# Risks Matrixes—Risks Assessment Tools of Small and Medium-Sized Enterprises: The Case of Latvia

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The enterprises need to assess the risk dynamic of financial instability and its impact on small and medium-sized enterprises' development, because it is important for enterprises to extend commercial activity and to open a new structural subdivision. We have researched types of risks, their identification, classification, and assessment possibilities in activities of small and medium-sized enterprises. We have used our own algorithm of identification, classification, and assessment of enterprises' risks. The goal of this research is to study the economic and financial risks' impact on small and medium-sized enterprises' development in Latvia. For study purpose, we have carried out the questionnaire of representative small and medium-sized enterprises about the economic and financial risks' impact on enterprises' development in Latvia. We have created classification of Latvian services sectors' economic and financial risks in the period from 2011 to 2012. Those risks have been included in the questionnaire. The risks matrix is a quantitative assessment tool of risks. We have created Latvian service sector economic and financial risks matrix. We have arranged risks by their sizes of possible losses for enterprises. For each risk has been assessed its probability of realization. We have created Latvian accommodations (hotel) and food services technological process risks map. Several parts of the risk map (segments) make it possible to assess each type of the risk separately in its segment. Risks matrix can be used to choose enterprises' strategy of risk management. Enterprise's strategy of risk management is developed by analysing zones of risk level.

*Keywords:* classification of risks, risks assessment, risks matrixes, questionnaire of small and medium-sized enterprises

## Introduction

Micro, small, and medium-sized enterprises are in accordance with the European Commission (2004) Regulation No. 364/2004 which characterizes the maximum staff number and annual turnover (or annual balance sheet total). A medium-sized enterprise is defined as an enterprise which employs fewer than 250 persons and whose annual turnover does not exceed EUR 50 million or whose annual balance sheet total does not exceed EUR 43 million.

In Latvia, it is important for small and medium-sized enterprises to create an efficient economic activity in both economic growth and economic slowdown. Enterprises have to assess marketing activities to attract new and retain existing clients, as well as to create marketing activities that increase clients' loyalty to an enterprise's brand. Decreasing income, enterprises should reconsider expenditures in order to improve their

financial stability. Because of reduction in clients' solvency, small and medium-sized enterprises in Latvia regularly have to make the profit and loss account, so that they operatively keep up with ratio of incomes and expenditures. Evaluating these aspects, enterprises can develop a business strategy to effectively perform their economic activities. Establishing a business strategy, enterprises need to classify economic and financial risks as well as assess their impact on enterprises' development. Assessing the risks in small and medium-sized enterprises, it is appropriate to use risks matrixes and risks maps. Using the risks matrixes, employees of a company can assess each risk, possible losses, and its probability of realization. Several parts of the risks map (segments) make it possible to assess each type of the risk separately in its segment. Assessing the zones of the risk levels, small and medium-sized enterprises can create their own risk management strategies.

## Previous Research

One of the world's leading insurance brokers and risk management consulting organizations, Aon Corporation, has issued a global political risk map for 2011 (Aon, 2011). The risk in each country was ranked as low, medium-low, medium, medium-high, high, or very high. Latvia is in group of countries whose risk level is ranked as medium. The major risks are the risk of monetary and the risk of reduction in clients' solvency.

Henschel (2010) has studied German small and medium-sized enterprises' risk management problems and carried out a questionnaire for enterprises about it. Levels of risk management are different in enterprises. In the first variant, there is risk identification and their documentation. In the second variant, staff of an enterprise additionally are forming risk classification and risk assessment. In the third variant, enterprises do above mentioned two methods and additionally perform risk management systems. The bigger the enterprises, the detailed and completed the risk management system is. Kirova (2012) has studied the graphical presentation of risk assessment in management decision-making process. Korombel (2012) has studied risk management problems of Polish small and medium-sized enterprises and carried out a questionnaire about it. Representatives of small and medium-sized enterprises (there were fully completed 101 inquiry forms) arranged risks by their importance. The most important risks were: the risk of financial instability (F5), the risk of increasing competition (E7), and the risk of legislative changes (E1).

Latvia's researchers (Komkova, 2008; Zimecs & Ketners, 2010) have studied the major problems of risk management in Latvian non-financial companies. In accordance with Komkova (2008), the practical risk management implementation is not possible without relevant risk models adaptation to Latvian economic situation, because entrepreneurs have a lack of experience in implementation and adaptation of risk management system. Zimecs and Ketners (2010) have studied business solution methodologies and their impact on risk management and carried out a survey of risk management developments. The entrepreneurs, who use the risk management elements in their daily activities, mainly manage risks by using information of business results.

Jansone and Voronova (2010) have studied financial stability problems of enterprises of Latvian trade sector. Jansone, Nespors, and Voronova (2010) have researched economic and financial risks in enterprises of Latvian food retail sector. The authors have recommended using E. Altmana Model (adapted for Latvia by RTU scientists R. Sorins and I. Voronova). Test results for trade services sector enterprises show that forecasting accuracy of  the risk of insolvency (bankruptcy) (F14) is more than 80% for both models (E. Atmana Model, R. Sorins and I. Voronova Model). Jansone and Voronova (2011) classified and assessed trade service technological process risks. It is important for small and medium-sized enterprises to identify and classify specific technological process risks. Voronova (2012) has studied financial risks and possibilities to assess them, as well as financial stability models which are adapted for other countries.

## Questionnaire for Small and Medium-Sized Enterprises

We have researched the economic activities of services sector enterprises in Latvia in the period from 2005 to 2011. From 2005 to 2008, the total turnover indices of Latvian services sector enterprises have increased. The highest value was researched at the first quarter of 2008. From the second quarter of 2008, services sector has started to decline, reaching the lowest rates in 2009. From 2010, the total turnover indices of Latvian services sector enterprises started to increase again. Latvian services sector SWOT (Strength, Weakness, Opportunity, and Threats) analysis is a component of the sector's risk identification and classification. By defining the opportunities and threats of the external environment and the strengths and weaknesses of the internal environment, we have identified the risks (Voronova, 2008). External environment's opportunities are to increase the turnover of Latvian services sector, if the country stimulates the economic growth, as well as to choose qualified staff. Latvian services sector external environment's threat is the risk of insufficiency of credit resources, which may lead to a decrease of current assets. Latvian services sector internal environment's strength is a possibility to offer assortment of qualified services, because the level of staff skills has been improved. Latvian services sector internal environment's weakness is the deadline of service extended, because the risk of debtors has increased.

We, classifying risks by the public relations' field, have considered the economic risks. By classifying risks by type of commercial activity, we have also considered the financial risks. The financial risk is the possibility of financial resources' losses by its financial default or failure of financial management. The economic risk is the decline of enterprises' competitiveness and the possibility of losses by unforeseen changes in an economic situation. The services sector is affected by change of national economic policy, economic crisis, and related processes. The financial risks are the greatest shares of the total package of business risks. They have both objective and subjective nature. Based on the above mentioned, we have created classification of Latvian services sectors economic and financial risks in the period from 2011 to 2012 (see Table 1).

Table 1

*Classification of Latvian Services Sector's Economic and Financial Risks in the Period From 2011 to 2012*

| The economic risk | Ranged by losses | The financial risk | Ranged by losses |
|---|---|---|---|
| E5: The risk of reduction in clients' solvency | 3.829 | F9: The risk of debtors | 3.571 |
| E2: The risk of increment of taxes | 3.657 | F8: The risk of insufficiency of current assets | 3.486 |
| E7: The risk of increasing competition | 3.343 | F4: The risk of inflation | 3.400 |
| E6: The risk of insufficiency of credit resources | 3.343 | F1: The risk of unpaid credit | 3.371 |
| E4: The risk of damage to reputation | 3.314 | F3: The risk of monetary | 3.314 |
| E3: The risk of financial instability of suppliers | 3.314 | F2: The risk of increment of interest | 3.286 |
| E1: The risk of legislative changes | 3.171 | F13: The risk of reduction in profitability of own capital | 3.257 |
| | | F12: The risk of reduction in profitability of assets | 3.257 |
| | | F11: The risk of liquidity | 3.229 |
| | | F5: The risk of financial instability | 3.171 |
| | | F6: The risk of insufficiency of own capital | 3.057 |
| | | F14: The risk of insolvency (bankruptcy) | 2.914 |
| | | F10: The risk of reduction in circulation of stocks | 2.857 |
| | | F7: The risk of investment (the new project planning) | 2.829 |

We have carried out a questionnaire where representatives of Latvian small and medium-sized enterprises gave information about economic and financial risks' impact on enterprise's development in 2012. Those risks have been included in the questionnaire. We have prepared the questionnaire about enterprises' activity and economic and financial risk assessment to predict the possible amount of losses. We sent inquiry forms to representatives of these small and medium-sized enterprises and received fully completed inquiry forms from 35 representatives of small and medium-sized enterprises.

Representatives of the questionnaire have assessed economic and financial risks to predict the possible amount of losses (Value of 5 means the maximum losses). Average results of questionnaire are showed in Table 1. From enterprises which participated in the questionnaire, there were medium-sized enterprises (48.6%), small enterprises (40.0%), and micro enterprises (11.4%). Results of the questionnaire show that small and medium-sized enterprises mainly do budget planning for period of time till three years. In the majority of small and medium-sized enterprises, budget planning as well as economic and financial risk assessment was performed by financial department manager. Questionnaire participants assessed economic risks which were ranged by possible amount of losses (Value of 5 means maximum losses). The biggest losses were possible from impact of these risks, i.e., the risk of reduction in clients' solvency (E5), the risk of increment of taxes (E2), and the risk of increasing competition (E7). Questionnaire participants assessed financial risks which were ranged by possible amount of losses from them. The biggest losses were possible from impact of these risks, i.e., the risk of debtors (F9), the risk of insufficiency of current assets (F8), the risk of inflation (F4), the risk of unpaid credit (F1), and the risk of monetary (F3).

## Risks Matrixes: The Case of Latvian Services Sector

We have researched types of risks, their identification, classification, and assessment possibilities. The purpose of the first international risk management standard ISO 31000:2009 (ISO, 2009) is to provide principles and generic guidelines on risk management. Risk is the effect of uncertainty on objectives. Impact of risk could be negative (losses) or positive (profit). We have studied the negative impact of risks wherewith amount of risk characterizes possible amount of result (losses) and probability of realization. Process of risk assessment includes identification and classification of risk and risk analysis of quality and quantity. In order to quantitatively assess the risk level, we have used two values, i.e., possible amount of risk result (losses) and its probability of realization. Risk level is multiplication of result of risk (losses) and its probability of realization. Risk level can be calculated by Formula (1):

$$Risk\ level = Result(losses) \times Probability \tag{1}$$

Risks matrixes and risks maps are one of the most common and easiest risk assessment tools. The application of risks matrix does not require the usage of a wide knowledge of quantitative risk analysis. It is necessary to develop a range of probability and detailed descriptions of the consequences for each of the possible scenarios. We recommend using risks matrixes and risks maps in order to assess different types of risks. For quantity assessment of risk, it is possible to use risks matrixes which arrange risks by their possible amounts of result (losses). For each risk, its probability of realization is also assessed (Vincent, 2010). Jansone and Voronova (2013) have created risk matrix where different zones of risk level are shown (see Figure 1).

Descriptions of zones of risk level are as follows:

S (Small risk level): Small losses and probability of realization (0.0-0.2);

M (Medium risk level): Small losses (0.2-0.6), medium losses (0.0-0.4), and big losses (0.0-0.2);

B (Big risk level): Small losses (0.6-1.0), medium losses (0.4-0.8), big losses (0.2-0.6), maximum acceptable losses (0.0-0.4), and critical losses (0.0-0.2);

A (Maximum acceptable risk level): Medium losses (0.8-1.0), big losses (0.6-1.0), maximum acceptable losses (0.4-0.8), and critical losses (0.2-0.6);

C (Critical risk level): Maximum acceptable losses (0.8-1.0) and critical losses (0.6-1.0).

| 0.8-1.0 | B | A | A | C | C |
|---|---|---|---|---|---|
| 0.6-0.8 | B | B | A | A | C |
| 0.4-0.6 | M | B | B | A | A |
| 0.2-0.4 | M | M | B | B | A |
| 0.0-0.2 | S | M | M | B | B |
| Probability of realization | Small risk | Medium risk | Big risk | Maximum acceptable risk | Critical risk |
| characteristics of the size of risk (losses) | | | | | |

*Figure 1.* Example of risks matrix (Different zones of risk level).

Risk matrix can be used to choose enterprises' strategy of risk management (Alexander & Marshall, 2006). Enterprises' strategy of risk management is developed by analysing zones of risk level:

(1) In zone of small risk level, medium risk level, and big risk level for enterprises, it is recommended to create a risk management system in order to decrease identified risks, their possible amounts of losses, and probability of realization;

(2) In zone of big risk level and maximum acceptable risk level for enterprises, it is recommended to realize risk insurance;

(3) In zone of critical risk level for enterprises is recommended business interruption.

Jansone and Voronova (2012a) have used their own created algorithm of enterprises' risks identification, classification, and assessment (see Figure 2).
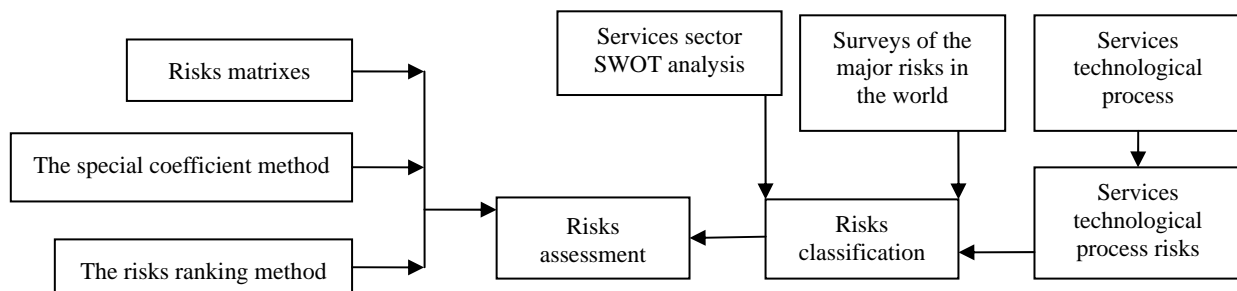


*Figure 2.* Algorithm of enterprises' risks identification, classification, and assessment.

Important stages of above mentioned algorithm are: make the SWOT analysis of services sector; get to know with the surveys of the major risks in the world; create the classification and description of specific services technological process risks; classify and assess risks in order to create risks matrixes; assess risks by using the special coefficient method; and rank external and internal risks by their impact on sector enterprises' development. The small and medium-sized enterprises can use our created algorithms of classification and

assessment of the risks to produce their own risk management systems. Enterprises carrying out their sector SWOT analysis and preparing description of technological process risks can identify and classify specific sector's economic, financial, and technological process risks. For risk quantity assessment, small and medium-sized enterprises can use risks matrixes, which arrange risks by their possible amounts of losses. For each risk, it is possible to assess its probability of realization. For quantity economic and financial risk assessment of Latvian services sector enterprises, we have created economic and financial risks matrix (see Figure 3).

| 0.6-0.8 | | | F7 | | |
|---|---|---|---|---|---|
| 0.4-0.6 | | E3 | E1 E6 F4 F10　F12 | E4　　E2 F1　　F5 F3　　F9 | |
| 0.2-0.4 | | F13 | E7　F6 F2　F11 | E5 F8　　F14 | |
| 0.0-0.2 | | | | | |
| Probability of realization | Small risk | Medium risk | Big risk | Maximum acceptable risk | Critical risk |

*Figure 3*. Latvian services sector economic and financial risks matrix.

The most of our classified Latvian service sector economic and financial risks sizes are from medium risk to maximum acceptable risk. The probability of risks realization is from 0.2 to 0.6. The maximum acceptable economic risks (with the probability of risks realization is from 0.4 to 0.6) are the risk of increment of taxes (E2) and the risk of damage to reputation (E4). The maximum acceptable financial risks (with the probability of risks realization is from 0.4 to 0.6) are the risk of unpaid credit (F1), the risk of monetary (F3), the risk of financial instability (F5), and the risk of debtors (F9). The maximum acceptable economic risk (with the probability of risks realization is from 0.2 to 0.4) is the risk of reduction in clients' solvency (E5). The maximum acceptable financial risks (with the probability of risks realization is from 0.2 to 0.4) are the risk of insufficiency of current assets (F8) and the risk of insolvency (bankruptcy) (F14).

Jansone and Voronova (2012a) have created classification of the accommodation (hotel) and food services technological process risks. We, for risk assessment, have created the first part of risks map (see Figure 4) where accommodation (hotel) and food services technological process risks are shown in separate segments.

| 0.4-0.6 | | V2　　V5 | V4　　V1 | | |
|---|---|---|---|---|---|
| 0.2-0.4 | | V6 | V8 | V7 | V3 |
| 0.0-0.2 | | | | | |
| Probability of realization | Small risk | Medium risk | Big risk | Maximum acceptable risk | Critical risk |
| 0.0-0.2 | | | | | |
| 0.2-0.4 | | D3　　D7 | D6 | | |
| 0.4-0.6 | | | D1　　D5 | D4　　D2 | |

*Figure 4*. Latvian accommodations (hotel) and food services technological process risks map.

Accommodation (hotel) services risks are marked with letter "V". Food services risks are marked with letter "D". The critical technological process risk is the risk of security system (V3). The maximum acceptable technological process risks are the risk of clients' payment (V7), the risk of Hazard Analysis and Critical Control Point (HACCP) system (D2), and the risk of employees' hygiene (D4). The big technological process risks are

the risk of reservation (V1), the risk of ordering food services (V4), the risk of accounting (V8), the risk of choice of food assortment (D1), the risk of food preparation (D5), and the risk of food products storage (D6). The medium technological process risks are the risk of registration (V2), the risk of room service (V5), the risk of ordering additional (beauty, health, and fitness) services (V6), the risk of acceptance of raw materials (D3), the risk of food products storage (D6), and the risk of clients' service (D7).

Risks map of four segments is created linking both the first part and the second part of the risks map. In the centre of risks map is point whose value is the smallest and probability of risk realization is also the smallest. Risks map which consists of four segments shows values and probability of realization of every type of risk (Latvian services sector economic, financial risks and accommodation (hotel) and food service technological process risks). Most of our classified Latvian accommodation (hotel) and food services sector's economic, financial, and technological process risks sizes are from medium risk to maximum acceptable risk. The probability of risks realization is from 0.2 to 0.6.

Risks are classified by fields of origin: external risk arises in the external environment; it does not depend on actions of the business structures; and internal risk arises by activities of the business structures. The economic risks are external risks. The financial risks are external and internal risks. The technological process risks are internal risks. We recommend small and medium-sized enterprises to use method of risks ranking, assessing external and internal risks by their effect on enterprises' development (Jansone & Voronova, 2012b). Internal and external risks effect coefficient values show which of the two risks (internal or external) has a bigger impact on sector enterprises' development. We have divided external and internal risks into several groups of risks (Jansone & Voronova, 2011). In group of risks are economic risks. In group of risks are external financial risks and in group of risks are internal financial risks. In group of risks are accommodation (hotel) technological process risks and food services technological process risks. We have created external and internal risks ranking by their effect on accommodation and food services sector enterprises' development. Values of external and internal risks are almost equal (difference is 4%), so both risks have an important impact on the Latvian accommodation and food services sector enterprises' development. For small and medium-sized enterprises, it is important to regularly assess the risk of insolvency (bankruptcy) (F14) in order to perform timely arrangements to increase the financial stability of enterprises. We have assessed Latvian accommodation and food services' sector risks by using the special coefficient method. From year 2006 to year 2009, we studied average financial indexes of Latvian accommodation and food services sector enterprises and did the economic analysis. The risks assessment by using the special coefficient method demonstrates that Latvian accommodation and food services sector risks dynamic has increased in the period from year 2006 to year 2009.

## Summary and Conclusions

The small and medium-sized enterprises can use our created algorithms of identification, classification, and assessment of the risks to produce their own risk management systems. Enterprises carrying out their sector SWOT analysis and preparing description of technological process risks can identify and classify specific sector's economic, financial, and technological process risks.

For risks quantity assessment, small and medium-sized enterprises can use risks matrixes, which arrange risks by their possible amounts of losses. For each risk, it is possible to assess its probability of realization. Risks matrix can be used to choose small and medium-sized enterprises' strategy of risk management. Enterprises' strategy of risk management is developed by analysing zones of risk level. Risks map which

consists of four segments shows values and probability of realization of every type of risk. Risks matrixes and risks maps are one of the most common and easiest risks assessment tools. We have recommended small and medium-sized enterprises to use risks matrixes and risks maps in order to assess different types of risks.

Questionnaire participants' assessment economic risks had been ranged by possible amount of losses from them. The biggest losses are possible from impact of these risks: the risk of reduction in clients' solvency (E5), the risk of increment of taxes (E2), and the risk of increasing competition (E7). Questionnaire participants' assessment financial risks had been ranged by possible amount of losses from them. The biggest losses are possible from impact of these risks: the risk of debtors (F9), the risk of insufficiency of current assets (F8), the risk of inflation (F4), the risk of unpaid credit (F1), and the risk of monetary (F3).

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