RISKS AND RISK MANAGEMENT ALTERNATIVES FOR BUILDING CONSTRUCTION INDUSTRY ENTERPRISES IN LATVIA: THE RESULTS OF AN EXPERT SURVEY

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Abstract. *In the era of progressive globalisation, risk has become an integral component of entrepreneurship, which makes it necessary for every enterprise to design a risk prevention plan.*
The research aim is to assess the expert opinions on risks and risk management alternatives for building construction industry enterprises in Latvia. To achieve the aim, the following specific research tasks are set: 1) to assess the most essential and widespread risks for building construction industry enterprises in Latvia; 2) to identify the most effective risk management alternatives for building construction industry enterprises.
Research methods used: monographic, descriptive, analysis, synthesis, data grouping and a sociological method – a structured expert survey.
The research results showed that almost half of the identified risks for building construction industry enterprises could be prevented by applying the risk mitigation strategy and taking various daily control and internal management measures, thereby investing no additional funds and reducing the consequences caused by the existing risks. A calculation of the average risk severity level by risk group revealed that the most essential risks affecting the building construction industry were those related to human capital.
To reduce the effect of seasonality and the risk of unforeseeable orders, building construction industry enterprises have to diversify their business, developing some auxiliary kind of economic activity. This would ensure earning revenues throughout the year.

Keywords: *building construction industry enterprises, Latvia, risks, risk management alternatives.*
Jel code: *M0*

Introduction

In the era of progressive globalisation, risk has become an integral component of entrepreneurship, which makes it necessary for every enterprise to design a risk prevention plan.

Effective risk management does not mean only preventing the risk, which seems to be the cheapest solution. From the economic perspective, it might seem that risk management is meaningless, as it generates no extra revenue, yet there is not a single economic activity being not associated with the occurrence of some risk. Risk is an integral component of entrepreneurship, and in the event of materialisation of the risk some losses could be suffered. For this reason, any entrepreneur has an opportunity to choose to do risk management and secure themselves against the

materialisation of unforeseeable events or to do the business and hope the risk is not going to materialise.

Even though risk management is not an obligatory activity to be done at an enterprise and some enterprises do not consider a risk assessment and analysis to be necessary, it is often required by other stakeholders – lenders, project evaluators, investors, and others. Besides, funding from the European Union (EU) Structural Funds is available in Latvia, and local governments actively use it to achieve the Europe 2020 strategy's five key targets in the fields of employment, education, innovation, poverty elimination, climate and energy. Therefore, depending on the level of skill of local governments and entrepreneurs to acquire EU funding, enterprises, among them building construction industry enterprises, in Latvia have to meet project developer requirements, among which the identification of the most important risks and risk prevention measures is an obligatory prerequisite, when participating in procurement tenders.

The industry of construction, including building construction, as a whole plays an essential role in the economy of Latvia. As of 1 January 2017 in Latvia, according to the available data of the State Revenue Service (SRS), there were 9100 taxpayers in the building construction industry (VID, 2018). However, the enterprises operating in this industry are subject to various risks, the causes of which are very diverse. Research and technological advancement is persistently progressing. Construction, assembly in particular, depends on weather conditions, the qualification of the workforce and their sense of duty etc., as the construction process is complicated and variable.

Even though the legal framework of the construction industry is voluminous and directly aimed at reducing the probability of occurrence of potential risks, the enterprises operating in this industry still face various problems regarding the quality of the construction work done. For this reason, the identification of potential risks and risk management strategies play an essential role in planning the economic activity of building construction industry enterprises.

The research problem relates to the fact that the construction industry is subject to many and diverse risks, and also the government steps to reduce the occurrence of the risks and the consequences caused by the risks by persistently enhancing the legal framework for this industry.

The **research aim** is to assess the expert opinions on risks and risk management alternatives for building construction industry enterprises in Latvia.

To achieve the aim, the following specific **research tasks** are set:
1. To assess the most essential and widespread risks for building construction industry enterprises in Latvia;

2. To identify the most effective risk management alternatives for building construction industry enterprises.

Research hypothesis: human capital risks are the most significant group of risks for building construction industry enterprises.

Research methods used: monographic, descriptive, analysis, synthesis, data grouping and a sociological method – a structured expert survey.

Expert survey period: 2 April – 7 May 2018.

The research is based on the research papers, studies, expert survey results, and other sources of information.

Research results

There is no single definition of the term "risk" given in research studies, as well as risk classifications and risk management methods are very diverse, yet the unifying element of the risk in the definitions is uncertainly and a possibility to make success or suffer losses.

Risk, risk assessment, risk management methods have been researched by many foreign authors: L. Mandru (Mandru, 2016), G. Bekaert, C. R. Harvey, C.T. Lundblad, S. Siegel (Bekaert et al., 2016), N. Dijk, R. Gallert, K. Rommetveit (Dijk et al., 2016), Y. Haimes (Haimes, 2015), S.C. Kumbhakar, E.G. Tsionas (Kumbhakar, Tsionas, 2008) as well as Latvian researchers: G. Pettere, I. Voronova (Pettere, Voronova, 2003), A. Zvaigzne (Zvaigzne, 2005), and others. There are research studies on the risks present in the construction industry (A.Q. Adaleke, A.J. Bahaudin, A.M. Kamaruddeen (Adaleke et al., 2018), P. Szymański (Szymański, 2017), A. Alhomidan (Alhomidan, 2013), S.S. Timofeeva, D.V. Ulrikh, N.V. Tsvetkun (Timofeeva et al., 2017)).

The authors of the present research have conducted the expert survey with the purpose to assess the risks and potential risk management strategies for building construction industry enterprises. In the survey, seven experts who are closely associated with the building construction industry were involved. Table 1 shows that the selected expert group is versatile, which allows assessing the risks for the building construction industry from various aspects.

Table 1 List of the experts *(source: compiled by the authors based on the information provided by the experts)*

Expert	Association with the field to be expert-evaluated
E1	The manager of a wooden building construction enterprise, has worked in the construction industry for 45 years, has master degree and the qualification of a construction engineer, and is certified construction supervisor.

Table 1 continued

E2	A young entrepreneur who has founded a construction enterprise two years ago by means of a business incubator, has professional bachelor degree in construction engineering and is a certified construction supervisor.
E3	A builder with 2-year experience in Latvia and 11-year experience in Norway in the construction industry.
E4	A financial employee at a construction enterprise who has master degree in economics.
E5	34-year experience in construction and 23-year experience in the supervision of building construction; master degree in construction engineering.
E6	A construction inspector; bachelor degree in construction engineering and professional master degree in construction.
E7	A coordinator of local government projects with 5-year experience in design and 8- year experience in coordinating local government projects; higher education in construction engineering.

In the research, 29 most essential risks present in the construction industry were identified; they are shown in Table 2.

To facilitate further analysis of the risks and make the data easy to perceive, each risk was assigned a code that denotes particular risk in the further analysis.

All the identified risks were divided into eight groups: production risks; human capital risks; natural event risks; logistics risks; political risks; legal risks; financial risks; and management risks.

Table 2 Risk classification for risk assessment in the building construction industry in Latvia *(source: compiled by the authors based on the advice given by the experts)*

Risk code	Risk characteristics	Risk group
R1	Price hikes on input materials	Production risks
R2	Project cost reassessment risk	
R3	Choice of wrong construction technologies	
R4	Obsolete construction machinery and equipment	
R5	Failure to meet the deadline	
R6	Non-compliance of input materials with quality standards	
R7	Dependence on a few customers	
R8	Emergence of new competitors	
R9	Seasonal demand	
R10	Corruption and bribing	
C1	Emigration of a qualified workforce	Human capital risks
C2	Frequent rotation of employees	
C3	Low qualification of employees and the lack of experience	
C4	Failure to observe work safety requirements	

Table 2 continued

D1	Changing climatic conditions	Natural event risks
D2	Natural cataclysms (fires, floods, storms)	
L1	Transport system problems	Logistics risks
P1	Changes in national foreign trade rules	Political risks
P2	Changes in national internal trade rules	
P3	Ineffective use of the EU Structural Funds by local governments	
J1	Amendments to the legal framework for the construction industry	Legal risks
J2	Professional responsibility burden	
J3	Unskilfully drawn up legal documents	
F1	Credit risk	Financial risks
F2	Inaccurately planned cash flow and inflation	
F3	Lack of pre-financing	
F4	Tax rate changes	
V1	Lack of experience in project management	Management risks
V2	Poor work organisation and control	

In the opinion of the experts, the materialisation of 15 risks (out of 29 identified ones) is known several months or a year in advance, which gives an opportunity to reduce their effects. Seven of them are construction process-related risks such as the choice of wrong construction technologies (R3) and the failure to meet the deadline (R5), the causes of which could be the lack of experience and errors made by a construction designer. However, an experienced construction designer foresees the occurrence of the risk during the design process and plans extra funds needed in the event of materialisation of the risk. An essential risk for construction industry enterprises is also obsolete construction machinery and equipment (R4), which is known several years in advance, at the moment of purchase of them. To rank the risks assessed by the experts by significance, the research applied the following equation (Pettere, Voronova, 2003):

$$B_k = (B_1 + B_2) * B_3, \tag{1}$$

where
B_k - score according to the scoring system presented in tables;
B_1 - probability of occurrence of the risk;
B_2 - risk impact period;
B_3 - potential losses.

After conducting the expert survey and performing calculations, one can conclude that the most essential risk for building construction industry enterprises was the lack of pre-financing (F3), as the probability of occurrence of it was rated as very high (several times a month), and the

potential loss caused by it is moderate (less than 50% of net turnover). Identifying the amount of potential losses, the experts' opinion was that it was not possible to express that in terms of money. In the event of materialisation of this risk, the enterprise might incur no direct losses, yet it misses the opportunity to increase its net turnover, as it is not able to start new construction projects because of financial considerations.

The risk of failure to observe work safety requirements (C4) is one of the most essential risks in the construction industry. The risk that some worker does not comply with work safety requirements because of irresponsibility or some other considerations might materialise very often, and it is difficult to predict the occurrence of it. The experts did not rate the occurrence of this risk as materialising suddenly. The experts believed that possibilities to make internal warnings were limited, as the management of the enterprise had to be aware of their subordinate employees, their features of character and their attitudes to work, thereby partly predicting the probability of occurrence of this risk.

The third most essential risk for building construction industry enterprises is the risk of ineffective use of the EU Structural Funds by local governments (P3), which directly affects the building construction industry enterprises of a particular municipality.

Even though the risk of non-compliance of input materials with quality standards (R6) is restricted by the legal framework of this industry, this risk is still considered to be one of the most essential risks for this industry enterprises.

The other essential risks – credit risk (F1), project cost reassessment risk (R2), the low qualification of employees and the lack of experience (C3) and the choice of wrong construction technologies (R3) – are internal by origin, and they arise from the internal organisational pattern of building construction industry enterprises. This means that the management effectiveness of building construction industry enterprises strongly affects the frequency of occurrence of internal risks for the enterprise, and it is possible to develop an effective risk management system if identifying all the risks for the enterprise.

The experts did not rate seasonal demand (R9) as an essential risk. This could be explained by the fact that in this industry, in the experts' opinion, enterprise managers perceived it as a self-evident component of this business and did not perceive it as an unexpected event that might cause unexpected losses. The frequency of occurrence of this risk is several times a year, yet the impact period of it is well known, and those employed in this industry can reduce the loss caused by the risk by diversifying their economic activity.
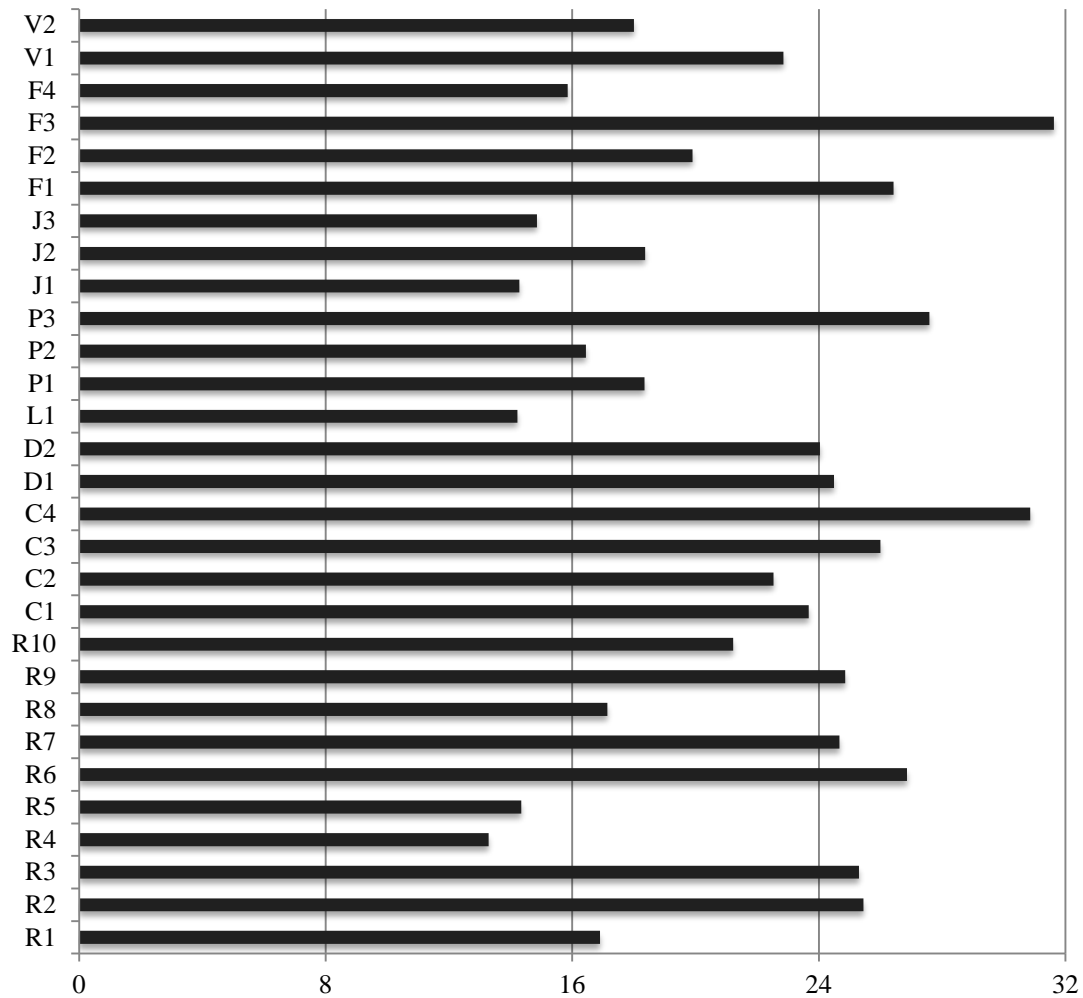
Fig. 1 Assessment of risks for the building construction industry, scores
(source: compiled by the authors based on the survey of experts)

The risk of amendments to the legal framework for the construction industry (J1), assessed by the scoring method, is one of the least essential risk for this industry (Fig. 1), although this risk, in the experts' opinion, should be one of the most essential ones for building construction industry enterprises because of regular amendments made to the legislation and changes in the quality of construction.

To assess the dispersion of risk scores, the authors calculated the minimum, maximum and average risk scores based on the experts' risk assessment, which revealed the experts' approach to assessing each risk and confirmed the objectivity of the risk assessment made (Fig. 2).

The calculation of the average risk severity level by risk group revealed that the most essential risks for building construction industry enterprises were those related to human capital. A pronounced lack of a workforce was specific particularly to the enterprises in rural areas; therefore, a lack of a qualified workforce was also more pronounced there, as well as the turnover of employees was higher.
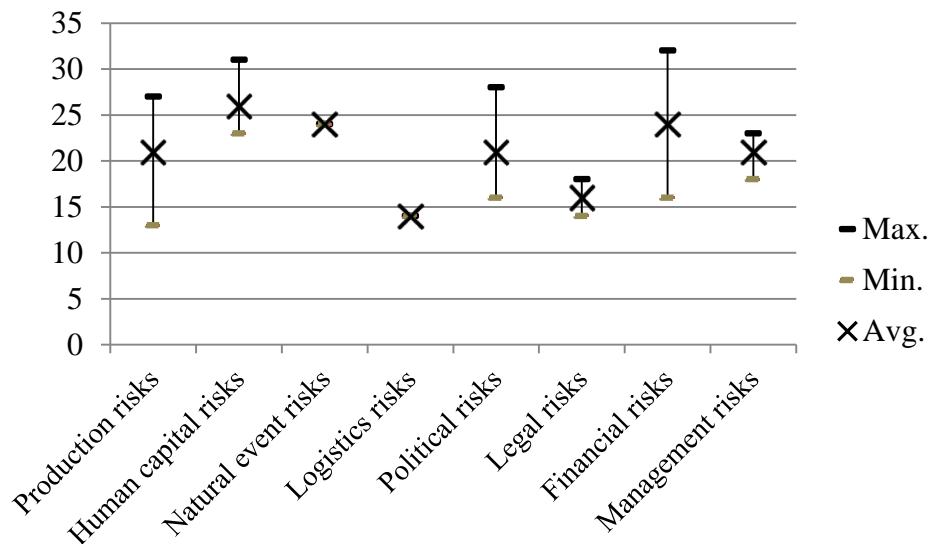
Fig. 2 Dispersion of risk severity level scores for building construction
industry enterprises on a scale from 1 to 32
(source: compiled by the authors)

The average risk severity levels for nature event risks and financial risks calculated based on the expert survey data could be regarded as similar. No dispersion of risk scores was observed for the group of nature event risks, while the dispersion for the group of financial risks was in the range of 16-32, which indicated that the experts carefully assessed the risks and the results obtained were unbiased.

In the final group of questions in the expert survey questionnaire, the experts were requested to assess the most appropriate strategy of risk management for each risk: **Av** – avoidance; **M** – mitigation; **T** – transfer and **A** – acceptance.

The expert survey results demonstrate that the experts' opinions are very similar in relation to the application of the risk management strategies to prevent the risks identified. Almost half of the identified risks could be prevented by applying some strategy of risk management and taking daily control and internal management measures, thereby investing no funds and reducing the consequences caused by the existing risks. Risk acceptance is also considered to be one of the most effective strategies of risk management. It requires being aware that the particular risk is going to occur and drawing up a plan for accepting this risk or doing nothing and hoping it never materialises.

The risk transfer strategy is regarded as the least appropriate for reducing the probability of occurrence of the identified risks and assessing the consequences caused by the identified risks. This strategy is the most appropriate in the event of materialisation of legal risks, which takes the

form of civil liability insurance for the professional activity of construction work managers and controllers as well as general civil liability insurance for building construction enterprises themselves. It has to be admitted that this risk management strategy, particularly civil liability insurance, is compulsory for building construction enterprises if they want to engage in the construction of some large object, especially if the construction is co-funded by the EU Funds.

The consequences caused by human capital risks could be reduced by means of insurance. To avoid the consequences caused by the risk of non-compliance with work safety requirements, enterprises could insure their employees against accidents at work and health problems. In this situation, in the case of accidents, the employees are granted financial assistance from an insurance company to partly compensate them for the damage. The experts are unanimous with regard to risk mitigation as another strategy for human capital risk management, which accounts for 75% of total alternatives for the management of these risks. The experts believe that these risks could be prevented by developing a motivation and bonus system for employees, as well as by simply promoting internal competition. As pointed out by an expert (E1), his practice has proved that appreciated and praised employees feel themselves belonging to their enterprises and wish to engage in developing the enterprises regardless of the size of remuneration. Consequently, their productivity increases and they trust their employers and believe in the goals of their enterprises, and as long as this attitude does not change, the employees do not seek jobs elsewhere. Accordingly, one can conclude that a well-developed employee motivation system and mutual communication are an effective instrument for preventing human factor risks.

Risk acceptance is considered to be the most appropriate risk management strategy for preventing natural event risks. The experts point out that the effect of seasonality on market demand in the construction industry had been observed a long time ago, and nothing else could be done other than to take it into consideration and accept it. The only instrument to be used to avoid a financial loss caused by this risk, i.e. a low turnover, is economic diversification. If the enterprises operating in this industry do not want to depend on seasonality, they have to engage in anther industry. Nevertheless, natural cataclysms are not easy to forecast, and their occurrence could be forecasted a short time before they take place. For this reason, the application of alternatives to manage this risk is different. Experts E1, E3, E4, E5 and E6 consider the risk acceptance to be the most appropriate strategy to manage this risk, whereas experts E2 and E7 prefer the risk avoidance. This means that construction works have to be deliberately interrupted in case inappropriate weather conditions set in, which, in its

turn, could affect the quality characteristics of the building. This also results in saving funds in the case an employee who has moved to a remote construction object is forced to work part-time because of bad weather conditions.

Risk mitigation is one of the alternatives for the group of production risks, as the experts recognise it to be the most appropriate risk management strategy for 50% of the identified risks. The experts are unanimous (100%) in using this strategy for the following production risks: obsolete construction machinery and equipment (R4); failure to meet the deadline (R5) and non-compliance of input materials with quality standards (R6). The risk of obsolete construction machinery and equipment is predictable, and a loss caused by this risk could be reduced by calculating depreciation in accounting. The risk of failure to meet the deadline could be also predicted if doing daily control and the work organisation system is well-structured at the enterprise. Therefore, daily control has to be done and meetings have to be held to solve any problem in order not to pay a fine specified in the construction contract for not meeting the deadline, which is very likely in view of the specifics of the construction industry. As regards the risk of non-compliance of input materials with quality standards – it could be prevented by requiring documentation certifying the quality of the materials from their suppliers and performing a study of suppliers.

Table 3 Risk management alternatives in the building construction industry rated by the experts *(source: compiled by the authors based on the survey of experts)*

Risk code	Risk characteristics	Risk management method applied						
		E1	E2	E3	E4	E5	E6	E7
R1	Price hikes on input materials	A	Av	Av	A	Av	Av	Av
R2	Project cost reassessment risk	M	M	M	M	M	M	M
R3	Choice of wrong construction technologies	A	M	M	M	A	M	M
R4	Obsolete machinery and equipment	M	M	M	M	M	M	M
R5	Failure to meet the deadline	M	M	M	M	M	M	M
R6	Non-compliance of input materials with quality standards	M	M	M	M	M	M	M
R7	Dependence on a few customers	Av	Av	M	Av	Av	M	Av
R8	Emergence of new competitors	A	A	A	A	A	A	A
R9	Seasonal demand	Av	A	Av	Av	Av	A	Av
R10	Corruption and bribing	Av	Av	Av	Av	Av	Av	Av

Av – avoidance; **M** – mitigation; **T** – transfer; **A** – acceptance.

Risk management alternatives for the other production risks, based on the experts' ratings, are presented in Table 3. As shown in Table 3, a strategy to be used to tackle the risk of emergence of new competitors (R8) is risk acceptance. The frequency of occurrence of this risk could be partly controlled by the government, yet the enterprise itself could do a study of its competitors and their advantages and disadvantages, thereby identifying its position in the market. In contrast, the risk of corruption (R10) could only be avoided by not allowing the risk to occur and not letting criminal and financial consequences emerge in the event of materialisation of the risk.

Various information resources report on bribery in the construction industry, particular situations in which some illegal benefit is demanded and taken. For example, the managements of construction enterprises pay bonuses to their project managers from their excess profits, yet the SRS electronic declaration system does not capture them. In this situation, one can identify three hidden and well-known problems: illegal benefits are taken; commercial bribery; bonuses are paid from excess profits after construction objects have been finished (Uzulēns, 2016).

To prevent the risk of corruption in the construction industry, the authors recommend construction enterprises and the senior officials of the Ministry of Economics, the State Revenue Service, the Procurement Monitoring Bureau, the Latvian Trade Union of Construction Workers and the State Labour Inspectorate to create a centralised information exchange system that is accessible only by them and in which, based on certain criteria, the number of enterprises to be primarily inspected is identified.

Conclusions

1. Based on the conducted expert survey and performed calculations, it can be concluded that the most essential risk for building construction industry enterprises is the lack of pre-financing.
2. Calculation of the average risk severity level by the risk group reveals that the most essential risks affecting the building construction industry are those related to human capital, thus, the research hypothesis is proved as true.
3. Risk acceptance is considered to be the most appropriate risk management strategy for preventing natural event risks, as the effect of seasonality on market demand in the construction industry has been observed a long time ago, and nothing else could be done other than to take it into consideration and accept it as well as try to do economic diversification.

4. Risk mitigation is one of the alternatives for the group of production risks, as the experts recognise it to be the most appropriate risk management strategy for 50% of the identified risks.

Proposals

1. To reduce the effect of seasonality and the risk of unforeseeable orders, building construction industry enterprises have to diversify their business and develop some auxiliary kind of economic activity, thereby ensuring earning revenues throughout the year.
2. To prevent the risk of corruption in the construction industry, construction enterprises and the senior officials of the Ministry of Economics, the State Revenue Service, the Procurement Monitoring Bureau, the Latvian Trade Union of Construction Workers and the State Labour Inspectorate have to create a centralised information exchange system that is accessible only by them and in which, based on certain criteria, the number of enterprises to be primarily inspected is identified.
3. To contribute to the development of the construction industry and the economy as a whole, the local governments have to actively engage in acquiring funding from the EU Structural Funds, thereby increasing the demand for construction services and employment in the regions.

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