

ORGANIZATION AND APPLICATION OF INFORMATION TECHNOLOGIES IN ENTERPRISES OF HERZEGOVINA REGION

Zdenko Klepić¹, Mirela Mabić², Jelena Brkić³

¹Faculty of Economics, University of Mostar, Bosnia and Herzegovina,
zdenko.kleplic@sve-mo.ba,

²Faculty of Economics, University of Mostar, Bosnia and Herzegovina,
mirela.mabic@sve-mo.ba,

³Faculty of Economics, University of Mostar, Bosnia and Herzegovina,
jelena.brkic@sve-mo.ba

Abstract

Rapid development of information technologies has had a big influence on global economy and has activated the series of changes such as: globalization, liberalization, concurrency growth, market expansion, availability of market information to all segments etc. Also, the significance of the Information itself has become larger since information technologies are making the process of gathering, processing, storing and distributing of data much easier with the primary goal of possessing the right information at the right time and at the right place in the organization with minimization of costs. The achievement of this goal is leading to improvement in all segments of business activity such as: research and development of new products, process of supply, supply management, accounting and finance, marketing, sales, control, communication and decision making.

Application of information technologies in the modern business does not only include buying and owning PCs in the company, but also a presence of high quality organization and utilization of information technologies which is a guarantee for successful and competitive existence in the market. What kind of information system should be implemented is dependant on the company size, amount of information and data it operates with, the type of business, future plans etc.

The objective of this research is to get the picture of level of enterprise informatization in Herzegovina with respect to amount and manner of information technology utilization. From these goals, the following hypotheses were set:

H1 – information technologies are insufficiently used and are not appropriately organized in the companies of Herzegovina region

H2 – there are substantial differences in utilization and organization of information technologies in the enterprises of Herzegovina region regarding their size

This paper will present the research based on the original questionnaire from the project named "Research and need analysis for training and consultative services for small and medium enterprises in the Herzegovina region" which was carried out by the authors for the Herzegovina regional development agency. The research was conducted in the end of year 2008 and in the beginning of 2009 and it comprised 105 enterprises from the Herzegovina region which spans over Federation of Bosnia and Herzegovina and Republic of Srpska. The size of

the enterprise (micro, small, medium and large) was defined through a two-dimensional criteria including two variables: number of employees and total income.

The research is expected to confirm the hypothesis and create the foundation for undertaking the appropriate actions in order to change the current, unsatisfying situation.

JEL classification: D83, G14,

Keywords: Information technologies, organization, enterprise, Herzegovina

1. Introduction

Rapid development of information technologies has had a big influence on global economy and has activated the series of changes such as: globalization, liberalization, concurrency growth, market expansion, availability of market information etc. Also, the significance of the Information itself has become larger since information technologies are making the process of gathering, processing, storing and distributing of data much easier with the primary goal of possessing the right information at the right time and at the right place in the organization with minimization of costs. The achievement of this goal is leading to improvement in all segments of business activity such as: research and development of new products, process of supply, supply management, accounting and finance, marketing, control, communication and decision making.

The level of application of information technologies on strategic, tactical and operational layers of enterprise's management hierarchy is having increased influence, along with some other factors, in determination of quality of competitive ability of business systems. (Markić; 2002, 19). However, information technology is just the potential that should be fulfilled with right work organization, direction and involvement of all employees. (Vajić et al.; 1994, 250). Application of information technologies in the modern business does not only include buying and owning PCs in the company, but also a presence of high quality organization and utilization of information technologies which is a guarantee for successful and competitive existence in the market. What kind of information system should be implemented is dependant on the company size, amount of information and data it operates with, the type of business, future plans etc.

2. Research Methodology

2.1. Establishment of hypothesis

From the previously mentioned field of interest, the goal of this research was derived and it could be stated as learning about organization, application and

usability of information technologies in the enterprises of the Herzegovina region (Klepić et al.; 2009). Also, there is the question of difference in utilization of information technologies in the enterprises regarding their size.

According to stated goals, the following hypotheses were set:

H1 – information technologies are insufficiently used and are not appropriately organized in the companies of Herzegovina region

H2 – there are substantial differences in utilization and organization of information technologies in the enterprises of Herzegovina region regarding their size

2.2. Scope of research and methods of data collection

This paper will present the research based on the original questionnaire from the project named "Research and need analysis for training and consultative services for small and medium enterprises of Herzegovina region" which was carried out by the authors for the Herzegovina regional development agency.

The research was conducted in the end of year 2008 and in the beginning of 2009 and it comprised 105 enterprises from the Herzegovina region which spans over Federation of Bosnia and Herzegovina and Republic of Srpska. The size of the enterprise (micro, small, medium and large) was defined through a two-dimensional criteria including two variables: number of employees and total income which are defined by Federal Law of encouraging development of small enterprise (Law on encouraging development of small enterprise).

2.3. Model of data processing

The questionnaire included yes/no questions and multiple choice questions containing answers concerning the level of application, possession and organization of information technologies. All the collected answers were observed in two ways: in aggregate and separately for every group of enterprises (micro, small, medium and large). Data were technically and statistically processed using Microsoft Excel.

3. Research Results

3.1. Basic characteristics of observed enterprises

The results analysis of empirical research of basic characteristic of the enterprises in the region, demonstrated following results:

- High percentage of observed enterprises were established in the last decade – from the year 2000 and there are 40% of them. 24% of them were established during the civil war (1990-1995) and 14% were established up to the year 1989.

- Most of these enterprises are stating their primary activity as retail/wholesale trade (27,62%). 17,14% of them are into different processing industries, 11,43% are in construction industry. Business services, agriculture and hunting and forestry have the same percentage of 5,71%.
- 96% of observed enterprises are under private ownership, 2% is under public ownership and 1% is belonging to mixed ownership as well as to joint ownership.
- 82% of the enterprises is run by national owners, 8% of them have foreign owners, while 10% of the enterprises have mixed owner structure.
- Most of the enterprises (70,48%) of Herzegovina region are organized as limited liability companies (LLC). 9,52% of them are registered as handicraft business, 8,57% are corporations, 4,76% are sole proprietors with independent retail shops, and other 1,90% are divided among private catering shops and restaurants, cooperatives and other forms of organizing.
- Big part of the investigated enterprises are employing 1 to 9 employees (47,12%). 29,81% of them are employing 10 to 49 employees, 18,27% hire from 50 to 249 employees and 4,81% hire over 250 employees.
- High percentage of observed enterprises are making up to 400.000 BAM in revenue, 28% of them are making between 400.000 BAM and 4.000.000 BAM in revenue, 25% of them are making from 4.000.000 BAM to 40.000.000 BAM, while 6% are making over 40.000.000 BAM in revenue.

Using the given criteria (number of employees and total revenue) the classification of observed enterprises of Herzegovina region has been done (The Law on encouraging development of small enterprise). According to the research results, 41% of the observed enterprises can be categorized as micro enterprises, 28% are small, 24% are medium and 7% of them are large enterprises.

3.2. Organization and application of information technologies in enterprises of Herzegovina Region

The companies that are active in complex, unpredictable and heterogeneous environment and which are faced with extremely strong competitors in this era of globalization have to base their business on highly sophisticated technologies. Organization and utilization of information technologies and resources is highly important for their operations so the research tried to gain some knowledge about the level of computer equipment and it's utilization in everyday business at observed enterprises.

According to the acquired results 31,3% of the enterprises made purchase of some IT equipment in the last month. 29,3% of the enterprises made such purchase in the last half year (6 months), 20,2% of them did it during the last year, while 19,2% of them made their last purchase over one year ago (15,2% from one year to three years and 4% over three years ago).

Table 1. The time of the last purchase of IT equipment

Last purchase	Micro	Small	Medium	Large
during the last month	21,05%	13,79%	56%	71,43%
during the last 6 months	26,32%	34,48%	28%	28,57%
during the last year	21,05%	27,59%	16%	0%
between one and three years	23,69%	20,69%	0%	0%
over three years	7,89%	3,45%	0%	0%
Total	100%	100%	100%	100%

Source: Author's calculation

Obtained data demonstrated in Table 1. are pointing to the fact that bigger enterprises are more frequent than smaller ones in their IT purchase, which is very important because of the high speed of IT development.

Computers should be connected with network in the modern information systems for their faster and more efficient work, but also for the purpose of lowering the costs. Obtained results show that 67% of the computers inside the enterprises are connected via intranet, while 33% of them are not connected. Size oriented analysis demonstrates that all the large enterprises have their computers networked, the same happens in 92% of medium, 62,07% in small and 48,72 in micro enterprises.

The research also tried to give the answer to the questions of which computer applications and software solutions are used in daily business at the observed enterprises having in mind the fact that more sophisticated information systems offer more efficient business results. According to the obtained results, the most present software solution is Microsoft Office package (Word, Excel etc.) which are used in 61,8% of the enterprises. The second category is consisted of specialized software which is standard support for operational transactions (accounting software etc.) and it is present in only 13,2% of the enterprises. The third category is involving specialized software products which are directly related to the main activity of the enterprise and it is present in 8,8% of the enterprises. 16,2% of the enterprises possess their own complete information management system, while none of the observed entities possess any software solutions related to decision support systems.

Table 2. The presence of software solutions at the enterprises of Herzegovina region

Software solutions in use	Micro	Small	Medium	Large
Microsoft Office Package (Word, Excel etc.)	80%	63,16%	40%	0%
specialized software which is standard support for operational transactions (accounting software etc.)	6,67%	15,79%	26,67%	0%
specialized software products which are directly related to the main activity of the enterprise	6,67%	10,53%	13,33%	0%
decision support system software	0%	0%	0%	0%
complete information management system	6,66%	10,53%	20%	100%
Total	100,01	100,01	100	100

Source: Author's calculation

The research tried to give the answers of organization of information systems, that is: the organization of support, maintenance and service of the information equipment and processes in the enterprise. In more than half of the observed entities (61%), there are no IT employees. In 28% of the enterprises there is one person in charge of IT (21% - he/she does this activity along the other jobs, 7% - that's his/her only activity). 11% of the enterprises have their own IT section (5% ad the part of some other department, 6% as standalone department with own manager). Analysis also demonstrated that, when it comes to the size of the enterprise, 40% of large enterprises have the IT department, while 8% of medium ones have it. Almost none of the small and micro enterprises have the IT department.

Outsourcing function of the information systems is usually referred to confiding one part or whole data processing to some other enterprise which is specialized in that kind of business (Bajgorić; 2007, 521). The maintenance of computer equipment is handled differently throughout the enterprises. 59,8% don't have any kind of contract with specialized IT company (31,4% hire IT expert when necessary, 28,4% had no say in this matter). The other 40,1% of the enterprises have some kind of contracts of maintenance and 8,8% of them for hardware maintenance (computers and network equipment), 12,7% of them for software support and 18,6% of them for both of previously stated matters. Analysis shows that medium and large enterprises have distinctive lead in signing contracts with specialized companies (outsourcing) against the small and micro ones.

Table 3. Contracts of maintenance and service of IT equipment and processes

Outsourcing for IT maintenance and service	Micro	Small	Medium	Large
a) no	41,46%	20,69%	16%	28,57%
b) no – hiring expert when necessary	34,15%	44,83%	20%	0%
c) yes – for service of hardware	4,88%	10,34%	16%	0%
d) yes – for service of software	7,32%	10,34%	16%	42,86%
e) yes – for service of hardware and software	12,2%	13,79%	32%	28,57%
Total	100,01%	99,99%	100%	100%

Source: Author's calculation

When it comes to utilization of information technologies for storing data about customers/suppliers/partners, the analysis shows that 26,5% of the enterprises store all of their information as digital data. 28,4% of them store most of their information as digital data, 20,6% do it just for some information, 9,8% rarely and 14,7% store no information as digital data and keep all of their archive just in paper form.

Table 4. Level of digital data storing

Storing information as digital data	Micro	Small	Medium	Large
a) not at all	27,91%	7,14%	4,17%	0%
b) few information	16,28%	7,14%	4,17%	0%
c) some information	18,6%	25%	20,83%	14,29%
d) most of it	11,63%	32,14%	45,83%	57,14%
e) completely	25,58%	28,58%	25%	28,57%
Total	100%	100%	100%	100%

Source: Author's calculation

According to the collected data, 88,5% of the enterprises is connected to the Internet, while 11,5% isn't. ADSL connection is the most common way of accessing the Internet which is used by 80% of the enterprises. 11,1% use cable Internet provider. Wireless Internet access is present at 7,8% enterprises, and only 1% use dial-up connection. The analysis shows that all of the large enterprises are connected to the Internet. 96% of medium, 93,10% of small and 79,07% of micro enterprises use Internet connection.

Web site is an important and unavoidable segment of enterprise's communication with the environment and it's effecting company's efficiency highly. According to the obtained results of the research, 51,5% of the enterprises of Herzegovina region possess their own web-site. Only 5,8% of these companies update the web-site on daily bases. 3,8% of them hasn't done a single update since the web-site had been created and published. 23,1% of them update their web-sites on weekly bases, 26,9% once a month, 21,2% once in every 3 months, 17,3% do it once a year and only 1,9% do it rarely than once a

year. When it comes to enterprises that don't possess a web-site, 11,8% of them have no plans of creating one. The rest have some plans for it without stating specific time of when that should happen. 43,1% are thinking of creating the web-site sometime during the next couple of years, 17,6% will make one in next year, 15,7% in next 6 months and 11,8% plan on creating one in the next three months. When observing the issue from the size of the enterprise point of view results show that 85,71% of large, 76% of medium. 50% of small and 31,71 of micro enterprises own a web-site.

E-mail has taken its substantial position both in personal and business life. The research tried to discover in what extent enterprises of Herzegovina region use this way of communication. The results show that 74,5% of the enterprises own an official e-mail. The analysis demonstrate that 85,71% of large enterprises possess an official e-mail. 96% of medium, 85,19% of small and 52,27% of micro enterprises do also.

When it comes to providing official e-mails to the employees, 24% of the enterprises do so for all of the employees. 35,6 of the enterprises provide e-mails to managers only (26,9 to all of the managers, 8,7% to top managers only). 19,2% provide it to the executive officer and 21,2% don't provide official e-mails at all.

Table 5. The possession of official e-mail by employees

Possession of e-mail	Micro	Small	Medium	Large
a) no one	29,55%	25%	8%	0%
b) just the chief executive	36,36%	14,29%	0%	0%
c) top managers	0%	14,29%	20%	0%
d) all managers	9,09%	25%	48%	71,43%
e) all employees	25%	21,42%	24%	28,57%
	100%	100%	100%	100%

Source: Author's calculation

Mere possession of official e-mail doesn't consequently mean that enterprise and the employees are using it. Results demonstrate that 87,6% of the enterprises practice the usage of the official e-mails in the communication and 46,6% of them do it very often, 21,9% do it rarely and 19% do it between rarely and often. 12,4% of the enterprises don't use the electronic way of communicating ever. The analysis demonstrates in the following table that larger enterprises use the electronic communication far more that smaller enterprises do.

Table 6. The extent of electronic communication usage in the enterprises

Electronic communication	Micro	Small	Medium	Large
a) never	22,73%	10,34%	0%	0%
b) rarely	29,55%	24,14%	12%	0%
c) between rarely and often	20,45%	20,69%	20%	0%
d) very often	13,64%	24,14%	52%	71,43%
e) extremely often (always)	13,64%	20,69%	16%	28,57%
Total	100,01%	100%	100%	100%

Source: Author's calculation

Increasing usage of electronic transactions, led to their big significance for enterprises as they considerably raise the level of effectiveness and business efficiency. According to the research results 52,4% of enterprises offer their customers/suppliers/partners possibility of electronic transactions (orders, reservations, payment etc.). Analysis of research results shows that all the big enterprises have an offered possibility of electronic transactions, 76% medium, 65,52% small and 22,73 micro ones also have it.

Available possibility of performing transactions doesn't necessarily mean that they are deployed by enterprises that have them. Research shows that 41,9% of enterprises of Herzegovina region use the options of electronic realization of transactions with their customers/suppliers/partners very often, 18.1% of them between often and rarely, 18,1% rarely, and 21,9% enterprises don't use it at all.

Table 7. The level of deployment of electronic transactions

Electronic transactions	Micro	Small	Medium	Large
a) never	36,36%	17,24%	4%	14,29%
b) rarely	22,73%	20,69%	12%	0%
c) between rarely and often	15,91%	20,69%	20%	14,29%
d) very often	11,36%	17,24%	48%	57,14%
e) extremely often (always)	13,64%	24,14%	16%	14,28%
Total	100%	100%	100%	100,0%

Source: Author's calculation

Internet banking makes business easier, faster, more efficient and cheaper, therefore the research tried to realize in what extent do the enterprises of Herzegovina region use Internet banking as a part of their business conduct.

According to the results, 53,3% of enterprises don't use Internet banking. Size oriented analysis demonstrates that 71,43% of large, 76% of medium, 62,07% of small and 15,91% of micro enterprises use Internet banking.

4. Conclusion

Fast development and big extent of usage of information technologies in business area along with the effects they carry to the business performance has made them one of the most important factors of enterprise concurrency. On its way to European integrations, Bosnia and Herzegovina is forced to liberalize and open its market which leads to the fact that Bosnia and Herzegovina enterprises found themselves competing with other enterprises from highly developed west European economies which are using up to date achievements from information technology filed in their business.

The results obtained from the research and analysis of collected data about the level and ways of information technologies organization and deployment at the enterprises of Herzegovina region clearly point that the first hypotheses H1 of this research can be accepted: "information technologies are insufficiently used and are not appropriately organized in the companies of Herzegovina region". Results concerning the level and ways of information technologies organization and deployment at the enterprises of Herzegovina region regarding their size (large, medium, small and micro) clearly and arguably point that the second hypotheses H2 of this research can be accepted: „there are substantial differences in utilization and organization of information technologies in the enterprises of Herzegovina region regarding their size”.

Enterprises should, regardless of their size, use the possibilities of information technologies, which are strongly related to company success in modern business of global and concurrent environment. Micro and small enterprises should use the help of IT experts in their business activity more often and they should also improve and modernize their communication with the environment as well as their online business.

REFERENCES

1. Bajgorić, N. (2007) Menadžment informacijskih tehnologija, Ekonomski fakultet u Sarajevu, ISBN 978-9958-605-98-7, Sarajevo
2. Markić, B. (2002). Poslovna informatika, HKD Napredak, ISBN 9958-840-10-3, Mostar
3. Klepić, Z., Skoko, B., Mabić, M. (2009). Research and need analysis for training and consultative services for small and medium enterprises of Herzegovina region, Regional Economic Development Association Herzegovina, Mostar
4. Vajić, I. et al. (ur.) (1994), Management i poduzetništvo 1000 programa ulaganja za mala i srednja poduzeća, Mladost dd i Centar za poduzetništvo doo, ISBN 953-96161-0-7, Zagreb
5. Zakon o poticanju razvoja malog gospodarstva (Law on encouraging development of small enterprise), Službene novine Federacije BiH br. 19/06 (The Official Gazette of Federation of Bosnia and Herzegovina no.19/06)