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The Role and Importance of Insurance of Business and Supply Chain Interruptions

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The subject of this paper is the issue of business continuity and risks of disruptions and the role of insurance. Special importance is given to the problem of supply chain sustainability. The critical element of success in business is maintaining continuous operations. If companies are not in a position to achieve that aim, or to finance their losses after an accident that can cause interruption, they certainly will fail. Insurance has a pivotal role in business and supply chain continuity risk management. As well as in all other cases, insurance cannot directly safeguard companies from accidents and subsequent disruptions but is the most important source of indemnification for losses when insured events materialize. Unlike developed economies, this type of insurance still does not have such importance in Serbia and other former Yugoslavian republics. We conclude that insurance, as an integral part of risk management efforts, should be combined together with other risk management techniques in order to provide business and supply chain continuity.

Keywords: risk, business continuity, supply chain, risk management, insurance

1. Introduction

Development of civilization was followed by the risk of the original community suffered from time immemorial to nowadays, making an integral part of all living and working activities of humans (Njegomir, 2011). Doing business is exposed to numerous risks that threaten property, life and health of employees, as well as business continuity. It is assumed that there are about 450 different types of risks in the world (Marovic and Avdalovic, 2006, p. 46). Doyens of economic thought, Samuelson and Nordhaus emphasize that economic life is a risky business (Samuelson and Nordhaus, 2009, p. 205). Recently, businesses are more exposed to uncertainty and various risks such as pandemics, terrorism, natural disasters, software viruses, and the like. New technologies, especially information and communications, modern ways of doing business that require delivery to business partners and consumers just when they need it, Just-in-Time (JIT), as well as a rapidly changing business environment bring numerous advantages, but also numerous challenges. Supply chains are becoming longer and highly technologically dependent, which, on the one hand, improves the efficiency of doing business, but at the same time, in the case of the risks that lead to business interruption, the potential consequences are far more devastating than they were twenty years ago due to the strong interdependence of risks.

Marine insurance was first developed and its traces date from the period of 5000 BC. Over time it became necessary to finance the consequences of indirect losses that are not covered by the usual property insurance. Afterwards, due to the expressed needs of businesses to ensure the continuity of their business as well as operating income the first forms of insurance against business interruption emerged as early as in 1797. Minerva Universal, a UK company paid insurance premium in case of lost operating income due to business interruption caused by the risk of fire. In the modern business conditions insurance coverage for business and supply chains interruption attract an increasing attention. The main reason lies in the fact that the indirect damages resulting from the realization of adverse events covered by property insurance in some cases become higher than the direct damage to property. Having this in mind it becomes important to analyze achievements in this type of insurance. The authors first analyze the exposure to the business and especially supply chain disruptions, followed by the risk management and then the application of insurance as a key element of the management of all these risks.

2. Exposures to the risks of business and supply chain interruptions

In the last decade, the most significant event in terms of the risk of business interruptions and the whole insurance industry is the terrorist attack of the 11th September, 2001 in the United States. The total insurance expenses caused by this adverse event amounted to around US$ 40.2 billion of which $ 11 billion (I.I.I. Insurance Fact Book 2004, p. 83) were expenditures of the insurance industry through the indemnities of lost profits and other costs caused by business interruptions, which indicates the importance of managing this type of risk. Another significant impact on businesses, insurance sector and the entire economy was the hurricane season of 2005, when the top three hurricanes, Katrina, Rita and Wilma, caused economic losses of nearly $ 170 billion, of which the insured losses totalled about $ 65 billion (Lloyd's, 2011). One of the causes of business interruption was the severe acute respiratory syndrome or SARS, which, according to the Asian Development Bank, caused losses in the form of reduced operating income and other costs related to business interruptions in the amount of approximately $ 60 billion in the countries of East and Southeast Asia. The possibility of pandemics (SARS, avian and swine influenza) primarily cause mortality and threaten people's lives, but also reduce availability of labour and cause business interruption, and it is necessary to manage this risk and implement preventive measures and draw up plans for crisis management. By now the focus in risk management has been on protecting the property from direct physical destruction that would lead to the business interruption, but the need to include the potential loss of human resources in the insurance is increasingly emphasized.

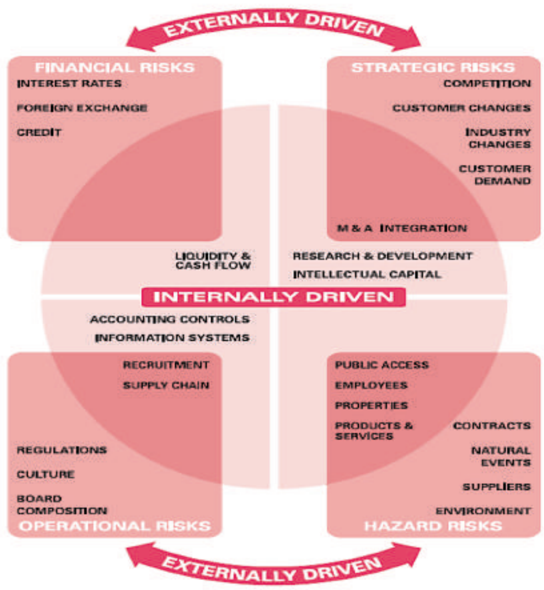

Figure 1: Cases of key risk of business interruptions

Source: A Risk Management Standard, AIRMIC, ALARM, IRM, UK, 2002, p. 3

Figure 1 shows the internal and external causes that may lead to business interruption, while emphasizing their mutual relations. In case of internal risk, an important factor may be the type of production and the necessary production conditions, and, for example, parallel production is less sensitive due to the use of multiple parallel machines, than mass production where the breakdown of one machine causes a slow-down of all the others. External causes may be a delay or interruption of energy supplies or raw materials where the problem is additionally complicated if the company applies the JIT inventory management and relies on one or a small number of suppliers.

Supply chains imply the physical shifting of a product or all business activities which are focused on delivering products to customers. Those activities are mutually related and form some kind of a supply chain. The main objective is to ensure the availability of goods and services to consumers at a time and place that best suits them, and at the same time to minimize the costs related to bridging temporal and spatial differences between production and consumption. There are numerous innovations in the field of supply chain management, and one of them is focusing on a small number of well-known suppliers, having in mind that establishing and developing cooperation with suppliers requires additional time and other resources. The development of JIT inventory management system tends to minimize the cost of holding inventory in order to increase productivity and efficiency in terms of both buyers and suppliers. In these conditions, however, a mistake in delivery will cause more problems than a smaller quantity of inventories with following costs. A supply chain disruption occurs when the supplier cannot deliver on time. In order to reduce total operating costs some business operations can be redirected to other companies and it is known as outsourcing, but it increases the exposure to risk of supply chain disruption because of possible interruptions in the delivery, as well as of deviations from the defined quality of raw materials and semi-finished products used in the production of a finished product.

Globalization, JIT delivery and minimum inventory levels that comply with the continuous delivery, focusing on a single supplier, the outsourcing of business operations which are not key operations and especially using of Internet which enabled the exchange of information and ordering nearly in real time, caused high risk exposure to supply chain disruption. This can go "deeper" into the entire chain, which complicate the problem of identifying exposure to risk and the implementation of measures of risk assessment and treatment.

3. Achieving business continuity through risk management

Interruptions in business can be caused by different reasons; some of them are predicted and some are not. Althouhg the probability of any individual adverse event may be small, the overall effect on the business can be huge. Continuity of business is not an ad hoc activity but a continuous process of planning where risk management plays a key role. Integrated risk management in the context of achieving business continuity involves three elements: 1) risk avoidance, with the primary objective of limiting the probability of the adverse event and its size, 2) risk transfer with the main objective to mitigate risk of an adverse event through risk transfer to third parties or through insurance and 3) preparedness with the main objective to normalize the business, as it was before the adverse event (Brauner, 2001, p. 5).

In modern business conditions companies have the ability to identify risks, to assess their potential effects and, on the basis of the assessment results, to take proper action, such as transfer, prevention and reduction, avoidance or risk retention. Risk management process is shown in Figure 2.

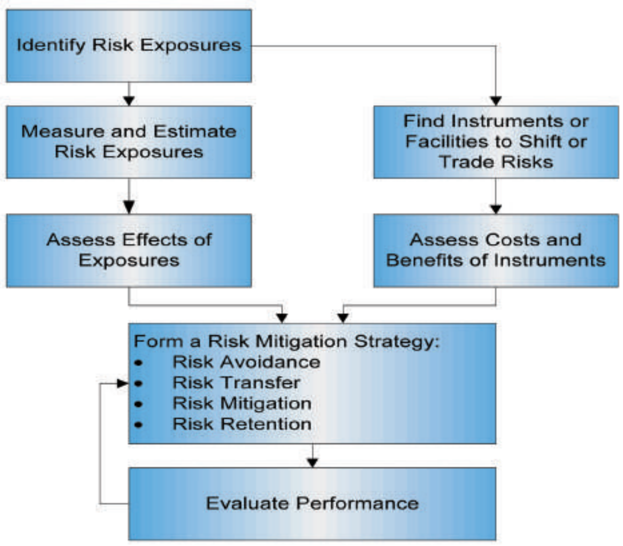

Figure 2: Risk management process

Source: Crouhy, M., Galai, D. and Mark, R.: *The Essentials of Risk Management*, McGraw-Hill, New York, 2006, p. 2.

Risk management implies the type and level of risk that are appropriate for the company to take in doing its usual business activities (Crouhy, Galai and Mark, 2006, p. 2). Companies must apply internally two forms of risk management, such as risk avoidance and preparedness in the case of adverse event. Each company is trying to avoid the adverse event that may jeopardize business continuity and income. Effective implementation of risk control measures, such as setting up a fire-extinguisher can greatly reduce the probability of occurrence and the extent of the potential damage and can have a positive impact on financial performance.

Safety is no longer seen as a technical issue. In recent times it is important to set up safety culture in the company as the most important measure of prevention of adverse events. Safety culture as way of dealing with risk reflects the awareness, safety and risk of all employees and presents an integral part of corporate culture, influenced by corporate principles, strategies, goals, and technological and social development. Despite all the measures taken, the company may still face the risk of business interruption caused by adverse events. Regardless of covering risks by the insurance, companies have to prepare themselves systematically to be able to react appropriately in case of an adverse event. Preparedness is not an alternative to prevention or to insurance but is complementary to them.

Regardless of the length of the business interruption the company still has to cover the fixed costs such as salaries, rent, depreciation of equipment and therefore the insurance of business interruption cover only fixed costs. Furthermore, it usually needs a certain period to normalize the business where the period of generating income recovery is usually longer than the period of technical recovering.

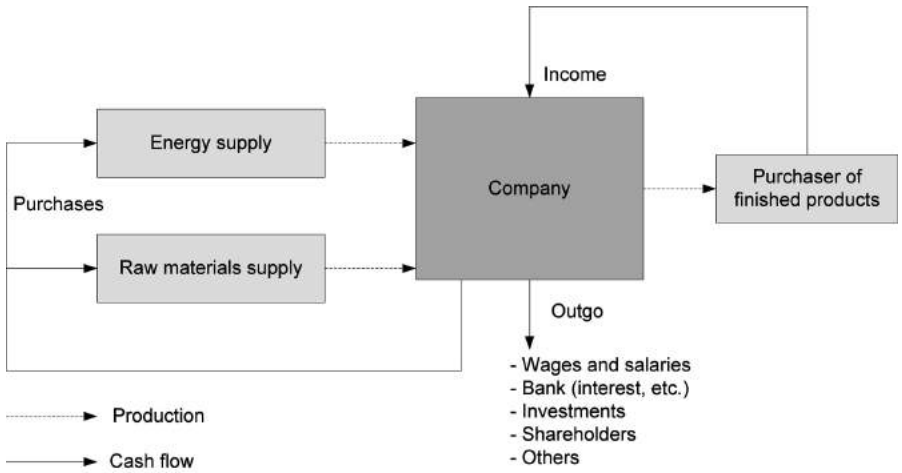

Figure 3: Normal operations

Source: Meier, W. et al.: *Business interruption insurance*, Swiss Re, Zurich, 2004, p. 13

The main task of the crisis management is to minimize losses and to normalize business in the shortest possible time. A well-planned provision of business continuity in the case of an adverse event and a response in a short time can mean the difference between the survival and the end of business. This is not only the intention of companies themselves, but insurance companies force them to behave so, too. The liability of insurer to pay indemnity due to business interruption can be stopped if the company did not respond promptly to minimize the damage and period of business interruption.

In addition to cost reduction in case of adverse events by insurable risks, managing of business continuity is extremely important in case of uninsurable risks, such as the risk of the loss of business reputation, which can not be avoided or transferred to the insurance company.

According to the report of the World Economic Forum and the “Accenture” company, more than 90% of the nearly 200 surveyed transport companies indicated that risk and need of supply chain risk management has become much more important compared to the previous period (New Models for Addressing Supply Chain and Transport Risk, World Economic Forum, 2012). Also, the study carried out by the brokerage firm “Aon” has identified that the issue of business interruption is on the third and disruption of supply chain is on the eighth place in the list of risk priorities of global managers (Global Risk Management Survey, Aon Corporation 2011). Finally, the study conducted by the Business Continuity Institute shows that 85% of the surveyed in the 550 organizations from 60 countries in the 2011 had at least one business interruption (Supply Chain Resilience 2011, The Business Continuity Institute 2011). For 17% of the surveyed the largest single loss due to disruption of the supply chain was EUR one million and more.

It is evident that awareness of exposure to risk of the supply chain disruption and of the need to manage this risk has significantly improved in recent years. Globalization, focusing on maximum efficiency of the processes with minimal required resources as well as the geographic concentration of production improve efficiency of the global supply chain networks, but also affect the changes in the profile of supply chain disruption risk. The key events that have caused a paradigm shift in terms of security of supply chains and affected the recognition of the need to manage this risk include the global financial crisis, terrorist attacks, floods in Thailand and Australia and the earthquake and tsunami in Japan. The aforementioned report indicates that by now the key impact to the supply chains disruptions has come from natural disasters and politically motivated unrest, sudden shocks in the field of demand and interruptions in information and communication flows.

In order to achieve an effective and efficient risk management it is primarily important to understand the supply chain and its participants, to identify potential possibilities of suppliers' business interruptions and to determine their own aggregate exposure to this type of risk and to quantify its potential impact. It is primarily needed to assess the exposure of business to this risk and then to define priorities. Focusing on the dominant supplier or supplier that participate the most in the total value of procurement does not necessarily mean the best approach. In the process of prioritization it is necessary to start from the influence of the income and value, to focus on the critical types of product, as well as on the potential financial impact of the supply chain disruption. After that it is necessary to model the exposure to risk of the supply chain disruption and its potential impact to business performance.

In order to reduce exposure to the negative financial effects of the supply chain disruption there are lots of available measures, such as the implementation of strict safety and quality standards, establishing cooperation with alternative suppliers or finding alternative supply chains and implementing other measures in the selection of suppliers. By choosing suppliers it is necessary to check whether they apply risk management programmes, whether their production is geographically concentrated, whether there is a possibility of using outsourcing, whether there is a dependence of the complex and not easy replaceable equipment, or whether they are exposed to other risks that could threaten business continuity of suppliers and lead to the supply chain disruption. Reliance on a small number of suppliers and their geographic concentration, particularly suppliers of raw materials, semi-finished and finished products from China and other countries, increases exposure to the risk of supply chain disruption. In this assessment it is good to use advice and experience of business partners, insurance agents and brokers, insurance companies knowledgeable about the quality of the existing insurance coverage.

4. The role of insurance in business interruption risk management

The main task of the risk management is to ensure an optimal risk-return relation through a variety of available risk management methods. Risk retaining traditionally occurs as a supplement to the transfer of risk to the insurance and this form of hedging is applicable in situations where the possibility of risk and intensity of the adverse consequences are small. Commercial insurance means insurance of companies such as producers, distributors, shippers, trading companies and wholesale and others. Commercial insurance covers insurable risks of entrepreneurial activities, whether a property or a commercial liability insurance and focus on four key areas:

- Protection of employees - a large number of employees or key personnel is difficult to be replaced and they may be unable to work for a longer period due to illness or injury caused by an accident;
- Protection against liability to third parties - business activities can cause damage to third parties, for example in the case of defective product, and if the fee has to be paid by the company then its assets are exposed to risk;

- Protection of assets – property such as buildings, equipment, inventory or personal property may be damaged, destroyed or unusable after the occurence of risk event such as fire;
- Protection against downtime - operating income can be reduced or totally lost in case of the adverse event and there are also fixed costs regardless of the degree of capacity utilization.

In addition to the direct consequences expressed through the loss of property, companies have indirect consequences in the form of lost profits, fixed costs and additional costs related to the risk of business interruption. Variable costs cannot be covered by insurance. Insurance coverage of operating income, as it is well-known in the U.S., is additional insurance that is contracted by previously paid property insurance premium. Having in mind that the most common cause of business interruption is risk of fire usually followed by the risk of breakdown of machines, it is usual to conclude a contract of insurance for business interruption caused by fire and other hazards and insurance of business interruption caused by machine breakdown. Insurance of business interruption is typical for developed countries, especially their most important sectors such as energy or trade. In the region, a most common insurance is that for the cases of business interruption caused by fire or other hazard (Marovic, Kuzmanovic and Njegomir 2009, p. 247).

The basis of the problem of the insurance of business interruption is an evaluation of damage due to reduced or lost operating income and the existence of fixed and additional costs caused by the occurrence of an adverse event. Insurance of business interruption covers reducing of net operating income of the insured company in the case of the risk covered by insurance. This reduction of net result is calculated by subtracting the revenue that the company actually generated during breaks in the business from the amount of revenue that the company could achieve during the same period under reasonable business circumstances. For example, the expected net operating income determined on the basis of revenues and expenditures realised in the previous year may have the following monthly structure: sales revenue amounted to 100,000 □, fixed costs 20,000 □, variable costs 20,000 □. Thus, in case of normal business circumstances, net income would amount to 60,000 □. Not taking into account the participation of the insured in the damage in the case of business interruption for a period of three months, the total lost operating income would be equal to the lost sales revenue and fixed costs multiplied by three, that is, 360,000 □. Also, the company may incur additional costs due to the adverse event associated with the company's efforts to overcome the problems caused by the interruption of business, such as the need for additional labor in order to recover the production process or to rent additional premises in another location in order to ensure the continuity of the production process or service provision (Njegomir 2011, p. 305).

At the international level, in terms of the duration of business interruption, there are two systems of compensation. The British system that is present in most countries means that the insurer has an obligation to indemnify until the recovery of ability of generating income and the U.S. system means that the insurer has a liability only until the technical recovery of the insured company (Meier, Werner, et. al, 2004, p. 31-33). Bearing that in mind, the insured amount is essentially equal to the sum of the net profit and fixed costs, and when this amount is divided by the total amount of the annual turnover, this is the way to calculate the total profit rate. Also, the insurer is allowed to reduce the amount of the indemnity or to completely abandon it if in case of business interruption the insured does not take the necessary measures to eliminate or minimize damage caused by business interruption and measures to reduce the duration of the interruption.

Insurers in all the countries of the former Yugoslavia offer insurance coverage for business interruption caused by fire and other hazards. Compensation covers operating profit that could not been realized due to business interruption. Compensation also covers the costs that would not emerge if there was business continuity as well as lost market share and other losses caused by business interruption up to the maximum agreed limit of coverage. The insurance premium depends on the exposure to risk of fire and other hazards, the length of the contractual warranty period, objects of insurance (operating profit and fixed costs) and granted discounts. The sum of insurance is voluntarily contracted and depends on the expected annual profit and planned expenditures, on the one hand, and the duration of the warranty period, which means the period within which it is possible to receive indemnity for the damage caused by business interruption, on the other hand.

In developed countries, especially in the United States, various types of additional coverage can be contracted, such as: a) business interruption caused by breakdown of computer, b) extended coverage of operating income (for example if the company suffered fire after reopening, additional time is needed for normalizing operations, due to the time gap between the recovering of the technical capacities and the capability to generate income, c) business interruption due to the activities of civil authorities, d) conditional insurance of business interruption caused by interruption of key supplier and e) various specialised types of insurance (Rejda 2005, p. 285-287). Some risks that are not covered by this insurance are the explosion of nuclear power, wars, political risks, pollution and contamination that have the character of fundamental risk.

In addition to the indemnity, the insurer has a significant role in providing technical assistance to the insured in managing the financial statements and risk management in order to identify timely business potentials and risks that could threaten business continuity. Discounts are usually given to companies that have established adequate internal risk management and that is the way to motivate companies to take care of risks that can cause business interruption.

Additional insuranance of business interruption has no purpose if it is not caused by physical damage on the property of the insured company or if business interruption is out of control of the insured. In those situations insurers have no obligation of indemnity and the problem escalated after some adverse events such as earthquake in Japan and volcanic eruption in Iceland. In order to meet the identified needs of corporate clients insurance companies have started to offer insurance coverage for the risk of supply chains disruptions, well known as trade disruption insurance. This type of insurance is especially important in modern business circumstances. Adverse events such as natural disasters, terrorist attacks, viruses or political unrest frequently cause disruption to the business, having in mind that more and more companies are focused on cooperation with a smaller number of suppliers in order to reduce costs, on the implementation of the just-in-time system of inventory management, outsourcing. Although companies are aware of an increasing exposure to risk of supply chains disruption and its negative financial effects, the demand for this type of insurance is still limited by unfavourable economic conditions, high cost of providing insurance coverage and the complex process of assessing exposure to this type of risk. Determination of adequate insurance premiums and assessments of risk are very complicated, requiring a lot of information from the insured. There are numerous difficulties in understanding risk exposures throughout the supply chain and on different levels or “links” of the chain. It is only few leading insurance companies in the world that offer insurance of supply chain disruption.

Conslusion

The terrorist attacks of 2001 and the hurricane season of 2005 stressed the importance of insurance of business interruption and supply chain disruption and highlighted the need to manage these risks. After the aforementioned events the modelling of these risks has been improved.

The occurrence of these risks was manifested in the form of threatened financial position and a significant negative impact to the company balance sheet items. The importance of business continuity, especially in the field of providing continuity of supply chains is reflected in the fact that in the agenda of the world’s leading companies and non-profit organizations such as the World Economic Forum, the risk of disruption of supply chains has been in the focus of attention in recent years, especially after earthquakes, tsunami and nuclear contamination in Japan in the first half of 2011. An increasing interest in managing this risk and providing insurance coverage as a key form of financing the consequences of insurable risks can be expected in the future. Regarding the growth of probability of events that can cause interruption of business and supply chains, insurance companies that offer insurance coverage for these risks will review their exposure to these risks in the future. What can be expected is an increase in premiums due to higher exposure to risk, as well as due to a growing interest in these types of insurance.

A standard exclusion of certain dangers out of insurance coverage indicates that companies cannot rely solely on the insurance as a form of risk management – risk must be managed through risk avoidance, prevention and reduction in case of adverse events. Companies have to manage risks of business interruption through the implementation of all available risk management mechanisms, in which insurance has the most important role.

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