Internet-ability – The feasibility and ability of information technology adoption by SMEs

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This paper deals with the adoption of new technologies by SMEs. Some organisations are better able to use the advantages of these technologies companies or organisations, and this often varies according to company size. Some firms are more able to translate existing processes into cost-efficient, customer-friendly, faster processes by using these newest information technologies. Certain company processes are more easily integrated with these new technologies than other processes.

To give support to the matter of internet-ability, the main conclusions of a survey are reported. These results illustrate how organisations possibly vary in the strategic drivers, pressures, barriers and opportunities of adopting new technologies depending on their size.

1 Introduction

While the gravity of the traditional laws of economy has brought businesses back to earth, the Internet did introduce some new business rules. Speed became much more important, leading to a shorter development life cycle for products and services, faster interaction with customers and other partners. Knowledge management grew in importance in this information-oriented society. Partnerships became increasingly important in the networked society. In our 24 hours/7 days economy, management can now monitor with Internet-based software in an on-line real-time way the relationships between their products, services and customers.

Michael Porter wrote that "the established companies that will be most successful will be those that use Internet Technology to make traditional activities better and those that find and implement new combinations of virtual and physical activities that were not previously possible." (Porter 2001)

But while some companies – be they small, middle-sized or large – are adopting Internet-technologies without a lot of problems, other firms do not succeed in implementing or integrating e-Business within their existing organisation. For that reason we tried to discover some of the criteria which will enable or attract an organisation for Internet-activities. To understand *the Internet-ability issue,* our research question is as follows. *Within a given business definition* (Abell 1980), *the customer life cycle and its related information processing activities determine the potential and reasonable use of Internet-technologies.* This position is illustrated with the results of a survey taken from Belgian small, middle-sized and big companies in 1999 and 2001.

2 Opportunities and potential of the Internet

This study starts with considering the elements of the "customer life cycle information process" as described by Ives and Learmonth (1990). The customer life cycle is not a chain of individual transactions (order, payment, etc.) but a strategy for managing the relationship with the customer. Information technology can provide the ability to

identify and track individual customers, to monitor service levels by company representatives and assist customers in specifying, acquiring, fixing or returning products. Information exchanges are occurring at different moments of this cycle.

Pro-active organisations can use Information Technologies to improve customer service strategies in three ways: *personalising service*, *augmenting service* and *transforming products* (Ives 1990). We will look at these three aspects from the customer's perspective, but the same can be done from the supplier's or other actor's perspective.

2.1 Personalized services

Customers wish to be approached on a personal basis, and appreciate tailor-made information. Most of the time, customer-related information – if it exists – is scattered across the company in branches, divisions, sales outlets, and their respective data warehouses. To manage this information it is necessary to consolidate it at the appropriate organisational level for each single customer.

A complete information system can be build around a customer in order to improve the business relationship. The information can be used to anticipate the customer's specific needs. With new technologies one can implement one-to-one marketing. Personalisation – building customer profiles and managing marketing tools in order to attract, please and eventually keep the customer – proves difficult to implement in an organisation because of the legacy of the existing, often badly integrated IT-systems.

2.2 Augmenting service

Service augmentation involves differentiation of products or services by providing the customer additional support. Customer support targets the various activities customers will be engaged in as they acquire and use a product/service. Every customer goes through a life cycle when he or she needs the product/service. There are four main phases in the customer life cycle: requirements, acquisition, ownership and retirement (figure 1).

While this categorisation can vary, the essential message is that there are different stages in the buying process of a customer and in the selling experience of a supplier. A company can be specialised in one activity of the life-cycle, e.g. logistics.

This concept of the customer life cycle corresponds with Michael Porters "value chain", which divides a company's activities into the technologically and economically distinct business activities. If a company wants to gain competitive advantage over its rivals, the company must either perform these activities at a lower cost, or perform them in a way that leads to differentiation and a premium price.

Chan Kim's and R. Mauborgne's "buyer experience cycle" (2000) links the supply chain with the customer life cycle, and states that a customer experiences the consumption of a product or service through six stages (figure 2).

In every stage there are several aspects that leverage the utility level: customer productivity, simplicity, convenience, fun and image, risk and environmental friendliness. It is important for an organisation to only focus on some of these aspects. This is part of the business definition, which will be discussed in the following part.
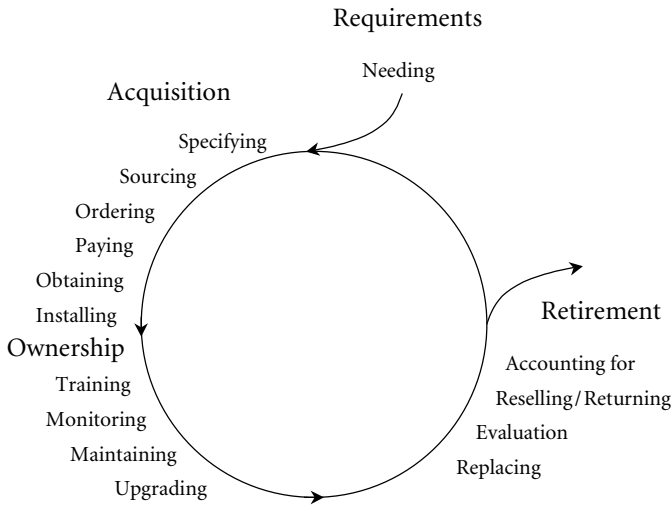
Requirements

Needing

Acquisition

Specifying
Sourcing
Ordering
Paying
Obtaining
Installing

Ownership

Training
Monitoring
Maintaining
Upgrading

Retirement

Accounting for
Reselling/Returning
Evaluation
Replacing

Figure 1: The customer Life-cycle (Ives, Learmonth 1990)

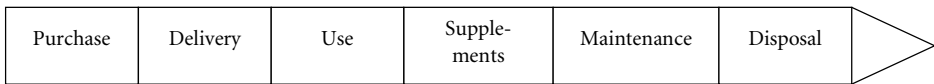| Purchase	Delivery	Use	Supple-ments	Maintenance	Disposal

Figure 2: The buyer experience cycle (Chan Kim, Mauborgne 2000)

Personalisation and service augmentation are powerful strategies that can differentiate a company's products and improve its customer relationships. The transformation of the business goes beyond mere product differentiation to develop new business practices. In extreme, it results in a fundamental shift in the nature of an industry.

2.3 Transforming your business

Michael Porter (2001) warned for the fact that dot.coms and other Internet players talk a lot about 'business models' instead of talking in terms of strategy and competitive advantage. The definition of what constitutes a business model can be very murky. Most often, it seems to refer to a loose conception of how a company does business and generates revenue. Yet simply having a business model is a low standard to build a company on. It is clear that it is not enough to define a business model without setting up founded business processes combined with a realistic strategic vision. In the next chapters, the word 'business model' is used from this critical point of view.

Treacy and Wiersema (1993) proposed that every organisation has to redefine its business model because the values of the customers have changed. Whereas in the past customers used to judge a product or service on the basis of some combination of quality and price, today they have an expanded concept of value that includes convenience of purchase, after sales service, dependability, and so on. According to Treacy and Wiersema, companies should focus on delivering superior customer value in line with

only one of three 'value disciplines': operational excellence, customer intimacy or product leadership. By keeping a narrow focus on only one of these dimensions, while fulfilling the minimal requirements (i.e. the industry standards) of the two other dimensions, they can become champions in one of these disciplines and take leadership positions in their respective industries.

The precise completion of these disciplines will depend on the nature of the product, the customer segments a company wants to serve and the customer function. These three characteristics are the building stones of the business definition according to Derek Abell (1980). One element of the nature of a product is whether the product is tangible or intangible. Other elements of the nature of a product/service – whether there is a good 'fit' between the customer and the product – can be linked with the concept of customer intimacy of Treacy and Wiersema. The strategy must also be geared towards the corresponding desires of the customer. In this respect, customer segmentation is very important to deliver the right kind of service in order to achieve maximum customer satisfaction. The purpose of a product for the customer and the expectations a customer has when buying a product or service is the last criterium that is mentioned by Derek Abell.

Burnstine (1980) classifies businesses models according to how they answer on seven fundamental questions concerning the processing of a customer order:

1. Is the product made to order or provided from stock?
2. Is the product tracked after purchase or not?
3. Is the product provided now or in the future?
4. Are customers profiled or stereotyped?
5. Is the product sold or rented?
6. Does the producer bill or take cash?
7. Are terms stipulated or negociated?

Most businesses will fall into no more than 4 or 5 of the 128 resulting business types. The seven questions can help to challenge the business model assumptions of a company and create new business opportunities.

All these concepts about the customer life cycle, business models, value chain, customer intimacy and information power are used to build the framework for the definition of Internet-ability. The next chapter deals with the criteria that have an influence on the attractiveness of doing e-Business.

3 Criteria for Internet-ability

All the concepts discussed in the previous pages form the basis of the search for criteria that influence the attractiveness of the Internet for a certain organisation. The concepts of customer life-cycle and the decision to opt for a certain business model determine the various criteria of Internet-ability. Every industry, organisation, process will be approached differently and the ability for using the Internet has to be examined for each process. On top of this – as is commonly believed in other domains – one can question whether this variety also exists between smaller and larger companies, concerning the use of the Internet.

3.1 Informational value

The level of *informational content* (as mentioned in 2.1) of a product or service is probably one of the most important factors that makes a product or service Internet-attractive. This depends on the nature of the product (tangible or intangible), and whether the additional cost for producing extra information is low or high. In every step of the customer-life cycle (pre-sales leads, contacts, offers or contracts; order fulfilment and the services during the delivery and finally the after-sales services), the information content plays a major role.

One element of *communication* is the *method used* by the organisation. Communication processes (with customers, suppliers, other parties) which already pass through information technologies (such as automated self-service) are more Internet-able than processes, where a physical contact with a collaborator of the organisation is required. The traditionally used media-formats (face to face, documents, oral, email) pose a technology integration problem, since the customers, suppliers and partners have to accept the computer-mediated interaction.

3.2 Business channel restructuring

Companies that in a previous life were mail order catalogue companies will forcibly and naturally evolve with the use of Internet-technologies towards an Internet-based mail order catalogue company. The word 'naturally' is quite important here, since the *distribution channel structure* is a complex subject in which mail order catalogue companies excel.

On the one hand, it can be an advantage when a firm has experience with direct sales, since this makes the transformation towards offering a catalogue on the Internet much easier. On the other hand, companies working with agents and intermediaries could have trouble selling directly to the end-customers since this can cause conflicts with the existing sales channels. It is very important to make good decisions and communicate them with the different partners to overcome this distribution channel problem. This is most visible in the PC- (Compaq versus Dell), insurance- (disintermediation of agents) and automobile-industry (dealers versus direct sales).

The intermediaries have to rethink their role if they want to stay competitive. They will have to add real value for the other partners in the value chain, or they'll be functioning in an ignored part of the chain.

The *potential for co-operation within the industry* or sector is very important when one plans to make use of the Internet-technologies. If organisations work together on different levels to reduce costs in the whole value chain, this can lead to co-operation in areas such as research and development, bargaining and buying power, setting up a common market-place.

Transparency of the market is another criterium that has an influence on the attractiveness of the Internet. A market with a lot of players and with imbalances in supply and demand (often maintained by a few bigger players in the market) is more interesting to transform with the introduction of an electronic marketplace.

3.3 Business process reengineering

If a company can combine certain existing business models or create new business models, it can generate revenue from different sources. One can use the *on-line auction model* or look for opportunities by setting up a common *marketplace* for existing retailers.

The *reach of a customer segment* has grown tremendously with the Internet. Exploration of certain niche-markets can at this moment be profitable because of the possible reach.

All of the criteria of Internet-ability mentioned above can be linked with the more theoretical concepts of the customer life cycle, business models, interaction moments, etc. The criteria give a view of the most influential factors that determine the attractiveness of the Internet. The article does not aims to give an exhaustive list of criteria, because there will be a lot more aspects that determine the Internet-ability, such as price, complexity of the product, regulation and security aspects, presence of human skills within organisations.

4 Survey results

In order to better understand the Internet-ability in Belgian companies, a survey was conducted over a period of time (1999–2001). Particular interest was paid to wether small and medium sized companies had another state of Internet use and readiness compared with larger companies (criterion: total employment lower (SME) and higher (large companies) than 500 persons).

4.1 Strategic e-business plan

It was found that, in 2001, on average 50% of the Belgian companies had already some sort of strategic e-business plan formally written down, while 50% had not (table 1a). In 1999 only 30% of the companies had an e-business plan.

1999 % companies *with* a formal e-business plan	*2001* % companies *with* a formal e-business plan
29 %	48 %

Table 1a: Companies with a formal e-business plan in 1999 and 2001

The amount of companies that find a formal e-business plan important rose from 62% in 1999 to 79% in 2001.

1999 % companies that find a formal e-business plan *important*	*2001* % companies that find a formal e-business plan *important*
62 %	79 %

Table 1b: Companies that find a formal e-business plan important in 1999 and 2001

If these results are split along the lines of *company size,* one finds that the small and medium-sized companies show an emerging, especially widening lag in their formulation of an Internet strategy (tables 2a, 2b). The lack of strategy formulation poses one of the major barriers for the adoption and implementation of Internet technologies in small and medium-sized companies.

	1999 % with a formal e-com strategy	2001 % with a formal e-com strategy
Small and medium-sized enterprises	26%	37%
Large enterprises	31%	55%

Table 2a: Companies with a formal e-business plan, according to company size, in 1999 and 2001

This widening gap can be better understood when asking companies' response on the importance of having such a formal e-business plan. Due to lower interest and/or lower Internet-ability there seems to exist a large gap between perception on the importance of such e-plan between larger and smaller companies.

	1999 % that find an e-com strategy *important*	2001 % that find an e-com strategy *important*
Small and medium-sized enterprises	47%	62%
Large enterprises	83%	94%

Table 2b: Companies that found a formal e-business plan important, according to company size, in 1999 and 2001

4.2 Strategic drivers

To develop a better understanding on the Internet-ability for these two groups in different processes (see customer life cycle as explained above) it was thought to be useful to make a deeper study on the drivers improving adoption or on the impediments or barriers hindering such adoption for smaller or larger companies.

The following tables bring us to the strategic reasons companies quote for adopting such an Internet strategy. In a study made in 1999 (Deschoolmeester e.a.) only a minority of Belgian companies felt that the adoption of the most basic Internet technologies, e.g. an online catalogue of products, would cut costs. The Internet was not really seen as a way to improve the bottom-line results of the company, and rather as a cost-raising investment that "had to be done". Rather, other reasons were seen as more important for the adoption of these technologies.

Six reasons are distinguished why companies would build an Internet business alongside their existing one: 1) cutting costs, 2) improving customer service, 3) differentiate from competitors, 4) improve collaboration with business partners, 5) improve their knowledge of the market, or 6) access new markets.

This CADIGA rule of thumb points to strategic drivers or thrusts that can be attained through the use of IT. The model is an adaptation made by authors on the basis of ideas from Porter (1983) and more specifically Wiseman (1985). It gives business management a list of motives why one should invest in IT.

CADIGA-rule for investing in IT

(C) Cost reduction / capital-control	A lot of companies implement an Enterprise Resource Program (ERP) to obtain a more productive procurement- and production planning. This way they can achieve smaller inventories of resources and finished products. They can also achieve a more optimal use of production-resources. Also, through more efficient information processing, smaller teams of purchasers and production planners can do more work.
(A) Alliances	Via Internet Web browsing the customer can place his order and buy a custom-made product. Also the cycle-time between sales-order and delivery can be drastically reduced. Web sites where these facilities are available can differentiate one's company from competitors which still follow the traditional way of selling.
(D) Differentiation from competi- tion	With the help of ICT companies can grow in size, in the number of business activities, or on a geographic scale. Besides quantitative growth this also entails qualitative growth whereby information is more accessible when it is needed, so personnel can be more "empowered".
(I) Information and knowledge / innovation	Having the right kind of information on the right moment brought to the right kind of decision-maker, is an essential task of all information management. If wisdom and experience are added to information, one gets knowledge. He who creates and shares the most knowledge with the help if ICT, and has a mentality of learning and sharing of knowledge among personnel will be a star player in the future. If companies want to have an image of being technologically advanced, ICT is one of the best means to achieve an image of being innovative. Some customers and suppliers prefer working with companies who prove to have a knack for innovation.
(G) organisational support of Growth	Integration and co-operation between the functional domains via central databases or co-ordinated activities in a integrated process are made possible with the aid of ICT. In an extended enterprise suppliers and customers can co-operate non-stop and in real-time thanks to the new ICT.
(A) Agility, flexi- bilty	To improve awareness on the role of ICT for the organisation, higher level management has to question itself on a regular basis on the relationship between potential and obtained results and the past or current and future ICT project portfolio.

In what follows it is analysed how these drivers are showing a different importance for a number of processes occuring in companies.

a) What benefits do companies expect from a 'gateway to market information (i.e. website) about the company'?

From the numbers in table 3a, one can see that small companies are eager to reduce costs via such a gateway, but large companies see it rather as a tool to improve internal or external collaboration and to some lesser extent also to improve customer service.

Benefits / Company size	Small companies	Large companies
Reduce costs	21,1 %	3,0 %
Improve internal or external collaboration	5,3 %	30,3 %
Improve customer service	26,3 %	39,4 %

Table 3a: Benefits expected from a Gateway to market information

b) What benefits do companies expect from an on-line customer self-service?

Both small and large companies think of on-line customer self-service as a cost-saver. However, larger companies see it also as a way to differentiate themselves towards competitors, to improve internal and/or customer collaboration and to improve customer service. Small companies think they will improve market/customer knowledge with this application, whereas large companies don't expect benefits in this area.

Benefits / Company size	Smaller companies	Larger companies
Reduce costs	37%	36%
Differentiation towards competitors	26%	39%
Improve internal or external collaboration	16%	24%
Improve customer service	42%	72%
Improve market/customer knowledge	21%	3%

Table 3b: Benefits expected from an on-line customer self-service

c) What benefits do companies expect from giving authorized access to preferred suppliers?

Clearly, larger companies expect a lot more benefits from giving authorized access to preferred suppliers than smaller companies.

Benefits / Company size	Smaller companies	Larger companies
Reduce costs	26%	39%
Differentiation towards competitors	11%	27%
No benefits	31%	12%

Table 3c: Benefits expected from authorized access for preferred suppliers

d) What benefits do companies expect from an e-application for Collaborative Supply Chain Management (SCM)?

Again, one can see that larger companies expect to improve internal/external collaboration and customer service. One third of the smaller companies sees no benefits from such applications.

Benefits / Company size	Smaller companies	Larger companies
Reduce costs	32%	52%
Improve internal or external collaboration	16%	46%
Improve customer service	5%	21%
No benefits	32%	12%

Table 3d: Benefits expected from Collaborative Supply Chain Management

e) Other results

Placing job vacancies on the Internet, is seen as a cost-saver by almost half the companies (both large and small). Larger companies again stress that this tool also improves external collaboration (30%), where smaller companies do not think so (16%).

Order taking for customers via the Internet is principally seen as a cost saver: 47% of the smaller companies and 61% of the larger companies think they will reduce costs by doing so.

32% of the smaller companies and 64% of the larger companies see *electronic purchasing* as a way to reduce costs.

Integrated CRM is, according to 53% of the smaller companies and to 67% of the larger companies, a way to improve customer service.

Larger companies see benefits in *collaborative new product/service development* to reduce costs (21% versus 10% of the small companies), to access new markets and create new business (30% versus 5% of the small companies) and to improve collaboration (30% versus 5% of the small companies).

f) Conclusion

A comparison with the surveys of 1999 and 2001, shows that 'cost reduction' is again an important reason for adoption of Internet-technologies, both for large and small companies. Nevertheless, larger companies more often mention improvement of customer service, and to a lesser extent, improvement of internal/external collaboration as a major benefit of most e-applications.

4.3 Barriers for the implementation of Internet-technologies

While having measured much more issues (12 in total), only a limited amount of variables are presented here. In table 4a, one can see that "lacking an e-business strategy" is clearly seen as a potential barrier for large companies, and even more so for small companies.

	1999 Very & Rather important barrier	*2001* Very & Rather important barrier
Small and medium sized enterprises	50%	68%
Large enterprises	53%	56%

Table 4a: How important a barrier is the lack of a formal e-business strategy?

The importance of lack of Internet technology know-how increased over the years, for larger companies more so than for smaller companies (table 4b).

	1999 Very & Rather important barrier	*2001* Very & Rather important barrier
Small and medium sized enterprises	36%	42%
Large enterprises	24%	55%

Table 4b: How important do you perceive the lack of Internet technology know how as a barrier?

The larger the enterprise, the more language was seen as a barrier, most likely because larger companies (want to) operate on a European level, and realise the complexity of having to maintain multi-lingual sites (table 4c). But smaller companies seem to have caught up in 2001.

	1999 Very & Rather important barrier	2001 Very & Rather important barrier
Small and medium sized enterprises	6 %	26 %
Large enterprises	15 %	25 %

Table 4c: How important are the language barriers ?

5 Conclusion

In this article, the authors first wanted to understand the basic components of Internet-ability in companies. These components are related, in our belief, to what extent products or services fit with the different operational processes in a company (such as purchasing process, sales process, etc.). When analyzing the opportunities for the Internet, for a given process, it was posed that, on the basis of a few real-life cases, a number of different criteria could be distinguished. These criteria were being situated at 3 different levels being the interest to improve informational value, the advantages for restructuring business channels and finally the opportunities brought forward by business process reengineering approaches.

In a second part we examined whether the Internet-ability varies between larger and smaller companies (under 500 employees being an SME in a wider European context), and also how these differences, if existing, might evolve over time (between 1999 and 2001). Larger companies more often formalized their objectives with Internet technologies into an e-business plan.

To have a more detailed view on the drivers and barriers that influence the Internet-ability, this study made an analysis for larger and smaller companies of differences in importance on a limited number of variables.

Research done by scholars who believe in the specificness of an SME and its management intends to find out if differences in interest, importance-giving or behavior are existing between smaller and bigger companies.

In this study, it is shown that the interest in e-business and the belief in Internet-ability for all sizes of companies is very much oriented towards obtaining cost-reduction in some of the major processes. For larger companies it can be seen that also other drivers, such as the improvement of customer service, but especially internal and external collaboration are of greater importance. For some processes, this study shows a widening gap in importance between these companies compared with the smaller ones in the sample.

The study however has to be careful with generalizing its findings too much since it is based on a rather small sample of companies of both sizes. Further analysis on this Internet-ability concept, studying drivers and barriers over time and for greater size of samples need to be done before making any final conclusion in this subject.

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