



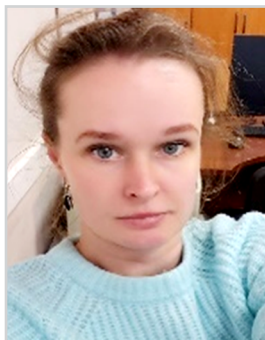
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## Risk management practices in the insurance industry with regard to supply chain management

**Abstract.** Today, fierce competition between manufacturers, increasing the level of innovation and reducing the life cycle of products have led to the design, production and marketing of products with various goals and a variety of risks in macro designs for supply chains. The purpose of this study is to design a strategic supply chain risk management system with a systematic approach to assess and control risks in the insurance industry. This article is an applied research and descriptive, correlational, and multiple regression analysis and path analysis techniques have been used to determine the factors affecting supply chain risk. This research is one-time cross-sectional taken place in 2021. The participant cases were 150, which resulted in 110 samples using Cochran's sampling formula.

Risk assessment and rating determines the superiority of each risk based on relevant indicators and thus provides the opportunity to provide an appropriate response to each risk. In this research, by presenting a comprehensive and hierarchical model for risk assessment, while identifying the main risks of the supply chain by relying on the method of risk failure structure and determining measurement criteria, a comprehensive questionnaire has been prepared based on the relative importance of each risk in the insurance industry. It has been determined as a case study using analytical method.

**Keywords:** Risk Indicator; Supply Chain Strategy; Risk Management Framework; Insurance Industry

**JEL Classifications:** E51; J20

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**Практика управління ризиками в страховій галузі щодо ланцюгів поставок**

**Анотація.** Сьогодні жорстка конкуренція між виробниками, підвищення рівня інновацій та скорочення життєвого циклу продукції призвели до проектування, виробництва та маркетингу продукції з різними цілями та різноманітними ризиками в макропроектах для ланцюгів поставок. Метою даного дослідження є розробка системи управління ризиками стратегічного ланцюга поставок із системним підходом до оцінки та контролю ризиків у страховій галузі. Ця стаття є прикладним дослідженням, і для визначення факторів, що впливають на ризик ланцюга поставок, були використані методи описового, кореляційного та множинного регресійного аналізу та аналізу шляхів. Оцінка та рейтинг ризику визначають перевагу кожного ризику на основі відповідних показників і таким чином дають можливість забезпечити відповідь на кожен ризик. У цьому дослідженні, представляючи комплексну та ієрархічну модель для оцінки ризику, одночасно визначаючи основні ризики ланцюга поставок, спираючись на метод структури запобігання ризику та визначаючи критерії вимірювання, було підготовлено вичерпну анкету на основі відносної важливості кожного ризику в страховій галузі. Це було визначено як приклад з використанням аналітичного методу.

**Ключові слова:** індикатор ризику; стратегія ланцюга поставок; структура ризик-менеджменту; страхова галузь.

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**Практики управления рисками в страховой отрасли в отношении цепочек поставок**

**Аннотация.** Сегодня жесткая конкуренция между производителями, повышение уровня инноваций и сокращение жизненного цикла продукции привели к разработке, производству и маркетингу продукции с различными целями и множеством рисков при макропроектировании цепей поставок. Целью данного исследования является разработка системы управления стратегическими рисками цепочки поставок с систематическим подходом к оценке и контролю рисков в страховой отрасли. Эта статья представляет собой прикладное исследование, и для определения факторов, влияющих на риск цепочки поставок, использовались описательный, корреляционный и множественный регрессионный анализ, а также методы анализа путей. Оценка и рейтинг рисков определяет превосходство каждого риска на основе соответствующих показателей и, таким образом, дает возможность обеспечить надлежащее реагирование на каждый риск. В этом исследовании, представляя комплексную и иерархическую модель для оценки рисков, определяя основные риски цепочки поставок, опираясь на метод структуры отказов риска и определяя критерии измерения, был подготовлен всеобъемлющий вопросник, основанный на относительной важности каждого риска в страховой отрасли. Это было определено как тематическое исследование с использованием аналитического метода.

**Ключевые слова:** индикатор риска; стратегия цепочки поставок; система управления рисками; страховая отрасль.

**1. Introduction and Brief Literature Review**

Supply chain risk management was introduced in the early 1990s. Indeed, increased competitiveness in the 1990s forced companies to improve performance in many respects. For this reason, managers in the industry have come to the conclusion that the production of a quality product alone is not enough, but the supply of products should be considered according to the customer's wishes (when, where, how) and their quality and cost. In such situations, companies found that they had to manage the units that provide the companies' inputs, processes, as well as centers related to delivery and after-sales service to the customer. Therefore, non-compliance in supply chain relationships usually occurs due to the diversity of interests and demands of both parties in the relationship. On the one hand, the supplier seeks to reduce uncertainty, reduce dependency management, increase transaction efficiency, increase social satisfaction of the relationship and control prices, and on the other hand, the buyer hopes to continuously improve supply, better alignment between sales characteristics. Achieve the supplier, its purchasing characteristics and reduce long-term costs. On the other hand, the emergence of new processes in the environment of companies and organizations, such as the state of political relations between governments, sanctions inside and outside the company, causes supply chains to face new and diverse risks every day. In such an environment, the management of the company is not possible without considering the risks facing the supply chain and the management of the company needs to identify, prioritize and monitor the supply chain risks. Achieving such a goal requires the development of a coherent and integrated framework for supply chain risk management.

Supply chain management involves the coordination and collaboration of processes and activities through various tasks such as marketing, sales, production, product design, procurement, logistics and information technology (Creazza et al., 2021). Supply chain management controls and improves the flow of information, materials and money throughout the chain and its goal is to create added value, produce high quality products, low cost, timely and ultimately create value for customers (Gurtu & Johny, 2021). Among the country's industries, the insurance industry, due to its special importance as a parent industry and having a proper supply chain cycle, and due to the issue of sanctions, is facing crises and, consequently, various risks in its value chain. With these issues in mind, the need to design a supply chain risk management system that is in line with the characteristics of this industry is felt more than ever (Etemadi et al., 2021; Bustinza et al., 2013). A look at the background of research related to supply chain risk management shows that although the theoretical foundations of research in supply chain risk management have generally grown, there is little evidence of practical examples of supply chain risk management for companies in the insurance industry. It can be seen. In order to fill this gap, the present study seeks a military design for supply chain risk management in the insurance industry.

## 2. Method

The company's supply chain emphasizes risks, has been raised. Conceptually, supply chain risk management is a systematic approach to identify, evaluate, prioritize and control risks and their overall and cumulative effects across the company supply chain in a coordinated and uniform manner (Cheung et al., 2021; Koc & Gurgun, 2021). Organizations operating in industries that are strongly influenced by laws and with high speed of change such as financial services and insurance, were among the first companies to turn to supply chain risk management (Koc & Gurgun, 2021). Meanwhile, the risks faced by different countries or industries are not only not permanent; Rather, they are fundamentally different from each other. At the same time, the importance of the risks faced by a supply chain varies.

Some authors describe the risk management approach as a silo-based approach, in which the risk management activity is performed separately and without any interaction between the activities (Koc & Gurgun, 2021). Experts in the field of supply chain risk management state that Silo's traditional approach to risk management is currently not very appropriate; today, companies need a structured and coherent approach to identify, analyze and manage risk in a range of all company activities (Man et al., 2019). Traditional risk management considers only incidental and operational risks, but risk management covers the supply chain of all risks (Norrman and Jansson, 2004).

Many researchers have pointed to the impact of guarantee chain risks (Zekhnini et al., 2004). A wide range of risks in the supply chain may have a negative impact on chain performance. On the one hand, it is stated that risk and uncertainty in the supply chain is increasing (Wagner & Bode, 2009); On the other hand, it is believed that global competition, technological change and continuous search for competitive advantage have increased competition and the difficulty of managing the supply chain of organizations (Berg et al., 2004). It can also be argued that supply chain risk management helps the entire company survive by identifying, mitigating, avoiding and treating risks that could disrupt the business. Supply chain risk management can provide stability in the creation, distribution, financing and sales of products and services. Supply chain risk management ensures that the board and the CEO are able to handle social and ethical responsibilities; finally, it helps the company to establish good relations with the legislators.

The method of the present article is applied based on the purpose and based on how the data are collected. This research is one-time cross-sectional taken place in 2021. The participant cases were 150, which resulted in 110 samples using Cochran's sampling formula. The 37 questions were asked in total which categorized in seven parts, each of which assesses a major supply chain risk factor. The reliability analysis of the defined parameters is presented in Table 1.

Table 1:  
**Reliability of identified factors**

Cronbach's alpha	Amount of questions	Risk factor
0.746	5	Political
0.724	4	Market
0.736	5	Information Technology
0.703	4	Disturbance
0.82	8	Supply
0.74	6	Production
0.767	5	Cooperation and links

Source: Author's own research

## 3. Results

Advances in technology, along with the reduction of trade barriers in many countries, have led to the globalization of business. The application of supply chain risk management system in organizations has a wide application. Designing a supply chain risk management system is a new approach that is used to strengthen and enhance the effectiveness of the supply chain of organizations. In the last two decades, following concepts such as globalization, the equations governing supply chains have also changed a lot, and managers are faced with more unknown conditions and more serious risks that need to prepare themselves for their active and effective management; Therefore, organizations must use the appropriate system in order to overcome the risks of the guarantee chain. Supply chain risk management system is one of the important areas that aims to develop methods to identify, evaluate, analyze and modify supply chain risk. There are several definitions of supply chain risk management; Among these, one of the most cited

definitions is the definition provided by the Committee for the Support of Transition Commission Organizations (Vishnu et al., 2019).

Supply chain risk management is a process throughout the supply chain in which the company exposes potential risks at all stages of its supply chain that may affect the entire supply chain, in order to increase short-term and long-term value for stakeholders and ensure movement. Monitors the supply chain risk, identifies, evaluates, controls and operates within the defined range. This definition highlights the emphasis of supply chain risk management on a holistic top-down approach to effectively manage risk for the entire supply chain of a company or organization (Roozitalab 2022); And its evolution revolves around two goals: first, a full understanding of the potential risks identified (Sizov & Kirov, 2021); And second, increasing the capacity of a supply chain to withstand and absorb failure without serious consequences, which in turn makes it possible to achieve the company's goals of maintaining and enhancing shareholder value (Aravindhan et al., 2021).

In the face of increasing risks facing the supply chain of companies, more managers and investors have realized the need to develop a comprehensive risk management system at the supply chain level. Today, the ultimate goal of establishing risk management systems is not only to protect shareholder value, but also to enhance shareholder value. Improving shareholder value in today's organizations requires identifying and monitoring all risks across the supply chain. In fact, organizations ensure the achievement of strategic goals and thus their survival by using the continuous process of identifying and monitoring supply chain risk. To this end, it is necessary to develop new supply chain risk management frameworks with regard to the types of risks facing specific industries. This means that the insurer, by purchasing the insurance policy, actually transfers its risk to the insurance company. Therefore, it is natural for the insurance industries to have more observe in the risks management. Insurers in the process of insuring risks have a great motivation and desire to identify and eliminate risky conditions and through various means such as initial visits to the risks or discounts on the amount of good and safe risk premiums.

### 3.1. Management of Risk

Insurance companies must first determine their degree of risk tolerance, for example, the amount of risk that they are able and willing to deal with given their economic goals and available resources. In this research the main factors should an insurance company consider to manage the risks are as follows:

**Risk management process:** Efficient risk management that responds well to the risks associated with key insurance-related duties, including service development, pricing, warranty, claims and compensation claims, and risk-sharing management.

**Risk Assessment:** The estimated risks should be compared with the insurance company's risk range to decide on the priorities for addressing each of the risks and performing appropriate responses.

**Risk reduction and control:** Insurance companies must take the necessary measures to reduce and control the identified risks. This requires setting appropriate boundaries and standards that are documented and communicating the boundaries to the relevant staff who have the required experience and ability.

**Risk review and monitoring:** There should be an effective monitoring system for tracking risk indicators to ensure that risk limits and standards are properly observed and any deviations from them are recorded in a timely manner. Insurers should also take steps to avoid deviations. To be examined to prevent their recurrence.

In the present article, the validation of the question was done by using 25 experts in industry field. The results of the validation for the risk management of the insurance industry supply chain are presented in [Table 2](#). The experts were university professors and researchers in the field of supply chain. Based on their opinions, the necessary amendments were made to the question and final version is deduced.

The sampling adequacy index and the area covered by Bartlett are presented in [Table 2](#). The Kaiser-Meyer-Olkin index (KMO) for all classes is higher than 0.6 and the level covered by Bartlett (Sig) is less than 0.5, which indicates that the identified sub-factors for each factor (structure) measure that factor and the validity of the structure. Is approved. Pearson correlation coefficient was used to answer research questions and determine the relationship between research

Table 2:  
**Validity test of determined parameters**

SIG	KMO	Parameters
0.000	0.627	Political
0.002	0.623	Market
0.000	0.644	Information Technology
0.000	0.682	Disturbance
0.000	0.649	Supply
0.000	0.645	Production
0.000	0.665	Cooperation and links

Source: Author's own research

variables and supply chain risk variable. According to Table 3, the parameters of the production issues have the most coefficient correlation, whilst the disturbance has the less risk.

To explain and extract the results, the results of the research information were categorized in a tabular format, as described in the first column of the characteristics mentioned in supply chain risk management, in the second column of the article with the specified topic, and in the next column The number of replicates of the extracted code was described in the research.

Table 3:  
**Pearson correlation coefficient**

Risk	Political	Market	IT	Disturbance	Supply	Production	Cooperation
1	0.785	0.657	0.701	0.61	0.768	0.895	0.782

Note:  $p \leq 0.01$ ; The significance level: 0.000.

Source: Author's own research

To review and integrate the results, first all the factors extracted from the studies were considered in detail, then by considering the concept of each of these codes, all the factors extracted were classified into three levels: first, second and third. By repeating this procedure, the main categories were formed for all the details. Finally, in order to control the extracted results, the opinions were compared with another expert and then the results were evaluated by Kappa index. After surveying 76 experts in the insurance industry, the dimensions of the supply chain risk management system were finally examined (Table 4).

Table 4:  
**Sign test results on the main dimensions of the system**

Variable	The amount of positive signs	Observed	Meaningful Number	Status
Creating the platform, establishing the process and setting the goals of the supply chain risk management system	76	4.334	0.000	confirmed
Identify supply chain risks	75	6.903	0.000	confirmed
Analysis and measurement of supply chain risks	75	7.011	0.000	confirmed
Determine supply chain risk management strategies	74	3.901	0.000	confirmed
Determining information and training procedures in the supply chain risk management system	67	5.553	0.000	confirmed
Improving the supply chain risk management system and continuous review	69	3.803	0.000	confirmed

Source: Author's own research

#### 4. Conclusion

The main purpose of this study was to provide a system to manage supply chain risk in the automotive industry, which in addition to considering the components of this sector, is also an efficient and effective framework that ultimately helps the organization in creating value. Regarding the uncertainties, increasing factors impacts on the supply chain and network have made it difficult for managers to achieve their goals. Each organization, depending on the type of activity and the sensitivity of its assets, faces different levels of risks that affect the quality of goods and services, so it is possible to identify these risks and obtain their impact on the supply chain to management. It is suggested that managers increase their knowledge and understanding of these risks to improve their decisions and help reduce the risk of the organization and the entire network. As future research, it is suggested to select appropriate solutions in order to respond to the risks and dangers of the supply chain and ultimately turn threats into opportunities. Make the necessary decisions to deal with them.

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