

# Information Technology for Business Process Management in Insurance Companies

Vesna Bosilj Vukšić, Darija Ivandić Vidović, Ljubica Milanović Glavan

**Abstract**—Information technology plays an irreplaceable role in introducing and improving business process orientation in a company. It enables implementation of the theoretical concept, measurement of results achieved and undertaking corrective measures aimed at improvements. Information technology is a key concept in the development and implementation of the business process management systems as it establishes a connection to business operations. Both in the literature and practice, insurance companies are often seen as highly process oriented due to the nature of their business and focus on customers. They are also considered leaders in using information technology for business process management. The research conducted aimed to investigate whether the perceived leadership status of insurance companies is well deserved, i.e. to establish the level of process orientation and explore the practice of information technology use in insurance companies in the region. The main instrument for primary data collection within this research was an electronic survey questionnaire sent to the management of insurance companies in the Republic of Croatia, Bosnia and Herzegovina, Slovenia, Serbia and Macedonia. The conducted research has shown that insurance companies have a satisfactory level of process orientation, but that there is also a huge potential for improvement, especially in the segment of information technology and its connection to business processes.

**Keywords**—Business processes management, process orientation, information technology, insurance companies.

## I. INTRODUCTION

**B**USINESS is a system of integrated processes. Understanding business operations and the related communication among employees, partners, customers and suppliers is a critical competitive, business advantage [1]. It is, therefore, vital that contemporary business systems identify, categorise and model business processes. Furthermore, they need to introduce business process monitoring and measuring with a special focus on critical success factors and key indicators of business performance. The need to define and document business activities applies to all organisations, regardless of the business field or segment a particular activity takes place in. In the process of defining these activities, the business process itself is defined as well. Business analysts point out that the way in which a task, i.e. a particular activity, is defined plays a significant role in task realization, both with regard to efficiency and success. Furthermore, they emphasise

Vesna Bosilj Vukšić and Ljubica Milanović Glavan are with the Faculty of Economics and Business, University of Zagreb, Trg J. F. Kennedyya 6, 10000 Zagreb, Croatia (phone: 00385-1-2383-333; fax: 00385-1-2335-633; e-mail: vbosilj@efzg.hr, ljmilanovic@efzg.hr).

Darija Ivandić Vidović is with the Croatia Osiguranje, Miramarska 22, 10000 Zagreb, Croatia (e-mail: darija.ivandicvidovic@crosig.hr).

that processes are interdependent, influence each other and cannot be observed individually, as islands, but need to be studied in their common interdependence with other processes and company aims, as well as with supporting systems and applications. Business optimisation which implies interconnection of people, information and companies is a key success factor. A real-time source of information is vital in making timely and correct decisions. In the process of preparing and making decisions, information technology presently plays a crucial role [2]. This paper is based on the analysis of information technology for business process management in the insurance industry. The functioning of national economies and the global market economy is nowadays inconceivable without the insurance industry as an important factor of financial system stability. Both in the literature and practice, financial institutions, primarily banks and insurance companies, are often perceived as leaders in the use of business process management tools on the global level, which may lead us to conclude that business process management is deeply integrated into business strategies of these organisations. This paper aims to answer the research question related to establishing if process management indeed lies at the core of business strategies employed by insurance companies. The first chapter presents an introduction into the topic. The second chapter defines and describes the concepts related to business processes. While describing the functioning of insurance companies, the third chapter places emphasis on their business processes. The fourth chapter offers a detailed overview of information technology for business process management. The fifth chapter presents our empirical study of the level of process orientation and the practice of using IT in business process management in insurance companies of the region. Furthermore, it presents a discussion and an analysis of obtained results and defines the research limitations. The final, sixth chapter provides the concluding remarks, the research contribution of our study and the guidelines for future research.

## II. BUSINESS PROCESS MANAGEMENT

In order to enable identification of business processes, it is crucial to define the concept of business processes. The word process has its origin in the Latin word processes, which means to move forward [3]. In spite of a significant number of definitions in scientific and popular literature, an unambiguous definition of business processes still remains to be proposed. Observation from different perspectives results in a whole series of definitions of business processes. Most of them actually contain the same elements: inputs, input

transformation, a series of activities and process outputs. Therefore, all definitions have a common feature: a set of logically connected activities that need to be performed to achieve a certain goal. This general definition of the concept is thus applicable both to production processes and service industry processes [4]. In short, a business process implies a series of logically connected activities using company resources with the ultimate aim of meeting customers' needs for products or services of certain quality and price within an adequate time frame and simultaneously creating certain value [5], [6]. Business processes collect data on the status and needs of employees and customers of an organisation. The data are then processed to enable undertaking the activities to meet those needs. They are actually the nervous system of each company [7] and because of that it is important to manage them. Business process management consists of several key areas. The perception of that concept in science and practice ranges from being driven only by information technology up to the holistic viewpoint on process management. Business process management initially focused on technical, i.e. information technology aspects in business processes and on the technology-assisted process design [8]. Only lately have researchers started perceiving business process management as an integral approach which is not focused solely on information technology. DeToro and McCabe [9] have introduced the holistic approach to business process management. They see business process management as a new model of organisation management that differs from the traditional functional and hierarchical approach. The holistic approach includes organisational aspects of process management and considers processes as the core enabling business operations while being supported by the staff of the organisation. Business process management therefore combines the management approach and appropriate information technology [10].

In the modern world, the increase of competition and customers' expectations require organisations to achieve a high level of efficiency and flexibility in order to be quick at adjusting to changes in the business environment. Consequently, organisations are forced to integrate their business processes through functional units. The need for such cross-functional integration leads organisations to adopt the process-oriented approach to activities management. There are a few definitions of business process orientation (BPO) in the literature, but the most adequate one states that the business process orientation of an organisation is determined by the level of attention the organization pays to its key business processes [11]. Business process orientation represents organisational efforts aimed at making business processes a platform for organisational structure and strategic planning [8], [18], emphasising processes as opposed to the hierarchy in the organisation [11]. It improves organisation efficiency through coordinating organisational activities in the system based on the integral processes. Business process orientation is tightly connected with information technology and business informatisation. On one hand, an appropriate level of business process orientation is a prerequisite for business processes

informatisation. Informatisation of disorganised, incoherent and uncoordinated business processes is useless. On the other hand, information technology enables and facilitates the execution of processes in a different manner [3]. During their analysis of the data collected in the period from 1997 to 1999, McCormack and Johnson [11] applied patterns and clear process evolution stages in companies. As a result of a detailed analysis of these patterns and process orientation levels as quantified by the process orientation measurement instrument, McCormack and Johnson developed definitions and numerical ranks for levels that a company goes through on its pathway to process orientation. They are as follows:

- Ad hoc level: processes are unstructured and ill-defined. Process measures are not in place and job and organisational structures are based upon traditional functions.
- Defined level: the basic processes are defined and documented and are available in flow charts. Changes in these processes must go through a formal procedure. Jobs and organisational structures include a process aspect, but remain basically functional. Representatives from functional areas meet regularly to coordinate with each other, but the process does not involve all employees.
- Linked level: the breakthrough level. Managers start employing process management with strategic intent and results. Broadly defined process jobs and structures are put in place outside of traditional functions.
- Integrated level: the organisation, its suppliers and customers take cooperation to the process level. Organisational structures and jobs are based on processes, and traditional functions begin to be equal or subordinate to processes. Process measures and management systems are deeply embedded in the organisation.

By combining BPO measurement instrument and maturity model, each organisation can place itself graphically on the maturity continuum (one of the levels of process orientation maturity). At that, the average values of each process orientation maturity level represent the range between the levels: a score of 0-3.5 represents the ad hoc level; 3.5-5 the defined level; 5-6.5 the linked level and 6.5-7 the integrated level [11].

### III. INSURANCE COMPANIES AND THEIR BUSINESS PROCESSES

An insurance company is a complex financial institution. Insurance companies are often perceived as just underwriting insurance, but at the same time they are important financial institutions and financial market participants. Being financial institutions, they perform the function of money savings transfer and allocation. To fulfil these functions, insurance companies first obtain resources by selling insurance policies and providing other financial services. The obtained resources are then invested into various forms of finance. On the one hand, insurance companies' investments define the importance of the insurance industry in financing the economy and the development of the financial market. On the other hand, insurance companies' investments play a role in their overall business strategy, profitability, solvency and market position.

In addition to transferring and allocating resources, insurance companies also perform the insurance function, which is specific and exclusive as no other financial institution provides it. The conditions on the contemporary market make it necessary to focus on creating value as a new criterion of business success. Creating value, however, happens only when an insurance company creates more than it has invested into resources [4]. Accordingly, an insurance company's business strategy needs to be targeted at creating added value. In order to create value, it is necessary to continuously improve the ability to create added value by investing in resources (especially human resources as a key factor in creating value in contemporary business) and by increased mobilisation of insurance company's internal potentials, primarily intangible ones. In relation to that, planning and decision-making processes need to be directed towards creating value, which is significantly more complex than profit orientation. In these conditions, the key challenge for the management is to create conditions for generating intangible values (knowledge, products, experience, benefits, speed, quality, reputation) and their transformation into tangible forms (income, profit, added value, shares, market value). It is the only way to ensure that the company will achieve long-term success and survive on the market.

Each organisation is defined through a series of business processes that describe how business is conducted in the organisation. Some processes are crucial for an organisation's business activity and constitute its comparative advantage. Some are not that crucial, but are still important for the company's functioning. Despite the abundant literature and theoretical studies into business processes, a standardised business processes catalogue still does not exist. This is partly due to the complexity of business operations in different industries, and partly to the variety of approaches used by different organisations when observing and analysing business processes as parts of their complex. In the insurance industry, as in other industries, there is no unified business process model that can be applied as a ready-made standardised solution for each insurance company. But with time, based on practice supported by theoretical research, a business process framework model in insurance has been developed and insurance companies can further adjust it to their specific needs and situations. The business process framework model in insurance (Fig. 1) is focused on managing key (core) processes that an insurance company uses to realise added value as facilitated by supporting and management processes. How an individual insurance company will organise its activities within such a framework model depends on the specificities of each company, its strategy, organisational structure, technology it uses, human and material resources at its disposal, as well as the external factors on the market and its competitors.

#### IV. INFORMATION TECHNOLOGY FOR BUSINESS PROCESSES MANAGEMENT

##### A. Business Process Modelling and Analysis

Many authors recognise the benefits of using information technology in developing process orientation [5], [12], [13]. They argue that information technology (IT) can have three different, yet complementary, effects on business processes. Through those effects on business processes IT creates value for the entire organisation. First, automated effects contribute to efficiency as value is derived from IT as a capital asset replacing work. Within this dimension, value is primarily derived from the influences such as improvement of productivity, labour savings and costs reduction. Second, information effects primarily arise from the IT's ability to collect, store, process and deliver information. As a result, value is derived from increased quality of decision-making, staff empowerment, reduction in resources use, and increased organisational effectiveness and quality.

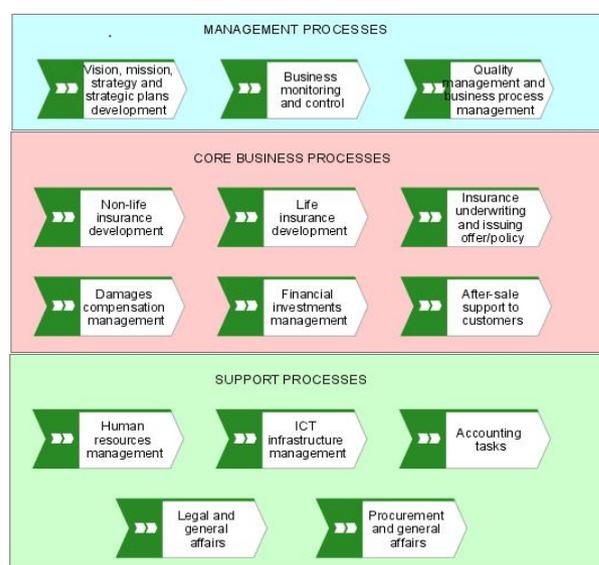


Fig. 1 Business process model for an insurance company

Third, transformation effects refer to the value derived from IT's ability to alleviate and facilitate innovation and transformation processes. Business value related to those effects is manifested through a reduced duration of processes and improved products and services. Davenport [5] writes about the positive effects of applying IT to support business processes realisation. According to this author, information technology enables the following: business processes automation, business processes duration reduction, easier collection, storing and delivery of information through forming repositories of business processes, monitoring and surveillance of business processes in real time, timely interventions, analysis of high amount of data, connecting activities in the business process and faster information transfer between geographically distant areas. Information technology enables better process practice, but does not in itself create added value [14]. However, information

technology is an essential and inevitable support to business process management. Processes and information technology are strongly interrelated, and process-oriented companies inevitably need tools to manage their business processes in an automated way. In the beginning, IT was developing as a means of business process modelling support. But business process modelling is just one phase of the business process management life cycle. It is a basis for management since a clearly defined business process model is a prerequisite for management [19]. Over the years of development and application of business process modelling tools, it has been proved that information technology should be used to help and facilitate the establishment of agile and efficient business processes, i.e. to support all phases of the business process management life cycle - from strategic thinking, through business process design and implementation to monitoring and process execution control [15]. Information technology oriented towards business processes, i.e. information technology for business process management, includes [3]:

- Business process modelling and analysis tools;
- Business process management tools;
- Business process management systems.

#### *B. Business Process Modelling and Analysis Tools*

Since enhanced understanding leads to improvement and optimisation [7] business process modelling and analysis hold crucial importance for the success of business process management initiatives. Business process modelling and analysis tools are software solutions used by managers, IT experts, analysts and end users in order to create business process models within an organisation, and store and analyse the related data. From the functionality perspective, these tools enable users to document, analyse the existing situation, to document proposals for improvements, and analyse the expected effects of the proposed changes [12]. Generally, it can be said that all process modelling and analysis tools generate business process maps that represent events, activities and conditions.

Basic functionalities of business process modelling and analysis tools include [3], [16]:

- Documentation of business process architecture;
- A series of methods for business process repository development;
- Business process analysis and process improvement proposals design;
- Creation of the base for information system development.

Consulting [8] defines business process control as a space for process modelling in which business users, business architects, business process analysts and IT analysts cooperate on business architecture, its changes and improvements. These include process analysis and process design aimed at supporting initiatives for business process improvement. Business architects use business process analysis (BPA) tools in order to work together with entrepreneurial, technical, application and information architects as a part of organisational efforts to find architectural solutions. Furthermore, the report emphasises that business process

analysis bridges the gap between IT efforts and matching business initiatives. Several business process modelling and analysis tools are presently available on the market. According to Gartner's research [17], research note G00219247, the leading producers of such tools is: Open Text – Meta storm, Software AG - IDS Scheer, IBM, Mega, iGrafx, Microsoft, Nimbus, Case wise, Mood International.

It is important to emphasise that there is no best business process modelling and analysis tool. There are many modelling and analysis tools which are, to a greater or lesser extent, specialised for certain groups of users and business fields. Since so many tools have been available lately, developing a basic tool with a series of additional modules has become a trend [15]. It attempts to meet the needs of all groups within an organisation in all business fields. Regardless of the growing number of "all-in-one" solutions, a company should choose a tool that corresponds to the company's own, specific needs.

#### *C. Business Process Management Suites*

A few key technologies enable managers and process owners to directly control and manage business process execution. These technologies have converged into a group of software tools called Business Process Management Suite (BPMS). In the literature, business process management suite functionalities and characteristics are systematised in a number of ways [7], [18]. Since the field is continuously developing, an unambiguous definition and description is not to be expected [1]. From the information technology perspective, the key functionalities of business process management suites are as follows [3]:

- Business process modelling and analysis. This component is used for the visual representation of an organisation's architecture with an emphasis on business processes. Models are stored in the business process repository. In addition to modelling, this component comprises functionalities for business process analysis (ABC analysis, BSC analysis and others).
- Business process execution management. This business process management engine is used for business process execution management in accordance with the established process models and business rules, for coordination of information resources and employees included in the process, and for communication of employees with the system during the process execution.
- Business rules management. This rule engine is used for establishing business rules and rules management during the process execution. Separating rules from a programme code makes the maintenance of programme solutions significantly easier while enabling business analysts to establish, to change and maintain business rules in accordance with business operations of the organisation and changes in business operations. Business rules management thus becomes simpler and more flexible, enabling amendments to business rules during the process execution.

- Enterprise document management (EDM) encompasses all functions of traditional documents and content management systems. These functions are needed because, in addition to employees, data and information stored in documents in various forms also participate in business processes.
- A server platform and integration interfaces enable the linking of the business process management system with other programme solutions within and outside an organisation.
- Business activity management (BAM) enables monitoring, analysis and optimisation of processes during their execution and using historical data. The collected data on process effectiveness can be used for analytical processing in the field of business intelligence.

Gartner's research "Magic Quadrant for Business Process Management Suites" [17], research note G00205212, lists the leading manufacturers of business process management suites: Pega systems, IBM (Lombardi), Software AG, Progress (Savvion), Meta storm, Oracle, Global 360 and Appian.

Business process management tools differ in possibilities, reliability and compliance with information standards as well as price. Deciding which one to buy is very difficult because the business process management tools market is relatively young and potential users lack practical experience that could be used as a guideline in choosing appropriate tools. But whichever business process management tool a company chooses, it will equip its managers with a tool for an efficient coordination of resources needed for business process execution. Furthermore, a BPM tool will contribute to informatization, automatization of activities and increased performance.

#### *D. Business Process Management Systems*

A business process management system (BPMS) is a platform for connecting a company's architecture, business process models, business flow management systems and information infrastructure serving as support in the execution of business processes [7]. BPMS is an application solution enabling organisations to realise their process orientation using information technology. According to most authors, process orientation implies that the company uses a business process management system to integrate people, systems and data. Gartner [19] defines BPMS as the leading Integrated Composition Environment (ICE) which supports business process management and enables continuous improvement. BPMS is an integrated group of software technologies enabling process transparency while simultaneously improving business processes and current task management.

Business process management systems have been developing for the last fifteen years. In the beginning, the emphasis was on business process automatization. Since then, the focus has shifted to developing systems which enable business operations monitoring as well as undertaking actions towards improving business operations [3]. Such a system should support the overall business process management system life cycle. It should connect a range of viewpoints on

business operations: the perspective of managers who define business goals, the perspective of IT experts who work on business process automatization and the perspective of analysts who evaluate business effectiveness. Unfortunately, most companies still use more than one application to perform individual operations within a process, which means that they are not taking into account the execution of the entire process [4]. It is expensive and time-consuming to synchronise multiple applications. Replacing them with a business process management system would connect individual steps and separate applications into a unique and interconnected unit. As a result, the management of all data and processes in a company would be simplified. A significant number of factors influence the success of a business process management system implementation. According to [20], process orientation of a company is an important factor influencing BPMS implementation. More precisely, as shown by practice, literature and research, a lack of process orientation causes various problems which influence the speed and costs of BPMS implementation. Since such systems facilitate business processes within an organisation and interdepartmentally, it is crucial for the organisation to recognise the processes as tools that can be used to increase the organisation's effectiveness [8]. The business process management initiative (BPMI) presently plays a significant role in the development of contemporary BPMS. Its basic purpose is to develop a standard graphic notation which would be accepted by producers of business process modelling programme tools. The development of a BPM system is expensive and complex. It sets high demands on project participants, and its success does not depend solely on the chosen information technology. The support of management to the implementation of the necessary organisational changes also plays an important role [21]. The application of BPMS overcomes the existing gap between strategic planning, introduction of a new business model and development of business process models in relation to the development of appropriate programme solutions involving IT experts [3]. BPMS enables measuring and publishing reports on the success of the business system. The aim is to enable monitoring of critical business and success indicators in real time so that business performance and the speed of reaction to change could be improved.

## V. EMPIRICAL RESEARCH OF INFORMATION TECHNOLOGY FOR BUSINESS PROCESS MANAGEMENT IN INSURANCE COMPANIES

### *A. Research Methodology Framework*

Both in the literature and practice, it is stated that financial institutions, primarily banks and insurance companies, represent leaders in business process management tools application on the global level. It is, therefore, assumed that business process management is deeply integrated into business strategies of these organisations [2], [10], [22]. Consequently, the main aim of our research was to empirically study the level of process orientation and the practice of using information technology for business process management in the insurance industry in the Republic of Croatia and the

region.

The main instrument for primary data collection within this research was an electronic survey questionnaire sent to the management of insurance companies in the Republic of Croatia, Bosnia and Herzegovina, Slovenia, Serbia and Macedonia. The questionnaire was based on the original research of process orientation conducted by McCormack and Johnson [11]. According to the questionnaire, process orientation consists of 7 dimensions. One of the dimensions of process orientation is process information technology and it is the only dimension important for the topic of this paper. The practice of using information technology for business process management was researched using the total of 5 questions. In this research study, close-ended questions were used in order to make the completion of the questionnaire easier. Only in a few cases was it possible to freely formulate an answer. Several questions, aimed at establishing objective facts, included potential answers. In most cases we used close-ended questions (statements) and the respondents were asked to express their level of agreement with the statements on a discrete Likert scale from 1 to 7: 1=strongly disagree, 2=disagree, 3=more disagree than agree, 4=neither agree nor disagree, 5=more agree than disagree, 6=agree, 7=strongly agree, x=do not know. The collected data were processed on a personal computer using the spreadsheet programme package Microsoft Excel and statistical analysis programmes Free Statistics Software, Stat Tools 5.7 and SAS Enterprise Guidever. A variety of regularly used statistical approaches were applied to data analysis: descriptive statistical analysis of collected data, descriptive analysis of mutual relationships among individual variables and the analysis and testing of statistical relationships among selected variables.

Questions on the legal status of companies, ownership, the number of employees, the range of annual turnover and location were used for determining the general characteristics of insurance companies and regional coverage of research. The research was to encompass the entire selected population (basic set), i.e. all 114 insurance companies in the Republic of Croatia, Bosnia and Herzegovina, Slovenia, Serbia and Macedonia. During the research, 62 completed questionnaires, i.e. 54.39% of the total set was submitted. Fig. 2 shows regional representation of insurance companies participating in the research. Most companies participating in the research were from Croatia, and Bosnia and Herzegovina, followed by Serbia and Macedonia. No insurance companies from Slovenia participated in the research.

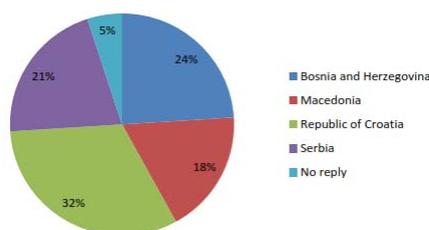


Fig. 2 Locational representation of respondents

The basic research set included small, medium and large-sized insurance companies. According to the categorisation of the Croatian Bureau of Statistics, small-sized companies have from 1 to 49 employees, medium-sized companies from 50 to 249 employees, and large-sized companies 250 and more employees. Fig. 3 shows the percentage of companies participating in the research according to the number of employees. Approximately the same number of small (29%), medium (32%) and large-sized (34%) insurance companies participated in the research.

The majority of insurance companies included in the research had the legal form of a joint stock company – as many as 87%. As far as ownership is concerned, the majority were privately owned - 82%. As far as the type of private ownership is concerned (foreign or domestic), 66% of the researched insurance companies were in foreign ownership.

Since the most significant revenue item of insurance companies is the sale of insurance, respondents needed to state their net income from sale in 2010. According to that criterion, 45% of companies participating in the research had a net premium income from 7 to 28 million euros, 31% received less than 7 million euros in premiums, and 16% more than 28 million euros.

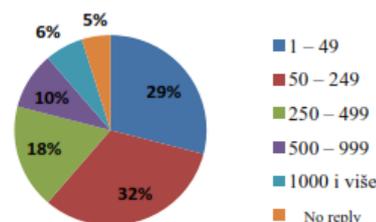


Fig. 3 Number of employees in researched insurance companies

### B. Research Results Presentation and Interpretation

The analysis of answers provided by all companies in the sample resulted in an average assessment of the process orientation of Croatian companies, as well as an average assessment of its individual dimensions. The analysis of average values of process orientation of insurance companies determined that the average value of process orientation maturity amounted to 4.97 (Fig. 4). Based on the established values, business processes of researched insurance companies could be placed at the defined level on the maturity continuum. As these were only average values, it should be noted that the level of process maturity of individual insurance companies could be significantly higher. Furthermore, the results placed the researched insurance companies on the borderline between the defined and the linked level of process orientation maturity. This result indicated that all business processes were modelled and documented. Furthermore, changes in business processes happened through formal procedures, although it was not exactly known who is responsible for each business process. Furthermore, the analysis showed that the process information technology with its average grade of 4.55 was the lowest rated dimension of process orientation. The grade was not significantly lower than the grade obtained for other dimensions but, if observed

separately, it put insurance companies at the level of defined business processes. Clearly, improvements are needed in that dimension. The low grade obtained for process information technology dimension resulted from the fact that informatization of insurance companies' business operations was primarily based on business functions, and not business processes. Business operations need to be based on processes if they are to be automatized through information technology.

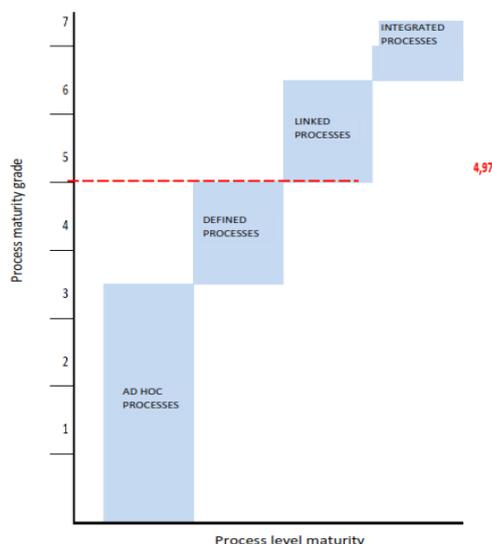


Fig. 4 The assessment of process orientation maturity of companies in the sample

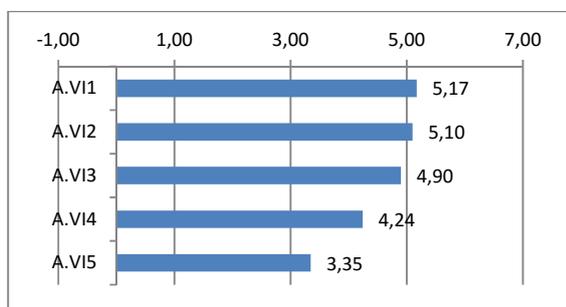


Fig. 5 Graphic representation of average grades in the process information technology dimension

Detailed results on process information technology perspective (Fig. 5) showed that the weakest point of insurance companies was the implementation of business processes modelling and analysis tools (Question A.VI5). Namely, if this grade (3,35) were had been observed separately, it could be said that the insurance companies are at the ad hoc level of process orientation maturity, which is disappointing. Besides, the research deals with the application of business process management system (Question A.VI4) which enables process modelling, automatization, execution and control. Since the average grade for this question was 4.24 further improvements in this field are required.

According to the results, the respondents evaluated the implementation of BPM systems better than business process

modelling and analysis tools usage. These results were not logical. Therefore, the assumption is the following: the questions A.VI5 and A.VI4 were answered by the insurance companies' managers who were not well informed on process modelling and analysis tools and BPM systems similarities and differences. However, the answers on questions A.VI5 and A.VI4 lead to the conclusion that in the future, the use of information technology for business process management will need to be intensified as it contributes to the organisation's value by coordinating its processes, and giving managers modes for efficient coordination of all human and technological resources involved in business processes. Among the companies that have business process modelling and analysis tools, only 45.1% used them regularly and 54.9% used them occasionally or rarely. The level of business process management systems use was no better. Only 48% of companies used them regularly, and 52% companies used them occasionally or rarely. As far as the business process modelling and analysis tools are concerned, insurance companies most often used ARIS (mentioned in 7 cases). In 48 cases there was no reply. The question about the frequency of those tools usage revealed that only five companies used them "daily", which supports the argument that business process modelling and documenting is not a regular practice in insurance companies of the region. Both core and supporting processes were modelled, and in most cases employees themselves modelled business processes without any help from consultants. For instance, as far as the introduction of overall risk management in insurance companies is concerned, according to the Solvency II Directive, all insurance companies shall have all business processes modelled and documented in the next few years. In that sense, future research will likely find significant improvements in business process modelling and analysis. The respondents gave much higher grades on questions A.VI1-A.VI3. According to respondents' assumptions information technology in their organizations is process oriented (Question A.VI1; grade 5,17), the managers use information systems for decision making (Question A.VI2, grade 5,10), information systems are flexible and support business processes (Question A.VI3; grade 4,90).

In order to check if there is a connection between process orientation of a companies and information technology they use, a correlation analysis between the dimensions of process information technology and overall process orientation of an organisation was conducted. Information technology represented an independent variable, and process orientation of an organisation a dependent variable. The correlation coefficient was the number expressing the level of correlation between the two variables. The correlation analysis showed that Spearman's rank correlation was  $r=0.748$  with the empirical level of significance  $p=0.000$ . Consequently, the two variables appeared to have a moderate positive correlation. That implies that an increase in the average grade for process information technology would be accompanied by an increase in the value of total process orientation. This finding confirmed the importance of information technology for a

company's process orientation.

TABLE I  
 PAST RESEARCH CONDUCTED IN THE FIELD OF PROCESS ORIENTATION MATURITY IN CROATIAN COMPANIES FROM ALL INDUSTRIES

Authors	Year	Sample	Business process orientation average grade
Bosilj Vuksic, V., Milanovic, M., Skrinjar, R., Indihar Stemberger, M. [12]	2005	202 Croatian and 203 Slovenian companies	3,47
Milanovic Glavan, Lj. [23]	2010	200 Croatian and 129 Slovenian companies	4,88
Bosilj Vuksic, V., Ivandic Vidovic, D., Milanovic Glavan, Lj. (this research)	2012	62 insurance companies from the main set (Croatia, Serbia, Bosnia and Herzegovina and Macedonia)	4,97

It has been stated in the introduction to this chapter that insurance companies are believed to be leaders in using business process management tools on the global level. Consequently, it is reasonable to assume that business process management is deeply integrated in their business strategies. Our research aimed to investigate whether this assumption is correct. The conducted research has shown that insurance companies have a satisfactory level of process orientation, but that there is also a huge potential for improvement, especially in the segment of information technology and its connection to business processes. However, if the results of the research presented are compared to the results of past research in the field of process orientation (Table I), it can be concluded that insurance companies have higher levels of process orientation than companies in other industries. The comparison of these surveys is questionable given the differences in the sample when the number and the type of business activities are taken into consideration. Research conducted in 2005 and 2010 encompassed various business activities and the sample was substantially larger than the population observed for the purpose of this paper. Besides that, the questionnaire is not entirely identical since the part on process orientation was modified to match the population surveyed in this paper. But, the 7-point Likert scale was used and the interpretation of results was identical. Therefore, regardless of the differences in research design, one can conclude that the insurance industry has a satisfactory level of process orientation maturity. Furthermore, researches [2], [10], [23] have shown that companies from the financial and the insurance industry have the highest level of process orientation of all other industries and the highest grades for the use of information technology for business process management. All these data prove that insurance companies are highly process-oriented, especially as a result of their focus on customers. This leads to the conclusion that such companies are pioneers in using business process management tools and systems in countries in which they operate, but that in insurance companies of countries in transition (Bosnia and Herzegovina, Macedonia, Republic of Croatia, Serbia) there is a potential for improvement: advances in the application of information technology would eventually take insurance companies to higher levels of process orientation.

### C. Research Limitations

One of the limitations of this research is a relatively small number of insurance companies participating in the research and therefore certain standard statistical methods could not be

conducted in relation to the study of the influence of one variable to the other. On the other hand, the rate of return of the questionnaires was satisfactory (54.39%), which indicated that a large part of the total population was represented. Also, the absolute number of 62 surveyed insurance companies, taking into consideration the total population, enabled conducting the statistical analysis and high quality inductive reasoning.

The second limitation is the fact that small, medium and large-sized insurance companies participated in the research, and it is logical that there are great differences in business process management practices among such companies.

The third limitation refers to the fact that the use of the questionnaire and the Likert's scale lead to certain subjectivity. The inability to verify the truthfulness of replies certainly presents a disadvantage. The fact that respondents sometimes do not know or do not want to reply to a question honestly casts doubt on the reliability of the obtained data. Sometimes, respondents simply do not understand the questions correctly as they are unfamiliar with business effectiveness management, business process management and knowledge management terminology. But, regardless of the abovementioned limitations, the collected data are more than valuable and useful for making conclusions on business process management in insurance companies.

## VI. CONCLUSION

Analyses of practice and the literature reveal that, globally speaking, insurance companies have reached advanced levels of process orientation maturity. The conducted research supports this claim, but it has also shown that insurance companies from the region could achieve higher levels of process orientation if they used process information technology more. The specific nature of business activities in the insurance industry drives insurance companies towards adopting process orientation. This natural potential should be used and the processes should be improved using various technologies at companies' disposal.

The conducted research could in future be expanded by including more respondents in the sample and by using in-depth interview methods in insurance companies, which would help prevent misunderstandings and subjectivity of respondents during the replying process. Conclusions reached in that way could be even more objective and relevant. Furthermore, this research could encourage other similar research, which would eventually contribute to the

development of this field.

Finally, the results of this research can be applied to all business systems, regardless of whether they belong to the service or production industry. Scientific knowledge obtained through this research will be, hopefully, useful to scientists as well as to professionals.

#### ACKNOWLEDGMENT

This work has been fully supported by the University of Zagreb under the project "Modelling Current Competitiveness Determinants of Croatian Economy".

#### REFERENCES

- [1] Ivandić Vidović, D., Bosilj Vukšić, V., Kereta, J. (2009), Analiza performansi poslovnih procesa za postizanje poslovne izvrsnosti: studija slučaja Hrvatskog osiguravajućeg društva (Analysis of Business Process Performance for Achieving Business Excellence: Case Study of a Croatian Insurance Company), *Poslovna izvrsnost Zagreb*, 1, 113-130.
- [2] Benko, J. (2012), Uloga informacijske tehnologije u upravljanju poslovnim procesima u osiguravajućim društvima (The Role of Information Technology in Business Process Management in Insurance Companies), *Magistarski rad (Master's thesis)*, Ekonomski fakultet, Zagreb.
- [3] Bosilj Vukšić V., Hernaus T., Kovačić A. (2008), Upravljanje poslovnim procesima – organizacijski i informacijski pristup (Business Process Management – Organizational and Information Approach), Zagreb: Školska knjiga.
- [4] Ivandić Vidović, D. (2012), Razvoj metodologijskog okvira za upravljanje poslovnim uspjehom (Development of a Methodological Framework for Business Performance Management), *Doktorski rad (Doctoral thesis)*, Ekonomski fakultet, Split.
- [5] Davenport, T. H. (1993), *Process Innovation: Reengineering Work through Information Technology*, Boston: Harvard Business School Press.
- [6] Harrington, H.J. (1996), *Business Process Improvement: the breakthrough strategy for total quality, productivity and competitiveness*, New York: McGraw-Hill.
- [7] Khan R. (2003.), *Business Process Management: a practical guide*, Tampa: Meghan-Kiffer Press.
- [8] Reijers, H. (2003), *Design and control of workflow processes: Business Process Management for service industry*, Berlin: Springer.
- [9] DeToro, I., McCabe, T. (1997), How to stay flexible and elude fads, *Quality Progress*, 30(3), 55-60.
- [10] Milanović Glavan, Lj. (2014), *Konceptualni model sustava za mjerenje procesne uspješnosti poduzeća (Conceptual Model of Process Performance Measurement System)*, *Doktorski rad (Doctoral thesis)*, Ekonomski fakultet, Zagreb.
- [11] McCormack, K., Johnson, W. C. (2001), *Business Process Orientation: Gaining the E-Business Competitive Advantage*, New York: St. Lucie Press.
- [12] Bosilj Vukšić V., Milanović Lj, Škrinjar R., Indihar Štemberger M. (2008), *Organizational Performance Measures for Business Process Management: a Performance Measurement Guideline*, IEEE computer society, ISBN 978-0-7695-3114-4.
- [13] Kueng, P., Hagen, C. (2007), The fruits of Business Process Management: an experience report from a Swiss bank, *Business Process Management Journal*, 13(4), 477-487.
- [14] Smith, H., Fingar, P. (2003), *Business Process Management: The Third Wave*, Tampa, Meghan-Kiffer Press
- [15] Lončar, A. (2008), *Alati za upravljanje poslovnim procesima, (Business Process Management Tools)* Zagreb: Infotrend, 158(2).
- [16] Gartner (2010), *Magic Quadrant for Business Process Management Suites, 2010-G00205212*, available at: <https://www.images2.adobe.com/content/dam/Adobe/en/enterprise/pdfs/magic-quadrant-for-business-process-management-suites.pdf> (4th July, 2012).
- [17] Gartner (2011), *Magic Quadrant for Business Process Analysis Tools, Analyst(s): David Norton, 2011 - G00219247*, available at: <http://public.dhe.ibm.com/software/au/rational/eam/article4.pdf> (8th July, 2012).
- [18] Harmon, P. (2007), *Evaluating an Organization's Business Process Maturity*, *Business Process Trends*, March 2004, 2(3), 1-11.
- [19] Gartner (2011), *Magic Quadrant for Corporate Performance Management Suites, Analyst(s): Iervolino, C., 2013- G00238924*, available at: <http://anibal.files.wordpress.com/2013/02/magic-quadrant-for-corporate-performance-management-suites-2013.pdf> (18th January, 2014).
- [20] Parkes, A. (2002), *Critical success factors in workflow implementation*, *Proceedings of the 6th Pacific Asia Conference on Information Systems*, Jasmin, Tokyo, 368-380.
- [21] Willaert, P., Willems, J. (2006), *Process Performance Measurement: Identifying KPI's that link process performance to company strategy*, *International Resources Management Association Conference 2006*, Washington, May 21-24.
- [22] Capgemini (2012), *Global business process management report*, available at: <http://www.slideshare.net/pexnetwork/global-business-process-management-report> (4th January 2014).
- [23] Milanović Glavan, Lj. (2010), *Upravljanje poslovnim procesima i znanjem primjenom informacijske tehnologije u hrvatskim poduzećima, (Managing Business Processes and Knowledge Using Information Technology in Croatian Companies)* *Poslijediplomski specijalistički rad (Postgraduate Specialist Thesis)*, Ekonomski fakultet, Zagreb.