

Information Technologies for Sustainable Business Development: Case of Latvia

Elīna GAILE-SARKANE

and

Deniss ŠČEULOVS

Faculty of Engineering Economics and Management, Riga Technical University, 1/7 Meza Street,
Riga, LV-1048, Latvia

ABSTRACT

The aim of the proposed scientific research is to determine information technology's and information's utilization possibilities in company long-term development. Authors analyze and show significant importance of the information technology and information resource as its main part for the business and role production development and market positioning. Authors offer their view to the information resource utilization problems and propose several new definitions: information resource, information power (outcome etc.), information resource capacity, and revise ways how to estimate information value (importance, relevance) as mean and source for the business using methods of competition and information units. Conducted research allows evaluate importance of the information resource for the business and shows its overall relevance to the national economy.

Keywords: information technologies, resource, source, mean, competitiveness, sustainability, evaluation.

1. INTRODUCTION

Sustainability will become increasingly important to business and management over time, and the risks of failing to act decisively are growing.

Since 1987 when the concept of "sustainable development" was publicly introduced by the Brundtland report of World Commission on Environment and Development, this notion has gained immense popularity among scientists, governments, and business people. A few years ago in a speech at an event organized by business action for sustainable development Kofi Annan, former UN Secretary-General, remarked: "And more and more we are realizing that it is only by mobilizing the corporate sector that we can make significant progress. The corporate sector has the finances, the technology and the management to make this happen" [21]. The recognition of importance of business involvement with

sustainable development has aroused a variety of business partnerships [22].

Sustainable development has broad appeal and little specificity, but some combination of development and environment as well as equity is found in many attempts to describe it [11].

Sustainable development is commonly perceived as fighting poverty while protecting the environment on a macro-level [2].

U.S. National Academy of Sciences review of the sustainability literature identified three major values to be sustained: nature, life support systems and community [3]. Sustainable development when incorporated by the organization is called corporate sustainability and it contains, like sustainable development, all three pillars: economic, ecological and social. These three dimensions interact [5]. In other words, the condition toward the direction of sustainable development can be presented as simultaneous improvement in company performance in all three dimensions, economic, environmental and social [6].

What are some things that, a business cannot do without? The most obvious thing is money. With no money, a company cannot survive for long. Demand for the company's product is also necessary. Modern organizations are under increasing pressure from stakeholders to find new ways to compete effectively in dynamic markets and changing customer preferences [12]. The marketplace has never been as dynamic and muddled as we enter the twenty-first century. This dynamism is a result of great changes in the following:

- The structure of markets.
- The mobility of individuals and the great increase in global travel.
- The growth of information technology and its impact on marketing.
- The nature of marketing segments.
- Strategic alliances and networks between organizations [14].

China International Electronic Commerce Center Director Liu Junsheng said, "The financial crisis, has posed a challenge to e-commerce. At the same time, it also brings

new opportunities” [13]. With the rapid growth of e-commerce, many transactional activities are now being conducted through the internet. It has changed the traditional marketplace into one in which the business model is highly complex and requires changes to business strategies, products and services, marketing methods, etc. [8]. Organization for Economic Co-operation and Development (OECD) officially acknowledges electronic commerce as a new way of conducting business [18]. Despite the economic crisis the world is facing today, e-commerce is proving to be a great opportunity for branding and having online presence, especially for companies that had never before considered the internet as an alternative marketing strategy.

In the new context, two major factors determine the future survival or success of organizations: electronic commerce [7], and the knowledge from customers [20], encouraging the adoption of e-commerce and the use of the internet as a platform to access and collect important knowledge from customers.

In nowadays for e-commerce success is extremely important resource is information and informational technologies where information plays the main role. The list of “resources” that a business cannot survive without goes on and on. In order for a business to continue in the long term, all of these factors must remain. For this reason, it is important for a business to be sustainable not just environmentally, but in all areas.

Therefore, the authors recommend to analyze how development and usage (utilization) of information technologies affect sustainability of a company development.

2. SPECIFICATIONS INFORMATION TECHNOLOGIES AND ITS MAIN ELEMENT – THE INFORMATION

The Information is one of the main resources, which together with other material resources – energy, financial and natural is included in every product or service and defines product’s competitiveness and business results.

Modern business sustainable development also depends on how effective business is using information, therefore we believe that the information could be taken as a source and mean of the modern business sustainable development.

Information resources form one of the most important markets in Latvia – information market. In terms of development information market is ahead of national economy growth in Latvia.

According to authors’ researches to characterize information resource the following definition might be used: *Information resource in business is a means or possibility of an information character, used to create specific products, services or processes* [10].

In accordance with authors’ researches information resource is:

- Transformations object: resource → result (see fig.1);

- Initial or intermediate means, which could be used to create new information resource.

Information resources affect usage of the other resources (see fig.1) and normally lead to the savings (economy, retrenchments). After utilization of information resource there are two possible outcomes: real product, service or process; and feedback in the form of information, which has significant value for the further information usage and gaining of the economic effect.

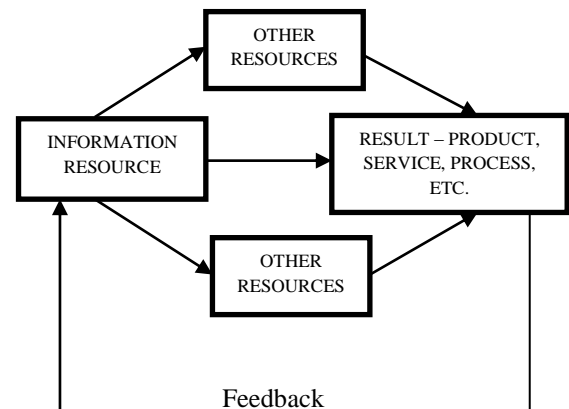


Fig.1 Information resource as transformation object in business

Let us point, that information resources are characterized by specific properties and features:

- Information resource has some level of entropy;
- It is non-material resource;
- It might be saved on various medias;
- It has fixed value (price);
- It might be transformed into managerial goals and tasks;
- It might have various indicators and degrees (ranks) of importance (technical, juridical, social, etc.);
- Information resource has the same properties as have marketing elements (marketing mix, segmenting, etc.);
- Importance degree of the information resource might be fixed or variable in various systems;
- Information resource provides stimulating effect on new idea generation;
- Utilization of information resource or its elements contributes to reduction of the uncertainty level during products manufacturing, distribution, usage, etc.;
- Information resource is not possible without information technology and its development.

Since information resource is one of the most significant resources for ensuring business’ long-term development, it is to examine economic features of the information resource. Power (outcome) of the information resource is very important characteristics, depending on economic objects (entities) informatization in the country or, in other words, how wide and effective information technology is used in companies.

Computerization level determines speed of information processing, storing and downloading, and also affects economically justified unbiased (impartial, objective) decision-making. In turn, the use of computer technology is one of the most important components to ensure information resource effective utilization.

So far the level of public computerization is comparatively good and, according to Central Statistical Bureau data, reached 62.8% for households and 95.2% for businesses in 2010 [4]. It is clear, that in near future even higher level of computerization might be expected, contributing the use of information resources.

Researching information resources and information technologies from the business point of view, it is to say that information technologies not only ensure selling and buying of the information, but also exercise access to the information, active usage and exchange by the public community, contributing its versatile development. Therefore authors conclude, that information technology effect to the business development and market economy in general is of very high importance and its proper and timely application stimulates sustainable business development.

Assessing relevance and role of the information resource for competitiveness ensuring, let us point that qualitative information is a means for a competitiveness improvement required for economic and market analysis. To assess the impact of the information to the product's competitiveness, it is advisable to adopt (use) M. Porter's five forces competitiveness model [15], what can be done on the basis of information resources system, which includes five types of resources: marketplace; consumers; competitors and their products; quality; prices - sales and consumer prices [1].

3. INFORMATION RESOURCE CAPACITY

According to the authors, there is a usefulness of information, i.e. that part of an information resource, which provides competitive advantages in reality. Information resource capacity is part of the information resource, which is real of service. It is necessary, mutually agreed part of the information resource, which form product according to required parameters, excluding the information gap. Information resource capacity is described by following relation:

$$Ir = \frac{In}{I}, (1)$$

where: I_r – information resource capacity;

I_n – necessary useful part of the resource, which describes advantages of the given product;

I – total information resource, which is consumed to develop and consume given product.

Thus, information resource capacity is a tool to produce competitiveness, although it, as a source of information participates in product's design. Really, information resources may be different and their quality affects both

the product's quality and total costs, connected with a product (sales and operating or consumer prices).

It is known, that if sales costs relative to consumer prices is within 0.05 to 0.2 range [17], then pricing (product's sales costs) has little influence on product competitiveness.

$$\frac{C_{sc}}{C_{cp}} = 0.05 \div 0.2, (2)$$

where: C_{cs} – sales costs;

C_{cp} – consumer price.

This means that in this situation product's sales cost becomes a little sensitive competitiveness element.

From here follows the problem – make total expenses of a way, to reduce its consuming component in favor of high competitiveness advantages (qualitative characteristics). At the same time lessen expenses' sales cost component, which directly influences product's competitiveness.

As a result product's competitiveness at the market is determined by two most important indicators – price (includes sales cost and consumer price) and quality. Hence, competitiveness model might be pictured as follows:

$$\frac{Q/Q_{et}}{EXP/EXP_{et}} = CS, (3)$$

where: CS – competitiveness;

Q and EXP are respectively quality of given and etalon product;

Q and C min desired quality level and lower price limit.

Indicators Q and C must be modeled according to product's design stages taking into consideration their mutual interaction to ensure desired quality.

Accordingly, given the need to minimize costs expenses, increased attention during product's quality modeling process must be paid to expenses reduction during all the stages of the quality loop, ensuring that: must be paid to expenses (costs) reduction during all the stages of the quality loop, ensuring that:

$$\Delta EXP > 1, (4)$$

Parallel to quality model, pricing model is creating, accounting market, production, direct and other factors. Quality and pricing models form competitiveness multi-factor model¹²:

$$C = f(F_1, F_2, F_3 \dots F_n) \rightarrow \max, (5)$$

where: $F_1, F_2, F_3, \dots F_n$ – competitiveness factors respecting their importance.

Sum of the weighted factors produces quantitative value of the competitiveness. Let us adopt qualitative competitiveness value for the base product CS_b for a unit of competitiveness and name it as competitive unit. Thus,

$$V_{cs} = \frac{CS}{CSb}, (6)$$

where: CS and CSb are designed and base product's competitiveness accordingly.

Knowing company's EXP CSb and reaching $V_{cs} = 1$, it is possible to plan C costs for designed product.

$$EXP_{cs} = V_{cs} \times EXP_{csb}, (7)$$

where: EXP_{cs} and EXP_{csb} – costs to ensure competitiveness of designed and based product respectively.

If volume of the investments for the new product implementation is known, then it is possible to calculate CS in competitive units according to factors, not taking S into consideration.

$$V_{cs} = \frac{EXP_{cs}}{EXP_{csb}}, (8)$$

Comparing VCs with required value it is possible to conclude on pricing of the product for market entry. We believe, appropriate, based on information and products competitiveness units, costs modeling, considering influence of internal and external factors contributes to the efficient management of competitive products.

In accordance with the theory of establishing competitiveness advantages, authors suggest information resources evaluation criteria. Information resources are evaluated by comparing with each other (by mutual comparing). Information resources used to improve competitiveness will always be compared with required information (see table 1).

Table No1 **Information evaluation**

Information evaluation criteria	Remarks
$I_m \geq I_n$	I_m – market information, I_n – required information
$I_p \geq I_n$	I_c – information on price, I_{vaj} – required information
$I_{inov} \geq I_n$	I_{inov} – information on innovations, I_n – required information
$I_{pr} \geq I_n$	I_{pr} – production (manufacturing) information I_n – required information
$I_{fact} \geq I_n$	$I_{faktiskā}$ – production information, I_n – required information

According to the information from Table 1, it is always necessary to compare actual or in company available information with required information.

$$\sum I_i \rightarrow CS_{max}, (9)$$

where: I_i – information types used in information resource;

CS – company's competitiveness.

Aforementioned researches confirm, that information

resource serves as a one of the most relevant resources for business sustainable development, and thus must be rational used. Summarizing it is to conclude, that an information as a resource and its qualitative utilization within a company ensure increase of company's and its products' competitiveness.

4. INFORMATION TECHNOLOGY IN BUSINESS: CASE OF LATVIA

Economic activities connected with information technologies, products manufacturing and services were at level of 3.6% from GDP in 2008 and at level of 3.3% from GDP in 2009 [4]. According to Central Statistical Bureau of Republic of Latvia (CSB) data at the beginning of 2010 95.2% of all companies were using computers and 90.7% of all companies were connected to the internet [4]. At the beginning of 2010 22.5% of all companies were using wireless internet access, 26.8% ISDN lines, 35.5% - xDSL and 46.7% other broadband internet connections [4]. It is surprising, that in 2010 only 48.6% of all companies have had a home page [4]. In 2009 only 6.9% were selling [4] and only 17.1% were buying [4] goods thru the internet.

In 2010 only 55% of all companies have used automatic data exchange services. At the same year 30.9% of all companies' employees have regularly used computer at the offices and 27.9% employees have regularly used computers with internet connection [4]. All these data prove, that e-commerce in Latvia is at a very initial point.

From December 2010 till January, 2011 authors conducted a survey to ascertain the intensity of the use of information technologies by small and medium-sized enterprises and technology impact on companies' development. 319 companies' executives were questioned during this survey. Survey consisted of 23 questions of a discrete type and 3 questions of a public type.

Survey results match with a data from public statistical sources concerning computers number growth in companies starting from 2006. Study shows a tendency of substantial computers quantity growth (about 25%) exactly in sales and services sector. At the same time technical, manufacturing, printing etc. enterprises show no such a trend. Executives have had a positive assessment of the information technology (IT) impact on information flow. 68% agreed, that information flow grew along with development of IT; 18% stressed, that the use of IT haven't produce any impact on the company information flow; 14% stated, that haven't thought about it. At the same time all survey participants confirmed relevance of the internet for company development and stated that social networking will increase impact to the business results.

As a result of study authors also summarize negative factors, appearing with increase of information technology utilization by business.

Most often mentioned are as follows:

- Increase of occupational diseases;
- Growth of number of spine disease;
- Uncontrolled personal use of electronic environment;
- Duties and tasks take longer time to complete;
- Etc.

There are 1 503 400 (June, 2010) active internet users in Latvia, i.e. 67.8% of total population [9]. More than 85% of the world's online population has used the internet to make a purchase – increasing the market for online shopping by 40% in the past two years – according to the Nielsen Global Online Survey on internet shopping habits. Among internet users, the highest percentage shopping online is found in South Korea, where 99% of those with internet access have used it to shop, followed by the UK (97%), Germany (97%), Japan (97%) with the U.S. eighth, at 94%. According to Latvian CSB only 8.5% of Latvian internet users have had an experience of purchasing in the internet [19]. Based on CSB data 86.8% of all enterprises were using internet in 2009, at the beginning of the 2010 total quantity of internet users increased by almost 4% and reached 90.7%. It is interesting, that the use of internet in regions is just slightly lower than in Riga and Riga metropolitan area (by about 5%). Authors believe that this uniform indicator of internet utilization in whole territory of Latvia has a positive impact on the use of IT in business and contributes to sustainable business development.

Hosting provider GRAM Technologies in cooperation with Latvian Internet association has conducted regular quarterly study “Latvian business and internet: Internet is oxygen for about half of the businesses” 193 companies have participated in this survey from which 52% are 10 or more years on the market; 50% of respondents are owners of the business; 12% of respondents - executives; 6% - marketing directors. Results of the survey are as follows: in the event of internet loss, it will very negatively affect 37% of companies and 4% will abort their operations.

43% of respondents state, that in case of internet loss their business will face minor complications but overall this event won't produce any substantial issues. Only 7% stated that this event won't impact their business at all. So, for more than 50% of businesses participated in a study internet isn't just a sales improvement means, but “an oxygen” they can't live without.

One of the most popular sales improvement channels for businesses is Google. This statement agreed 45% of respondents, followed by e-mail marketing (38%) and commercials at advertisement portals (35%). Attention to the products promotion thru social networks pays 25% of the respondents. And only 19% uses advertisement banners [16].

Despite the recent economic crisis, businesses pointed to the positive turnover dynamics, increase of sales volumes and overall growth of competitiveness. Thus, authors conclude that the use of information technology in business ensure business development.

5. CONCLUSIONS

Summarizing results of the study authors came to a conclusion that information technologies positively impact more business segments and contribute to sustainable business development.

Research results clearly show that information technology mainly affects company's information flow. Considering that information resource has today become one of the prevail resources for sustainable development, it must be outlined that this resource economic evaluation becomes of the high importance.

Utilization of the information resource ensures general business competitiveness growth.

Study conducted by the authors on information technologies utilization for business development shows growth of the IT utilization volumes, especially in business segments not affected by wide use of IT before. Businessmen agreed that IT has a positive impact to the development of business results, although pointed to some shortcomings.

6. REFERENCES

- [1] L. Bañasová, D. Cagánová, M. Čambál, “The Identification of Key Managerial Competencies as a Tool for Increasing Business Competitiveness”, **Proceedings of the European Conference on Knowledge Management**, 2010, pp. 46-53.
- [2] R.J. Baumgartner, D. Ebner, “**Corporate Sustainability Strategies: Sustainability Profiles and Maturity Levels of Sustainable Development**”, 2010 [Electronic resource], viewed on March 12, 2011, <http://www.interscience.wiley.com> DOI: 10.1002/sd.447.
- [3] Board on Sustainable Development. **Our Common Journey: A Transition Toward Sustainability**. Washington, DC: National Academy, 1999.
- [4] Central Statistical Bureau of Latvia, [Electronic resource], viewed on March 23, 2011, <http://data.csb.gov.lv/Dialog/Saveshow.asp>
- [5] D. Ebner, R.J. Baumgartner, “**The Relationship Between Sustainable Development and Corporate Social Responsibility**”, 2006 [Electronic resource], viewed on March 12, 2011, <http://www.crrconference.org>.
- [6] F. Figge, T. Hahn, “Sustainable value added – measuring corporate contributions to sustainability beyond eco-efficiency”. **Ecological Economics** 48 (2), 2004, pp. 173-187. [Electronic resource], viewed on

February20,
2011,http://www.csiprogress2007.org/index.php?option=com_frontpage&Itemid=1

- [7] A. Gupta, et. al., "An empirical study of consumer switching from traditional to electronic channels: A purchase-decision process perspective". **International Journal of Electronic Commerce**, vol. 8, issue 3, 2004, pp 131-161.
- [8] T.L. Hsia, J.H. Wu, E.Y. Li, "The e-commerce value matrix and use case model: A goal-driven methodology for eliciting B2C application requirements." **Information & Management**, vol. 45, issue 5, 2008, pp. 321-330.
- [9] Internet World Stats, [Electronic resource], viewed on April23, 2011, <http://www.internetworldstats.com/stats4.htm>.
- [10] J. Karimi, T.M. Somers, A. Bhattacharjee, "The Role of Information Systems Resources in ERP Capability Building and Business Process Outcomes". **Journal of Management Information Systems**, Vol. 24 Issue 2, 2007, p221-260, [Electronic resource], viewed on February 12, 2011, <http://web.ebscohost.com>.
- [11] R.W. Kates, T.M. Parris, "Long-Term Trends and a Sustainability Transition". **Proceedings of the National Academy of Sciences**, Vol. 100, No.14, 2003, pp. 8062-8067.
- [12] P.A. Phillips, C. Wright, "E-Business's impact on organizational flexibility." **Journal of Business Research**, 2008, Article in press.
- [13] Pressmeldungen.at. "**Financial Crisis: A great Opportunity for E-commerce**", [Electronic resource], viewed on April 18, 2011, <http://www.pressemeldungen.at/69035/financial-crisis-a-great-opportunity-for-e-commerce/>.
- [14] A. Ranchhod, "**Marketing Strategies: A Twenty-first Century Approach**". Essex: Pearson Education Limited, 2004, 239 p.
- [15] M.E. Porter, "**The Competitive Advantage: Creating and Sustaining Superior Performance**". N.Y.: Free Press, 1985, 260 p.
- [16] Research: "**Internet – the „oxigen” for approximately of half Latvian companys**", [Electronic resource], viewed on April 23, 2011, http://www.lia.lv/aktualitates/28/petiju_ms_internets__skabeklis_aptuveni_pusei_kompaniju/.
- [17] S. Sarkisjan, "**The theory of prediction and decision making**", Moscow: Highschool, 1977.
- [18] T. Sung, "E-commerce critical success factors: East vs. West". **Technological Forecasting and Social Change**, vol. 73, issue 9, 2006, pp.1161-1177.
- [19] The Nielsen Company, "**Over 875 Million Consumers have Shopped Online – the Number of Internet Shoppers un 40% in Two Years.**" [Electronic resource], viewed on April 23,2011,<http://nz.nielsen.com/news/OnlineShopping.shtml>>.
- [20] M. Tsai, C. Shin, "The impact of marketing knowledge among managers on marketing capabilities and business performance." **International Journal of Management**, vol. 21, issue 4, 2004, pp. 524-530.
- [21] M. Wade, "**Good company citizenship. In Governance and Sustainability: New Challenges for States, Companies and Societies**", Greenleaf: Sheffield, 2005, pp. 186–199.
- [22] World Business Council for Sustainable Development (WBCSD) 2007. "**Doing Business with the World – The World Comm. Environ. Dev. 1987. Our Common Future**". NewYork: Oxford University Press.