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# THE IMPACT OF TECHNOLOGICAL DEVELOPMENT ON INSURANCE COMPANIES

## УТИЦАЈ ТЕХНОЛОШКОГ РАЗВОЈА НА ОСИГУРАВАЈУЋЕ КОМПАНИЈЕ

**Summary:** *In the contemporary business environment, the fundamental parameter for the successful subsistence of the competitive advantages is keeping pace with the contemporary trends. This also applies to the insurance industry, regardless of how conservative it is considered to be. Information and Communication Technologies influence all business sectors of the insurance companies. The users are increasingly reaching for the Internet as tools of research of insurance prices and products, and possibilities are opening up for the insurers through the new distribution channels. Innovations of the existing products and the development of the new ones represent the driving force behind the evolution of the entire insurance sector. Investing in the modern technology through information systems and risk modeling software makes administrative work easier, and has a significant role in the strategic-business decision-making process.*

**Key words:** *Insurance, Information and communication technology, Innovation*  
**JEL classification:** *G22, O33*

**Резиме:** *У савременим условима пословања, основни параметар успјешног одржавања конкурентских предности јесте праћење савремених трендова. То се односи и на индустрију осигурања, ма колико конзервативном се она сматрала.*

*Информационо-комуникационе технологије свој утицај имају на све секторе пословања осигуравајућих компанија. Корисници све чешће посежу за интернетом као средством преко кога ће доћи о информацијама о цијенама и производима осигурања, а осигуравачима се отварају могућности у погледу нових канала дистрибуције. Иновације у постојећим, и развој нових производа представљају покретач развоја читавог сектора осигурања. Улагање у савремену технологију у виду информационих система те софтвера за моделирање ризика олакшава административне послове, али и има важну улогу у доношењу стратешких пословних одлука.*

**Кључне ријечи:** *осигурање, информационо - комуникационе технологије, иновације*  
**JEL класификација:** *G22, O33*

## 1. INTRODUCTION

The development of information and communication technologies in the last few decades caused considerable changes not only in economic activity, but also in patterns of consumer behavior. The most significant changes are reflected in globalization, innovations in human resources management, new products as well as distribution channels. Technology development has made it possible to reduce the prices of home computers, mobile phones, and tablets that enable access to the global network from anywhere on the planet. The role of technological innovations in all business segments is incessantly increasing. Although the insurance sector is failing to keep pace in the adoption of technological innovations, insurance companies in developed countries strive to keep up with new technologies and take advantage of the opportunities that are offered to them. The uses of new technological achievements in insurance are numerous, from the possibilities of developing new products and services and product distribution to information support in the implementation of actuarial tasks, as well as in strategic decision-making. The research will make an empirical and theoretical analysis of what is already known, starting from the theory that keeping up with the technological progress, the development of new and the improvement of the existing products is a necessary

component of the business strategy of the insurance companies and their survival on the market.

## 2. CONTEMPORARY TECHNOLOGICAL TRENDS

Technological progress has significantly influenced all spheres of human life and business in the past decade. According to the United Nations and the world's leading global information, data and measurement company, Nielsen Holdings, there are more than 4 billion Internet users in the world today, which means that more than half of the world's population has Internet access. The principal reason for this increase is the increase in the number of smartphone users, where only in 2017, about 200 million people bought the first “smart” phone (Wearesocial 2018). Other possibilities that Internet has to offer are the social networks. This Internet medium offers users the opportunity to connect with other users, and exchange various multimedia content. Social networks have been experiencing tremendous popularity in the past few years, especially among younger generations. They are not just means of connecting people, as their potential for achieving business goals has been recognized by numerous companies. There are 4 basic types of social media, such as social networks, as Facebook or LinkedIn, then microblogs such as Twitter, Tumblr; then there are sites for sharing multimedia content such as YouTube, Flickr, and encyclopedia-based sites for the exchange of scientific data. In 2017, 47% of the business in the European Union used at least one of the aforementioned social medias (Eurostat 2017). These results demonstrate that Internet offers an enormous market for the existing products and services, including possibilities for the development of the new products tailored to the needs of the population.

*Table 1 Internet usage and population stats in 2018 by World Regions.*

<b>World Regions</b>	<b>Population (Est 2018.)</b>	<b>Internet Users 30.6.2018.</b>	<b>Population Percentage</b>
Africa	1,287,914,329	464,923,169	36.1 %
Asia	4,207,588,157	2,062,197,366	49.0 %
Europe	827,650,849	705,064,923	85.2 %
South America	652,047,996	438,248,446	67.2 %
Middle East	254,438,981	164,037,259	64.5 %
North America	363,844,662	345,660,847	95.0 %
Australia/ Oceania	41,273,454	28,439,277	68.9 %
Total	7,634,758,428	4,208,571,287	55.1 %

Source: Internetworldstat 2018

Information and Communication Technologies (ICT) have transformed the economy in its entirety because they have led to cost savings, increased efficiency, enabled the development of new products and activities by adapting to the needs of the customers, and opened up new companies and new jobs. The basic advantages of the use of information and communication technologies in sales are reflected in the following:

- Window dressing is unnecessary,
- Sales staff is minimal,
- No geographical limitations,
- Instant communication is possible,
- The ability to present through an interactive multimedia catalog that can provide as many information as the customer wishes,
- Quick adjustment to changes in sales prices and supplies,
- Great potential to adjust to customer needs (Ćirić 2010)

ITC innovations are also changing the consumer habits and behavior. The consumers are increasingly choosing online shopping. According to the data of the National Retail Federation, about Consumer Behavior during one week of Thanksgiving Day sales in US, as many as 25% of all customers made their purchases online, while 54% used various means of purchase including Internet.

### 3. THE INFLUENCE OF MODERN TRENDS ON INSURANCE

Trends of modern technological development have found their place in the financial and capital markets. Information is the fundamental resource in this market. They are necessary for the planning process and development of new products as well as the appropriate adjustment to the environmental influence. New technologies, particularly Internet, enable the connection of various economic agents in terms of better exchange of financial instruments and goods, as well as the expansion of the market. The Internet allows this activity to take place globally (Economides 2004, 1-3). The specificity of this sector is that it works with services and products in intangible form. The exchange takes place on the basis of information, that is, the exchange of financial instruments is carried out through a digital record. By virtue of the development of information technologies, this sector has great potential for evolution and development of new services. The financial sector is leading in the application of new technologies, and technological innovations have been mostly adopted by banks. By using new technologies, banks eliminate geographical limitations, communication and connection with clients is facilitated, as well as acquisition and flow of information. Significant financial savings are made through the use of new technologies, as the transaction costs are reduced, and therefore the initial investment in technological development is paid off. Electronic banking enables online payments, bank account balance reports, setting up bank accounts, applying for a loan, buying Securities, insurance, while e-banking through mobile devices is being increasingly used. According to Eurostat data for 2017, around 51% of residents in Europe use Internet banking, with a trend of constantly increasing number of users. Since 2007, this number has doubled (Europa 2018). Technological innovations were not overlooked by other financial organizations. This primarily refers to stock exchanges, where timely information plays a key role, as well as microcredit organizations, and insurance companies.

Initially the application of information technologies in insurance companies found its place in the work process itself. Software creation enabled easier premium calculations, damage processing and policymaking process, and accordingly the databases are being created. With the emergence of the Internet, opportunities expanded, as insurers have the opportunity to create their own websites where they can present their offer and provide clients with all the necessary information. Through the popularization of the Internet, the development of social networks and mobile telephony, insurance companies see new chances for development. They enable clients to report damages and provide documents necessary for compensation of damages via the Internet. Insurers use social networks as a marketing tool. As an example we shall mention "Farmers Insurance" that offers virtual insurance of crops in the popular game Farmville on Facebook (Insurancetech 2010) In addition to that, insurers use social networks for the acquisition of customer data and are able to offer them the appropriate products. Changes made by digital technology in the insurance industry are largely reflected in the possibilities of more efficient data acquisition and analysis, and software support. However, there is also a multitude of options for distribution improvement, development of new channels, and new products, which will be discussed in more detail below.

#### 4. INTERNET AND INSURANCE DISTRIBUTION

The distribution of insurance products can be internal and external. External channels are brokers, agents, and bank insurance, while internal implies direct sales. Insurance companies choose sales channels by pursuing long-term goals of securing the highest sales volume at the lowest cost. Agents or representatives are "extended arms" of the insurance company and must provide them with a given number of the insured, and directly represent the interests of an insurer. Brokers or agents primarily preserve the interests of the insured. Companies adapt to customers because their cultures, needs, requirements, and financial opportunities vary among the countries. Technological developments in the distribution field were initially reflected through IT support of sales agents so that they were able to perform their services as efficiently as possible. Through Internet popularization web sites are emerging where insurers present their products, especially in the areas of travel insurance or automobile liability insurance. In this way, clients are able to familiarize with products and prices in certain insurance companies. Monitoring customer behavior and the global trend of online shopping, it is clear that there is a need for insurers to provide independent sales channels based on modern technology, primarily on the Internet. Wide use of the Internet enables potential insurers with access to greater number of clients, clients with access whenever they want it, and digital job performance. The Internet also enables improvements in classic forms of distribution, in the form of accessibility to larger databases. Additionally, the use of Internet implies a considerably lower costs as opposed to other channels. Reduction of costs is mirrored in reduction of administrative costs, distribution costs, and claims settlements.

According to the Swiss Re report, Internet distribution channels are reducing the costs of distribution to 12%-26% of the premium value. Additional administrative costs savings amounted to 9%-15% of the premium amount, while claims settlements amounted to 4%-12% of the premium amount (Sigma 2000).

Despite the advancement of technology in this segment of insurance business, according to the Swiss Re data, agents, brokers and other intermediaries still hold around 60%-70% of the sales. The reason for this is mainly the complexity of certain insurance products, especially life insurance. Insurance Europe has a more detailed overview that individually monitors the participation of certain distribution channels for life and non - life insurance.

Based on this survey, it can be seen that bank insurance has a leading role in the distribution of life insurance, especially in countries such as Malta, Portugal, Turkey, where even 80% of the policies is sold through these distribution channels.

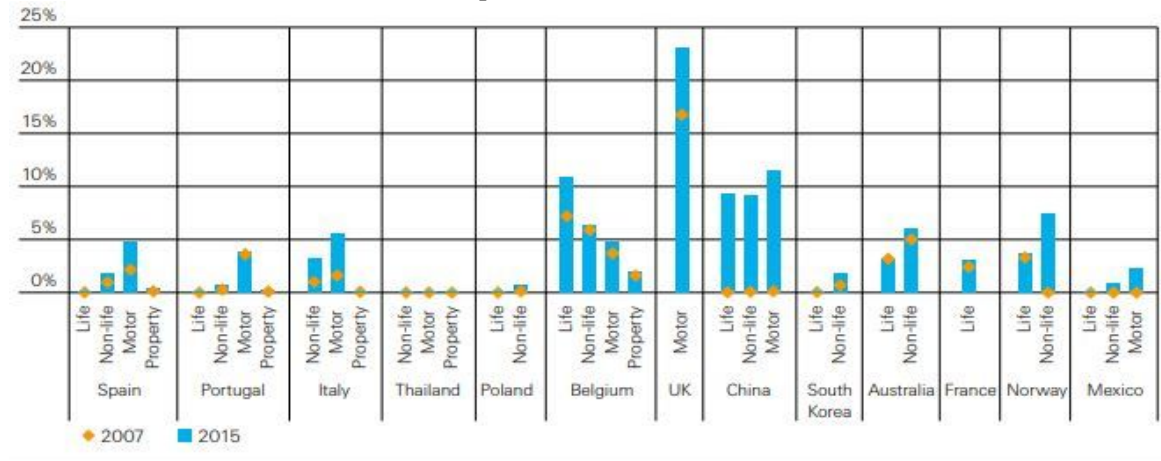
In the case of non-life insurance, the situation is somewhat different, since sales are predominant through agents and brokers. Direct Internet sales are developing rapidly in individual markets, especially in the sale of standardized products, such as motor vehicle insurance, and house insurance. According to the data of Swiss Re regarding the period from 2007 to 2015, Internet sales of vehicle insurance in Great Britain are exceeding 20%, and the trend of significant growth in this type of sales is observed even in China. (Chart 1)

Swiss Re offers several reasons why it is difficult to sell insurance products over the Internet:

- The complexity of some products requires specific explanations, especially regarding life insurance products. Although it is expected that technology will overcome this problem,
- Specificity of certain insurance claims, which cannot be standardized,
- Insurance is not purchased on regular basis, in some cases only once during a lifetime, therefore, the insurer and the insured have almost no interaction,
- Mistrust of the customers concerning Internet commerce, especially among the older customers,

- Regulatory barriers, for example, an insurance company in the United States that wants to sell policies over the Internet, must have a license to sell in all 50 states. Another example is the problem in the case of a dispute, where the issue would arise, according to whose laws the dispute should be acted upon.

Chart 1. *The share of direct sales of insurance over the Internet in the selected countries for the period 2017-2015*



Source: *Swiss Re, Sigma 3/2017*

It is important to mention that the development of new distribution channels depends to a large extent on the market, the financial capabilities of the population and the cultural differences. In accordance with the listed information, we can expect that in the future distribution channels via the Internet will be on the rise in the markets of the developed countries, while the traditional distribution models will continue to remain in the developing markets. Nevertheless, insurers in less developed markets also need to be present on the Internet, provide customers with easier access to information, and offer sales of simpler insurance products.

## 5. ITC AS THE DEVELOPMENT INITIATOR OF INSURANCE PRODUCTS

Changes in technology development are forcing insurers to adapt to customer needs by introducing new products. Information technologies are also offering chances of development to insurers. Information technology related services, which are also present in our country, and are already offered by numerous insurers, and these are the insurance of computers, mobile phones, or glass surfaces of these devices.

One of the new trends in developed markets based on the development of information communication technology is the Usage-Based Insurance (UBI). This trend emerged on the markets in Great Britain and USA whereby the costs are dependent upon type of vehicle used, measured against time, distance, behavior and place, on vehicle usage and behavior data. Travel data is obtained from a device that is built into the car or is subsequently installed, and it is possible to collect data also via a mobile application that is inserted into the phone of the insured, which is then connected to the vehicle.

Picture 1 *Insurance cycle based on usage*

Source: Confused 2018

Amodo developed two models of this system, the first premium is paid on the basis of mileage, while the second premium is paid taking into account the quality of driving from the aspect of safety (Amodo 2018). The benefits of this insurance model are numerous for the insurance sector, as they enable the placement of new products, lower costs of the acquisition by the insured, outstanding compared to the competition, and the lower number of reported claims by the users of this insurance policy. According to Ernst & Young, this type of insurance has the potential to reduce the reported damage by 40%, while the administrative costs could be reduced by as much as 50%. Users benefit from these innovations, starting from a lower cost policy that is based on the driver's vehicle use or behavior, through the development of communication channels between the insurer and the insured, through which the user has insight into the statistics of his driving. Nonetheless, the most important advantage is safety, since, apart from being able to have insight into one's driving behavior, the user will also receive recommendations from the insurer. Considering that there haven't been new products in the automobile insurance market for a long time, it can rightfully be expected that the leading global insurers will start with more active offer of Usage-Based Insurance.

With the advancement of technology and the development of the automotive industry and the transport infrastructure, it is realistic to expect that fully automated cars will appear in the near future. Sophisticated software, as well as an algorithm that would complement itself, would process all the data in real time, and predict the movement of other vehicles and pedestrians (Clark 2017). These automated automobiles are expected to lead to a 90% reduction in traffic accidents, and the insurance premium and insurance compensation scheme would be significantly different.

Technological innovations have also influenced the real estate market. According to the AMR (Allied Market Research) study, by 2020, the smart home market will reach \$ 35 billion. The main reason for such development of this market are government measures, rising energy costs, and environmental awareness. The use of technology through smart devices that are built into these houses allow insurers to collect a large number of data about their customers and their behavior, and also provide them with an opportunity to sell new products. Encouraging people to accept the "Internet of Things" will be crucial for the Insurance Companies of the future. The Internet of Things is the network of physical objects (devices, buildings, vehicles) with embedded software and sensors and the possibility of connecting with an operator or other device. Aviva, a multinational Insurance Company, offers more

favorable premiums for customers who install sensors in the home, with the aim of reducing costs from the largest single item in the damages, and that being flood damages. The smart sensor that is being installed detects leakage on the pipes and warns the house owner via the telephone (Aviva 2018).

The Internet of things, as a combination of sensors and communication networks, greatly enhances the collection and transmission of information, automates numerous processes in the business, and improves control. The risk assessment, that the insurance companies are exposed to will be more realistic, insurance companies will reduce their losses and will offer better insurance terms. Setting sensors to insured objects allows for more realistic measurement and risk assessment, and therefore the cost of insurance will be more realistic. Also, the possibility of fraud will be reduced, because the insurers will have real data.

Given the rising competition that leads to lower margins, insurers will have to use the Internet of things to make their business more efficient. Automation of the process affects the reduction of the costs of insurance companies, which will be the main competitive advantage in the future. The claims will be done through applications on mobile devices, so users will not have to fill in a number of forms, and employees in insurance companies will avoid the paperwork, so the claims will be dealt more efficiently. Connected devices will enable easier calculation of risk, and adjustment of the premium to each insured person individually.

Insurance Companies around the world are seeking to find new ways to apply these technologies in order to prevent claims for damages. This leads to a transformation of the insurance sector from the industry that compensates the damage incurred to an active system of prevention of the occurrence of harmful events.

## 6. THE ROLE OF INFORMATION IN STRATEGIC DECISION MAKING

The root of the Insurance Companies line of work is mirrored in taking over the risks that the insured are exposed to, in exchange of the premium amount. The specificity of the business cycle in insurance is its inversion in relation to the production, trade or service enterprises because the insurer's income in the form of a premium is preceded by expenses that are reflected in the form of compensation for damage when the insured event occurs. The risk represents uncertainty as to the occurrence of a future event, and uncertainty arises when an individual has no information about the environment and is unable to quantify the risk. Risk is one of the basic components of the insurance.

For the adequate management of the Insurance Company to be achieved, quality information system is necessary, which would enable statistical monitoring and organization of input data, and access to these data by managers. It is quite natural for insurers to seek solutions to improve business processes within the company, and the best tools for this are different software solutions that facilitate complicated operations and enable digitization of business. In this way, a faster flow of information is provided, which increases the efficiency of employees.

Main roles of the information systems in modern business are:

- Support business processes and operations
- Support for making business decision-making
- Support the comparative advantage making strategy (Stojanović 2017)

Regarding the historical development of the need for faster data processing, the first recorded traces date from the period before the Second World War. Namely, in 1936, English actuary, William E. Phillips, in a paper published in the *Journal of the Institute of Actuaries*, describes the characteristics of a fast computer, which consists of electronic components, and which would use the binary number system, which is the basis of electronic data processing of

today. Phillips stresses that such a device would be of great importance for the Insurance Industry (Mitchell 1974). We can conclude that in particular the actuarial function has greatly benefited from the development of new technology, both in its beginnings and today.

Given the importance of the actuarial function and that the actuaries are key factors in making strategic decisions in the Insurance Company, it is important to implement the actuarial functions in the information system of the insurer. This would allow the reduction of the costs of controlling input data and saving actuarial resources in relation to accounting without the help of the Information System. Companies with modern, well-developed Information Systems have improved their organization and mode, so that policies are issued with the help of computers, and the premium is calculated on the basis of the parameters entered for the specific client (Pavlović 2011).

A special contribution of modern technology has been made in the field of Risk Modeling. This area is rapidly evolving as the risks that are accepted in the coverage can be assessed on the basis of science-based methods. Without an adequate risk assessment and analysis, an Insurance Company can adopt a strategy that will result in inefficient use of available funds, which can jeopardize the survival of the Insurance Company over time. For this reason, computer-based risk modeling is a great help in determining real premiums, as well as in assessing total capital and its relationship with risky portfolio. Modeling is especially applied in catastrophic events because statistical models do not give a true picture of the possibilities of achieving these events. The basic characteristic of catastrophic events is low probability and the great intensity is why it is not possible to manage these risks based solely on previous experience. Technological development and improved understanding of natural disasters enabled the development of computer models for assessing the risk of catastrophic events and their evaluation and management. According to Swiss Re in 2017, economic losses from natural disasters amounted to \$ 330 billion, which is more than double as compared to 2016 and far above the 10-year average of \$ 190 billion, while claims for damages amounted to \$ 138 billion (Sigma 2018). Based on global climate change, it can be assumed that more catastrophic events can occur in the years to come, and it is therefore essential for the Insurance Industry to adequately quantify risks using modern technologies.

## **7. CONCLUSION**

The aim of this paper is to draw more closely an important topic for the contemporary Insurance Companies. Based on market developments under the influence of Modern Technologies, Insurance Companies, however conservative, will be forced to adapt to the requirements of the Insurance Market. In order to successfully operate, an Insurance Company must be competitive, and this will be achieved through the development and improvement of distribution channels in aim of costs reduction, by creating new insurance products that follow contemporary trends in all spheres of human life, and implementing modern Information Systems and software solutions, in order to facilitate the collection and processing of data and strategic decision making.



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