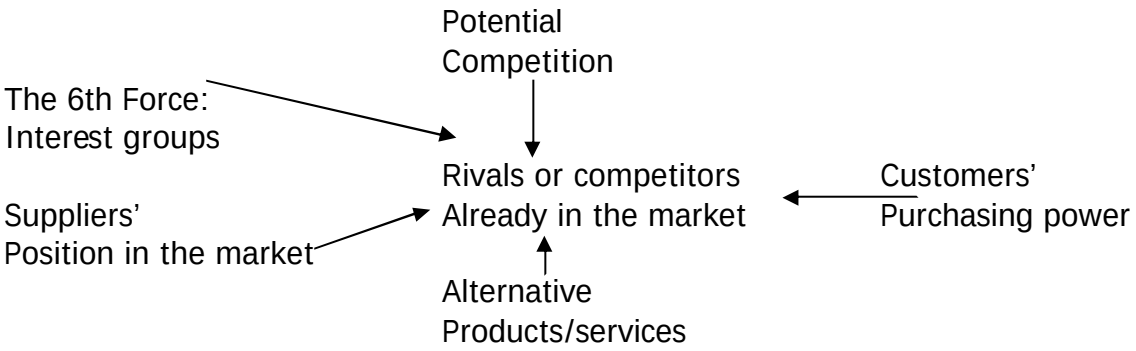


Figure 12: *A graphical illustration of Porters 5 (6) forces.*

Rivalry amongst sellers already in the marketplace depends on factors such as the number of firms in the industry, their relative size and how hard they fight each other for market share. If only one firm exists, then a monopoly exists. If two or more firms inhabit that market, then rivalry exists which will constrain the ability of firms to set prices and generate profits. Higher degrees of rivalry (more firms) can make markets unattractive. Potential competition refers to that inhabiting a market successfully may mean the generation of above-normal profits. This is likely to attract potential competitors, and if new entry takes place, then prices and profits are likely to fall. However, if there are 'barriers to entry for example patent rights, then profits will be easier to sustain.

Alternative products or services refer to the ability of substitutes to reduce profits. For example manufacturers of glass bottles would make much more money if there were no plastic bottles or cans. Customers' purchasing power refers to the ability of buyers to negotiate about purchase price. Clearly if buyers are powerful, then they may squeeze prices and profits. Similarly suppliers' position in the market refers to the ability of suppliers to negotiate prices, or even, if there are very few suppliers, terminate supply.

Porters original 5 force model has been modified by adding a sixth: Interest groups (Greenpeace etc), which have an influence if a product is offensive to environmental, women's, etc pressure groups. It is tempting to make government the seventh determinant. This may be justified in the case of company C, where approval as a college is a significant barrier to entry, but Porter (1990) specifically states (page 126) that this should not be the case, as the government's role is in influencing the other determinants.

An ICDT analysis (Angerhahn, 1997) is often used by organizations wishing to see how they should adapt their products to the Internet. Thus the model can be used to look at Internet relations in connection with the trade, distribution and promotion of the companies own products. Conversely it can be applied to each product separately, in order to find out how suitable that product is for the Internet, and perhaps suggest areas for improvement. Clearly ICDT is very future-focussed. And will not, for example, reveal if Internet is making structural market changes to historical product lines, which may cause bankruptcy.

Six I's analysis (McDonald & Wilson, 2002. p119-128) sees superior customer value at the center of a wheel with six spokes, as shown below (redrawn from McDonald & Wilson, 2002). They regard it as desirable that organizations achieve as large a circle as possible.

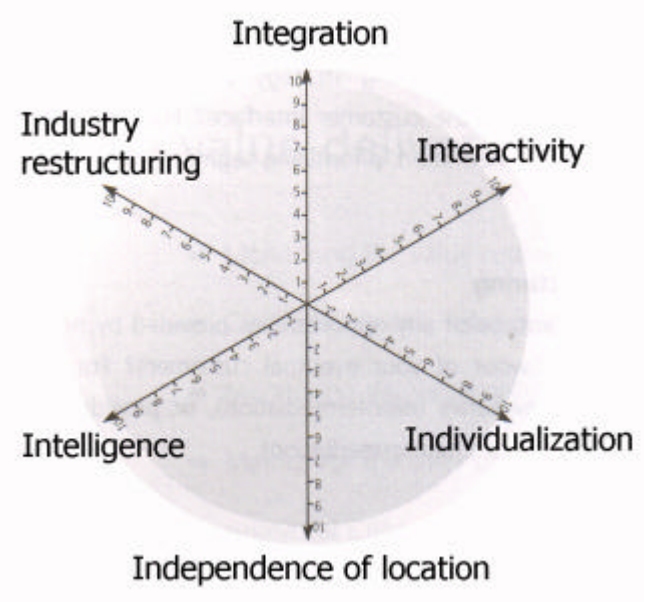


Figure 13: *A graphical illustration of McDonald & Wilson's "Six I" analysis.*

- Integration refers to the 'know your customer' principle and should be understood as integrating customer information gathered client-side on the web site should be pipelined seamlessly into integrated back-end systems.
- Interactivity supports a dialog with the customer. McDonald & Wilson (2002) prefer a 1-to-1-dialog form between the customer and the company employees.
- Individualization is understood as the tailoring of information to suit individual customers (otherwise often called personalization).
- Independence of location refers to the ability to substitute for local physical locations whilst achieving global delivery.
- Intelligence refers to informed strategy, e.g. rational decisions based on data mining, reliable marketing statistics etc., and probably not to any significant extent on espionage.
- Industry restructuring represents the viewpoint that if an organization is not able to restructure to use IT-enabled marketing, then probably someone else will.

Dis- and re-intermediation apply both upstream and downstream in the supply chain. They can be compared with other phenomena thus:

Name	Effect	Inherent questions	Examples
Product substitution or reconfiguration	The underlying need for the product is replaced by a better option	Does e.g. an electronic channel enable the customer to be satisfied in a different way. Can products be reconfigured (e.g. bundled) to add value?	Newspapers compete with news web sites
Disintermediation	One less link in the chain.	Does the removal of the intermediary improve flow and can the value-added services previously provided by the disintermediated party be handled by others	Telephone and Internet banking
Re-intermediation	A previous intermediary is replaced by a new one.	Does the replacement of an old intermediary afford advantages and do these advantages outweigh the negative effects of stopping one relationship and starting another?	Web sites which search for the cheapest product
Partial channel substitution	An intermediaries role may be reduced	Does the addition of a channel improve communication flow, or is it simply cannibalization of previous business	Car web sites which inform, then point prospective customers at local traditional outlets for purchase
Media switching or addition	Links in the chain are unchanged, but the communication method is changed	Can the Internet, or e-mail, just reduce costs, or can it also add value?	Selling to the same customer via telephone, but with web support (e.g. call center or CRM systems)

Table 10: *Comparison of the characteristics of various media channel effects.*

3.6.2. Case Company A

Company A is a travel agent.

3.6.2.1. Cross-functional flow chart

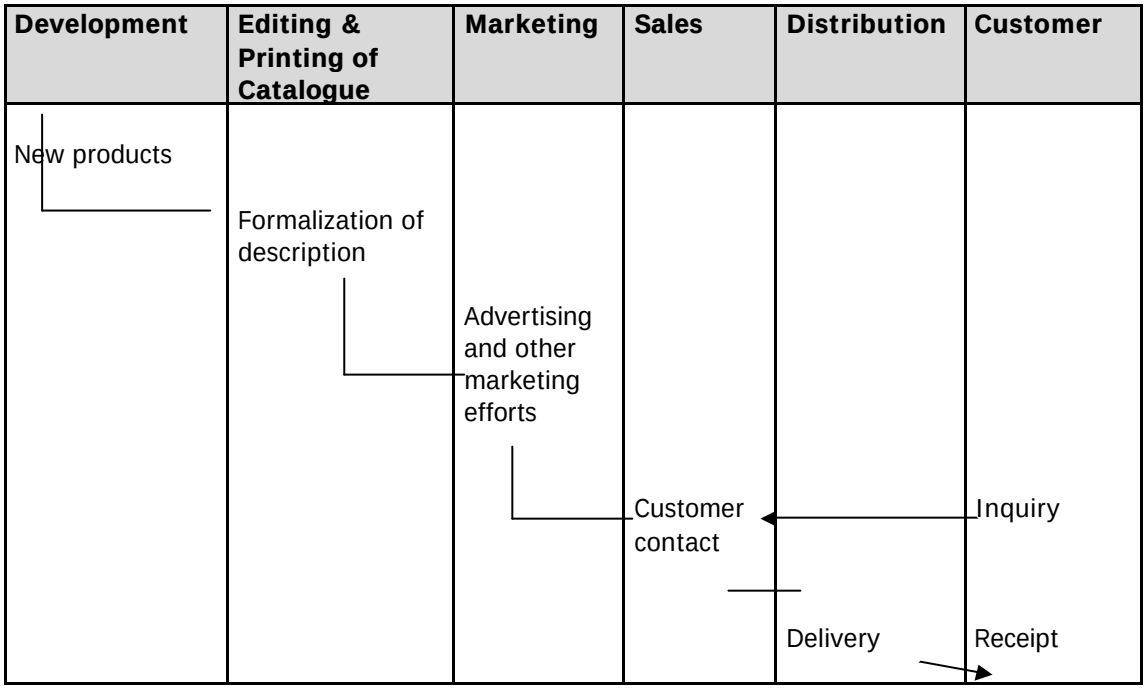


Figure 14. *Cross-functional flowchart pertaining to company A (prior to Internet). Unless marked with an arrowhead, flows entail a degree of feedback.*

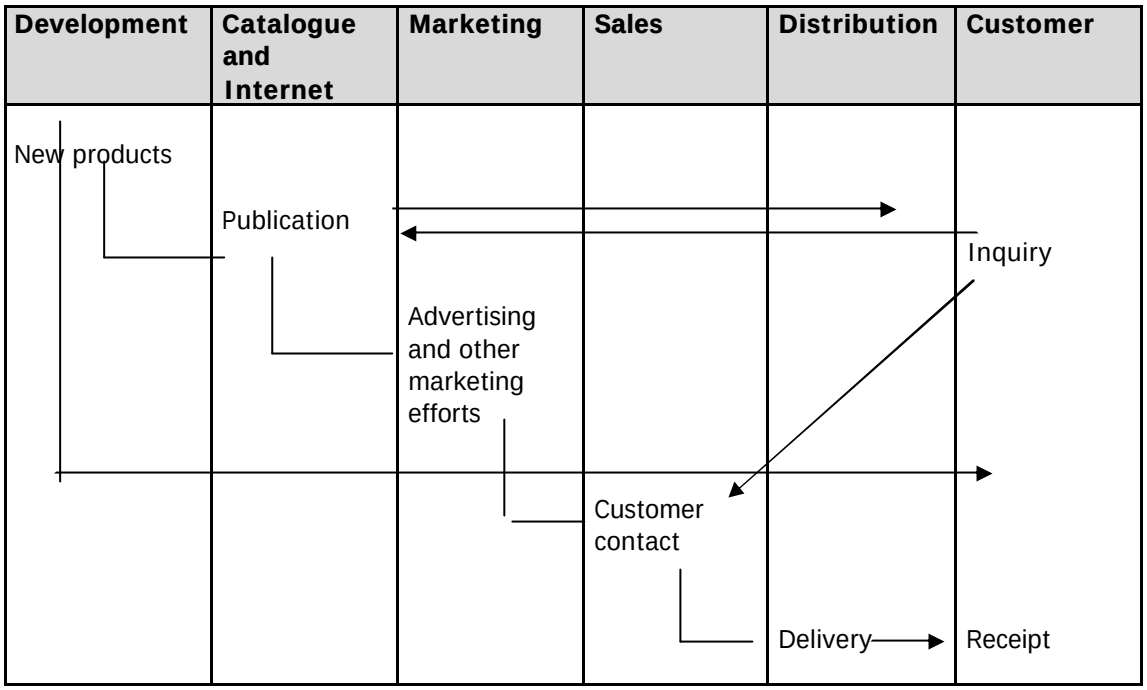


Figure 15*. Cross-functional flowchart pertaining to company A, post Internet. Unless marked with an arrowhead, flows entail a degree of feedback.*

The introduction of Internet as a sales channel involved difficulties both for the marketing departments as well as the sales department. In particular the sales department became disoriented due to the presence of customers with whom they had had no contact. These pressures did not relent and, after the period covered by this inquiry, significant business process reorganization took place. This involved largely dissolving the department structure and setting up selling teams organized geographically (Africa, America, Asia, China etc), where each team included a person from the previous marketing, IT, etc departments. This reorganization was so radical that even the pay structure was changed, with team members being paid a flat rate plus a three-tiered bonus (individual bonus, team bonus and overall company profit bonus). The latter two were needed to stop sales members 'poaching' customers from each other.

3.6.2.2. Porter

Sellers already in this marketplace belong to three groups according to size. The smallest are not economically significant and are formed and dissolved regularly. The large companies are the charter tour operators. Between 1998 and 2003 this segment has been characterized by strategic alliances and fusions with larger foreign companies. The middle segment (to which company A belongs) has been subjected to an even harder

'vacuum cleaner' type shakeout typified by bankruptcies, fusions motivated by self-defense, and occasional takeovers. In this hostile environment company A has invaded as many specialized niches as possible (play ice golf in Greenland, run a marathon on the great wall of China, etc.) as well as the luxury/high quality end of the market (tour round Egypt with a Professor of Egyptology, A week in Israel with a Chief Rabbi as guide, ecological safari in Africa etc).

This hold on profitability is precarious and unattractive for alternative products or services. However company A has also tried to secure its advantage by e.g. building its own ecological lodge in Kenya, signing exclusive rights for running on the great wall of China, buying the last remaining icebreaker cruise ship for tours around Greenland (in summer) and the Antarctic (in winter).

Customers' purchasing power in this market is limited to group reductions. Clearly an entity wishing to book e.g. 30 places on a tour will be able to bargain for a reduced price.

Company A has gone to great lengths to reinforce its position with regards to suppliers by, as far as possible, nullifying suppliers' position in the market. Local offices in the major destination areas (Bangkok, Beijing, Cape Town, Mexico and Nairobi) mean a large amount of flexibility. Thus tours can be announced centrally but the branch office will always be able to select the components (which bus, which driver, which hotel etc.) from amongst the local supply.

3.6.2.3. ICDT

The web site for company A allows customers to select travel according to various criteria (destination, type of holiday, price category, departure date etc). During the 1970s, company A organized long (several months) and complicated tours of e.g. South America. Plotted on a marketspace diagram, these are highly customized/highly specialized. Fortunately, during the early 1990s (i.e. just before the Internet was introduced), demand for this type of extreme information-intensive tour fell to zero and they were phased out.

Analysis of company As actual sales statistics showed that approx 50% of their turnover was derived from a small handful of relatively simple tours (thus there were immediately highlighted under 'favorites') where the classification according to figure 4 can be put on a 'Low Simple' level with generic presence. The information demand for these tours is limited to a short description, some photos of sunny beaches, a price and departure date. Thus VIS if filled to 100% of need, VCS is filled to 100% of need, whilst the price means that transactions can be completed easily and rapidly.

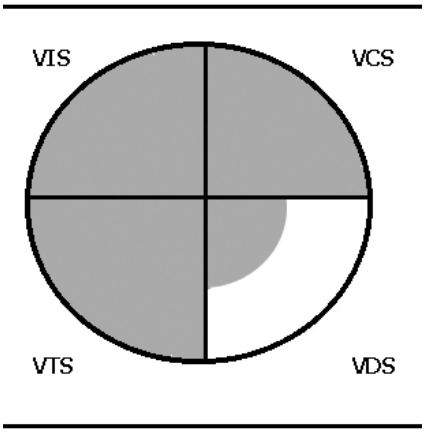


Figure 16. *ICDT analysis for standardized holiday products ('favorites').* For holidays that are either highly customized (e.g. a small group running a marathon on the Polar Circle) or where the information is complex (e.g. schedule for sailing from Greenland to the Antarctic, where landfalls are weather-dependant), then the Internet VIS is never 100%. Such holidays tend to have large download catalogues, but the HTML pages refer the customer to a telephone number or e-mail (i.e. put the burden over to VCS). Furthermore these holidays are typically quite expensive and are paid in installments, meaning that the Internet VTS is hardly used.

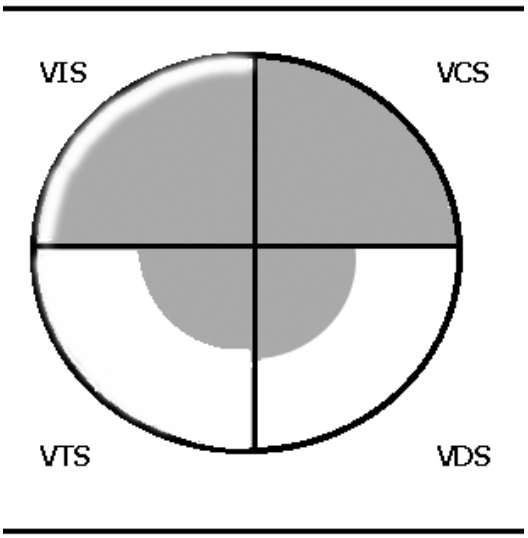


Figure 17. *ICDT analysis of products with advanced, generic presence or simple, customized presence.*

3.6.2.4. Six I

Company A scores 7 on integration. This is because many of the airline booking systems (Worldspan, SABRE etc) were amongst the first EDIs made, and as such are not particularly amenable to integration in a HTTP environment. This is also the reason why interactivity scores 8. However

interactivity and individualization (10) still score high because they share a HTTP interface (the intranet) with the call center technology.

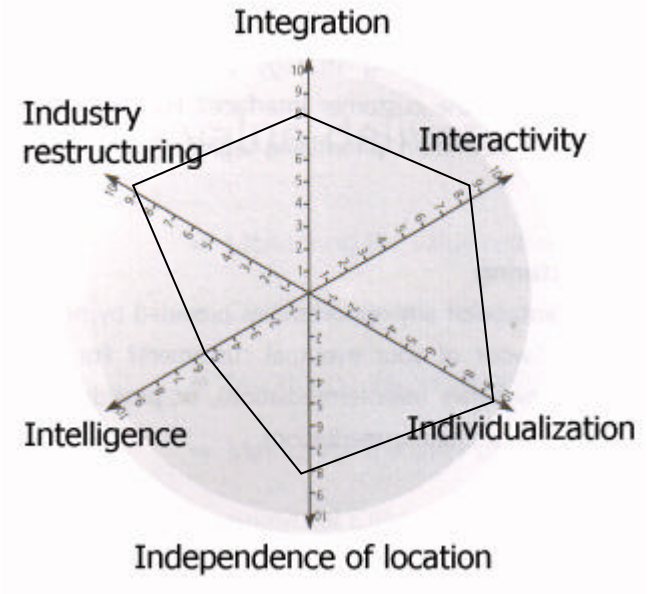


***Figure 18**. Six I diagram for company A, post Internet*

Going alone on the main web site, company A should score poorly, due to the fact that the main web site is in Danish. However independence of location scores 8 because the many satellite web sites are in English and have a proven track record of attracting e.g. American customers. Intelligence would have scored poorly, but the integration with call center technology pulls it up to 5. Company A is very aware of industry restructuring (see e.g. innovation 12), which accordingly scores 9.

3.6.2.5. Areas of dis/re-intermediation

Customer-facing intermediation is not a large issue with Company A. Company A has long-standing (>10 years) arrangements with Supplier S (mountaineering and trekking equipment) and Supplier W (snorkeling and diving equipment). When Company A started offering ant/arctic cruises there was a supplier issue in connection with heavy seafaring clothing, but this was minimal for the numbers of customers involved. For their sports tours (marathons on the Polar Circle, along the Great Wall of China, down Mt Kilimanjaro *etc*.) experience showed that the participating enthusiasts already possessed what they needed.

For the preparation of tours, Company As branch offices will always be able to select the components (which bus, which driver, which hotel *etc*.) from amongst the local supply. So this is not a re-intermediation issue for the main office or Internet.

Intermediation using 3rd party portals (rejsefeber.dk, mrJet.com *etc*) was, however, time-consuming because it was manual work. Furthermore a significant degree of co-ordination was initially needed, e.g. explaining to the portal programmers that a publishing time function (i.e. dates between which the data was publicly accessible) was needed, because some holidays were summer holidays, some have seasonal fluctuations in price etc.

3.6.3. Case Company B

Case company B is an up-market partner-matching bureau.

3.6.3.1. Cross-functional flow chart

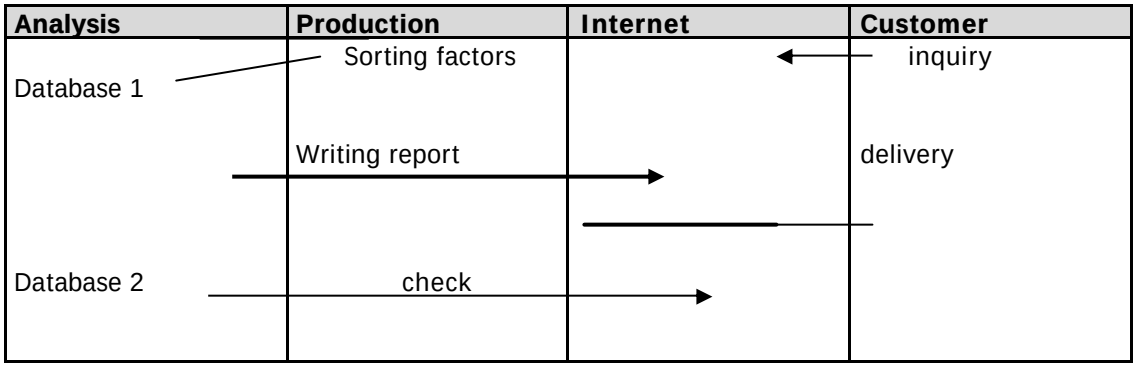


Figure 19*. Cross-functional flowchart pertaining to company B. Thicker lines represent iteration 2. Unless marked with an arrowhead, flows entail a degree of feedback.*

Customers use Internet-delivered forms to start an inquiry. Upon delivery at company B there are sorted and fed into an analysis database. This results in a report about 'how I am and how my perfect partner will be'. This is textually polished up by hand before being returned to the customer. In a second iteration the customer may wish to be matched (that is, informed if someone close to the wished characteristics exists in the customer database, or appears up to a specified future date). The difference between the first and second iterations is mainly that the databases are different. In the first iteration the astrological and psycho-social analysis database is used, in the second iteration (if wished), the customer database is used.

3.6.3.2. Porter

Company B has no suppliers, since all resources are in-house. Customers, those wishing to find a 'life partner', have also very little bargaining power,

as they (especially if they find the astrological *etc* methods credible) are often quite desperate to find their ideal partner. Both rivals and competitors already in the market, as well as alternative products and services are, in principle, multifold; dating agencies, marriage brokers etc., have existed since biblical times. However the application of Internet and computer database technology, in 1994, was novel. Company B makes major use of this advantage on its web site:

"... let us assume that you are standing on a street and a random person comes past every 10 min. Obviously, it could be, that the first person you meet has exactly all the attributes you seek. However, that's unlikely. The factors involved are gender (1:2 chance), age (1:7 chance, assuming people live to 70 and you are interested in a 10 year "window"), sign of the zodiac (1:12 chance), ascendant (1:12 chance), "special dates of birth (1:31 chance, assuming 11 special birthdays from 365), sibling status (1:7 chance) and that that person is available for a new relationship (optimistically about 1:5). Therefore the chances of that person being your "ideal" are:

1 : 2 X 7 X 12 X 12 X 31 X 11 X 7 X 5 = 24 060 960

That is; one chance in twenty four million, sixty thousand, nine hundred and sixty. At 10 min per person, working continually and without ever sleeping you need 268 years to find your "ideal" partner by random chance alone ..." (non-attributable quote from web site).

Potential competition in this market is tremendous and it was only a matter of time before larger organizations with an existing stake finally 'got the message' and covered the main market with systems that were better programmed and more extensively advertised.

3.6.3.3. ICDT

Coverage of the VIS was quite good. A strict reply policy, a chat room and spaces where aspiring poets and artists could place their offerings, means that the VCS was also filled. The transactional space was badly filled, due only partly to the attitude of German banks to on-line transactions in the mid 90s. However the distribution space was almost completely empty. Customers could download forms in PDF format, but thereafter must fill them out with hand and post/fax them to company B. Company B returned hardcopy (the report) with surface- or airmail.

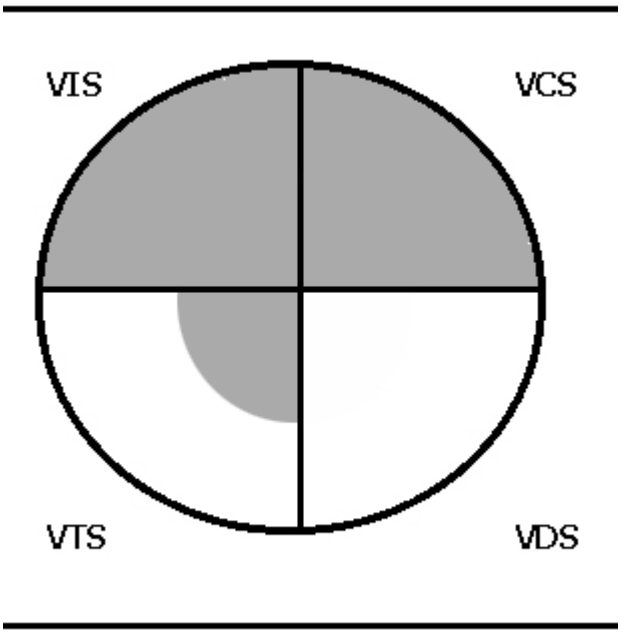


***Figure 20**. Six I diagram for company B.*

3.6.3.4. Six I

Company Bs Internet presence was not integrated. The back end certainly involved database technology but there was no contact and thus processing of customer information both into and out of the database, took a large amount of manual labor. Interactivity was very low on the web site (partly a reflection upon technology at that time). Individualization was similarly almost non-existent. Company B made a lot out of independence of location. Intelligence was, at best, medium, whereas company B was very aware of restructuring within the industry, although it failed to make the strategic alliances needed to fill its customer database to the necessary level.

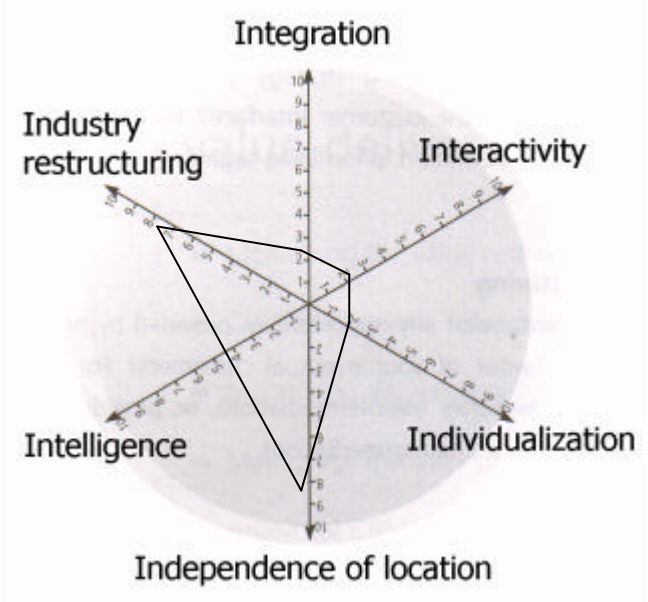


Figure 21: *Six I's diagram for company B.*

3.6.3.5. Areas of dis/re-intermediation

Company B had no areas of dis- or re- intermediation. In fact one factor about company B which stands out is its almost complete lack of viable strategic alliances, either with suppliers of customers, or as a supplier.

3.6.4. Case Company C

Company C is a private college and registered Institute of Adult Education.

3.6.4.1. Cross-functional flow chart

Products can be divided functionally into two groups, those where the students participation is largely automated (all computer/programming courses and one business course) and those others where a large degree of human tuition is involved. The latter case is represented by the thick arrows (in figure 22).

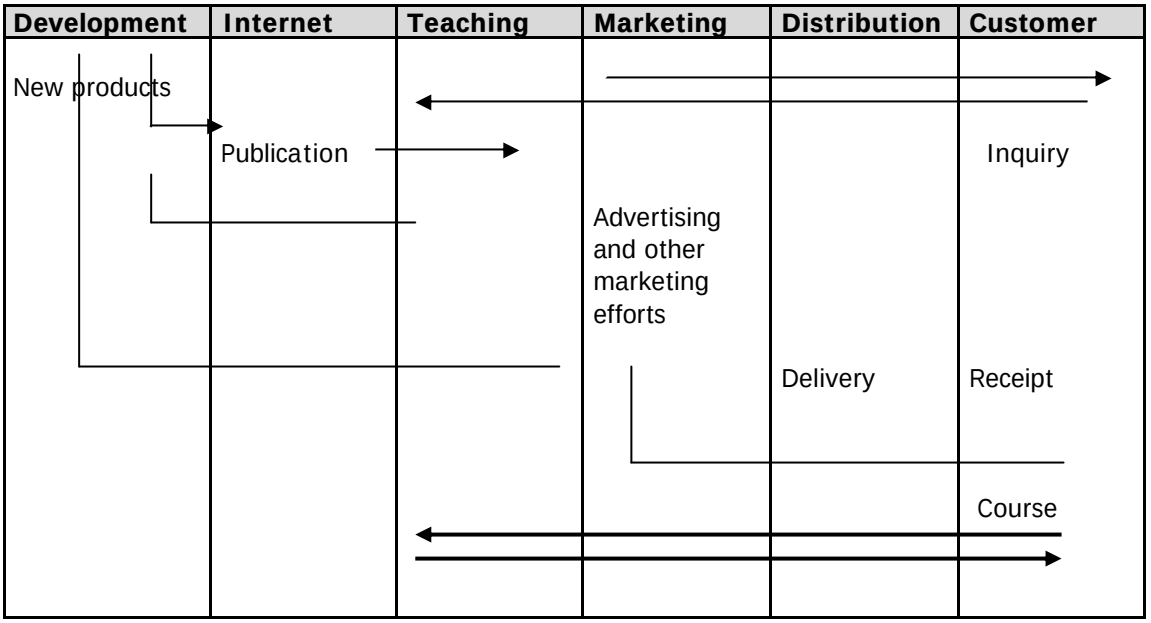


Figure 22: *Cross functional diagram for company C.*

3.6.4.2. Porter

Sellers already in this marketplace belong to three groups; private firms giving courses of a vocational nature, small public and private post-school colleges, and universities. The smallest are often software houses who are experimenting with teaching e.g. programming to fill up their slack time. They award their own certificates, which usually are not accepted elsewhere (an exception to this may be e.g. Microsoft certification). The universities are by-and-large uninterested in e-learning, and, relying on their size and prestige, follow a 'mountain to Mohamed' philosophy. Thus relevant sellers include small colleges, especially 'correspondence colleges' used to distance teaching. Traditionally colleges collect a whole 'class' of students before running a course and paying a teacher. Company C avoids direct competition with such colleges by offering immediate enrolment, i.e. by discarding the idea of a semester. Clearly collecting a whole 'class' of pupils' means that teachers are freelance and paid by assignment or pupil. However, experience showed that many teachers can have a full-time job elsewhere, whilst still being partial to earning a little more in their free time.

Customers' purchasing power in this market is limited to group reductions, clearly an entity wishing to book e.g. 30 places on a course will be able to bargain for a reduced price.

Company C has gone to great lengths to reinforce its position with regards to suppliers by preparing all its own material. Indeed the material from several courses has been published in book form, and company C offers certificate-giving exams to those who have read these books, thus securing a cross- and up-sell advantage. Supplies of teachers have been secured partially by agreement with an Indian software firm (teaching programming) and partly by signing exclusive agreements with all available teachers of linguistics who are bilingual in Arabic and English.

3.6.4.3. ICDT

Company C's web site is based on a 'select subject – see demo – buy' principle and must therefore in a Figure 4 type classification be put on a 'Low Simple' level, where the standardized courses can be classified as generic presence, and the language courses as customized presence (indeed, they demand that customers first take an exam). Business courses belong to either one category. These two product categories can be mapped on an ICDT/Marketspace diagram of the figure 2 type.

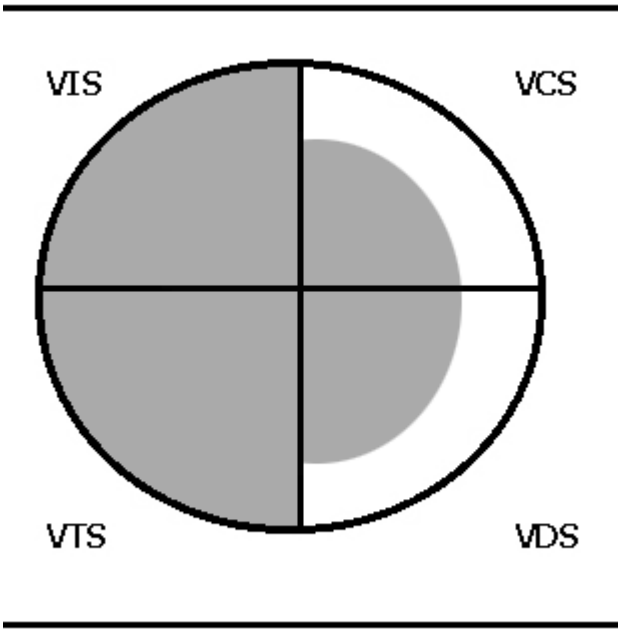


Figure 23: *ICDT diagram for computer courses, company C.*

Where the information spaces can be seen to be filled, with the exception of the communication space VCS for computer/programming courses. This is because in this case the tutor to student communication is limited. Similarly the VDS is limited, because the courses are sent on CD by post (sending electronically, e.g. by e-mail attachments, proved to be too difficult).

Conversely in the case of the language courses, the information spaces are filled (VCS is filled because of the intensive tutor to student communication), and because all contact is Internet mediated.

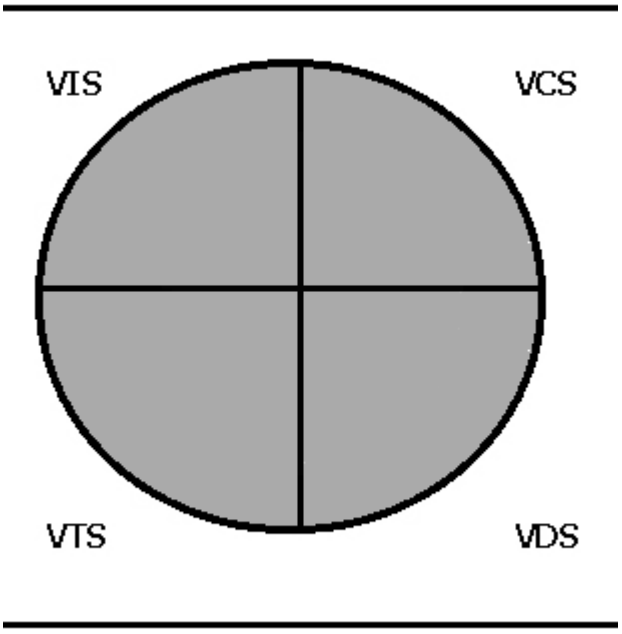


Figure 24: *ICDT diagram for language courses, company C.*

3.6.4.4. Six I

For Company C the level of integration is given as 8 because results from language (and other courses requiring a large degree of human tuition) still have to be entered into the database by the teachers by hand.

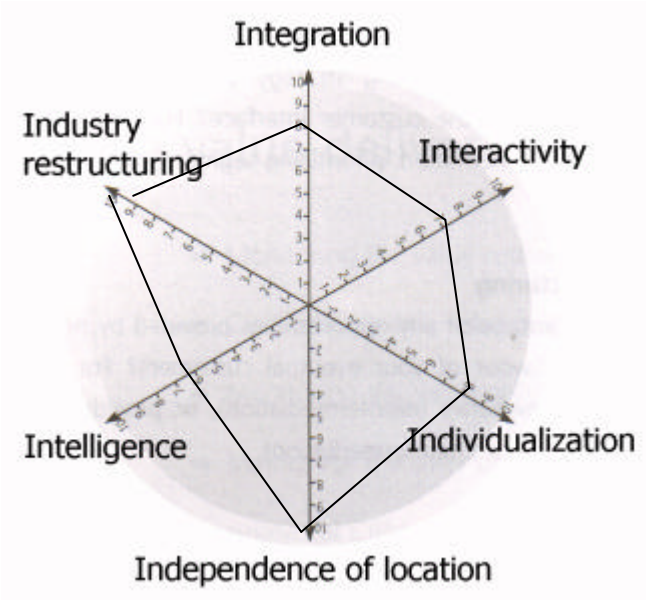


Figure 25: *Six I's diagram for company C.*

Interactivity is given as 7, because the human (tutor) element requires that not all course assignments can be automated in an interactive fashion. Individualization is given as 8, because despite that teaching is essentially a one-to-one experience, company C has tried as far as possible to use 'mass education'. Independence of location is given as 10 because this is the founding principle behind company C and its strategic business approach. Intelligence is given as 5, because delivery often involves surface mail and the web site, for those not logged on to the teaching areas, is a simple series of click through acts (select subject – see demo – buy). Industry restructuring is given as 10, since this is obviously the way the education industry has to go.

3.6.4.5. Areas of dis/re-intermediation

Company C has no areas of dis- or re-intermediation, however it is clear that this will become an area of heightened importance as company C tries to grow by integrating itself into the value supply.

3.6.5. Short conclusion.

Innovations are context-dependent (see chapter 2.1). Furthermore the analysis techniques used in 3.6 need to deal with interviewees' environment, and not solely on a technical basis. Thus a fairly thorough description of the case companies is demanded. The analyses presented here consist mainly of a Porter-type analysis, an ICDT and a six I's analysis. The cross-functional flow chart and the areas of dis/re-intermediation, are descriptive background information, not analytical *per se*.

Each analysis contains weaknesses. For example company A would appear from ICDT analysis to be weak in VDT and, for products with advanced, generic presence or simple, customized presence, very weak in VTS. However it may be misleading to say that this is disadvantageous for company A. Simply the special geographic situation (being in Denmark, a country the size of Yorkshire, with a population the size of Birmingham or Glasgow), means that company A does not need to cover these areas fully. Similarly the six I's analysis may give a more dismal view than the true situation, because the interfacing with intranet and call centre result in a 'lift' which their Internet, alone, would otherwise lack.

Conversely, all analyses seem to confirm a bleak situation for company B (figures 20 & 21). Company C appears to be working well in the labour-intensive language areas, and grappling with the harsh realities of automated e-learning, in its computer areas.

Nimble dis- and re-intermediation, often postulated to be a potential cost-saving strategy, was not obvious in this study. All the case companies tended to fall into the traditional B2B pattern for SMEs, i.e. closer, stable relationships leading to shorter supply channels. These results are in agreement with general marketing knowledge (for review, see Pittaway & Morrissey, 2003) that supply and intermediation often involves a highly specialised and therefore very stable relationship between companies.

Conversely it could be argued that the case companies here had exceptionally short supply chains and thus the Internet had no visible effect on supply chain management. Clearly the case companies are not in the business of e.g. assembling jumbo jets (where millions of parts from thousands of disparate suppliers have to be found and coordinated), but company A (as opposed to companies B and C) did have a significant number of different products in many different countries all over the globe. Company A simply chose to use Internet protocols differently (e.g. innovations A6 – see 4.1.1.5 – and with e-mail).

4. Results

4.1. Points 1 and 2 of General Systems theory: Identifying innovations on a subjective level and in economic terms.

The Internet revolution has made the business world very aware about innovation. Great market leaders saw their profits evaporate as their market became obsolete. Missed opportunities can be expensive and embarrassing, e.g. Bob Metcalfe could not convince his bosses at Xerox that his idea - Ethernet - was worth taking up, and so he left in 1979 to found 3Com. Today Xerox copying machines are used almost exclusively in an Ethernet environment. Many such stories abound, and serve to underline the essential dilemma underlying strategic renewal - How can a company continue to be a market leader in the existing business area whilst trying, in a structured way, to avoid missing out on the next wave?

Porter (1998) states, "*Much innovation is mundane and incremental, depending more on a culmination of small insights and advances than on a single major technological breakthrough*". So what is the content of, and difference between; innovation (in its many forms), creativity, problem solving and just having a good idea? This is important to consider, since even such 'un-scientific' methods as a quick glance at the Yellow Pages will reveal that almost none of the companies (especially SMEs) operating today do so based upon their monopoly of a major technological breakthrough.

Here it is defined that creativity is a sub-set of problem solving, and innovation is problem-solving at a meta-level; finding solutions, often before the problems become apparent, and often solving one problem in such an elegant way that several are solved simultaneously. In this empirical (albeit qualitative) chapter, General Systems theory is called upon. Those events or changes, which here are defined as innovations, are those where:

- The people involved can remember (or find it worthy of remembrance - that is, it has impinged upon their consciousness), agree upon the facts, and still find innovative
- A positive financial impact can be seen or implied, even where this cannot be exactly calculated
- They help in our non-subjective, abstract and academic understanding of the field

However it should be remembered that innovations are always relative to the environment and timeframe in which they occur. This is in agreement with earlier definitions, e.g. the "*first or early use of an idea*" (Becker and

Whistler, 1967), "*the adoption of means or end that are new*" (Downs and Mohr, 1976), "*the adoption of change that is new*" (Knight, 1967), "*an adoptive change considered as new*" (Daft and Becker, 1978) and "*an idea, practice or object that is perceived as new*" (Rogers, 1983).

Innovative problem-solving mostly includes:

1. A difficulty, disturbance, or potential disturbance, is felt
2. The source is located and defined
3. Possible solutions are thought about
4. The consequences of each solution is considered, sometimes in combination with other possibilities
5. A tentative solution is implemented
6. Successful solutions spread, by word-of-mouth, by example, etc.

Traditional DoI theory, however, cannot be used to track factor 6 within the framework used here. This is because DoI theory assumes that all persons are in a system that, for practical purposes, is open-ended and where all can communicate freely with each other. The systems studied here are small and closed, encompassing SMEs with a staff from 1 to 120. Furthermore, communication within companies is mostly not free, being restricted by departmental boundaries, barriers between boss and subordinate, etc.

In the following, innovation is compared and contrasted between the companies A, B & C during the years 1997 to 2003. It should be noted that none of the case companies were founded on invention, and that the creativity innovation of their original business idea is not counted.

4.1.1. Case Company A.

Company A is a travel agent specialized in offering high quality (almost unique) tours to the lesser-explored part of the world. Company A began with an Internet presence in 1994, and re-organized this presence into a 'brochure-ware' flat HTML web site during 1997. The web site was delivered by an external supplier and published in its basic form in spring 1997, where it was not updated and was used very little until autumn 1997. Up to this point the innovatory activity can be judged to be low.

In autumn 1997 a person was hired to look after Internet. This person was designated 1-A. The process flow diagrams have been shown earlier (figures 14 & 15). By December 1997 the web site was a relatively true brochure-ware copy of the printed media. At this point innovations A1 and A2 took place (notice that A1 & A2 are described together, as are A3 & A10, because of 'cause and effect' thematic linking).

4.1.1.1. Innovations A1 & A2

Innovation A1 was hiring an external company to make bulk submissions to search engines. Innovation A2 was to convert the catalogues from WordPerfect format to RTF format and place them on the web site as downloads.

The Internet initiative had already cost us significant amounts of money, mostly in terms of wages, so when (the 1-A) came to us and wanted more money for submissions, we looked at it very negatively. Of course, the problem was that in 1997 we had not heard of 'submissions' or 'downloads'. It was all Chinese to us (the leadership). (2-A)

Coming from software development it was plain to me that downloads were the best means of quickly transporting large chunks of information from one place to another. I was re-formatting the texts anyway, so I only had to put a version into a more widely compatible format. It was hard for me to convince (the leadership) that fancy 4-colour print catalogues were too expensive and too slow. So I did it anyway. At the end of the month I took the web site statistics and worked out how many of which catalogue had been downloaded. Because of the stiff resistance I'd been meeting I knew that this would not convince them of much. So then I went to the accounting department, got all the printing bills, and worked out what the catalogues cost to produce, because no-one in the company had calculated that before. Putting on postage was the last factor I needed. Then I had to request a formal meeting with the Marketing Director and the Managing Director. At the meeting I simply said that last month the download scheme had saved them 150000 kr. in printing and postage costs alone. That was the only way to get their attention. After that I got the 10000 I needed for the submission project. (1-A)

We were a bit sceptical about the figures presented, because we thought customers were just taking everything. We were also worried about possibly delivering out material directly to our competitors. However the concept suddenly convinced us. We quickly wrote a press release stressing the environmental angle (customers can download then print out just the page they need, saving trees and ink). After that downloading catalogues took off, requests for print catalogues, even ordered on-line, decreased and we were saving around 2 million kr. a year. (1-A)

It should be noted that there were a variable number of catalogues. Over-proportional savings came from downloads of the English-language catalogues. These were otherwise very expensive because they were produced in low numbers and furthermore cost a high international postage. Around 18 months later downloadable catalogues began to appear on competitors web sites.

4.1.1.2. Innovation A3 & A10

One day I couldn't use the printer, so I went to the marketing dept. to see what was happening. There three people had covered the whole floor in paper, putting print catalogues from stacks into window envelopes and then inserting the letters which were churning out of the printer. At some point they ran out of envelopes with a window, so had to use plain envelopes, writing the address with hand. They were doing a bulk mailing out to previous customers. I asked, why don't you send it with e-mail? (1-A)

Whilst we were getting ready to bulk mail our new catalogue out, (1-A) came and asked why we didn't use e-mail instead of doing all this expensive mess. I just replied, because we don't have their e-mail addresses! (2-A)

At that time the company used Eudora1.4 as e-mail program (later replaced with GroupWise). Eudora1.4 is a standalone application that appends text messages to a growing file stored locally on each PCs hard disk. Therefore it was easy to copy these MBX files over to my PC and write a small application to strip e-mail address out. Thus after some manipulation I had the e-mail addresses of everyone who had ever requested information by e-mail. I also put a HTML document on the web site where customers could subscribe to mailings, and used a small PERL application to write these addresses to a CSV file which I could download and import to my database. After deleting doubles, and competitors' addresses, I soon had 5000 e-mail addresses. Only then did I return to the marketing dept. and suggest we start a bulk e-mailing service. (1-A).

*We had forgotten all about the concept of bulk e-mailing until (1-A) mentioned that he had collected 5000 addresses. Quickly we made a nice letter and put in one or two new products and sent it out. At that time (early 1998) no-one used bulk e-mailing. The result was astounding. We even got many very appreciative *thank you* mails back!* (3-A).

Innovation A10. *I thought the e-mailings were sub-optimal. We were not exploiting the immediacy of e-mail. I wanted to send out special and last minute offers, not just repeat what was already on the web site. However payment (lack of Internet payment gateway) was a problem. So I added to the standard e-mail footnote that customers wishing to secure their place on the tour immediately could e-mail back to us and use their own Internet banking service to transfer the money. After that the service really took off and remains in use today, over 5 years later!* (1-A).

4.1.1.3. Innovation A4.

Company A sells travel literature that is relevant for their destinations. This was extended in 1998, when company A became an Amazon associate and customers could not only choose from literature in company A's store, but also from Amazon. Unexpectedly, large revenues began to pour in, however inspection of the list of articles sold showed that they had nothing to do with Company A's business area. Inspection of web statistics showed this HTML page to be a highly requested page. This page contained a very clear and highly detailed account, in Danish, of how to buy at Amazon and thus the most probable explanation is that many Danish persons had book marked this page and were using it as their access point for all their Amazon shopping. Although their ordering had nothing to do with Company A, it was very profitable for Company A, who received a percent of each sale.

We reckoned that in 1998 and 1999, about 30% to 40% of all of Denmark's ordering from Amazon went through our web site (1-A).

4.1.1.4. Innovation A5

Innovation A5 represents a strategic business innovation. A travel portal (here called 'Company T', see 6.4) was opening. They listed all travel bureaus addresses from the national organization, and thus could boast that all agencies were in their system (even without the individual agency's express consent). However in order to get any useful coverage, agencies have to pay a large fee. Part of this coverage was that customers could type in a destination and be rewarded with a list of suppliers/agencies, with their prices, the cheapest being first on the list.

Other agencies put together cheap tours and put 33% margins on the top. Our products are much more high quality, they cost more, so even with only 19% margins, our products are more expensive. Why then, should I pay a hefty fee, just to let customers know that my product is the most expensive? (2-A)

Thus Company A contacted two other large portals who were just about to go on-line (rejsefeber.dk and MrJet.com) and made a non-exclusive agreement to supply all their tour & package holiday products, with payment on a commission basis. Thus these two portals came on-line ahead of schedule, sporting products that appeared like bargains, but were actually Company As products at normal price. The value of the idea was recognized on a wider plane, insomuch as rejsefeber.dk won the national 'e-commerce prize' the following year. This innovation could also be classified partly as intermediation insomuch as it had early experience

with the Internet channel and was thus more confident than its competitors in initiating intermediation.

4.1.1.5. Innovation A6.

Company A has many tour destinations in inaccessible parts of the world, and where mobile telephone services are not available. This, in combination with the time difference, can lead to delays in sorting out any problems that may occur.

One of our guides turned up in my office. He had had problems on Jakarta and couldn't contact HQ. So I said I'm make an emergency web site where guides could log in using a cyber cafe, or his laptop and a fixed telephone line. I made an orphan URL, put a .htaccess file in with a password, so it was the same password for all guides, and made a message board in PERL. Of course all guides could see what was on the message board, so on top of that I made a message notification system for 1-to-1 communication using code like:

```
<form method = "post" action = "cgi/mail.pl">
<select name = "recipient">
<option value ="per@teledanmark.dk">Per at home</option>
<option value ="per@companyA.com">Per at work</option>
<option value ="20304050@teledanmark.dk">Pers mobile
phone</option>
</select>
INPUT ....
SUBMIT
</form>
```

for all staff at Company A. This system became very popular amongst the guides, and not only for emergencies, but for general coordination. I believe it was the first such system in this branch in Scandinavia. However occasionally guides get jobs with other companies, and so eventually word leaked out, and other companies started to make similar systems. (1-A)

This system was justifiably popular because it avoided international and mobile telephone fees, whilst also smoothing out worldwide time-zone problems (2-A).

4.1.1.6. Innovation A7

Press releases are normally sent out by fax. However this entails the journalist re-typing the text. Thus it was suggested that press releases are sent out by e-mail in RTF format. This led to journalists ringing and inquiring about graphics/photographs. Thus a two-step procedure was adopted, where the press release was sent in RTF format, and the body of the e-mail contained a link to an orphan URL 'press room'. The pressroom

contained a list of all press releases, further material, and a selection of graphics in various formats.

This 'journalist friendly' system led to a marked increase in (free) press coverage.

4.1.1.7. Innovation A8

There are many web sites with travel themes. These were contacted and asked if they wanted to be carriers of a competition. Many agreed and they advertised a competition on their web sites, where the winner would receive a voucher to put towards their next holiday (for 5000 kr., about half the cost). All they had to do was fill out a registration form, then answer a couple of questions, where the answers were on company As web site. Over 4 months about 15000 people participated. Thus company A got a load of marketing data from the information on the participants registration, company A knew that thousands of people were reading their web site very closely, and, of course, the voucher was for a holiday with company A, so company A got at least one new customer.

4.1.1.8. Innovation A9.

4-A worked in the postal department at company A. 4-A had been wanting a PC in the postal department, so address labels could be printed out directly. The leadership declined, so in order to gather opinion in his favour, in conversation with 1-A, he mentioned that most post went to few postal areas, and with a PC he could also easily work out where these were. 1-A and 4-A worked together data mining the customer database (those who had been on holiday) and postal database (those who had ordered a catalogue) and rapidly worked out that there were geographical hot-spots where there were many catalogue requests, and that many orders came from some, but not all, of these hot-spots. Conversely especially one other region ordered relatively many holidays for relatively few catalogue orders. 1-A and 4-A then approached the marketing director with the idea that printed advertisements (until then in the expensive national press) could be supplemented with cheap advertisements in the local newspapers in these specific areas.

We had never heard of 'data mining' back then, until (4-A) *came with this first very practical example. Like all good ideas, it is simple and useful when you look back at it and think, 'why didn't I think of that'* (3-A).

4.1.1.9. Innovation A11

In 2000, in contrast to the rest of the branch, company A had grown to Scandinavia's largest travel provider on the Internet (and had won several design and business awards) and was expanding. 1-A had moved over to the marketing department (see innovations A7, A8, A9 and A10). 5-A was hired as apprentice and brought in to the IT department to take over 1-As old position. Shortly after a new rationalization and expansion was undertaken, under the control of 5-A.

I was amazed that 5-A *was given project leadership; he was 20 years old with neither qualifications nor experience in IT. However I was more amazed that no-body had thought to ask me, after all, I was the only person at company A with any formal qualifications, and I'd been doing an excellent job with the Internet for over three years. At least I could have made suggestions as to technical implementation and what features should be included. I thought people would have learnt from the anti-virus fiasco* (5-A bought and installed an expensive new anti-virus system, only to discover that it will only scan mails and attachments when the e-mail system is Microsoft, and it did not work with company A's Novell GroupWise). *I didn't even know we were having an in-house server until the hardware arrived. I went to the responsible manager for an explanation, he looked at me and said, "you do not exist in my universe" so I simply asked him if he thought that was good management.* (1-A).

Looking back, it was 2000 and, like everybody else, we were doing too much too fast. Changing the Internet system had become necessary, but perhaps an in-house server was too much. We didn't have the expertise and overview. The project should have been finished in six months, but took almost two years and cost three times the estimated budget. We should have taken more time to review the situation and given the project to someone more experienced. (2-A)

However the new system did have an unexpected benefit. By using that web site as an intranet catalogue (very fast, due to high capacity LAN) sales staff could keep up with customer queries on e.g. the telephone. This led to very short response times and cut down on paper/print media in the offices. This also led to rapid identification of any mistakes and the reliable and prompt updating of information. This was clearly reflected on the regular Internet site.

4.1.1.10. Innovation A12

A call centre was initiated combining telephony and TCP/IP. This innovation was conceived by 2-A and implemented by 5-A with an external

consulting company responsible for planning and deliverables. The telephone number of customers calling to company A was logged and two IT chains were initiated automatically. The first chain looked up the originator of the number using the telephone company's public databases. The second chain searched the internal customer and catalogue databases. If this found no matches, then the returning originator data was used to search the databases again. Thus by the third ring, the sales operative had a window open on their screen which had a background colour of pink (telephone number but no other matching data), yellow (known telephone caller who had requested a catalogue) or green (a known customer). In the last two cases all database information (name address, destinations etc) were shown. This enabled the sales person to open the telephone connection and say something similar to "*Hello Lars Larsson, how was your trip to Thailand*?" Sales staff reported that this personalization was a great hit amongst customers and may have been responsible for a large part of the 2 million DKK/annum extra profits, which the company estimated this innovation accounted for (see chapter 4.1.4).

4.1.2. Case Company B.

Case company B is a partner matching agency, basing its selection on various parameters, including psychosocial factors. Company B started its Internet presence in 1994.

4.1.2.1. Innovation B1.

I didn't have sufficient money to pay a web designer to make a web site. Furthermore the web site had to be made and finished over the Christmas and New Year period. Therefore I advertised expressly in foreign countries where part of the payment was a real German Christmas (1-B).

I still remember making that web site. On Christmas day the whole family turned up, his parents had made a really traditional Christmas dinner and it started snowing, just like in a Disney film. I am also single, so I got thinking about the web site, I thought the data structure was not good enough, so I put in the extra time to make it better. Of course I had found out by then that there was no extra cash involved, but I got my horoscope instead (2-B).

In fact within three years the web site won five different international design awards.

4.1.2.2. Innovation B2

I was complaining one day that it took far too long to work out all the relevant factors by hand. My friend had just found a program that could do all this. So she told me where it was and we looked at it together. To cut a long story short, it was very useful and cut the processing time in half (1-B).

I had just started work in Human Resources, so I was very interested in the automatic processing of psychosocial profiles. Upon returning to (the town) *I called in on* (1-B) *to say hello, and found him wrestling with exactly the same problem. So we looked at some software together and we both benefited* (3-B).

4.1.2.3. Innovation B3

Originally, customers filled out a questionnaire, and the results were simply sent in to be evaluated. At that time it was the limit of the technology, but had the disadvantage that the customer had to fill in a long page, then send, then wait. It became obvious that many customers were losing patience during the process and were simply leaving without finishing the session. During a conversation I touched on the topic of holding peoples attention. It turned out that that person worked in the theatre, and had several good suggestions as to how to keep the customers attention. (1-B).

Getting and retaining the customers attention is one of the first principle of acting and theatre in general. So I told him (1-B) to give only 3 questions. When the customer has filled out these they click on 'next' and the next 3 appear, together with the number of prospective hits amongst the partner database. The beauty of this system is that singles, especially females, are eternally hopeful; so it is quite irrelevant for them if there is a large chance, say 1000 hits amongst prospective partners in the database, or just 1. For them, one can be THE one, complete with white horse. In fact, one may be better than 1000. (4-B).

4.1.3. Case Company C.

Several university teachers were unhappy that the institutions where they worked were uninterested in teaching through the Internet, set up Company C in 1999. Therefore they got together and planned to teach distance learning on the Internet in their spare time. The model they chose was an international model, on a philanthropical basis, aimed at spreading applied subjects (computer skills, business and language) at a

price, which even participants from developing countries could afford. Quickly their main target became the Middle East. Company C is a nationally approved college. Company C can be judged to be a 'learning organization' with high innovation potential. They began their web presence in Feb. 2000 offering certification in PC use according to the European Computer Driving Licence (ECDL) model, as this is a standard product, involving no development work.

The process flow model was simply from teacher to student *via* the Internet.

4.1.3.1. Innovation C1

I was developing a course on Arabic English translation, and some customer e-mails were diverted to me because they were in Arabic. So I could see that there were many who would like to take the ECDL course, but their English was not so good. Therefore I suggested that the company offer an Arabic hotline, so customers on PC courses could get help in Arabic. (1-C).

4.1.3.2. Innovation C2

I was unhappy about the business course I was developing. In normal learning there is practical work, where the learner has a chance to do it themselves, and perhaps even make a few mistakes. How could I convert this to e-learning? Therefore I suggested that students on the course could get access to an 'MBA Toolbox', where they could actually set up their own firm, buy a domain name etc. (2-C).

The 'MBA Toolbox' idea was really good. It took a lot of time to set up agreements with other companies (suppliers), so I thought that it should be offered to everyone, whether they were our students or not. But this started getting out of hand, so we went back to the original idea. Actually it was obvious afterwards, that we had to concentrate the product on the focus group that needed it. (3-C).

4.1.3.3. Innovation C3

I could see from the web statistics that only few of our visitors were from our target countries. Although newspaper advertisements made a difference, it was clear that our message was not getting across. Therefore I approached portals and ISPs in the target countries, offering to sponsor competitions etc. I don't know if they thought I was condescending, or rich, or what, but they were either not interested or they wanted large amounts of money. One portal was interested in a

franchise/reseller arrangement where they offer our courses. I think we had six or seven courses then. The whole thing ended in a cultural misunderstanding mess. For example I requested the name and e-mail of their project manager, so I could fix up a course for him, so he could see how it worked. They thought that I was insulting them, and actually testing their manager to see if he was good enough. I guess you just can't force good ideas on people. (3-C).

4.1.3.4. Innovation C4

A lot of people started to have to work late in the evenings. This is because the customers in the Middle East would send their e-mails in after they finished work, and wanted replies the next day. I have an Indian friend in Canada, who has a nephew in India who has a software company. So I got his e-mail and suggested we do a deal with them. (2-C)

The Indian software house had many employees who were suitable tutors and although we only get small amounts of money from our customers, it turned out to be acceptable. So our job got easier in that tutor e-mails received after 16.00 our time were redirected to India. These guys get up 6 hours before our customers, so they have plenty of time to work on them before sending the corrections on to the Middle East. Thus the customer gets up early in the morning and wow, the reply to what he sent last night is waiting. (3-C).

4.1.4. The financial value of the innovations

Originators of innovations have been divided into CED and SAH because during interviews it became strikingly obvious that this was a major division. CEDs were named as being responsible for around two-thirds of all recorded innovations. CEDs are called so because many have acquired nationality in their country of residence.

Innovation	Person	Persons background	Approx. value (if possible to estimate)
A1	1-A	CED	Hard to estimate since the visits (requests) provoked by submission services are mostly machine-made
A2	1-A	CED	Ca. 2 mio. Kr. per annum
A3	1-A	CED	Ca. 0.5 mio. Kr. per annum, in extra revenues, plus ca. 1 mio. Kr per annum in saved printing and postage costs.
A4	1-A	CED	Ca.0.5 mio. Kr. per annum
A5	2-A	SAH	Ca. 4 mio. Kr. per annum
A6	1-A	CED	Increase of efficiency, hard to put into money.
A7	1-A and 3-A	CED and SAH	Increased branding, hard to put into money
A8	1-A and 3-A	CED and SAH	Increased branding, hard to put into money
A9	4-A	CED	Ca. 1 mio. Kr per annum
A10	1-A	CED	Ca. 0.5 mio. Kr. per annum, in extra revenues, plus that it helps company A save on internet payment gateway services
A11	5-A	SAH	Doubtful monetary value
A12	3-A	SAH	Probably around 2 mio. Kr per annum.
B1	1-B and 2-B	SAH and CED	20 000 Kr.
B2	3-B	SAH	Time saving, hard to put into money.
B3	4-B	CED	Increased customer appeal, hard to put into money.
C1	1-C	CED	Increase user-friendliness, hard to put into money.
C2	2-C	CED	Ca. 1 mio. Kr. per annum
C3	3-C	SAH	None
C4	3-C	CED	Ca. 2 mio kr. per annum

Table 11: *Overview of innovations and their origin. CED = Culturally and/or ethnically different. SAH = Stay at home.*

The pattern in company A seemed to be explicable by Trickle-down theory, namely that the results achieved by lower social caste (the CED's)

provoked action amongst the socially superior caste (the SAH's). In this case, and this effect seems to provoke the company to start much larger and more prestigious, Internet B2C projects, but with SAHs in charge.

In order to check this theory, three control companies in the same country were taken. These were companies D, E and F. Companies D and E are SMEs not directly involved in Internet B2C e-commerce, and F is neither a SME nor involved in Internet B2C e-commerce. D and E are expressly innovative companies, whilst F is a ministry and ministries are not normally known for innovation. In a series of random interviews with managers and CEDs employed in these organizations were asked about sources of innovation.

4.1.5. Other facts about Innovation gleaned from the interviews.

4.1.5.1. Company D

There are no CEDs in company D. The CEO of company D reported that innovation was high and managed by constructive teamwork and short times to decision making. The CEO was reluctant to point to any single person as being a nucleus of innovation, but mentioned that two graduates, referred to here as 1-D and 2-D, were especially adept problem-solvers.

4.1.5.2. Company E

The CEO and owner of company E is a CED. He reports that he set up his own business because he could not stand working for SAHs any longer. The CEO said that innovation is high because of flexibility within the organization, and team spirit. When asked to specify about the latter point, it became obvious that many CEDs are employed at company E (55%) and than many of them have had many different jobs, so that they are very happy to at last get a job in an environment where they are respected (or at least in the same apparent social class as the boss). One employee said:

Here we are not Danish and we are not foreigners. We know sufficient about the local (SAH) culture to be able to talk to (SAHs), and a lot about our own cultures. But here we are free to pick which of the best aspects of which culture we want. We can pick and choose. Therefore we end up with something that is better than either. We like that, it gives us self-esteem. (1-E).

4.1.5.3. Company F

The director of company F was not willing to be interviewed, but pointed out the ministry's official equal (ethnic) opportunities policy. A source that wished to remain anonymous pointed out that statistically there should be around 50 CEDs employed at F, but there were in fact only 11, and all of these were confined to lower positions. Three of these agreed to be interviewed.

I don't know. I'm 55 years old and I've been doing this kind of thing for years. My new boss is (a SAH) *19. Certainly he is a nice boy. But sometimes it is difficult; I think I know more about this than he does* (1-F).

I started working here over 10 years ago, and when I came there was nothing. I actually made these databases, I programmed them myself, and I typed in almost all of the data. I made the way we all work in this department, it is all built on my ideas, suggestions and work. Every year or two I get a new co-worker (a SAH)*, I teach them everything, and then they get promoted over my head and move. I haven't had a single promotion yet; I'm still on the same pay scale as when I started here* (F-2).

I have more qualifications than my boss, so most ideas start here. Most of my ideas and recommendations just get lost somewhere, but some seem to wander up in the hierarchy until they reach someone who has decision-making power, but these people are normally totally ignorant of what it is about. So after a while in limbo the idea re-surfaces, but this time it is apparently the brainchild of someone else (a SAH) *in middle or top management. In principle only leaders are allowed to appear as sources of innovation. And there are no* (CEDs) *in the leader levels. In fact I applied once for a leader job, but was told bluntly that they were reserved for SAHs. The glass ceiling here is about floor level. I've managed to get a couple of things through, but it is incredibly frustrating, and the game of strategy takes more time that the new project itself.* (3-F).

4.1.5.4. Analysis of the 'CED Effect'

Foreigners in companies A, B and C introduced innovations. This data is correlated with the non-innovative environment in company F, which appears to be rather harsh on its few CEDs (although it is certainly possible that many SAHs may likewise have given negative reports). Company E also supports the proposition, being highly innovative with many CEDs. But company D introduced many innovations without any CEDs. The most apparent questions should thus be:

1. Is this because the innovators are foreigners?
2. Were these foreigners particularly creative
3. Other 'foreigner-related' factors, e.g. cross-cultural
4. The foreigner aspect is a red herring and in fact other factors are important.

Question 1 appears overly simple to explain anything, in the light of that every human being is a CED in the vast majority of countries on the planets surface. On the other hand, common sense says that the fresh viewpoints foreigners can bring may also be valuable (question 2 and partly question 3).

However given the lack of any convincing correlation for questions 1-3 in the case companies, meant that question 4 should be pursued. The most obvious line was to re-evaluate the CEDs, and other origins of innovation, and explore their background.

Person	**CED or SAH**	**Responsible for innovations or other involvement.**	**Educational and professional background**
1-A	CED	A1, A3, A10, A4*, A6, A7* & A8	Doctorate in Chemistry, MBA and Master in IT
2-A	SAH	CEO of company A A5	Master in Biology
3-A	SAH	Marketing manager of company A A4* A7*	Teacher
4-A	CED	A9	Master in Physics, experience as real estate agent.
5-A	SAH	A11 & A12	None
1-B	SAH	B1	Master in Biology
2-B	CED	B1	Economist with Master in Computing
3-B	SAH	B2	Degree in Music, further education in HR
4-B	CED	B3	Actor with degree in 'theatre science'
1-C	CED	C1	Master in Economics then Doctorate in Linguistics.
2-C	CED	C2 & C4	Master in Politics, MBA and then Master in IT
3-C	SAH	C3	Doctorate in Education
1-D	SAH	Many (unspecified)	Bachelor in Archaeology and Master in IT

2-D	SAH	Many (unspecified)	Bachelor in Economy and Master in IT
1-E	CED	Many (unspecified)	Varied, previously director of a large taxi company, many skills in marketing and organization.
1-F	CED	Probably few	Farmer, unskilled
2-F	CED	Many (unspecified)	Nurse, then Bachelor in IT
3-F	CED	Many (unspecified)	Doctorate in Physics, Bachelor in Commerce and Master in IT

***Table 12**. Overview of the people involved in the innovations reported and their educational background. * = shared innovations.*

A correlation becomes immediately obvious: The innovators (or innovation nuclei) are not only highly educated and/or experienced, but they have high qualifications in several, often apparently unrelated, academic areas. Whilst reviewing the raw interview data it became apparent that several of the CED interviewees had actually touched upon this subject:

Generally I was astounded by the lack of curiosity (amongst the SAHs) about their work, as well as their appalling lack of IT skills. (1-A)

Basically, in this country, you can't give (SAHs) and (CEDs) equal chances, because if you did, then all the (SAHs) would be unemployed (2-F)

4.1.6. Short conclusion.

Innovations have been listed which fulfil the first two criteria of General Systems theory. As stated in 3.4, only one innovation from the central case companies had to be discarded because it did not fulfil these criteria.

A dramatically large proportion of these innovations – and those alluded to from the control case companies – originated from highly qualified people who were culturally and/or ethnically different (CEDs). Hypotheses regarding this effect are discussed in 5.1.

4.2. Point 3 of General Systems theory: The value of the innovations in extending abstract knowledge about Internet marketing.

If the innovations listed in chapter 4.1 should qualify as 'real' innovations, then General Systems theory would suggest that they must have value. To recap, in order to prove they have value they will be held up against 3 criteria at personal, corporate and systems levels:

A. Value in human terms. The people involved should find them memorable as an innovation or breakthrough, and the people involved should furthermore, even after several years have elapsed, roughly agree on what the innovation was.
B. Value in economic terms. The people involved, occasionally aided by hindsight should try to put a monetary value on an innovation.
C. Value in academic terms. Can the innovation be used in abstract ways to shed light on related fields of endeavour?

Chapter 4.1 has presented the results of interviews, thus fulfilling the criteria set out in point A. Also in chapter 4.1, table 11 presents the approximate economic vales associated, where appropriate, with each innovation. This fulfils the criteria set out in point B.

This chapter therefore reviews the effects of these innovations in the light of general Internet marketing and advertising expressions, i.e. will evaluate them according to point C.

4.2.1. Internet makes the market transparent.

Market transparency has been discussed as the rational basis for consumer buying behaviour for over a century. Thus the Internet has been heralded as the ultimate breakthrough in market transparency, e.g.

"*The Internet is a nearly perfect market because information is instantaneous and buyers can compare the offerings world-wide. The result is a fierce price competition, dwindling product differentiation and vanishing brand loyalty*" (Kutter, 1998).

This, however, is almost certainly untrue. Let us assume that the corner shop has no web site, and thus no web-associated overheads. Common sense indicates that even the most thorough searching for a specific product price on the Internet yields no advantage to the rational consumer if the lowest price is to be found at the corner shop. However,

the non-Internet market remains non-transparent and will thus not be discussed further here.

In principle the degree of market transparency should be higher in the Internet market, than in the non-Internet market. However the amount of information found (for example as number of hits returned from a search engine) may be classified as overload, since few have the time and patience to examine the thousands of links to find the most advantageous price (see 'bounded rationality', chapter 2.2.6). To illustrate this, the following terms were entered into Google.com:

Search Term	Number of hits returned from google.com
"Audi 100"	45 400
"Zanussi refrigerator"	118
"Wrangler jeans"	16 200
"Orange marmalade"	21 800

Table 13. *Number of hits for selected search items in the search engine 'google.com'.*

It is not new that marketing science accepts the failure of bounded rationality, and this has given rise to the concept of market segmentation, however this is not explored further here, as it is hardly relevant to this thesis. Suffice to say that segmentation does not occur at this niveau on the Internet, i.e. search engines do not return consumer information or customer communication (in the sense of Dann & Dann, 2004, "... *the primary role of communications is to inform the consumer of the existence of the product and deliver a range of information such as product features, pricing and distribution outlets ...*"), for example it is not possible to search in Google or other general Internet search engines for 'toothpaste' whilst specifying that the results returned should be of interest to those in a particular income bracket, with false teeth and living in a particular area (although the latter point is now – in 2006 – being addressed by local.google.com).

Clearly, conventional Internet search engines are largely incompatible with consumerist marketing. The greater the perceived risk of a purchase, the longer and more widespread is the search for information. Indeed, CyberAtlas (2000a, b) reported that 58% of US householders who use the Internet spend time searching for information about specific products and/or services. This is a lot of time, and thus also the reason why specialised web sites endeavour to raise transparency based on price, e.g. dealtime.com. However this is still sub-optimal, because, as 2-A has already remarked (see innovation A5, 4.1.1.4), that company A is not interested in price comparisons, if this is the only comparison. Company A must be able to tell the customer that the higher price is justified by a

better product, i.e. in ICDT terms, company A requires a larger information space than just price.

It should be noted that the search engine companies, whilst probably aware of this limitation, are reacting in a different fashion, identifying suppliers rather than price: Clients searching for towns etc on Multimap.com (started 1996) are offered the possibility of finding e.g. local hotels. Since 1998 UpMyStreet.com acts as a local yellow pages, guiding clients to local on-line and off-line companies and this theme has recently (2005) been taken up by the 'local' parts of Yahoo and Google.

Joines *et al* (2003) concluded that Internet shopping is a convenient search for bargains. Participants in their sample found the Internet very convenient to use, especially with regard to saving time, in their search for advantageous prices. However their search was limited to examining the first web sites they encountered, the number falling between 6 and 8 web sites. Given that the same is probably applicable to the travel market, then the success of company A's business strategy can be explained. By having their products, at the same price, albeit under different names, on three major web sites (and a handful of smaller web sites) then their products would appear to be the average market price. Consumers would have to look carefully to find cheaper products, which may even then appear suspiciously cheap.

Thus transparency in the Internet market is probably higher than in the non-Internet market, but innovation A12 (4.1.1.10) shows that such apparent transparency may easily be misled by behind-the-scenes manipulation (or brokerage, agencies, or even franchises). Shortly, in large market segments, bounded rationality is lost (and thus so is transparency), whilst, on the other hand, narrow market segments like the market for specialized travel in Denmark, may be hijacked and lose transparency. Note that in innovation A12, company A is actually using its Ricardian control of scarce knowledge assets (person 1-A) for Schumpeterian ends.

Selling through other web sites is also a negation of the Sullivan (2000) prediction that every small or home-based business will need a web site. Sullivan, and others like him were simply not aware that innovative firms, perhaps specialized in Internet services, could rush in and offer services as brokers and selling agents (and auctioneers, e.g. e-bay).

4.2.2. Communication with the customer.

As late as 2002 major authors in marketing are espousing the virtues of individual tailoring web sites to customers, of mass customisation and of dialogue with the customer (see e.g. McDonald and Wilson, 2002). Case

company C followed ‘received wisdom’ and started a chat room for existing customers, as well as a ‘classified ads’ BBS system. This should increase ‘web stickiness’.

"*The BBS pages are used rarely. They are actually embarrassingly comatose. Looking back, the concept of stickiness is ridiculous; it is like a restaurant persuading diners to stay for a couple more hours after they have eaten.*" (3-C)

"*Our first web site had really a lot of feedback links where customers were encouraged to talk to us and request further information etc. We got lots of mail, and we responded to all mail within 24 hours. Later we checked the correspondence database against the customer database and can confirm that in 3 years and over 2000 mails, only one single "information-requester" has ever subsequently bought a product. Thus we realised what should have been obvious from the start, that if the customer is not completely satisfied that they need the product, then they will not buy it. Or to put it another way, if they don't want it the first time, then they still don't want it a second time. Many of our products are unique, so you can't blame this on price comparison. This revelation led to us streamlining the web site and eliminating most of the customer feedback mechanisms. This saved 80% of the wasted time we previously had spent on answering e-mails.*" (3-C).

However, it may be that the case companies presented here are simply more interested in transactional marketing than in relational marketing. Indeed only case company A entered into repeat-buy relationships with its customers, but mainly through its call centre – see 4.2.3 below - and by means of data mining – see innovation A9, 4.1.1.8 – and not by means of the Internet. Clearly more research is needed in this area.

4.2.3. One-to-one marketing.

1-to-1 marketing and personalization of web sites (one-to-many-to-one) is being hailed as the next big step in Internet marketing (e.g. Fingar & Aronica, 2001; Loudon, 2001; McDonald & Wilson, 2002; McDonald & Christopher, 2003), but again, this prediction is flavoured with large company thinking. What do the case companies – SMEs – have to say?

Our call centre system handles 1-to-1 marketing. We actually have a customer retention rate of 20%, but we have had our fingers burnt with big expensive web projects. We don’t want to complicate our already-expensive web system with more stuff, let it repay its investment before we think about that (2-A).

Basically, we tell people what their psychological profile is. It is unlikely that customers will want to know that again. In partner matching, our matches are so good that few, if any, customers feel the need to return (1-B).

We do not believe in 1-to-1 customer relations. We sell education. Once you are an Arabic-English Translator, you will not come back and get the same certificate a second time (3-C).

4.2.4. The effect of automated keyword submission on visit rates.

The effect of automated keyword submission was illustrated both by positive and negative examples. Firstly, Company A hired a submissions service in autumn 1998. The results are shown in Figure 26. Assuming that the inclination of the basic curve was due to expansion in general Internet use, and thus would have continued anyway during the experimental period, then the submission service was responsible for an approximately 19% increase in visits during the immediate post-submission two months.

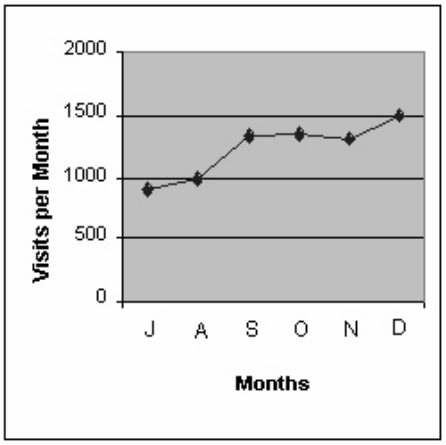


Figure 26*. Company A, effect of automated submissions on visit rates during the second half of 1998. Submissions were effected on the 30th and 31st of August.*

Secondly, Company C routinely used submission upon posting new or updated files on their server, but stopped this practice during autumn 2002. Figure 27 shows a corresponding slump in visit rates during the months when no submissions were made.

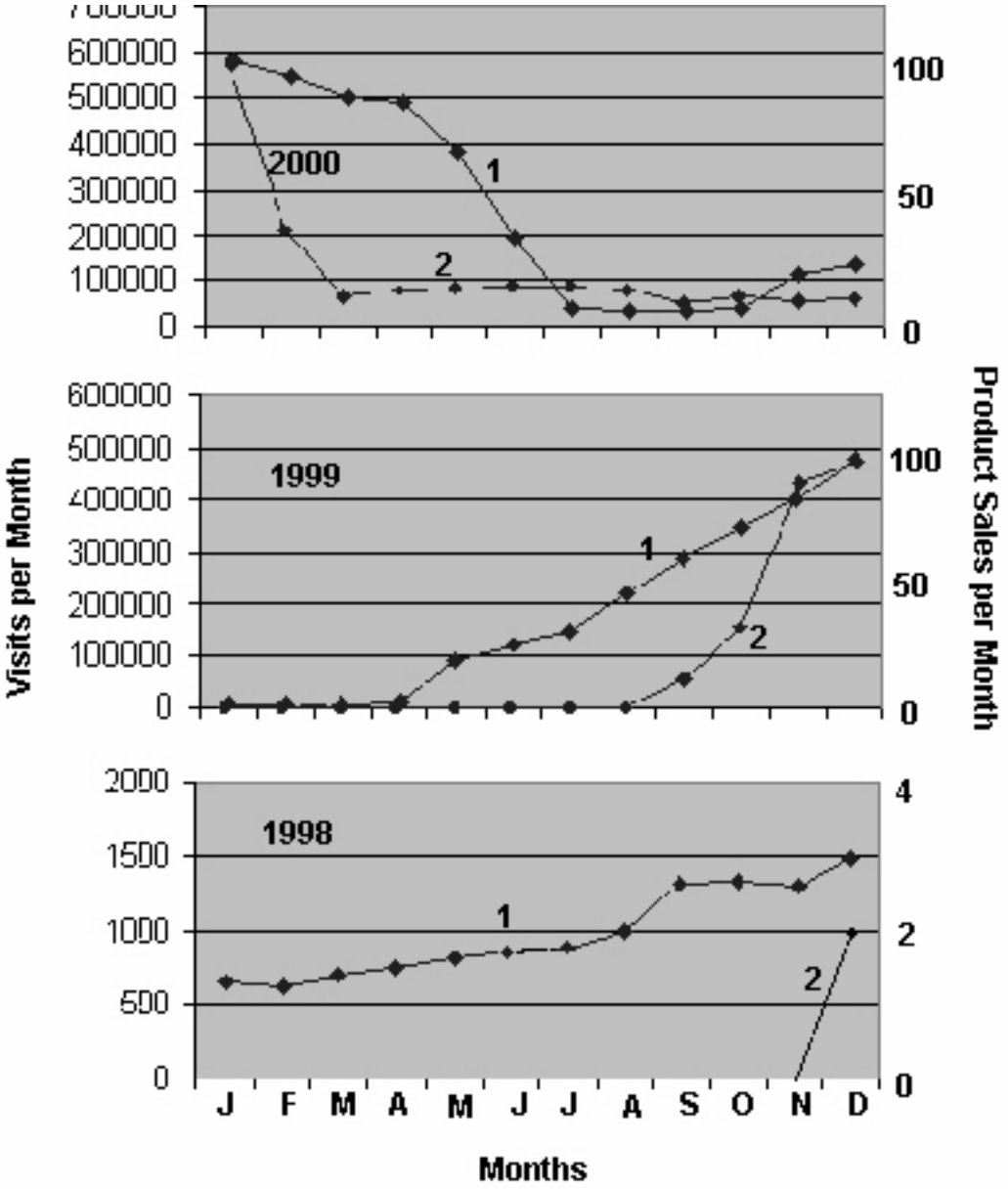
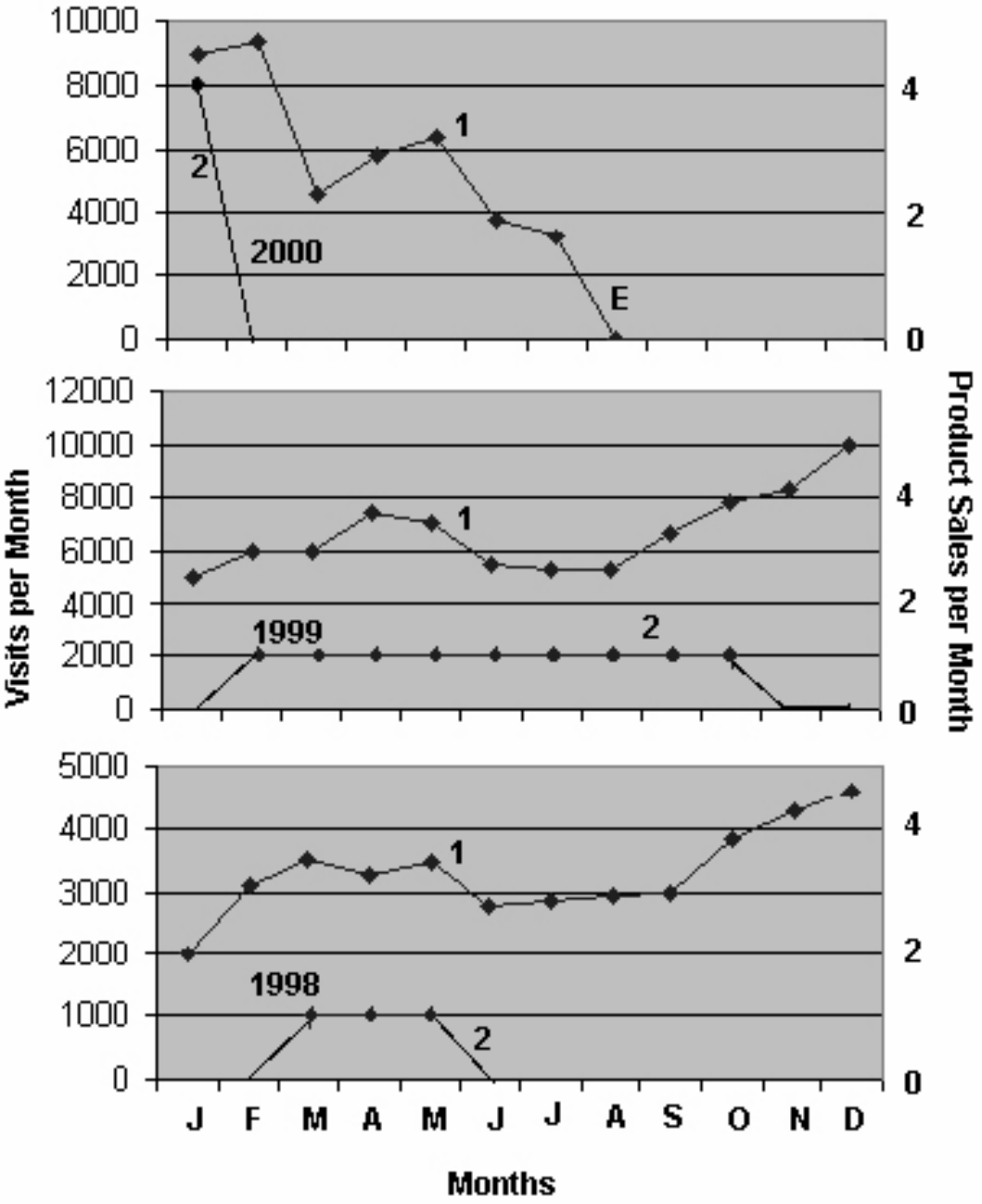


***Figure 27**. Company C, Curve 1: Effect of neglecting automated submissions on visit rates during the second half of 2002. Submissions stopped on the 1st of September. Curve 2: Sales during the same period.*

Figure 28 (below) shows the number of visits and number of products sold per month for each company's web site from January 1998 to December 2002. For brevity, data for 1997 (Company A and Company B) is excluded from Figure 28, but is included in Table 14.


10000
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Visits per Month
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J F M A M J J A S O N D
Months

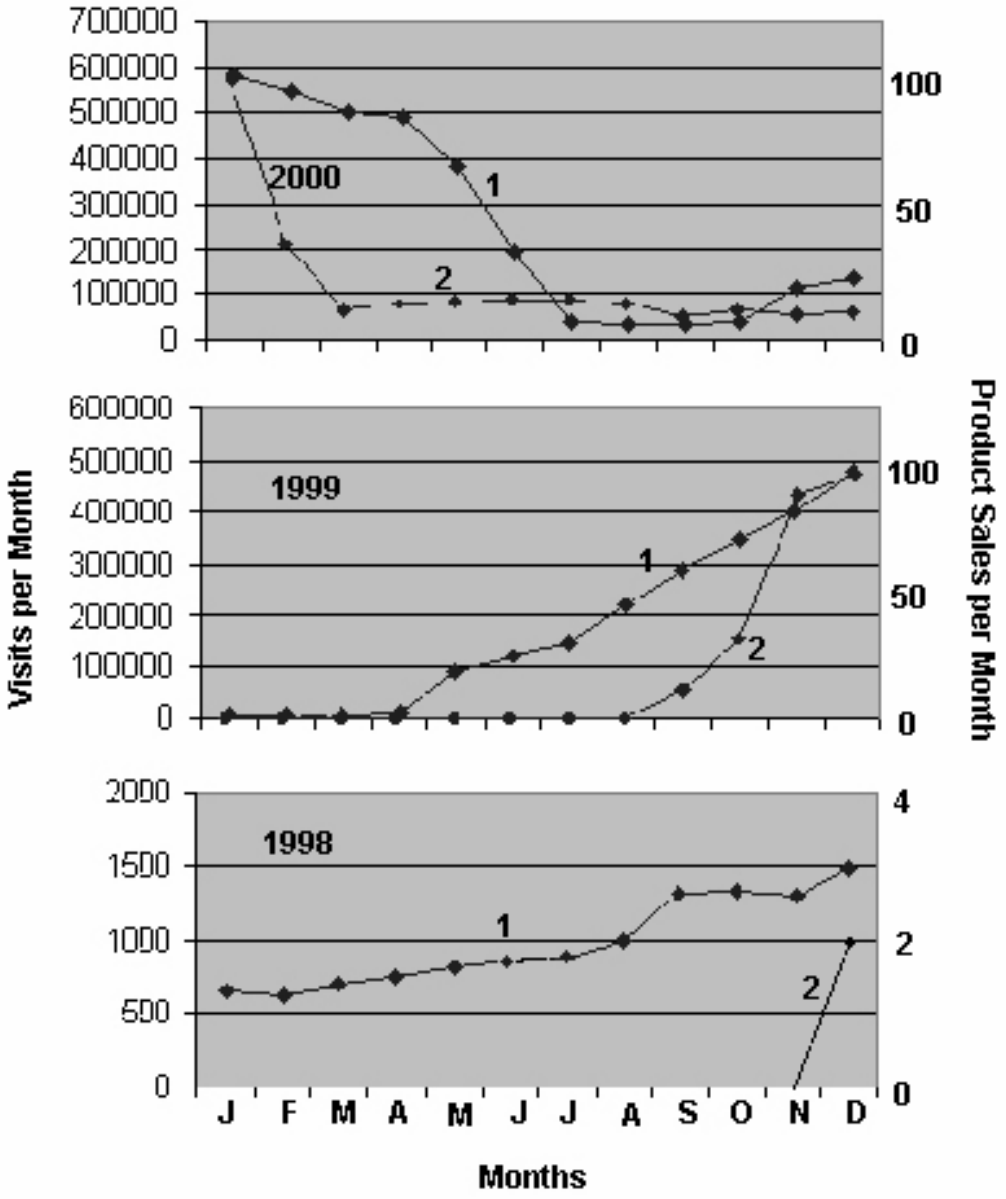

Figure 28 A, B & C*. Monthly visits and monthly sales for Company A (figure 28A), Company B (figure 28B) and Company C (figure 28C). In all cases curve 1 refers to visits whilst curve 2 refers to sales during the same period. B; beginning of operations. E; end of operations.*

The data from Figure 28 is summarised below in Table 14.

Company	Year	Visits	Sales	Visits/Sale/Year	Visits/Sale (av.)
A	1997	9758	1	9758	9791
	1998	11712	2	5856	
	1999	2116207	240	8818	
	2000	3081136	290	10625	
B	1997	7359	0	not applicable	10595
	1998	39637	3	13212	
	1999	80531	9	8948	
	2000	41994	4	10499 (6 months)	
C	2000	21400	1	21400 (8 months)	10301
	2001	152868	16	9554	
	2002	175967	17	10351	

Table 14. *Overview over annual visits and sales - (N.B.: Company B started operations in June 1997 and ceased operations in August 2000. Company C started operations in May 2000.).*

As shown in Figure 26, submissions had a measurable effect on Company A's visit rates, and that this effect stopped after approximately 2 months. During this time Company A's sales remained constant (data not shown), i.e. the increased visit rates had no obvious sales effect. Clearly it could be argued that customers became aware of Company A's products during the submissions period (which was a seasonal 'low period') and may later return to buy, but the short-lived nature of the submissions effect can equally well argue against this point of view.

Figure 27 shows that when Company C stopped using submissions software, visits slumped. However, within the same period, product sales rose to record levels, perhaps due to that the season from which the data is taken is also a 'high period', being a traditional College entrance season.

The most likely conclusion from the above data is that, when provoked by automated keyword submissions, increased visit rates are due to HTTP requests from search engine spiders, crawlers and similar cataloguing software systems. There is no evidence from this study that such submissions-provoked increases resulted in higher levels of product sales.

Short-term analysis of 3 web sites selling B2C products revealed a chaotic picture, where absolute visit rates, absolute numbers of products sold, and number of visits per product sold, varied wildly with type of product and with season. However long-term analysis, from Jan. 1997 to Jan. 2003, surprisingly revealed that on average one product was sold every 10229 visits, with little variance (max. 4.28%) between web site annual averages

(table 14). This figure is sometimes called the Mellor constant (Mellor, 2003b) although it is plainly a variable as it will probably change slowly with time.

Table 14 shows that on long-term average there are approximately (but consistently) around 10000 times more visits than customers. From Table 14, column 6 (Visits/Sale (av.)), the overall average can be calculated to be 10229, with the maximum variance being 4.28%. In the raw data (Table 14, column 5 - Visits/Sale/Year) the single largest variances are Company A in 1998 (5856, which corresponds to -42.75%, but the two sales in 1998 are perhaps not representative) and Company C in 2000 (21400, which corresponds to +209%, but one sale in seven months is probably not representative). Otherwise the range of variance in the raw data is quite narrow, falling between -13.8% and +29.2%.

This high degree of correlation points to the existence of an underlying unifying factor, because the customers are otherwise so diverse in nationality, interests etc. between the three web sites, and that the companies involved use different marketing methods and strategies at different times, have different seasonal selling curves, etc. The most reasonable explanation is that customers are few, and that their contribution to total visits is 'swamped' by a 'background' rate, which, on average, is approx. 10000 times greater.

Visits (all HTTP requests) can be divided into 4 general categories:

1. Those originating from customers (i.e. those purchasing a product),
2. Those originating from potential customers (e.g. those clicking on a link to the web site, even if they immediately regret this and click on the browser 'back' button).
3. Directed requests from machines (e.g. cataloguing software from indexing engines, often called 'spiders', 'crawlers' or 'bots', software checking for broken links, monitoring software etc.).
4. General machine communication (e.g. the routine background requests which enable the Internet to function).

Automatic machine requests (category 4) are responsible for maintaining inter-server communication and the structure of the Internet. This type of traffic accounts for around 50% of all HTTP traffic on the Internet (Mellor, 2003b). Such machine requests, as well as category 3 cataloguing software, and other software which e.g. checks for broken links, may well follow links contained in banner advertising, thus giving a misleading impression that banners are more popular than they in reality are. Banner hosts that are crawled often by cataloguing software may thus appear to be better sources of visitors than they, in reality, are. It may be possible to produce software that can distinguish between the first two categories and the latter two. However until such software is available, the amount of visits attributable to each category remains a matter of interpretation.

Thus Figure 28 A, B & C and Table 14 are interpreted as showing that visits from the first category (customers) are ‘swamped’ by a very large ‘background’ due to visits from the latter three categories. Indeed, because of short-term market vagrancy, this ‘background’ can be considered to be variable and random (or otherwise influenced by uncontrollable external forces). Because the ‘background’ is so very much higher than the customer visit rate, then it hardly changes the significance if the background at any particular point in time is e.g. only 9000 times higher, or e.g. 11000 times higher. Such non-relevant vagrancies will certainly be higher than e.g. banner advertising campaigns, which are known for their low click through rates (Goldsmith & Lafferty, 2002).

Figure 26 and to some extent, figure 27, show that automated submissions simply temporarily increase the ‘background’ request rate. This is because automated submissions attract machine-made HTTP requests (category 3 requests), who's sales potential are zero. The success of bulk e-mailing in attracting customers seems to be surprisingly low, even highly focussed e-mailings resulted in only one sale per approx. 22000 e-mails (see 4.2.7), so bulk e-mailing appears to attract few category 1 and many category 2 requests. So although one may be tempted to say that in the long-term, there occurs one sale per approx. 10000 visits, using these tools to e.g. double visits, will by no means necessarily double sales.

4.2.5. The Mellor constant

The Mellor constant (Mellor, 2003b) distinguishes sharply between visitors (requesters) and customers (those who actually buy). The constant says that for each customer visit there is an overall, statistical, but actually irrelevant ‘background’ visit rate approximately 10228 times higher. Because of the large difference between the number of customer visits and the number of other visits, then a specific selling situation can occur at any time, whether the overall hit rate is high, low, decreasing, increasing or steady, just not 0.

Note that Mellor constant applies to B2C web sites only. Even within this category there will be differences according to branch, e.g. mail-order firms, where Internet simply replaces telephone, can be expected to exhibit a higher sales rate.

The real importance of the Mellor constant is that it "takes the temperature" of selling on the Internet. Obviously the proportion of the population using Internet will vary with region (country etc) but the Mellor constant takes all Internet users into account without regard to origin. But how realistic is the Mellor constant? Or to put it differently, how does the

figure of 1 customer per 10229 visits for on-line shopping compare with off-line shopping?

The situation on-line can be compared to a shopping street. 10229 people on the street are exposed to the shop window or display, but click away again. From each 10229 only one actually goes in and completes a transaction. How does this compare with the physical world?

In order to make a rough comparison, a region north of Copenhagen was taken (called Bagsværd). The population there was 61611 in 1997 and estimated to be 62275 in 2002, and the population covers about 66% of its needs by shopping locally (Institut for center planlægning, 1994, Institut for center planlægning, 1996). Here there are 503 shops, of which 200 correspond to SMEs. Thirty-one of these are on Bagsværd Hovedgade. The daily traffic on Bagsværd Hovedgade is 8000 cars, 3000 bicycles and 12000 pedestrians (telephone call to vejdirektoratet, 2003) i.e. 23000 units in all, all of which are considered to be 'shopping units'. Twenty six of the small shops were asked in May 2003 how many transactions they completed each day, twenty were unwilling or unable to answer, three said around 40, and three said around 50, i.e. an approximate average of 45. This means that in average each shop experiences that 1 in 551 passing shopping units will stop and complete a transaction. Common sense tells us that driving (car or bicycle) and walking are well-established innovations in shopping, and thus must correspond to the extreme top right corner of the Bass curve (i.e. all those who are going to use it, are using it). Assuming that on-line shopping is not cannibalising off-line shopping, then the figures can be plotted on a Bass curve:

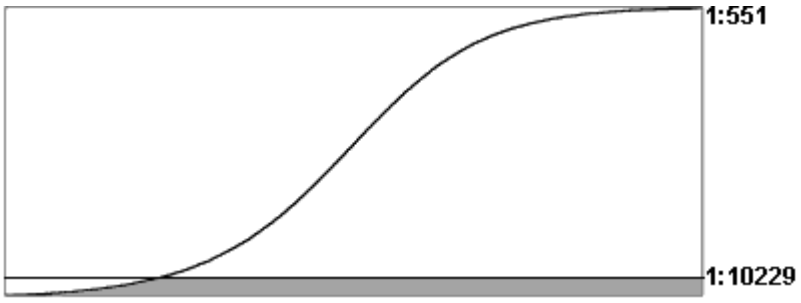

Figure 29*. Shopping Bass curve showing (the shaded area) the amount of Internet shopping as predicted by the Mellor Constant.*

The grey shaded area under the line (figure 29) thus represents the theoretical proportion of shoppers needs being covered by on-line shopping. Since the total area represents 66% (Institut for center planlægning, 1994), then it would appear that 1.54% of the total

populations total shopping is being covered on-line. Obviously the Mellor constant applies to company A (as shown in table 14). Demarks Bureaux of Statistics say that 1.9% of average Danish household income goes to holiday travel (www.dst.dk). Comparing these figures (i.e. 1.54% with 1.9%) it would therefore appear that the Internet has a good market penetration in the holiday travel sector in Denmark.

However, despite the name, the Mellor constant is almost certainly not constant (it is a variable ratio), but will vary with time, and depending upon:

- The diffusion of the Internet
- The diffusion of shopping amongst Internet users
- The branch of industry involved
- Developments in the machine-made background of requests on the Internet.

4.2.6. Use of web statistics.

Many authorities, from the 'gurus' (e.g. Malcolm McDonald in McDonald and Wilson, 2002) to the 'wannabees' (e.g. Hofacker, 2001; Chaffey, 2002) exhort the web manager to analyse their web statistics. But when asked what they could gather from such analyses, the case companies replied:

"*Our analysis of web statistics show that, with few exceptions, people hit the root index file. Anything linked to this is also well visited. If it is not well linked, then it is buried and much less well visited. A page, which takes more than 6 clicks to get to, is lost. We don't use web statistics to find out which page is popular. On the contrary, from our sales statistics we know which products are popular. Thus we can shove such products to the forefront and ensure that they get the visits they deserve. Forget web statistics and concentrate on sales*" (2-A).

"*Basically we have two products, which are intertwined, so the only interesting statistic is which countries the visits are coming from. This is interesting for future language versions, but also with respect to those countries where the population believes in voluntarily arranged marriages between consenting adults. Obviously these people should be interested in getting good partners, and this is a potential market*" (1-B).

"*We have tried to use web statistics to measure the effect of newspaper adverts in target countries, with some success, for example 4% of hits will come from Egypt, but after a newspaper advertisement this may increase to 6%. We also try to roughly forecast sales by looking at overall increases in visits, but basically web statistics cannot be used for much. The only concrete thing which ever affected policy was that we saw one support*

download, a 16-bit PowerPoint reader, was popular, so we decided to retain the ECDL1 course [Based upon Win95]*, which we would otherwise have scrapped in favour of more modern syllabuses.*" (3-C).

4.2.7. The effect of bulk e-mail on visit rates.

Bulk e-mailing is a marketing tool supposed to increase sales (Tomasula, 2002). Both Company A and Company C make use of bulk e-mailing as a marketing technique. No useful statistics exist for Company A that correlates bulk e-mailing with web site visits. However Company A has a business pipeline dedicated to e-mail marketing based on an e-mail address database containing around 12000 e-mail addresses at any one time. About 400 new additions to the database occur per month via a HTML form on a dedicated HTML 'subscription' page. Bulk e-mailing takes place quarterly and results in typically approx. 1000 mailer daemon error messages, reporting that customers have changed their e-mail address, mis-spelt their e-mail address, post box full, and other errors. This corresponds to a customer 'loss' rate of approx. 3% per month. On an annual average (over 3 years), Company A reports the sale of one product per 21870 successful e-mails sent.

Company C sends out one e-mail message in bulk in January each year (2001, 2002 and 2003). The message was sent twice, with 14 days between the two. Firstly it was sent to those who have requested information, but had not bought a product. The second mailing consists of exactly the same message, but sent to those who had studied (or were still studying) at the College. Figure 30 shows that both mails elicited a significant response in visits to the web site in 2001 (the curves for 2002 and 2003 are not shown, but the tendency was very similar). In all cases an estimated approximately 25% of successful e-mail recipients re-visited the web site.

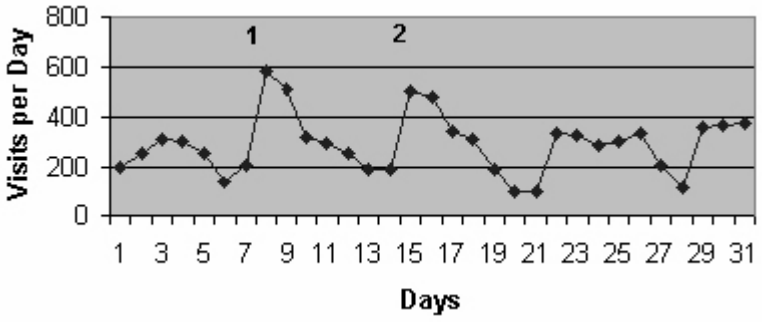

Figure 30. *Company C, effect of e-mailings on visit rates during the days of January 2001. At point 1, Sunday the 7th, 1233 successful e-mails were sent to those who had requested more information. At point 2, Sunday the 14th, 799 successful e-mails were sent to existing customers.*

Company C sends annual e-mail messages detailing, ‘best student of the year’, policy changes, new courses etc, to those who have expressed interest, and to past/present students. Company C's e-mailing database contains under 4000 addresses, thus the three annual bulk e-mailing actions can be estimated to have resulted in between 8600 and 10100 successful mails. Despite the relatively high rate of interest expressed, measured as post-mailing web site visits, careful comparison with the e-mailing database with new customers reveals that no e-mail recipient has ever subsequently bought a product. The most likely explanation is that those customers who are on the past/present students list, have simply had their needs fulfilled. That those who had expressed interest (and even returned to the web site) still failed to buy is probably due to that if they were not convinced enough to purchase upon their first visit, then it will be unlikely that they will be sufficiently convinced upon their second visit.

Figure 30 (data from Company C) also illustrates the ‘week wave’ phenomenon of visitor behaviour, with marked troughs in visit rates at weekends. This common phenomenon is often attributed to visitors preferring to use the Internet from their place of work, instead of using their domestic line (if any). This interpretation is supported by statistics from Company A, where visit rates peak during lunch break times, 12.00 to 14.00 (data not shown).

Company A sends highly crafted e-mail messages on a quarterly basis to those who have expressly subscribed to the service. The mails contain 1-2 paragraphs of details of special- and last minute offers, together with a direct link to the relevant HTML page and the e-mail and telephone number of the appropriate employee. Despite this high degree of precision, Company A reveals that the sales response is only one per 21870 successful e-mails. This apparent extremely low sales efficiency may, however, be slightly misleading. Jayawardhena *et al* (2003) reported that "*the outcomes of purchase intentions did not necessarily correlate with consumer segmentation according to purchase orientations*", and thus it is possible that e-mail recipients were stimulated to buy quite different products. Such purchases would not have been reported in this business channel.

Despite the narrow base of the marketing data, and possible channel crossover, it is tempting to compare the purchase rate for the pure Internet channel (1:10229), with that for the bulk e-mailing channel (1:21870). Can the indication that the Internet channel is twice as efficient be taken as evidence that Internet purchases are more impulse buys, as reported by Parsons (2002)?

4.2.8. Other facts about Internet marketing gleaned from the interviews.

A wealth of other data, not immediately connected with the 19 innovations, was gleaned from the interviews. Two important points are presented below.

4.2.8.1 Does a payment gateway help convenience shopping?

Having accepted that convenience plays a large part in customers' decisions to buy, then a payment gateway seems essential from Transaction Cost considerations (see 2.5.3). The importance of 'trustworthiness' of such services has been underlined by e.g. George (2002). This is probably correct for Amazon.com and other large volume web sites (see e.g. Vijayasarathy, 2002), but again, that was not the experience of the three case companies.

I took a positive decision not to have a payment gateway. The reason is that the providers do not give the merchant sufficient security. VISA allows charge-backs up to 18 months after purchase. That means a customer can pay with VISA, go on holiday, return and then get all their money back. These payment gateway providers automatically accept charge-backs, so I have no say in the matter; the provider simply subtracts the charge-back from my account. Apart from that, in this country I can send an invoice with the post so the customer can pay within a few days. If they want to pay immediately, for example if it is a last-minute offer, then they can use their Internet home banking. (2-A).

The best example of banks blocking e-commerce progress happened to our South Africa branch, where the bank insisted that a paper photocopy of the cardholders' passport accompany card payments. (2-A).

In 1994 the situation was that the customer sent you a credit card number, and you put that in your electronic terminal. When I started with this system, the costs were a bit vague, because some costs were fixed others as percentages etc. After 6 months I was shocked to discover that it was costing me a fortune, several hundred percent more than I had thought. I returned it to the bank and berated then for advising me so badly, in fact I was so dissatisfied that I changed bank. (1-B.)

The problem with payment gateway providers is that they concentrate on having an image of security aimed at the customer. They have neglected the trader. For two years I have tried to decide whether to abandon the payment gateway or not. I doubt that it pays for itself. The problem is charge-backs. Our products cost around 600 pounds. Thus the provider takes 30 pounds per transaction, this is in addition to their annual fee.

Anyone with a false VISA card number thus immediately costs me 30 pounds, plus typically 20 pounds in charge-back fees, that is, I lose 50 pounds. Plus, of course, that I have sent the goods and have had other costs, like setting up a tutor for that person. Another small thing that annoys me is that we pay VAT to the provider on every transaction, but I cannot get that tax money back from the provider when the transaction falls through. I complained to the provider, who recommended me to get a signed letter from the customer confirming purchase. I replied that if they were sending me letters, they could just as well send a cheque and then I would happily get rid of the payment gateway. They didn't reply to that. (3-C).

Of course, it is impossible to compare how many customers, who bought a product, would not have bought it if that had implied a walk to the bank to pay for it. However the experiences of the three case companies clearly show that payment gateways are a mixed blessing. All the persons interviewed agreed that the banks and gateway providers do not support the small merchant trader, and that this is a major barrier to on-line payment and thus to e-commerce in the Internet 'entrepreneurial cluster'.

4.2.8.2 Does a fast web site help sales?

"*In the e-commerce world, it's performance, performance, performance. The speed of your web site is directly equated to sales*" (Kevin Ertell, Tower Records, quoted in Gray, 2003, p487).

None of the case companies supported the view that slow web sites would enhance sales, indeed everyone would probably support the view that selling on the Internet is facilitated by the customer getting the information on the screen within a reasonable time. A very slow web site ('very slow' obviously being dependent upon the speed of the connection used) may well kill sales. Company C was especially aware of that and has a graphic-light web site compatible with their Middle East customers who often have a 28 kbps telephone modem, and may even be connected through a manual exchange.

Ertells' remark (above) seems to imply that is the web site that is being sold (as opposed to the product). However, as 2-A states in 4.2.6, it is quite obvious that it is the product that determines sales. A director of company C added:

"*A few visitors may appreciate how fast our web site loads, but it is ridiculous to imagine that they return simply to marvel at the ease of clicking around it. If they return, it is because they are interested in the service being offered, and not because of the web site*" (3-C).

4.2.9. Short conclusion

The innovations fulfil the third of the three criteria (human, financial and academic) postulated by General Systems theory. The effects of the innovations can be investigated and the results contradict in many ways the accepted wisdom of Internet marketing (Mahajan & Venkatesh, 2000). This shows that SMEs cannot accept the slogans and theories common in Internet marketing without critical re-evaluation. Furthermore, what works for large organizations may well not work for SMEs, underlining the point that small firms are not small versions of large firms.

Blindly accepting current dogma and slogans – even where they appear to work for large organizations (which is by no means always the case) - will contribute to transition costs, including switching costs, and will erode margins.

4.3. The case companies revisited.

In the original work (see Mellor 2005a), the individuals in the case companies had been interviewed starting with mediator-led group discussions with broad questions, followed up by individual interviews, following and linking the themes coming out of the previous discussions, and finally by my giving an oral presentation about my results to ensure that relevant topics had been included, no significant omissions had been made, and that the data corresponded with the groups' view of reality. Transcripts were subsequently submitted to the case companies in 2003 for final review and approval. However all this work appertained to the subject case company only: They had not seen the results gathered from all the other case companies, nor had they seen the overall conclusions.

Clearly my having published much of the work in my book (“Sources and spread of innovation in small e-commerce companies”, Mellor, 2005a) provided me with an instrument to present a shortened total overview to the case companies.

Thus between December 2004 and early January 2005, 24 examples of my book were sent out to individuals in the case companies with the request that they peruse the content and collect any feedback, either individually or in groups. I would then come on an agreed date and perform the interviews. The response is shown in the table below.

	Number sent	Number of replies	Individuals involved
Company A	5	2	2-A, 3-A
Company B	4	1*	3-B*
Company C	3	3	1-C, 2-C, 3-C
Company D	3	1	The ex-CEO of Company D
Company E	3	1	1-E
Company F	7	2	2-F, 3-F

Table 15: *Response rate to mailing of first results. * = 3-B was working in the Ukraine, and was only available for telephone interview.*

Their status as of March 2005, in order of adaptive *versus* innovative market (F, A, B, C, D & E, see Table 16, in 5.1.1) were:

Company F: None of the 4 members of the leadership selected (Director, Vice Director, Head of HR and Head of Communications) acknowledged receipt of the book. Subsequent telephone enquiries revealed that they refused any comment whatsoever. 1-F was still employed at Company F, but now refused to participate further. 2-F was still employed at Company F and was available for questions and interview. 2-F revealed that 3-F had been demoted several times in the intervening year and thus 3-F had left employment at Company F, but it was possible to track this person down.

Company A: Persons 1-A and 4-A had left employment at Company A for better jobs. There whereabouts were unknown but 2-A (the CEO) and 3-A (Head of Marketing) were able and willing to comment.

Company B: Company B had stopped trading in August 2000 (see table 3) and the innovation nuclei were untraceable. However the ex-CEO was still available for comment by telephone.

Company C: All of the staff that contributed to the 2003 study were available and willing to participate.

Company D: This Company had been the object of a hostile takeover by a large American company. The previously identified innovation nuclei had left and were untraceable; however the ex-CEO was still available for comment.

Company E: This Company had fared badly in 2004 and was much reduced in staff, but 1-E was still present and willing to co-operate.

Their most relevant comments were:

2-F: *This Company has not instigated an innovation programme. There are constant complaints from the workforce, but the management deals with this by calling in expensive consultants and we all spend a day running round sticking pieces of paper on the walls. We have now done this so often that it has become totally irrelevant. With respect to non-Danes, the situation here is getting worse; we are now down to 5 CEDs in the whole Ministry (around 2400 people). An 'equal opportunities' commission was formed, but as soon as I was elected onto it, the Vice Director came to me personally and explained that this commission was to investigate equality between Danish men and Danish women, and would not be investigating racial equality. I wonder when the rebound will come, and what direction it will be in!*

3-F: *Companies have lifetimes; they are born, mature and eventually get old and die. Ministries can't die; they are zombies kept artificially alive – simply brain-dead on life support. My innovations at Company F should have saved them around 3 million GBP, but it was like throwing pearl before swine, they just preferred to throw the money away. I got more and more unpopular and indeed my last innovation – which indeed did save the Ministry around 0.5 million GBP – made me so unpopular amongst the bosses that I was demoted to glorified tea-boy. Eventually I realized that simply by doing my job, I was just provoking them. It was time to look facts in the eye. Within 2 weeks I had a much better job with 50% more pay.*

2-A: *Quality initiatives have been seen as leading to job losses. This view is actually supported by middle management, since it is actually they who have the most to lose. Middle managers don't like the concept of teamwork and sharing decision-making with subordinates, they see their power being eroded. Middle managers can quietly and effectively sabotage most things. It is very hard to pin this down, a manager may simply drop a disparaging remark at an opportune moment, perhaps in a tea-break, and this carries a lot of weight with the workers.*

3-A*: I think I learnt a lot from seeing the results. I was very interested to read the book. Since this study was performed and since reading the book, we have become much more aware of our innovative resources. We try to pay attention to this and to encourage foreigners and the quieter personalities to put their ideas forward. We don't have a formal system, so many ideas may be implemented without being recorded and indeed some may be lost because individuals are too busy to forward them or present them at our weekly meetings. However since we became aware of these factors, our business processes have changed positively and indeed financially we are probably the strongest amongst those we benchmark ourselves against.*

3-B: *The book helped crystallise my thoughts. I too have done many things and may be classified as 'multi-skilled'. Now I too work in the*

Ukraine where one can really get angry about the numbskull system. So I think I have seen this effect from both sides and in my opinion you really have managed to uncover something here.

1-C: *I really like the theory in the book and can see that there is real food for thought. As far as we are concerned, our market is maturing extremely rapidly. So should we be less innovative, to keep in tact with the market? Or more innovative to inhabit niches the big guys haven't filled yet? If you could tell me this, then I'd buy your book.*

2-C: *It is certainly hard to discipline the innovation process. We basically run in shifts, either here or in India* [pertaining to innovation C4, see 4.1.3.4. for details] *and there is a tendency to forget that you may be faced with a problem that someone else has already solved. We are trying to adopt a knowledge sharing approach so as to raise efficiency; lower response times and avoid splintering.*

3-C: *It is difficult to keep the continuous innovation going. This company is in principle prospering, but the process of idea generation means that we are doing too many things. I think we will retrench soon and prune off the least-profitable areas.*

D: *We entered into a deal with a co-called Business Angel, who should invest a lot of work with our Company. That's why he could acquire a lot of stock cheaply. But within 2 weeks he'd sold off all his stock to a large US Company, and a few days afterwards a load of yanks in suits moved themselves into our offices. We were plundered and abused. We were all fired or resigned, the people who used to work here (i.e. 1-D and 2-D, who took part in the original work) are scattered around now I don't know where they are.*

1-E: *I think that you are really on the right track. It is a combination of peer respect, as opposed to being looked down on by the Danes, combined with that our (CED) guys really have knocked around a lot and really can pull out a lot of different skills. However I think your theory is lacking, because you only look at how innovation starts at the very bottom. I believe that in fact there is a whole level of the same stuff on a higher plane. As an example, what happened to this Company, established (SAH) firms get together and can effectively squeeze out innovative (CED) firms. So it happens also at the corporate level, and not only at the individual level*.

Of course it is gratifying that various interviewees (2-F, 3-A, 3-B, 1-C, 1-E) accept the results (although several of them may not have properly understood it, as judged by their comments) and that 3-B and 3-F are generally agreeing on the 'Trickle-down' effect and its dangers, as described in Chapter 5.1.

However it is not that a series of Companies ranging in market from mature to immature, have been tested for innovation. Rather it is the factors controlling adopting individual innovation in these Companies whilst simultaneously the market was evolving from extremely immature to maturity, indeed Internet commerce at the beginning of the period studied (1997) was radically different from now in 2006. This may be one stabilising factor behind the success of 'clicks and mortar'. For example, it may not be that Company A has 'got the hang of it' and become much more innovative, but rather that they have become somewhat more aware of innovation whilst simultaneously the Internet market has matured up, to 'meet them halfway' so to speak.

Certainly those Companies being in the middle of the innovation scale seem to have prospered e.g. Company A and Company C (albeit that Company C has had to take a 'quick pruning' entrepreneurial attitude in order to avoid 'innovation overshoot'; i.e. maintaining a very loose innovative structure in a rapidly firming market), whilst those at the extremes of the scale e.g. typified either by extreme rigidity (Company F, note that 3-F uses death analogies similar to *rigor mortis*), or by bleeding-edge innovation, have not fared well (neither Company D nor Company E exist in the same form today). Certainly Company D may well have fared better if the market had matured more slowly.

Conversely, none of the case Companies have instigated anything like the HR systems described in 5.1.4 and 6.1. This is despite the results obtained from 2,000 organisations within Australia and published by Farrell (2000) indicating that a market orientation is positively related to a learning orientation within the company and that a learning orientation has a stronger significant positive effect on business performance (as also seen in the cases of Company A and Company C) than does market orientation. Perhaps the difference is that this study reveals the importance of the multi-skilled and of CEDs, which are factors not researched by Farrell (2000).

Also the literature on this subject – the genre perhaps being typified by Bessant (2003) – continues to describe administrative harvesting methods in large companies, mechanisms not easily transferable to small companies like those documented in this study.

5. Discussion

5.1. Regarding Innovation

There should be three processes describing the spread of innovations:

1. The spread of ideas in an 'open-system' population can be represented by a smooth Bass curve (figures 9 & 10).
2. In a closed, but still large population, spread will be represented by an uneven Bass curve. As an example consider the banking business; innovative banks introduced revolutionary concepts including credit/debit cards, cash vending machines and Internet banking. Each of these innovations included a long lag phase, where proof-of-concept was established. Adoption spread by imitation of the concept, with extra time lags caused either by conservatism or by the time needed to circumvent proprietary rights etc. Thus adoption was not the theoretical smooth curve, but was by a random block-wise process until all banks interested in these systems had adopted them (see Gopalakrishnan & Bierly, 2001).
3. The spread of ideas and innovations within firms is even less related to the Bass curve. Within companies - especially SMEs - populations are small, not large. Diffusion is not free but stopped by hierarchical and departmental boundaries and finally, even if the value can be appreciated, then innovative processes may be outsourced or sold if they are not conceived as contributing to core competencies (Quinn & Hilmer, 1995).

The classical process, process 1, is well researched. Process 2 has also been the subject of several studies (e.g. Landry *et al*, 2002; Tether, 2002; Loudon, 2001) and the lack of research around process 3 in SMEs is the reason why the work described here was undertaken.

Seen internally, from within the company, innovation is tied to a process of adoption, normally defined as:

- A difficulty is felt
- The difficulty is located and defined
- Possible solution suggested
- The consequences of the solutions are considered
- The solution is accepted

As seen and discussed in 4.1.5.4., CEDs were a major source of innovation (diversity innovation, micro/incremental innovation). However aptitude as innovation nuclei was more correlated to multi-specialization in the educational background of those people, both CEDs and SAHs, who were responsible for innovations (see table 12, in 4.1.5.4). The people 1-D and

2-D (SAHs) were unusual insomuch as they both attended the IT-University of Copenhagen, which is unique (at least in Denmark) in taking students with any Bachelor degree (at all) and giving them a 2-year conversion Master degree in IT 'on top' (www.itu.dk). How then did CEDs manage to get a similar educational profile? The answer would appear to lie in the process of becoming a CED. Typically such people will have had a university education from their homeland. Then they could either be just plain curious and move to another country voluntarily, or they may be more inquisitive than their government allows, with the same end effect (albeit not voluntary). Other skills are needed in their new country; this often means starting from the beginning with a new education. Obviously, during this time their intelligence, innovative ability and flexibility will be tested to the limit. The result of this process can be expected to be flexible people with a deep knowledge of many different areas, enabling innovative cross-fertilization to take place. It should be said that such people are liable to be quite different from those (especially SAHs) with one specialist education, or with one cross-disciplinary education, or a generalist education. Those CEDs who can endure the Darwinist rigours of internationalism are indeed fire-hardened multi-specialists. As such, it is not unexpected that they be recognized as innovation nuclei.

5.1.1. Can trickle-down theory explain the CED effect?

As stated before, DoI theory cannot be applied to spread of innovations in SMEs because that lack of free space means that unrestricted Brownian motion between people and between ideas and people is not allowed in a containerised company environment. Therefore evidence for Trickle-down was sought. The major theory concerning innovation between social groups is the Trickle-Down theory (Simmel, 1904). Although modified by McCracken (1988, p93-103), Trickle Down, in its most basic form, states that two conflicting groups act as a motive force for innovation, where subordinate groups seek to establish parity and the super ordinate group, in turn, abandons or mutates these markers in order to preserve the difference in status. The negative effects of Trickle Down theory are becoming apparent from diverse areas of IT, for instance Participatory Design, which, as the name suggests, insists on breaking this effect with – and even partially insisting upon – equal participation from all groups. At its most basic, evidence for Trickle-down could be e.g. successful lines of innovation being started by social minorities seen as inferior, which, upon success, become more important, prestigious and expensive whilst being controlled by someone from the socially superior majority. Evidence for Trickle-down mechanisms was found in Company A. However this hardly seemed to apply to Companies B and C. The question of Trickle-down was therefore pursued in the same country using three further case companies, and seemed to be highly visible in case company F. Furthermore, employees in case E seemed to have experienced it and be

fleeing from it (even though it was not present in E itself). However, it was not immediately evident in company D.

Lack of convincing evidence for Trickle-down in all cases led to speculation about the companies field of activities, especially if they were in mature *versus* immature markets. The reason for this is that A-I theory (Kirton, 2003) characterizes mature markets (and companies in them) as 'adaptive' and immature markets (and companies in them) as 'innovative'. The following matrix attempts to put the case companies on a scale between mature (adaptive) and immature (innovative) markets, and compare it to the approximate degree of Trickle-down experienced.

Highly Adaptive					Highly Innovative
F	A	B	C	D	E
High Trickle-down					No Trickle-down

Table 16. *The approximate positions of companies A – F on a scale ranging from highly adaptive to highly innovative and indicating the positions where Trickle Down can be implied.*

It is ironic that many today, when talking about innovation, concentrate on high-profile entrepreneurship like exploiting a new scientific discovery (immature markets), when incremental innovation (as personified by A2 and A3, as well as better known examples like the Phillips screw) are those that are firmly based in mature markets and can turn an immediate profit. Indeed several authors (e.g. Loudon, 2001) stress, without dealing with why, that innovation in mature markets and innovation in immature markets should be kept quite separate (although Marchand *et al*, 2001 on p27, without being specific, do mention that established companies will not benefit from IT investments unless the IT system includes innovation support). It appears that in order to explain the observed results by Trickle-Down; SMEs must be segmented further into active in mature/immature markets and powered by invention/diversity innovation. Indeed future research could focus on e.g. heavy R&D SMEs (i.e. in immature markets and using both invention and diversity innovation, as often found in e.g. the biotech industry).

5.1.2. Can A-I theory explain the CED effect?

Humans, being social creatures, form groups. These groups are usually formed on the basis of common interests and common perceptions, i.e. a common cognitive style. Employees in companies in mature markets (e.g. employees in F) are likely to solve problems in a certain way, and this way is agreed upon by consensus within the ruling group. Such a ruling group obviously includes the leaders ('opinion leaders', in DoI parlance). In such environments, innovators (being outside the group) may be viewed warily, their ideas appearing risky, peripheral or even silly (although, conversely,

employees from the major consensus group in company F, if transferred to e.g. company E, may be ignored and treated as having ideas, which are merely fine-tuning and hardly creative).

Kirton (2003) reports that expatriate managers in multinational companies are significantly more innovative than their colleagues in head office. So even bosses within the same company (but are merely serving abroad) are people who do not have the difficulties which CEDs have faced, plus they are per definition members of the ruling group and change agents may well be found amongst their subordinates (see 'innovation decisions', chapter 2.2.3). Despite this, heterogeneous groups (those with wide diversity) are more difficult to recruit because it is not always apparent what the selection criteria are. Furthermore they are more difficult to manage, a factor that may take resources away from groups task - the actual problem solving. But foreigners are more comfortable with crossing boundaries, so in the right environment, they are more efficient over a wide range of problems. If, as postulated above (see figure 6 and chapter 2.3.1.) innovation comes not only from invention and creativity, but also from diversity, then CEDs should theoretically function well in SME environments. However, tables 17 and 18 (next page) show that this is hardly the case.

Accommodating diversity may cost extra effort and it is reasonable to examine cost against benefit. But can efficiency be correlated to degree of innovation? Certainly this is a 'grey' area, since comparisons may not be valid. However Company F, an extreme non-innovator - collected e-mail addresses on its web site for those interested in receiving an e-mail newsletter. As reviewed in 2.5.2, prices for such outcomes are typically around 0.5 US dollars per e-mail address. Company F, however, pays 8 times this amount. Could this significant difference indicate that they have not been nimble enough to search for a better deal? Costs and benefits are elaborated further in 5.1.4.

Change agents (as defined by DoI theory) are extremely important. Even where the intended change has its origins in the dominant group, a supporting executive must believe in the intrapreneurial idea and provide the resources needed. However Kirton (2003, p 295) notes that when innovation comes from outside the dominant group, traditional change agents (supporting executives?) may feel treated as unworthy and actually become resistance agents. This is important because it can lead to "*guileful behaviour*" (Williamson 1995, see chapter 2.2.6) which in turn may lead to the negation of the basic assumptions of Transaction Cost theory - finally ending up working diametrically against the organisations best interests (as one could suspect is the case in company F)!

In chapter 4.1.5.4 results were presented showing that 60% of the people involved in the innovations listed were CEDs. Where have CEDs had their innovations adopted?

	Mature markets	Immature markets
Small innovations/cheap projects	A1, A2, A3, A4, A6, A7, A8, A9 & A10	C1, C2, B1, B3
Large innovations/expensive projects		C4

Table 17. *A matrix dividing innovations originating from CEDs on a plot consisting of innovation size against market maturity*.

And where have SAHs had their innovations adopted?

	Mature markets	Immature markets
Small innovations/cheap projects	A7 & A8	B2, C3 (flop)
Large innovations/expensive projects	A11 (flop) and A12	

Table 18. *A matrix dividing innovations originating from SAHs on a plot consisting of innovation size against market maturity*

From table 17 it is quite obvious that CEDs can, if persistent, get small innovations accepted. However the interview with 1-A also made it obvious that this is only by going straight to the leaders (i.e. not through change agents). In more extreme mature markets, e.g. that exemplified by company F, then even this direct approach no longer works or is even expressly forbidden (see e.g. Rose & Lawton, 1999, p292). Thus, to borrow an analogy from chemistry, the 'Energy of Activation' required to set their ideas rolling is much higher than for an SAH.

Table 18 shows however, that in companies in mature markets, SAHs (who are more likely to be admitted into the consensus group than CEDs are) are those leading major projects. This impression is strongly supported by the interviews conducted at company F (and the converse effect, in immature markets, at company E). These major projects have a high failure rate, but this should not immediately be taken as a sign of incompetence, since larger projects mostly inherently contain a disproportional higher risk.

On the other hand, the success of Internet in Company A did result in a trickle-down response, as documented by Innovation A11 (see 4.1.1.4),

and that the response (which nearly bankrupted the company) led the leadership to buy on a sellers market whilst investing in areas outside their core competencies (Quinn & Hilmer, 1995), so perhaps failure was not so surprising.

These results imply that Trickle-down is confined to mature market situations, where CEDs are almost always extraneous to the dominant consensus group (the 'Innovation Gap'). Indeed it appeared to be absent only in companies working in highly innovative immature market situations. The interviews support the contention that in company F, CEDs were far from the consensus group, whilst they were nearer (but still external) in company A, and part of the loose consensus group in company C. One interesting question for further research is, is Trickle-down caused, or aggravated by, the lack of sympathetic change agents (or reversing them into resistance agents)? Have highly qualified multiple-specialist CEDs, who should (theoretically) function well in an SME environment, simply angered the middle management? That is, are the CEDs identified here as innovation nuclei, so different in culture and personality that communication between them and the ruling consensus group has broken down, and thus the company is unable to use their innovative talents? This question cannot be answered at the moment, but it seems likely since the converse effect, of increased openness to change after opening the consensus group, has been known for over a decade (e.g. Fox, 1994).

5.1.3. Why are CEDs often innovation nuclei?

In the normal working population of an EU country, the level of CEDs is around 5% at any one time. In company A, there were approximately one hundred people employed (fluctuating between approx. 90 and 120 during the three years of this study). There were exactly three CEDs amongst the workforce. All the innovations listed for company A come from five people (where two of these were leaders), two CEDs and three SAHs. Despite this, two of the three CEDs were responsible for 66% of all innovations. Clearly there may have been more innovations made quietly by SAHs and gradually incorporated into the fabric of the company, but these, if any, do not fulfil the three criteria set up by General Systems theory (see chapters 2.2.4, 4.1 and 4.2).

One point that has been stressed in this work is that diversity is a third, and little known, contributor to innovation (see chapter 2.3.1 and figure 6). When examining CEDs one first jumps to the conclusion that a major factor may be culture. However it seems unlikely that cultural factors *per se* is the major factor, because e.g. culturally-determined intoxication habits like one person (Californian?) getting stoned, the second getting drunk (Scottish?) whilst the third is teetotaller (from Utah?), will lead to any of the people from the 3 different backgrounds becoming notable

innovation nuclei (although rumour has it that highly creative people like Picasso, Van Gogh and similar figures were high alcohol consumers) or that e.g. eating chilli or not eating chilli, can lead to workplace innovations. Clearly the effect may be partly due to the interaction between cultures, the broadening of horizons provoked by travel and of how people work - and work together - which leads to different understandings and a cross-fertilisation process. But can this explain these very large differences?

Whilst concentrating on workplace innovations it is necessary to refer back to table 12 (in 4.1.5.4), which lists the qualifications that the people interviewed have. These are summarised in a slightly different form below:

Person	**Origin**	**Number of qualifications***
1-A	CED	3
4-A	CED	2
2-B	CED	2
4-B	CED	2
1-C	CED	2
2-C	CED	3
Average		2.8
2-A	SAH	1
3-A	SAH	1
5-A	SAH	0
1-B	SAH	1
3-B	SAH	2
3-C	SAH	1
Average		1

Table 19. *Number of significant qualifications (*) i.e. paper qualifications like degrees in different and separate academic disciplines, amongst innovation nuclei.*

From table 19 it can clearly be seen that the CEDs possessed on average almost three times the qualifications that SAHs possessed. This does not make them more intelligent. Clearly a SAH may have dedicated his/her life to an incredibly deep study of one discipline. However taking into account the results from company D, and in light of 3-B, it becomes obvious that double or treble specialisation is a common factor.

The results can be explained as follows: SAHs have a choice of academic education and normally these courses or degrees fall into one of the following categories:

Generalist	A little bit of a broad selection of disciplines
Cross Disciplinary	A good grounding in a narrower selection of disciplines
Specialist	A deep study of one discipline

The innovation nuclei identified in company D were SAHs, but significantly they had taken a specialist education in one area, followed by a specialist education in a different area. Thus they represent a fourth type:

Multiple-specialist	A deep study of two (or more) disciplines.

The CEDs are similar. One recurring theme in this work is that diversity fuels innovation. The data reported here supports the view that workplace innovation is promoted by variety amongst work disciplines – CEDs being often multi-specialists – possess this. For example meetings between different people where they are specialists in different fields often encounter the problem that the two (or more) types of expert have difficulty understanding each other. Therefore workplace innovation is at its most simple (and most powerful) when communication problems do not exist, where the two or more specialists are literally embodied within the same person. Thus one person is able to look at a problem with the eyes of a (say) geologist and with 'MBA-eyes' simultaneously.

CEDs often lead a nomadic existence, driven from country to country by curiosity, persecution or other grounds. During this process they need to adapt, be flexible, innovate and show self-responsibility and initiative. For some (but not all) CEDS, this initiative often results in a rich and varied experience and a wide variety of qualifications. Thus they may become 'multiple-specialists' and innovation nuclei. These CEDs have become expert and creative problem solvers. In this respect it is interesting that several recent studies (unfortunately again concentrating on large organizations) have concentrated on cross-cultural management (Chevrier, 2003, Peterson, 2003, Lagerström & Andersson, 2003).

Creativity, problem solving and decision-making are closely linked: "*Creative thinking produces novel outcomes, and problem solving involves producing a new response to a new situation, which is a novel outcome*" (Guildford, 1977, p161). The difficulty for the innovator (especially a CED), independently of where the inspiration has come from, is persuading sufficient change agents to help getting the idea up to the decision making stage. Are the benefits for early adopters (typically the leader of the group, or other in middle management) sufficient? CEDs outside the consensus group will often fall prey to "*Fundamental Attribution Error*" (Burger, 1991), a common example being of speaking with an accent and using less sophisticated terms, biasing the hearer to group the CED with

lower-class, poorly educated SAHs. This often overlaps with the "*Halo Effect*" (Murphy *et al*, 1993), insomuch as once a negative impression is formed, then others tend to view what that person does, even things about which they have no knowledge, in unfavourable terms.

Clearly Human Resource departments should be very aware of this, but simultaneously that, if the environment is wrong, then the innovations will be stillborn and that the company will not profit from them (and indeed the CEDs may feel 'mobbed' and leave, perhaps with expensive legal consequences). However despite urgings for companies to be 'fair' to their employees (e.g. Chan Kim & Mauborgne, 1997) and the introduction of 'innovation relays' in several multinational companies (e.g. Asakawa & Lehrer, 2003), this is a topic notable by its complete absence in the standard Human Resource Management textbooks (e.g. Bennett, 1997, Dessler, 1999, Greenberg & Baron, 2000, Schultz & Schultz, 2002). However the inexorably increasing numbers of nomadic CEDs, 'lifelong learners' and people in 'second career' (Drucker, 1999) make this a subject that Human Resource Management will soon no longer be able to avoid.

5.1.4. The cost of managing diversity innovation.

In 5.1.1 it was stated "*However, accommodating diversity costs extra effort and it is reasonable to examine cost against benefit*". Despite this logical wish, no data exists on how much the management of diversity innovation costs. It is also no great help just to blame the leadership ("*poor motivation is lack of skilled leadership, not a lack of desire within people*", Whetton *et al*, 2000).

Asakawa & Lehrer (2003) studied formal innovation management between different branches of multinational companies, concluding that new formal knowledge (i.e. not diversity innovation) can quickly be raised to executive levels then 'pushed' to other groups by intermediaries employed specially for this purpose. A similar study of IT specialists at one multinational company Lagerström & Andersson (2003) concluded that costs were significant, including a dedicated intranet, frequent teamwork weeks and frequent co-ordination meetings. Neither of the above two models are relevant for SMEs.

It appears academically accepted that teams composed of individuals drawn from diverse backgrounds have advantages over teams composed of individuals drawn from similar backgrounds (Rochford & Rudelius, 1992). This has been variously speculated to be due to a broader knowledge base and/or cross-fertilization of ideas (Damanpour, 1991; see also the classic paper by Aiken & Hage, 1971). However these results have hardly been turned into practice in SMEs – perhaps TQM is the nearest there has been to an application. These results have also

unfortunately been eclipsed by the ‘championing’ idea (see 2.3.4), which has been much more compelling to senior managers in large companies.

In her 2003 paper, Sylvie Chevrier explores several strategies for diversity management (N.B., this may not be the same as managing diversity innovation) and concludes that the only help may be "... *that a kind of cultural mediator helps the cross-cultural team in deciphering each other's system of meaning and constructing acceptable compromises* ..."). This may be acceptable (as well as needed and, according to the data, long overdue) for large enterprises like company F, but employing extra staff for this purpose is financially simply not an option for organisations the size of companies A, B, C, D and E. However, insomuch as e.g. company C is in an immature market, then they presumably do not have as much need for it (as supported by the data presented here).

Therefore further studies are needed on the cost of accommodating (and managing the innovative input), of highly qualified CEDs into working environments.

5.1.5. Short conclusion

Broadly speaking, education can be broken down into Generalist, Cross Disciplinary and Specialist. The data presented here supports the view that workplace innovation is promoted by variety amongst Specialists. However meetings between two (or more) types of expert often results in communication difficulties. To express this in terms of TC theory, the transaction costs for communication are high. This is illustrated below.

I was once present at a meeting between a database programmer and an expert in bovine disease who, together with a specialist in animal transport, wanted an Internet based information system made. Before the meeting the veterinarian said they had a ‘database’, which turned out to be a stack of papers, and the transport person had a ‘program’, which turned out to be an activity timetable. Clearly the database programmer and I had quite different conceptions about what databases and programs are. I am sure that most professionals have had similar experiences.

Therefore workplace innovation is at its most simple (and powerful) when communication problems do not exist, where the two or more specialists are literally embodied within the same person. That is, when the transaction costs for communication costs are zero. One prominent group of such ‘multiple specialists’ are CEDS, who sometimes have a rich and varied experience and a wide variety of qualifications. Thus they may become expert and creative problem solvers and innovation nuclei. The difficulty for such CED innovators is persuading sufficient change agents to help getting the idea up to the decision making stage (see 2.3.3 and the DoI theory stages shown in 2.2.3).

Trickle-down appears to be confined to mature market situations, where CEDs are almost always extraneous to the dominant consensus group. Indeed it appears to be absent only in companies working in highly innovative immature market situations. A quick glance at the literature reveals the generous use of terms like; ‘innovate organizations’, ‘team working’, ‘loose structure’ etc., but these are vague catchall terms. One interesting specific question for further research is, is Trickle-down caused, or aggravated by, the lack of sympathetic change agents? That is, are the CEDs identified here as innovation nuclei so different in culture and personality that communication between them and the ruling consensus group – usually the strata of middle management - has broken down, and thus the company is unable to fully use their innovative talents? Interestingly, the innovative CED is often able to successfully enter the business market as self-employed or as an entrepreneur (see Werbner, 1999, for a review of this well-known effect, often called ‘ethnic entrepreneurship’) and it could be speculated that this is possibly provoked by rejection by companies in the host country

Cross-cultural management is a theme well beyond the scope of this work, but if management practices are embedded in national cultures (Hofstede, 1980), then the employment of ‘cultural mediators’ (Chevrier, 2003) may be a promising point of departure for large organizations. Several other authors (e.g. Leonard & Swap, 1999, Cook, 1999) have also come forward with experimental ideas, but again, without relevance to SMEs involved in Internet B2C e-commerce.

5.2. Regarding Internet marketing

It is a chilling fact that the selection of popular 'guru' predictions cited in this work, stemming from 1997 to 2003, have been proven not only to be wrong, but actually seem to be almost diametrically opposed to reality, at least as far as B2C SMEs are concerned (see the abstract for a concise list).

Clearly believing such predictions could significantly raise the switching or entry costs for the unaware, and SMEs are especially in danger, due to their:

- Typical lack of detailed knowledge
- Inability to hire 'real' consultants to help them
- Precarious capital situation if mistakes are made

5.2.1. Aligning Internet marketing with core competencies

It is a widely recognized dictum that companies should not shoulder tasks that are not compatible with their core competencies (Quinn & Hilmer, 1995). This view would appear to be supported by the present study.

- **Company A:** Used diversity innovation to 'expand' their core competencies, a strategy which worked well until the limits were overstepped (innovation A11), i.e. they brought themselves into the danger zone when they, as a travel agent, started performing large-scale in-house software development.
- **Company B:** Since the core competencies were so narrowly defined (astrology), this case company can hardly be discussed in this respect.
- **Company C:** Internet and Internet marketing are well-aligned with this company's core competencies (e-learning).
- **Company D:** Theoretically this company possesses parallel competencies, but unfortunately the early hostile take-over of this company prevents a comparison.
- **Company E:** This company was not deeply involved in Internet marketing and thus can hardly be discussed in this respect.
- **Company F**: Although this company possesses a large IT department, it is hardly involved in Internet matters and developments are steered by the Press Office. In January 2006 company F will launched a new Internet presence, its 3rd major overhaul since 2000, at a cost of over 1 million GBP. It appears that Internet marketing is well outside their core competencies, they are

unable to use diversity innovation – or even their own resources – and thus Internet is an extraordinarily expensive venture for them.

This is discussed further in 6.4.

5.2.2. Cooling off in Internet marketing strategies

It is doubtful as to whether any of the (still existing) companies participating in this study are trying to better their search engine ratings (by e.g. filling up their meta-tags with popular keywords) or trying to indiscriminately drive Internet traffic ('requests' or 'hits') to their sites.

- The original success experienced by Company A – as first mover – is no longer so apparent due to dilution of its market share by larger late-comers. Company A has recently been experimenting with 'sponsored links' on Google.
- Company C has tended to supplement its marketing using newspapers (print), but only 4% or clicks came from those countries where the adverts were brought (see the statement by 3-C in 4.1.3.3). Company C has now (December 2005) completely redesigned its web-offering, streamlined many of its courses and is experimenting with opening small offices in target countries to try to get closer to the customer.
- Company F relies on state portals.

5.2.3. Short conclusion.

Success in the adoption of Internet channels & Internet marketing appears to correlate well with core competencies. However, it is too naïve to say that those who know about it, do it well. Furthermore the vast majority of SMEs are either relatively ignorant, or, at best, amateurs in the field. Thus the factors involved in the adoption and use of IT & Internet marketing in SMEs appears to be a fruitful field for further research.

6. Conclusions & future work.

Traditionally immigration has been considered in purely demographic and economic terms. For example Borjas (1993) states *"... the entry of immigrants ... produces a slight increase in the income of US natives overall* ..." and goes on to use the Harberger Triangle (Harberger, 1964, for review see Hines, 1999) to estimate an increase in the real income of natives due to immigration to be about 0.1% (roughly 5 billion US dollars in 1993). Although Borjas (1993) goes on to state that "... *not everybody benefits equally ... workers with competing skills lose, while owners of land and capital gain* ...", however the results presented here show that certain immigrants, highly-qualified (perhaps multi-skilled) CEDs can make outstanding contributions to SMEs in immature markets in terms of innovation – indeed – it is well known that innovators are often 'outsiders'. Indeed, innovators with non-traditional backgrounds - or those who were not appreciated in older, established, companies - may often be found as founders of new companies. Innovations may also come from another nation "*with different circumstances or ways of competing*" (Porter, 1990).

SMEs in the Internet 'entrepreneurial cluster' are highly dependent upon innovation to survive. None of the case companies described here depended on inventive innovation, but an analysis of everyday innovation showed that they, to a very high degree, used a under-researched category of innovation springing from diversity (see figure 6, in 2.3.1) as summarized below in table 20.

Type of innovation >	**Invention**	**Creativity**	**Diversity**
Company A	No	Normal	Medium
Company B	No	Normal	Low
Company C	No	Normal	High

Table 20. *Levels of use of the three types of innovation amongst the three case companies*.

The diversity involved in workplace innovation is promoted by variety amongst work disciplines promoting inspiration. This could be e.g. the meeting between different people where they are specialists in different fields. The problem with such meetings is that the two (or more) types of expert have difficulty understanding each other. Therefore workplace innovation is at its most simple (and powerful) when communication problems do not exist, i.e. where the two or more specialists are literally embodied within the same person, a so-called 'multiple specialist'.

One prominent group of multiple specialists are some CEDs, who have often been forced to take several specialist educations, to adapt, be flexible, innovate and show self-responsibility and initiative. Long after this

study started, other bodies, for example the EU (EC, 2003), came to similar but fuzzier conclusions without really knowing why ("*Companies who implement diversity policies - that is policies that seeks to encourage a mix of races, sexual orientations, religions, physical disabilities, ages and sexes within the workplace - can expect benefits in the short and long term... short and medium term benefits, such as improved cash flow through resolving labour shortages, opening up new markets, reducing costs and improving performance in existing markets, as well as long term benefits, including building a differentiated reputation with key stakeholders and customers and improving the quality of human capital*." (EC, 2003).

It should be noted that not all innovation nuclei were CEDs, and that not all CEDs were innovation nuclei. However CEDs were highly prominent under innovation nuclei. SAHs are embedded in the same cultural context and thus tend to share certain world-views (Alderfer & Smith, 1982); including ways of co-operating, managing conflicts, accepting authority *etc.,* and they often form the leadership consensus group. Unfortunately CEDs are normally far from the consensus group (as defined by A-I theory, Kirton 2003) and thus they encounter great difficulty in persuading sufficient change agents to help getting their ideas up to the decision making stage.

Case company B could not use diversity innovation to any significant degree and went bankrupt. Case company C is a young start up in an immature market and welcomed diversity innovation. Company C is on the classical path to success; it started selling three months after opening for business, it reached break-even after 18 months and today, over 5 years since starting, returns ever-higher profits in a market characterized otherwise by bankruptcies, mergers and acquisitions, *etc*.

Company A capitalised on a stream of smaller innovations stemming from diversity, but these successes spurred a Trickle-down effect, where members of the consensus group (as defined by A-I theory) were forced into premature responsive action, resulting in several expensive mistakes which threatened the life of the company. Today, however, case company A is still surviving in a mature and highly competitive market where most comparable firms have gone bankrupt or been subject to take-overs.

6.1. Conclusions in the light of Human Resources Management

As presented in 2.1, it is widely believed that a range of determinants interact to provide innovation, often cited amongst these are ‘demand pull’ and ‘technology push’, invention and creativity. However the present work illustrates that a further major source of innovation – here called ‘diversity

innovation' – may outweigh these others. This 'diversity innovation' can only be accessed if the proper competitive-collaborative environment is present.

This effect has been known for some time, for example Allen (1977) showed that the key players in the Apollo program were those who were both in formal information management positions, but were also well connected in the social structure of the organization. It is relatively easy to measure successes, but what proportion are they of the whole? Thus the present work also focuses on the under-researched converse case, why good innovations don't 'make it'.

Clearly all levels of management, and especially the Human Resource departments, should be very aware of the above-mentioned Trickle-down effect (see 2.2.7), including that, if the environment is wrong, then any innovations will be stillborn and that the company will not profit from them. Despite its obvious importance, this is a topic notable by its complete absence in the standard Human Resource Management textbooks (e.g. Bennett, 1997, Dessler, 1999, Greenberg & Baron, 2000, Schultz & Schultz, 2002), although Teece (2000, p 50) mentions *"... the firms human resources and capital and the mechanism by which firms attract, train and hold first-rate people have not been deeply analysed ..."* and Legge (1989) has noted that cultural integration leads to increased production.

However the inexorably increasing numbers of 'lifelong learners' and people in 'second career' must soon make this a subject that Human Resource Management no longer can avoid. Host organizations should not be overawed by innovation nuclei, be it second-careerists, sometimes foreigners, with huge and varied credentials, but rather welcome them into their system and, "*above all, avoid bludgeoning them to conform to a system which was never meant to accommodate them*" (Drucker, 1999, p 188-195).

Human Resource managers should also realise that creating the right environment for CEDs, and for 'lifelong learners', is essential. As Maslow (1943) pointed out, human motivation comes from the desire of individuals to satisfy their needs. Firstly these are basic physiological needs to satisfy hunger, thirst etc. Once satisfied, these needs no longer operate as primary motivators, and people concentrate on the next need in the hierarchy. Next come safety and protection needs, then the need to belong, then the need for esteem, followed finally by the need for personal growth and development. Clearly well qualified foreigners fleeing their country of origin to a new host country may drop from high levels to lower levels, as illustrated below:

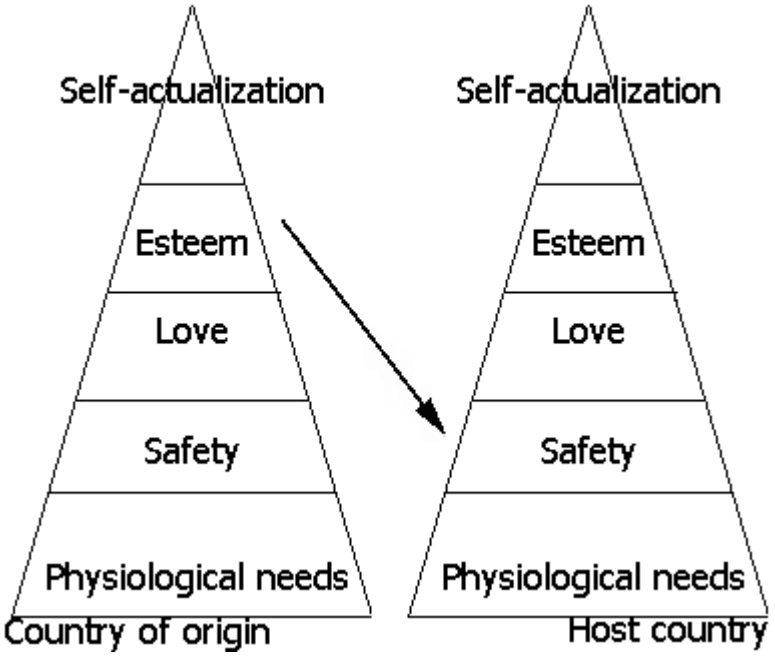

***Figure 31**. Regression in motivation upon moving country.*

Equally clearly these people, many of whom may be innovation nuclei, will feel a deep need to over-achieve and regain their lost position of esteem etc. Mechanisms must be in place to allow them to do this; otherwise the vital energy will be lost. Interestingly, Borjas (1993) makes the point that in Sweden, the highly skilled are penalized by tax policies and become part of the nomadic 'brain drain', whereas in e.g. Mexico, the highly skilled are rewarded well; thus the nomads are over-proportionally the poor-skilled. However immigrant unemployment is generally high and their wages are generally lower - indeed wage parity with other US citizens can take decades to achieve. In the meantime it can be assumed that many immigrants find jobs, not with large corporations, but with SMEs.

In the 1970s, smaller companies were held up as being viable alternatives to larger companies, but the 'happy ship' scenario developed by Ingham (1979) and others has since been questioned by academics whose research included not only the managers, but also the managed (e.g. Ram, 1994). This led to the 'bleak house' scenario, supporting statistics from work tribunals and generally exposing widespread poor employee relations. Clearly the 'ruling consensus group' problem is manifest in several areas! However it is not sufficient to simply blame the management (or, more specifically, the middle management, as in Whetton *et al*, (2000), but to seek plausible strategies which can be applied to SMEs (ideally not only SMEs) and which are likely to yield data enabling scientists to assess if the strategy has had a measurable success.

The results presented here support an argument for a 'third estate' in Human Resource Management (assuming here that HRM departments only exist in established companies i.e. in a mature market situation). This can be put into a developmental context as follows:

1. Traditionally the personnel department (as it was called then) support employment of new employees (interviewed exclusively by different managers) by filling out the forms and other mundane tasks, as well as completing the everyday employee-related paperwork. Thus the '**first estate**' of HRM was/is to regulate relationships between the company and the law.
2. In more recent times Human Resource managers sit on interview panels as part of the regular comparison between the competencies that employees (including prospective employees) possess and the company's competence needs. Furthermore, if needed, the Human Resource department will arrange that competencies can be acquired or upgraded. Thus the '**second estate**' of HRM involves co-ordination between the company and its employees.
3. The 'third estate' is more complex and involves regulating relationships between persons and groups within the organization. Already today some extreme aspects of this relationship, e.g. allegations of 'mobbing', may come to involve the Human Resource managers, but these tasks need to be deeper and much more care should be taken if a company is to use 'diversity innovation'. This type of thinking hardly exists in the UK/US world and traditionally such tasks, where practiced, have been the domain of e.g. the continental trade unions, and are factors widely believed to have played a part in the "*Wirtschaftswunder*" of the 1960s. Thus can '**third estate**' HRM act as "*the sympathetic change agents*" referred to in 5.1.2?

6.2. Conclusions in the light of corporate enterprise (intrapreneurship).

Some established companies in mature markets consciously try to remain entrepreneurial by harvesting and using innovations and ideas from employees. This process is called 'intrapreneurship', or 'corporate entrepreneurship' and a corporate entrepreneur is therefore a person who initiates innovative changes in mature companies. Chandler *et al* (2000) report that mature companies actively supporting intrapreneurship may have an advantage in times of rapid market change, and thus the type of innovation involved may well be diversity innovation (or at least, not invention innovation). Lessem (1987) hypothesised that in order for intrapreneurship to function a strategic 'champion' (sometimes called an 'enabler') is needed to protect the new innovation, and that this protector

must have well-schooled change agents in place if the innovation is to successfully be realised (see 2.3.4 for a critique of 'championing').

The similarity between these findings and the work reported in this thesis includes that an innovation acceptance mechanism does not exist in the companies reported here as being not able to accept diversity. Here the innovation is bottom-up diversity innovation and it is postulated that the innovator is outside the consensus group and thus does not have access to sympathetic change agents. This could be seen as an extension of the behavioural focus as expostulated by Man & Chan (2002) "*person-to-person, group-to-group interactions based on co-operation, communication and trust*". Conversely, in Lessems view, change agents are explicitly activated as a result of a top-down change. Either way, person-to-group upwards, or top-down, it could be that change agents are an essential link, and that the one-way, top-down process envisaged by Lessem (1987) should more properly be considered as a two-way 'innovation pipeline'. If this is the case then the results presented here show that the two-way effect should be in place (or put in place) in companies that are much smaller than hitherto studied, since the 'trickle-down' effect, in companies in mature markets, was already evident at company size 120 employees (Company A).

6.3. Conclusions in the light of other theories and practice.

6.3.1. Awareness of innovation in SME development

Firstly it would appear that the present definition of SMEs could be revised to a more fine-grained structure to take their economic development into account. The present micro-organization (1-9 employees) could reasonably be modified slightly to 0-9, to include part-time owners. The definitions of small organizations (10-99 employees) and medium-sized organizations (100-249 employees) are clearly static, but the developmental stages could be revised into:

1. Flat small enterprises: (10-50 employees). In this area diversity innovation works and flat structures are sufficient.
2. Managed small enterprises: (51-120 employees). In this area diversity innovation is no longer arithmetically possible and a professional canalization (management) should be put in place.
3. Innovation-aware small enterprises: (120-249 employees). At size 120 Trickle-Down becomes a threat and enterprises approaching this size range should be especially aware of the dangers.

6.3.2. Innovation in IT practices

The reasoning behind introducing and being aware of innovation is that it appears quite obvious that more optimal results can be achieved if all ideas from all the involved persons are included. Indeed several approaches with respect to IT/Internet have been developed (e.g. Soft Systems Methodology, Checkland & Howell, 1998; Information Ecology, Davenport, 1997). It is not the intention of this work to paraphrase the well-known findings of Participatory Design (e.g. Kensing, 2003) or Computer-Supported Cooperative Work (e.g. Grief, 1988), but the problems encountered in these areas (the 'Innovation Gap') were similar to those reported here, including that:

- The innovative person, if a CED, is disregarded as being low status, or
- Lack of technical expertise amongst the decision-makers: The idea is simply not understood.

For genuine communication to take place, a sound mastery of technical fundamentals is needed (Kapor, 1991; Mellor, 2003b), and indeed Maturana & Varela (1987) comment, "*Communication depends on not what is transmitted, but on what happens to the person who receives it*". Other authors, ranging from the classical (e.g. Shannon & Weaver, 1963) to the recent (e.g. Mellor & Mellor, 2004) also echo this sentiment. However exactly this technical understanding was lacking within the leadership of especially companies A and B (see tables 12 and 19), as well as being fairly comprehensively absent in the leadership of company F. To put it differently; to succeed, core competencies must include technical skills and leaders ignoring these are simply (wrongly) re-defining their/their company's core competencies to exclude these.

This would lead to the postulation that transition costs for IT projects would be highest in company F, followed by company A and then company B (although in the case of company B, this would have to be reckoned in % rather than currency, due to its small size) then company C being most cost-efficient. Indeed in 2005 it would appear that company F is still paying 'top dollar' for mediocre solutions (see 5.1.2), whilst company C, even without state support, is one of the few private e-learning colleges to be making a profit.

6.3.3. Knowledge management

It may seem surprising that otherwise-entrepreneurial management is often able to completely overlook innovative people/ideas within their organizations. The answer here lies probably, as stated before, within the 'consensus group' construction of A-I theory (Kirton, 2003), although

within larger organizations, deliberate belittling of potential intrapreneurial competitors (as in case company F) may also play a role. Either way, it is not easy to see how successful communication, participation and the implied democracy can be achieved. But without it, innovation cannot be introduced, thus transaction costs will increase and the organization will perform more poorly than it otherwise could. This realization has led to the proposal that formalized knowledge 'depositories' could be made in organizations. However difficulties include:

- It is difficult to formalize fragmented knowledge (Boisot, 1998).
- Individuals are unwilling to formalize their hitherto personal knowledge assets.
- Technical difficulties in retrieving e.g. keyword-identified knowledge, especially in its proper context.

In fact I am presently unaware of any clearly and doubtlessly successful IT-based knowledge management project, process or system.

6.4. Internet marketing – are the conclusions holding up?

Below are the conclusions listed in the Abstract (here underlined), together with a 2006 commentary:

- ✓ Market transparency on the Internet is quite restricted and open to manipulation by suppliers. This conclusion was based on the lack of consumer transparency proved by conventional search engines, as well as the business strategy described in innovation A5. Actually innovation A5 is similar to a case reported around the same time (i.e. probably happening 1998 or 1999), where finding normal-price flights on an airline web site was quite easy, but finding the cheapest flight was "*extremely difficult*" (Moon & Frei, 2000). The increasing hyper-fragmentation of markets since then (Kotler & Trias de Bes, 2003) has meant that 'hi-jacking' strategies, as expiated (and indeed used as a first-mover advantage) by Company A and described in Innovation A5, have become less possible. As detailed in 4.1.1, Company A was an early mover in Internet marketing of its travel products and thus was able to secure competent employees at a time – from 1994 to 1997 – when individuals with such qualifications were scarce. As detailed in 4.1.1.4, they used their knowledge to provide content for two portals - rejsefeber.dk and MrJet.com. Especially rejsefeber.dk was an early mover and indeed won the Danish governments 'e-commerce prize' in 2000. The business model used by rejsefeber.dk was based on a commission model i.e. they took a % of the price when a travel package was purchased. This was an insightful

business model, because the main type of product sold through such a portal would be relatively standardized (in line with ICDT theory) and thus relatively cheap, which again is in line with customer behaviour in finding bargains, as well as keeping commission fees low for participating travel agencies.

In May 1996 a different portal opened, Company T. Company T boasts that it "*collects the (Danish) travel branch on the Internet, such that consumers can quickly and easily find travel information*". Company T started by approaching the Association of Danish Travel Agencies ('Danmarks Rejsebureau Forening'), acquiring a list of all their members and publishing this, with links to the various members web sites, on their web site. Agencies not wishing to be on this list have to contact Company T to be removed (although few do). However the content, up to 2004, was provided only by agencies paying a rather high flat fee. Despite this and very vague 'small print' wording on the web site, Company T has in the years 1996-2004 enthusiastically propagated the impression (and this has been repeated in TV) that all products from all providers can be found and compared on their web site, which was actually not the case. Thus Company A 'packed' independent portals to limit market transparency (note the portals themselves were aiming to increase transparency). However Company T, as a portal itself, used a strategic alliance with the branch association for exactly the same ends (market obfuscation).

Thus, when small and specialized markets are involved, market transparency can be manipulated by a variety of means. However it is getting even more difficult for consumers and today companies needing more virtual information space (VIS), or simply trying to sell an expensive product, have partly or wholly moved to a policy of deliberate confusion. A good example is the Telcos, where it is nearly impossible to properly compare the prices for mobile telephony in the UK (Prof Les Hatton, Kingston University, at a seminar held on 10.02.2005 and entitled "Consumer price obfuscation and fuzzy global optimisation", see www.leshatton.org/Documents/Kingston-10-02-2005.pdf).

- ✓ <u>There was no evidence that URL submissions to web search engines will improve sales.</u> It is heartening to see that the subject of simple bulk submissions has been quietly dropped in a recent textbook on e-business (e.g. Groucutt & Griseri, 2004). Google has launched a partial solution, which could be taken as a partial admission of the failure of 'classical' search engine function. Called "Google AdSense" it is designed to increase relevance by choosing paid ads that are related to the search being undertaken, combined with monitoring ad performance with customisable online reports that offer details like the number of page impressions, clicks and

click-through rate. Google claims that this enables advertisers to track the performance of specific ad formats, colours and pages, and thus spot trends more quickly and easily than previously.

- ✓ There was no evidence that communication between the company and those clients requesting information, improved sales. There was no evidence that 'chat' or other peer-to-peer web facilities improved sales. New ideas based upon latest technology may require the involvement of customers, or selected 'pilot customers' in assisting the supplier of a truly new and effective product (Chaston, 2000); however this situation does not apply to any of the cases reported here. Significantly the Shell oil company has created a forum for customers (www.shell.com/tellshell) but it is doubtful as to whether it has paid for itself in terms of increased sales of petroleum products. However, as noted by Kotler & Trias de Bes, (2003), power has been transferred from manufacturers to distributors, and channels recently show signs of being concentrated in their hands (e.g. www.tesco.com), but some, like www.avon.com, are trying to lever the brand to become an expert portal. It is not possible at the present time to evaluate when/if such strategies will lead to financial success, and for whom.

- ✓ Returning customers are few and it is their satisfaction with the product, not with the web site, that determined if they return. This appears more and more obvious, especially as professionalism in web site production (content management systems etc) increases and becomes uniform, leading to fewer really bad web sites.

- ✓ A very high background rate of random hits, as opposed to customers, makes analysing web statistics a fruitless task. Conversely sales statistics can be used to prioritise which products are given good web coverage. The marketing hype surrounding web log analysis is cooling off. As an example, in a recent major book Berry & Linoff (2004) state that web log data is only one of 17 sources of information for data mining and further state that "...*determining which ... marketing message stimulated the response can be tricky, it may not even be possible* ..." (Berry & Linoff, 2004, p 109).

- ✓ Bulk e-mailing of offers may be a less successful method for achieving sales than a web site is. Companies are faced with the dilemma that Product Life Cycles are getting shorter, so how can they inform their customers that changes have taken place, when the customers (as least as far as e-mail is concerned) are suffering from information overload and general 'relationship marketing fatigue' (Arnott & Bridgewater, 2002)? Indeed (Kotler & Trias de Bes, 2003) note: "*Today only one out of 10 sales promotions will*

obtain a response ratio higher than 5%, while some years ago this was the minimum you could expect ...".

- ✓ <u>On-line payment not a great advantage because third-party payment gateways and even the company bank, mostly fail to support the merchant.</u> General recognition of the repudiation/non-repudiation problem (see e.g. Laudon & Traver, 2001), has led to increased popularity of measures in the small payment area (e.g. PayPal) but this may only be a stop-gap, as larger players have recognized the problem and may be gaining support for their pilot products (e.g. mondex, MS-passport).

- ✓ <u>Intermediation amongst SME partners lacks adequate support, but dis- and re-intermediation is not rapid.</u> The case companies described in this work still retain their traditional suppliers. Furthermore, ERP systems, once hailed as the essential killer technology in intermediation issues (e.g. described as "*buzz word*", Messerschmidt, 1999; "... *the hottest segment of the e-business arena* ..." Vizard, 2000) has not had the expected breakthrough w.r.t. small businesses. Indeed in 2004 Claus Thomsen of RAMBØLL Management speaking about SMEs states "... *Enterprise Resource Planning (ERP) systems are hardly applied in the sector* ..." (Thomsen, 2004). However, marketing for large companies in an off-line environment (e.g. supermarkets) is a hyper-fragmented affair, where distributors own the shelf space and decide which producers to favour. Producers respond by introducing more brands both to appeal to smaller segments, as well as to combat distributors (since a high discount on one brand may compensate for a lower one on another from the same portfolio). Although SMEs are not presently in this situation, it remains to be seen how far hyper fragmentation will push along the value chain, and to what extent hyper fragmentation can affect such services.

Thus it appears that the 2003/4 conclusions are holding up well.

6.5. Future directions.

The following is a list of some of the possible future research directions, which this work has uncovered:

- The importance of diversity innovation should be confirmed by research in independent branches, e.g. biotechnology.
- Trickle-Down should be investigated in SMEs showing clear differentiation into mature *versus* immature markets, invention *versus* diversity innovation and in transactional marketing *versus* relational marketing.
- It should be specifically investigated if Trickle-down is caused, or aggravated by, the lack of sympathetic change agents (or reversing them into resistance agents) in organizations.
- Protocols should be designed which are likely to yield data enabling scientists to assess if a HRM 'third estate' strategy is practical and if it has a measurable success.
- Further studies are needed on the cost of accommodating (and managing the innovative input), of highly qualified CEDs and similar individuals (e.g. 'second careerists') into working environments.
- It should be possible to confirm or deny the postulation that transition costs for IT projects should be higher in companies (SMEs) working in mature markets and where 'innovation pipelines' are not in place.

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