

How Microenterprises can benefit from the use of Business Information Systems

Peter Sasvari and Zsuzsa Majoros

Abstract— Nowadays, the role of information is increasingly important therefore the use of various information systems is an essential requirement for all enterprises. Microenterprises are in a difficult position because they cannot afford to implement expensive software applications but at the same time they have to remain competitive so they need these kind of systems. Microenterprise is the most common business type in the developed countries, that explains why it is essential to analyze their IT penetration and usage habits. The present paper is an overview of the business information systems in use by microenterprises in Germany, Hungary and Slovakia.

Index Terms— Information Technology, Hungary, Germany, Slovakia, Microenterprise, Business Information System.

I. INTRODUCTION

The type of the applied information systems in each country probably depends on the degree of their ICT development. Therefore, before analyzing the responses to the questionnaire, it is required to characterize the three countries from the aspect of the level of their individual ICT development. One of the best indices for measuring the level of ICT development is the ICT Development Index (IDI). The IDI is a compound index published by the United Nations International Telecommunication Union based on the internationally agreed ICT indicators. It provides a valuable tool for measuring the most important indicators of the information society. The IDI consists of eleven indicators altogether, grouped in three clusters: access, use and skills. The main objective of introducing this compound index was to measure and compare the temporal evolution of ICT development, to study the progress of ICT development in both developed and developing countries, to measure the digital divide and detect the potential of ICT development within and across countries.

According to the latest rankings, Germany was ranked in the highest position among the surveyed countries, reaching the 7th position in the regional ranking list in European Union. Slovakia, outstripping Hungary by only one position was ranked 23rd [20].

Apart from the leading countries, the IDI gave special attention to the most dynamically developing countries which could show an improvement by up to 5-7 positions from 2010

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to 2011. However, those countries are not examined in the present study so it can only be stated on the ranking list with reference to the level of ICT development that Germany reached the highest level, followed by Slovakia and Hungary [20].

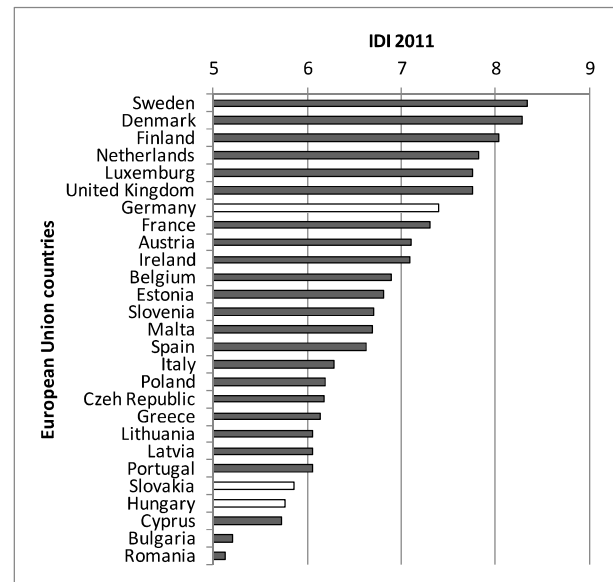


Fig. 1. The Trend of Economic Development

This paper focuses on to what extent the level of ICT development determines the IT supply of microenterprises in these three countries.

II. THE CONCEPT OF BUSINESS INFORMATION SYSTEMS

The following processes can be found in every information system, that is input, processing, storage, control and output. [11].

- Input means both entering data into the system and preparation for processing. In addition to actual data record, this process includes data classification and the control of data record as well.
- Processing converts the recorded data into information valuable to the manager. It consists of processes such as the classification, comparison, summary, analysis and maintenance of data, together with performing mathematical operations.
- During storage, the data are stored for later use in some systematic fashion. They are usually organized and stored in records, files and databases.
- A good information system needs some kind of feedback or control, which should closely monitor the output of the

system, if it is not adequate for the purpose, controlling processes are needed to intervene.

- Output provides the data exported from the system, that is, the transmission of information to the manager. It is very important that the information provided to the user should be easy to understand.

In addition, certain resources - hardware, software, staff and data - are required for the operation of the system.

- In the case of information systems, hardware means all physical devices and materials that are used for data processing. Thus, a personal computer can be a hardware itself but it can also be a memory stick or even a sheet of paper if it contains useful information.
- On the one hand, software is responsible for operating any computer program, on the other hand, it also includes all the processes and activities that must be carried out in the processing of information. In the case of information systems, it is possible to talk about software without reference to computers.
- In order to apply and operate information systems, it is essential to employ staff or human resources. These include IT professionals, system organizers responsible for its design, programmers, and system operators responsible for the operation of the system. On the other hand, the users themselves, such as executives, managers and administrators should also be included here.
- Data are one of the most important resources of any information system since their main purpose is to process data and convert them into information. Data are often stored in the form of databases or knowledge bases (facts and rules).

Information systems are always linked to a physical system, organization, firm or corporation. According to this approach, an information system is a conceptual system that represents the company, that is, the actual physical system. There are claims coming from the physical system which, in exchange, are satisfied by the information system in the form of various services. Such claims can be the management of records or actual data, the simplification of everyday work, the preparation of forecasts, the detection of correlations at higher levels or providing a quick and accurate communication.. Information system are required to provide services satisfying these needs.

A. *The definition of business information systems*

There are several definitions offered on business information systems in the literature. According to Burt and Taylor's approach, "business information systems can be regarded as an information source in any combination thereof, or any access to and any recovery of their use or manipulation. Any business information system is designed to link the user to an appropriate source of information that

the user actually needs, with the expectation that the user will be able to access the information satisfying their needs" [7]. Davis and Olson define business information systems as "an integrated user-machine system for providing information to support the operations, management, analysis, and decision-making functions in an organization. The system utilizes computer hardware and software, manual procedures, models for analysis, planning, control, and decision-making by using a database" [6].

"Information systems are a part of any organization that provides, generates, stores, separates, divides and uses information. They are made up of human, technical, financial and economic components and resources. In fact, they can be regarded as inherently human systems (organizations, manual systems) that may include a computer system, and automatizes certain well-defined parts and selected items of the system. Its aim is to support both the management functions and the daily operation of an organization." [7]

In a broader sense, a business information system is the collection of individuals, activities and equipment employed to collect, process and store information related to the company's environment, its internal activities, together with all transactions between the company and its environment. Beyond giving direct support to operations, its basic task is to provide decision-makers with the necessary information during the whole decision-making process. The system's main components are the following [1]:

- Individuals: the actual users of technical apparatus. Belong to this group both people who develop, maintain and operate the system and users of information, as top managers who receive information on the factors affecting business operations, and use business information systems to make decisions in relation to planning, implementation and monitoring business activities.
- Information (processed data on external and internal facts and communication) which – due to its systematized form – can be used directly in the decision-making process.
- Technical apparatus, nowadays usually a computer system (hardware and software) that supports and connects the subsystems applied to achieve corporate objectives.

The computer system standardizes a significant part of the information and communication system, thus making it easier to produce and use information. According to one definition proposed [5], "information systems are systems that use information technology to collect information, transmit, store, retrieve, process, display and transform information in a business organization by using information technology.". Raffai's understanding of information systems is as follows: "it uses data and information as a basic resource for different processing activities in order to provide useful information for performing useful organizational tasks. It's main purpose is the production of information, that is dedicated to creating

messages that are new to the user, uncertainties persist, and their duties, to assist in fulfilling the decisions" [19].

B. The history of business information systems

After the first appearance of computers, it became clear soon that they could also be used with high efficiency in the business world. The first applications can be dated back to the mid-1950s but even in the 1960s, computers were used for only collecting, processing and storing data. The focus was on the data themselves, computers were applied for registration, billing, bookkeeping tasks in daily business operations. These systems were called Electronic Data Processing Systems (EDP). This activity has changed and differentiated a great deal, nowadays core business functions are performed by the so-called Transaction Processing Systems (TPS).

Around the mid-1960s, a new idea was raised: if computers are useful for employees working at lower levels, why cannot it be useful for managers as well? That is how Management Information Systems (MIS) emerged. These systems were designed to make pre-defined reports, and it proved to be really suitable to support decision-making at the level of management.

In the 1970s the first systems appeared that were able to focus on a specific issue, giving way to interactive processes and ad hoc queries as well. These are called Decision Support Systems (DSS), they were further developed in the 1980's. During this period, Group Decision Support Systems (GDSS) also appeared, helping the shared decision-making process of more stakeholders.

Similarly, to Decision Support Systems, Office Automation System (OAS) also emerged in the 1970s, revolutionizing office work and providing new opportunities such as word processing and spreadsheet programs, video conferencing and sending electronic mail.

The 1980s saw the appearance of microcomputers, software packages designed for users and the subsequent spread of networks, bringing users much closer to computer technology. At that time, it became necessary to develop an information system able to satisfy the needs of top management. These systems are called Executive Information Systems (EIS), which provide easy-to-understand, graphic, tabular information for managers.

Later, the development of business information systems was paved by the use of artificial intelligence in the form of Expert Systems (ES), which are designed to give an expert advice and make decisions, by focusing on a special business issue.

It could be seen from the 1990s that the integration and strategic role of business information systems became more and more significant. The history of the development of business information systems is summarized in the following table:

TABLE I
THE HISTORY OF BUSINESS INFORMATION SYSTEMS

PERIOD	TYPE OF BUSINESS INFORMATION SYSTEMS	SCOPE OF USAGE
1950s	Transaction Processing System (TPS)	It is used for collecting, storing, modifying, and retrieving the daily transactions of a business organization. It usually consists of an advanced database system for such business events as settlement of accounts, sales, rental payments, orders and raw material purchases.
1960s	Management Information System (MIS)	It is used to analyze operational activities in the organization. It makes pre-defined reports at regular intervals even when special events occur; it focuses on the information need of managers and gives assistance to solve well-defined problems. It is efficient mainly at an operational or tactical level.
1970s	Decision Support System (DSS)	It is naturally emerged from Management Information Systems, intended to help decision-makers to compile useful information from a combination of raw data, documents, and personal knowledge, or business models to identify and solve problems and make decisions. Its interactivity and the capability of elaborating problem-analyzing models makes it especially effective at tactical levels.
1980s	Executive Information System (EIS)	It is designed to facilitate and support the information and decision-making needs of senior executives by providing easy access to both internal and external information relevant to achieving the strategic goals of a business organization. It is usually easy to use, offering user-friendly features.
	Expert System (ES)	It is designed to propose a solution to unstructured, specific problems where highly-prepared expertise is needed. It actually stores all the available facts and figures, then it draws conclusions based on them. Actually, the facts and rules are stored, and based on these conclusions. It is a special field of application within the broader area of artificial intelligence.

1990s	Enterprise Resource Planning System (ERP)	Its main purpose is to facilitate the flow of information between all business functions inside the boundaries of an organization and manage the relationships with outside stakeholders. It may include customer and supplier relationships and supply chain management as well. According to its most recent interpretation, it provides support to the full operational level by its modular structure.
	Business Intelligence System (BI)	It is designed to produce large amounts of information with the potential of leading to the development of new opportunities for a business organization. It often includes online analytical processing (OLAP), data mining, process mining, business performance management, benchmarking and predictive analytics. With its complexity, it proves to be one of the most powerful decision support tools.
	Corporate Performance Management (CRM)	It is designed to organize, automate, and synchronize business processes, mainly sales activities, but also those for marketing, customer service, and technical support. It also contributes to product development and the elaboration of marketing strategies.
	Supplier Relationship Management System (SRM)	It is aimed at creating closer, more collaborative relationships with key suppliers in order to maximize the value realized through those interactions. As a cross-functional system, it provides support for decisions especially at operational and tactical levels [10].
	Supply Chain Management System (SCM)	It is designed to facilitate the systematic and strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of both individual companies and the supply chain as a whole. Its application is useful for making decisions both in operational and tactical levels [9].
2000s	Enterprise Performance Management (EPM)	It is a management field of Business Performance Management which considers the visibility of operations in a closed-loop model across all facets of the enterprise. There are several emerging domains in the EPM field which are being driven by corporate initiatives, academic research, and commercial approaches [18].

	Business Suite	A business suite is a set of business software functions enabling the core business and business support processes inside and beyond the boundaries of an organization.
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Enterprise Resource Planning (ERP) Systems were first used in the 1990s. Other cross-functional systems also started to spread such as Customer Relationship Management (CRM) Systems, Supplier Relationship Management (SRM) Systems and Supply Chain Management (SCM) Systems. In the same decade, the use of data warehouses became more and more common, which in turn led to the spread of Business Intelligence (BI) Systems as well. Applications based on Business Intelligence took the earlier CRM and SRM systems to a higher level. After the millennium, a new trend appeared by the use of corporate or business performance management (EPM - Enterprise Performance Management, CPM - Corporate Performance Management, BPM - Business Performance Management). Nowadays, the integration of various applications is in the forefront, on the other hand, it becomes more and more typical that the operational and top management levels of decision-making are distinguished. The business software market is increasingly competitive, major manufacturers offer industry-specific and size-dependent complex business packages (Business Suite) to companies.

C. Factors affecting the implementation of business information systems

When a business organization makes a decision about introducing any business information system, its determination can be explained in terms of [11]:

- "Technical considerations: companies applying fragmented, outdated business information systems with the lack of transparency.
- Strategic considerations: ERP systems may play a role in maintaining and enhancing competitiveness, they may establish the technical background to apply e-commerce solutions.
- Business considerations: among others, cost reduction and profit increase objectives, job cuts, stock reduction, reducing IT costs, improving productivity and more rapid turnaround of orders may belong to this group of factors."

However, the evaluation process leading to the decision of introducing a business information system is quite complex and it takes a large number of aspects into consideration. The most important step during this process is to select the most relevant aspects, then, after weighing them carefully, the management of a company can choose the best offer available. According to Kacsukné and Kiss (2007), these aspects can be divided into general and specific aspects as it follows.

1) General aspects:

- Availability of documentation: it is important for a company to investigate the availability of user guides, manuals and other system support documents.

- Compatibility: a newly-introduced system should fit the existing hardware and software assets and it also should be compatible with the hardware and software devices available on the market.
 - Costs: in the process of introducing a business information system, a business organization not only has to pay the price of a software product but it also has to pay attention to the additional costs related to its introduction such as education, professional and license fees, not to mention some incurring costs during its usage (telecommunications, maintenance and repair costs). In order to make an optimal decision, it is recommended to consider some other indirect effects of the introduction as well.
 - Ergonomy: the user-friendly nature of a system or an application is monitored here, with a special emphasis on its effects on the human nervous system, the eyes and hands.
 - Modularity: in the market of business applications, companies generally purchase the modules of various business information systems that are necessary to perform certain functions, maintaining the possibility of adding more modules to the purchased system in the future.
 - Network access: it also should be considered whether the newly-implemented system can be integrated into the existing network. In the case of hardware, it is a question of physical interface, whereas in the case of software the real question to be considered is whether the new application can run in a network environment.
 - Performance: a decision can be deeply affected by the expected performance associated to the business information system such as speed and capacity features.
 - Reliability: it is important to determine whether there is a risk of system failure and the extent to which occasional errors may result in damage. There are available systems that already have built-in self-monitoring and error diagnostic functions. The criterion of reliability is particularly important in those areas where human life is at stake or the occurrence of a failure may end up in causing huge financial losses (in hospitals, air traffic control, banks, etc.).
 - Support service: it may also be an important factor to what extent the manufacturer provides the installation, maintenance and repair of the newly-introduced system.
 - Technology: as in the case of products, product life cycle is a crucial factor in business information systems. A business organization has to decide whether to take the risk of experimenting with a brand-new technology or to resort to using more proven but less modern systems.
 - The manufacturer's reputation: although this aspect is not included in the referenced literature, it is possible that some companies prefer to ask for an offer from a larger, more respected service provider, ignoring smaller companies that may provide the same services with the same quality.
 - Usability: first, a business organization has to consider whether the applicable system is suitable for the tasks it is required to perform. If it turns out that the selected system is only partially able to fulfill the requirements, decision-makers will have to make compromises in terms of their needs, after taking other aspects into account.
 - Warranty: this includes the evaluation of the warranty services and conditions provided by the manufacturer.
- 2) *Specific aspects:*
- Availability of new software versions: it is reasonable to think about the future when selecting a business information system, that is, to check if there will be any new versions available for the selected system, what areas will be affected by the occasional upgrades, how quickly they will be done, and what additional costs will be incurred.
 - Customer support: this means that a business organization needs to know whether the producer is willing to provide customer support in the phase of introduction and after introduction if needed.
 - Flexibility and customization: it is important to take into account to what extent the implementation of a new system can be adapted to already established business processes. It is not reasonable to change well-functioning and long-established business processes in order to meet the capabilities of a newly introduced system, just because the new system is unable to adapt to the specific needs of the company. On the contrary, the manufacturer should be able to serve unique customer needs.
 - Free trial period: it is possible that some companies may choose a system based on experiences gained during a product demonstration or the testing of a shareware application.
 - Security: it is very important for a company to take into account protection options against the possibility of causing intentional or accidental damage to a company's existing network system.
- D. *Business information systems in SMEs*
- When moving to the realm of microenterprises and SMEs, some specific considerations have to be made.
- First, different levels of business information systems penetration might be recorded when observing organizations with different size. Microenterprises are expected to adopt only a limited amount of IT-related instruments because of their traditional lack of resources and simple organizational structure and processes that can be monitored directly by the owner-entrepreneur. In this context IT adoption usually includes e-mail usage, internet access and the implementation of simple information systems designed to improve few operational processes [21][4].
- Similarly, also small-sized enterprises should rank lower in IT adoption than their larger counterparts. Since SMEs do not usually have a managerial structure, they do not need

business information systems for managerial decision-making processes like MIS, DSS or EIS [12]. In Italy, past researches indicate that small enterprises do not have middle-level managers and the management of the organization is still mainly informal. Thus, IT investments for improving management's decision making have been rare [16] [8].

Second, it is possible that SMEs do not take into account all the aspects mentioned in part 2.3. when deciding to adopt a new or additional business information system. As suggested by Caldeira and Ward [3], smaller organizations might have scarce internal capabilities and expertise to fully understand business or strategic implications related to IT-based information systems' adoption. Contrary to this position, Levy and Powell [14] and Lesjak and Lynn [13] suggest the existence of some SMEs that are increasingly aware of the strategic benefits related to business information systems. Also in Italy there are companies that consider IT-based systems as an integral part of the business strategy and deploy them through projects that involve all organization members [8]. According to Yetton et al. [22] and Levy et al. [15], these SMEs do not usually conceive business information system only as a means of cost reduction (therefore investing merely in operational information systems that automate transaction processes), but they also employ them to add value to their products or services.

III. TEST METHODOLOGY

Our survey is based on a primary research, enterprises were asked to fill in a questionnaire in Hungary and Slovakia in the first quarter of 2011, whereas the identical questionnaire was filled in by German enterprises in the last quarter of 2012. The questions were aimed at exploring several areas within the enterprises, now we focus on only one major area. The introductory questions were directed at some background information of the surveyed enterprises, their IT infrastructure, their Internet usage patterns together with their information management practices were also subject of the inquiry. Present article deals with the use of business information systems by taking a closer look at the responses given to the questions related to them. Beyond the examination of business information systems, our aim was to put the initial assumption of our research to the test. After studying the relevant literature, we came to the assumption that the IT supply microenterprises was reflected by the ICT development level of the country they operate in. This connection is tested in our paper by comparing the results of the survey to the index showing the level of ICT development. In all three countries, hundreds of enterprises of different size received the questionnaires either electronically or on paper. In Hungary, 94 enterprises responded to the questionnaire, 21% of them were microenterprises, 29% of them were small-sized enterprises. Medium-sized enterprises also reached 29% and 21% of the respondents were corporations. In Germany, only

53 enterprises showed willingness to respond to the questionnaire, 27 of which were microenterprises, with 11 small-sized enterprises, 6 medium-sized enterprise and 9 corporations. With 51%, more than half of the 86 respondents in Slovakia were microenterprises, 26% of them were small-sized enterprises, 15% of them were medium-sized enterprises and only 8% of them were corporations (see the Appendix 1 for more details). The present article deals with only the examination of the microenterprises, the other size categories are not taken into consideration here.

IV. ANALYZING THE ICT USAGE PATTERNS OF MICROENTERPRISES

From the classification methods presented above, the questionnaire used the distinction based on the types of activities. Those types of activities were highlighted for comparison that is essential for the operation of microenterprises. In all three countries, most respondents used transaction processing systems, followed by the use of office automation systems (see the Appendix 2 for more details). The third most frequently used systems were supply chain management systems. These applications were used in all of the three surveyed countries. The question is: in which country did microenterprises use business information systems in the largest proportion? As it is shown in Figure 2, the German enterprises led the way in applying all types of business information systems, followed by the Slovakian enterprises while the proportion of applying such systems was the lowest among the Hungarian microenterprises. The proportion of companies planning to introduce an information system was about the same in Hungary as in Slovakia but in most cases Germany put these two neighboring countries behind.

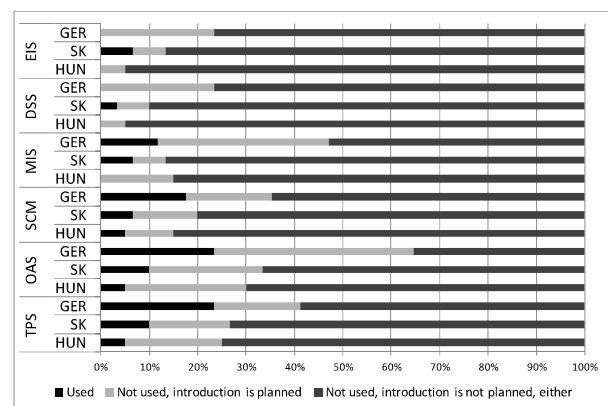


Fig. 2. The Trend of Economic Development

The questionnaire also included some questions about the reasons for introducing the business information systems shown in Figure 2, the answers are presented in Figure 3 below (see the Appendix 3 for more details). The organizational causes for the introduction of such systems were given a great importance by the German and Slovakian

respondents, whereas they were regarded as an insignificant factor by the Hungarian microenterprises. In Germany, microenterprises had a tendency to use business information systems due to business considerations and the nature of their activities. The importance of strategic reasons and business considerations both refer to the high level of the country's business culture. The primary cause for the Hungarian microenterprises to introduce such systems was that their activities required a very fast flow of information. Of the three countries, the majority of the Hungarian microenterprises reported that they had decided to introduce information systems to adapt to their competitors that had already used certain information systems. Such technical causes as replacing the existing inflexible, outdated system were mostly characteristic to the Slovakian microenterprises. On the whole, it can be said that the microenterprises in the surveyed countries identified similar reasons for introducing information systems, a significant difference occurred only in the case of organizational reasons and business considerations.

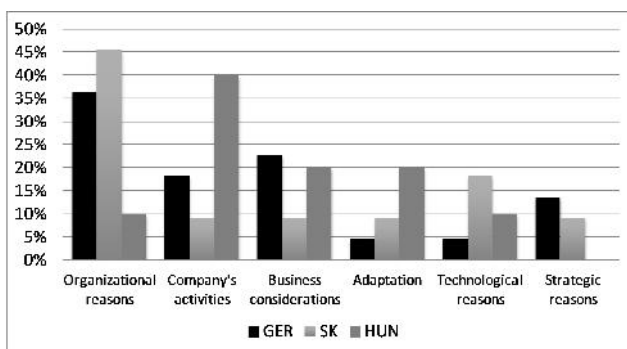


Fig. 3. The reasons for introducing the applied information system(s)

The aspects for selecting an implemented information system also carry important information on the ICT development level as it can be seen in Figure 3 (see the Appendix 4 for more details). One of the most important aspects was usability, it was preceded by only costs among the German, warranty, security and costs among the Slovakian microenterprises. The Hungarian microenterprises also weighed up costs but flexibility, customization and security were also important aspects. In the course of selecting an information system, technology proved to be the least important factor in all of the three countries. Figure 4 also shows that while in Hungary such short-term considerations as costs and usability were regarded as more important criteria, microenterprises in Slovakia and Germany put more emphasis on such long-term criteria as warranty and support service when deciding upon the introduction of an information system.

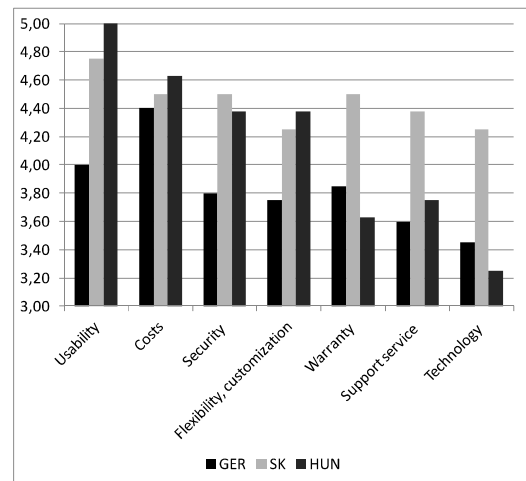


Fig. 4. The aspects for selecting an information system

After exploring what types of information systems are used by microenterprises in general, we also have to take a look at what results can be achieved by applying such information systems according to the users themselves. As it is shown in Figure 5, the sense of user satisfaction was measured on a 1-5 Likert scale (see the Appendix 5 for more details). At first sight, the high scores given to a new standard of connection with suppliers and customers and the improved internal communication can be spotted in Slovakia, the latter was also in the first place in Germany. In the case of the Hungarian microenterprises, the most important result of applying an information systems was to improve information supply for decision-makers. According to the German and Slovakian respondents, information systems played a minor role in improving competitiveness. However, their Hungarian peers put it in the second place.

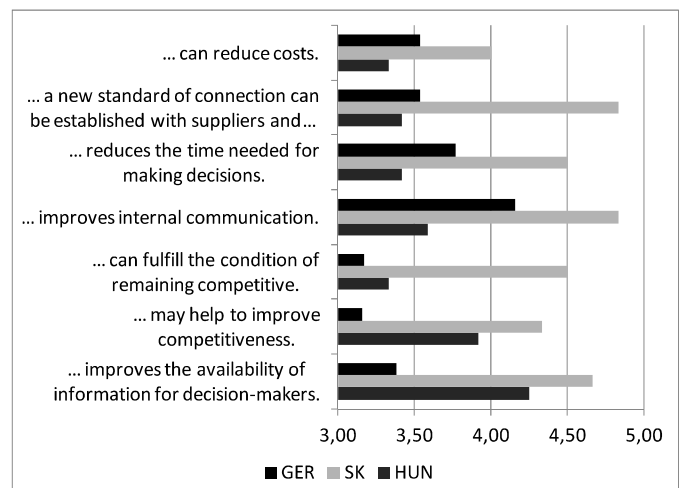


Fig. 5. Results achieved by introducing an information system

V. CONCLUSION

By examining the usage patterns of information systems among microenterprises, it is possible to draw some conclusions on their connection to the general ICT

development level of each country. The IDI index ranks Germany as the most advanced of the three surveyed countries, followed by Slovakia and Hungary. According to the initial assumption we examined, what influence the level of ICT development had on the ICT usage patterns of microenterprises. After analyzing the questions of the survey, it can be stated that information systems are most frequently used by the German microenterprises while their Hungarian counterparts used them the least. Introducing an information system is also planned in the largest number among the German microenterprises. Based on these findings, our initial assumption was justified. In terms of the aspects determining the introduction of an information system, the Slovakian microenterprises gave the highest scores to all of the listed criteria. While the short-term criteria were more important for the Hungarian microenterprises, their German counterparts put the question of using information systems in a longer-term perspective, which also refers to a higher development level. In reference to the results that can be achieved by using information systems, the Slovakian microenterprises had the most positive opinion. The Hungarian microenterprises mainly used information systems for improving their competitiveness, in Germany they were mostly used for improving internal communications instead. In summary, the findings of the questionnaire showed that there was a clear connection between the actual level of ICT development and the ICT usage patterns of microenterprises. As it was indicated by the IDI index, the most advanced country among the three surveyed countries was also the one where various types of information systems were used in the greatest number and the microenterprises operating there had a tendency to plan for a longer term than their counterparts operating in Slovakia and Hungary.

APPENDIX - I

Background information

	GERMANY	SLOVAKIA	HUNGARY
Number of companies			
Microenterprise	27	44	20
Small-sized enterprise	11	22	27
Middle-sized enterprise	6	13	27
Corporation	9	7	20
Percentage distribution of companies			
Microenterprise	50.94%	51.16%	21.28%
Small-sized enterprise	20.75%	25.58%	28.72%
Middle-sized enterprise	11.32%	15.12%	28.72%
Corporation	16.98%	8.14%	21.28%

APPENDIX - II

Distribution of using business information systems

	GERMANY	SLOVAKIA	HUNGARY
Transaction Processing System (TPS)			
Used	24%	10%	5%
Not used, introduction is planned	18%	17%	20%

Not used, introduction is not planned, either	59%	73%	75%
Office Automation System (OAS)			
Used	24%	10%	5%
Not used, introduction is planned	41%	23%	25%
Not used, introduction is not planned, either	35%	67%	70%
Supply Chain Management System (SCM)			
Used	18%	7%	5%
Not used, introduction is planned	18%	13%	10%
Not used, introduction is not planned, either	65%	80%	85%
Management Information System (MIS)			
Used	12%	7%	0%
Not used, introduction is planned	35%	7%	15%
Not used, introduction is not planned, either	53%	87%	85%
Decision Support System (DSS)			
Used	0%	3%	0%
Not used, introduction is planned	24%	7%	5%
Not used, introduction is not planned, either	76%	90%	95%
Executive Information System (EIS)			
Used	0%	7%	0%
Not used, introduction is planned	24%	7%	5%
Not used, introduction is not planned, either	76%	87%	95%

APPENDIX - III

Reasons for applying a business information system

	GERMANY	SLOVAKIA	HUNGARY
Organizational reasons	36.36%	45.45%	10.00%
Company's activities	18.18%	9.09%	40.00%
Business considerations	22.73%	9.09%	20.00%
Adaptation	4.55%	9.09%	20.00%
Technological reasons	4.55%	18.18%	10.00%
Strategic reasons	13.64%	9.09%	0.00%

APPENDIX - IV

Criteria for selecting a business information system

	GERMANY	SLOVAKIA	HUNGARY
Usability	4.00	4.75	5.00
Costs	4.40	4.50	4.63
Security	3.80	4.50	4.38
Flexibility, customization	3.75	4.25	4.38
Warranty	3.85	4.50	3.63
Support service	3.60	4.38	3.75
Technology	3.45	4.25	3.25
Availability of documentation	3.75	4.13	3.63

Availability of new software versions	3.25	4.13	3.50
Compatibility	3.70	4.38	3.75
Compliance with information strategy	3.63	4.25	3.63
Customer support after introduction	3.65	4.00	2.86
Customer support in the phase of introduction	3.63	4.13	2.88
Ergonomics	3.30	3.88	3.25
Free trial period	3.40	4.38	4.38
Manufacturer's reputation	3.50	4.13	2.75
Modularity, extendibility	3.45	4.25	4.13
Network access	3.45	4.25	4.38
Performance	4.05	4.63	3.88
Reliability	4.32	4.38	4.13

APPENDIX - V

The effect of business information systems

	GERMANY	SLOVAKIA	HUNGARY
... improves the availability of information for decision-makers.	3.38	4.67	4.25
... may help to improve competitiveness.	3.15	4.33	3.92
... can fulfill the condition of remaining competitive.	3.17	4.50	3.33
... improves internal communication.	4.15	4.83	3.58
... reduces the time needed for making decisions.	3.77	4.50	3.42
... a new standard of connection can be established with suppliers and customers.	3.54	4.83	3.42
... can reduce costs.	3.54	4.00	3.33

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