

## **The Construction in Lithuania and Their Transformation in 21st Century**

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### **Abstract**

Lithuania as a member of European Union shares the same economical space with countries, which have longer experience of market economy. In that situation it is very important to know the European economical system and the peculiarities of construction market.

Internationalization processes in construction influence the business of Lithuanian contractors. The beginning of 21<sup>st</sup> century could be named as an intellectualization epoch of construction business, engineering and management solutions. The success of Lithuanian contractors will depend on international construction experience, competitive abilities and adaptation in changeable construction market.

### **Keywords**

Globalization, construction market, construction project management.

## **1. Introduction**

What is the current competitive situation in the European and global construction sector? What influence does internationalization have on Lithuanian economy and construction sector in particular? How should all construction market participants adapt to the constantly changing market conditions? What are the best global practices in construction? What changes should the national construction sector prepare for? What should be done by Lithuania to retain competitiveness and ensure the development of construction companies as a member of the European Union sharing the same economic space with other countries, which have more experience and much stronger economic potential? All these questions are relevant to Lithuania's as well as other countries' economies and their subjects. The methods of construction operation should be recognizable by construction companies of other countries. The beginning of the XXI century is a challenge to the Lithuanian construction sector and its participants. What should the input of universities be into the global construction process theory and practice?

## **2. Globalization processes and Lithuania**

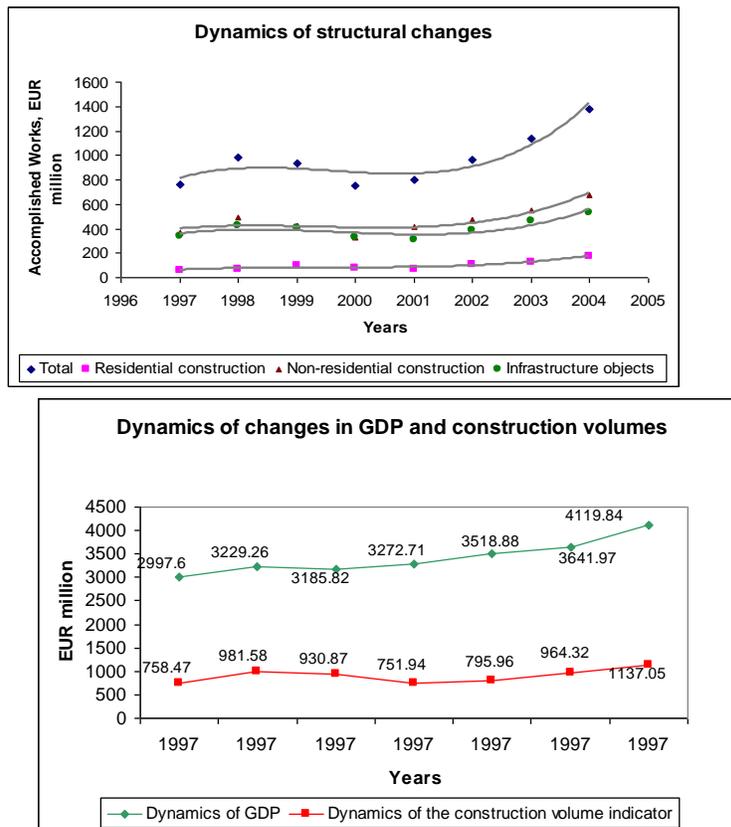
The establishment of the European Union and its further development is a natural result of the integration process. The Lithuanian Republic is also taking an active part in the process. Our country has good opportunities to present itself in the European economy and use both its advantages and potential to achieve its purposes. On the other hand, all economic subjects need to put more effort into retaining and developing their operations in a very competitive market. (Juodis, 2001).

The dwindling construction volumes in Western Europe have increased competition and made the contractors review their operational strategies. The essential economic transformation processes in Central European countries have created premises for growth in construction exports. The increase in construction exports by Western European contractors influences the Lithuanian construction sector.

### 3. The dynamics of the construction sector transformation in Lithuania

The role of construction in the economy is outlined by construction volumes and their comparative weight as part of the gross domestic product (GDP), as well as the number of people employed in construction. In 2004, construction work worth EUR 1383,02 million was carried out in Lithuania. Construction amounts to 7.71% of the Lithuanian GDP. Creating a job in construction allows creating two jobs in other sectors related to construction. 102,200 people are employed in construction. This comprises 7.2% of all Lithuanian labour force, which was 1.436 million in 2004. Annual construction volumes per head are around EUR 402. More than 50% is residential construction, 25% is private economic object construction, 9% of construction is for social purposes and 16% is construction of infrastructure objects (Figure 1).

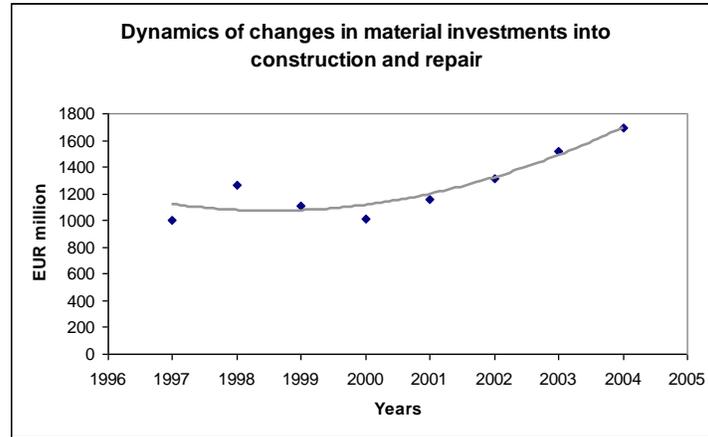
**Figure 1: Dynamics of structural changes in Lithuania’s construction sector in 1997-2004**



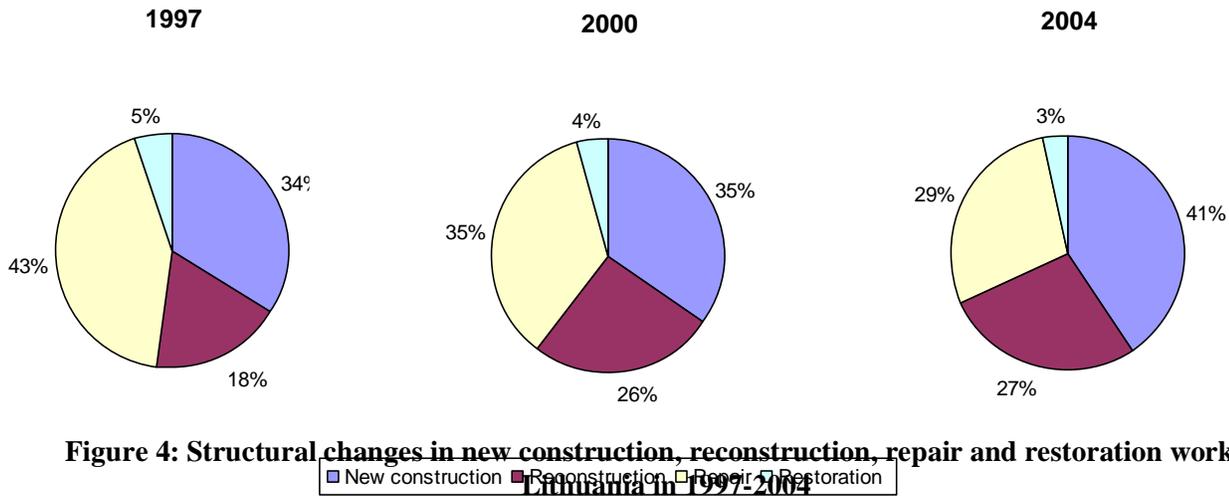
The dynamics of changes in GDP and construction volumes in Lithuania is provided in Figure 2.

**Figure 2: Dynamics of changes in GDP and construction volumes in Lithuania in 1997-2003**

Since the beginning of 2000, the growth of construction has increased by an average 6.85 % per year. Material investments into construction and repair have also increased (Figure 3). Demand for residential construction in Lithuania is great, but the volumes of this construction are increasing slowly, while the volumes of infrastructure object construction are increasing steadily. The main industries have accumulated sufficient funds, which, however, are used for the renovation and modernization of existing structures instead of new construction. In Figure 4 we see that around 56-61% of all investment goes to renovation and modernization of existing structures (Juodis and Varnas, 2004).



**Figure 3: Dynamics of changes in material investments into construction and repair in Lithuania in 1997-2004**



**Figure 4: Structural changes in new construction, reconstruction, repair and restoration work in Lithuania in 1997-2004**

Therefore a lot of attention is devoted to maintenance, modernization and renovation of existing structures (Juodis and Varnas, 2003; Juodis and Varnas, 2004)

The situation in the Lithuanian construction market depends on the construction juncture and the developmental dynamics of this sector of the economy. The juncture of construction shows a certain situation and reflects the specifics of construction operation within a certain time period. The juncture is determined by processes of market economics. Changes in juncture depend on numerous interdependent

factors, such as the relationship of demand and supply in the market, monetary policy, technical advances, changes in regulation of economic activity, international and ecological situation etc.

Juncture changes in construction influence other economy sectors related to it. The following sectors are most sensitive to changes in construction: manufacturing of construction materials and products, construction equipment, wood processing industries, building engineering systems' production etc.

The negative impact of juncture fluctuation is decreased on the national level by regulating the size of public investment in the country. This enables to ensure more stable operation of not only the construction sector, but also the whole national economy.

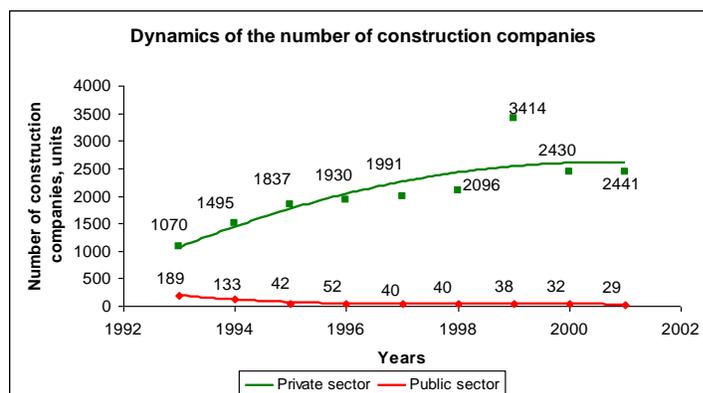
Juncture information is used for setting the construction juncture policy. The supply of such information has not yet formed in Lithuania, although the demand for it by construction companies as well as those in other sectors is huge. In the absence of juncture information it is difficult to make correct construction strategic management decisions. The nature of juncture changes in the country's economy as well as in separate sectors is different. In many Western European countries, construction market and juncture research companies are already operating. They monitor the change tendencies in construction and disseminate information to all market participants. Such juncture information is used by construction companies for operational and strategic planning.

The development of construction is closely connected to the development of the economy as a whole. The process of economic development proceeds in S-shaped cycles. Lithuania was an independent country in 1918-1940; then it lost its independence and once again became independent in 1990. From 1940 to 1990 Lithuanian economy experienced periods of deformed development with all the downsides of planned economy. Therefore the development of Lithuanian economy did not follow the classic S-shaped cyclical nature. The current development of Lithuanian economy demonstrates natural economic market processes. Lithuanian economic indicators are used to illustrate this development. However, there is not enough data available to carry out an extensive analysis of the dynamics of long cycles of the construction sector development. On the other hand, such construction sector juncture and development research are necessary for forecasting.

#### 4. Management of construction in Lithuania

Various models of construction company management are emerging in Lithuania. Management is oriented towards long term goals and optimal development. This development is characterized by an adaptive nature. The system of construction company management depends on a particular company's area of operation, size and legal status.

Currently around 3000 construction companies of various legal statuses are operating in Lithuania (Figure 5). Small companies (up to 20 employees) make 75.2% of all companies. Medium-sized companies (20 to 499 employees) make 24.6%, while large construction companies (over 500 employees) make 0.2% of all companies.



### **Figure 5: Dynamics of the number of construction companies in Lithuania**

Each group has its particular management system. Small construction companies have a certain specialization profile. Their management system is simple: there is one level of management and a minimal management apparatus. Such companies have a small area of operation. They also have lower construction expenses and operate more efficiently. Consequently, small construction companies sign contracts not only with investors, but also with other construction companies. However, there are fewer small construction companies in Lithuania compared with other countries.

Medium-sized companies usually have a regional nature of operation. Such companies construct more complex, large objects, for example, infrastructure objects, industrial, administration, residential structures etc. Medium-sized construction companies compete with small and large companies. Unlike the small companies, the management system of medium-sized companies usually has three management levels. The success of medium-sized companies depends on the area of operation and level of specialization. Companies of this segment have to react timely and adequately to the changes in the construction market and choose suitable operation improvement strategies.

The largest construction companies are usually joint stock companies. They construct extremely complex, large objects not only in their home country, but also abroad. Due to fierce competition, these companies are also transforming just like small and medium-sized companies. The tendencies of such construction companies' development show that increasing attention is being devoted to the management of complex construction projects, preparation and optimization of construction decisions, coordination of the construction processes, expense control and regulation (Juodis, 2001). Large construction companies handle all the functions of a construction project, up to the delivery of the finished object for intended use.

In other countries large construction companies also carry out building maintenance and modernization (Atkin and Brooks, 2004; Henzelmann et al, 2001). Besides, they often handle the financing of large construction projects. There is more innovative activity in such companies (Braun et al, 2004). However, large construction companies in Lithuania are not yet operating in this way. Usually, only residential construction is financed; after completion, these objects are sold.

While building a large construction project, efficient cooperation ensues among companies of various sizes and operating profiles. The legal base of such cooperation is usually a two-party or multiple-party agreement.

During the recent five years, construction project management companies have been established in Lithuania. The employees of such companies are former construction project managers, engineers, economists, specialists of informatics etc. Usually, a construction project management company has 5-7 employees. Such companies carry out the "turn key" solutions most efficiently. The construction project management companies devote a lot of attention to decision preparation, evaluation and selection, monitoring of project flow and expense control throughout all project stages. Companies that actively cooperate with universities show the best operational results. One of the best practices is cooperation with Kaunas University of Technology.

In this university, complex construction project management decision optimization research (both theoretical and applied) is carried out with the help of knowledge of various sciences: civil engineering, system engineering, applied mathematics, informatics, cybernetics, and construction economics. Information from Lithuanian construction companies is used in this research. Furthermore, questionnaires for carrying out special construction project management research are designed. This allows the analysis of a wide range of topics. The use of construction project methodology allows optimizing complex

construction tasks, using mathematical optimization methods and models, such as mathematical programming, inventory management, probability theory, series theory, game theory, correlation, artificial neural network and other models. For example, Lithuanian clients select the most suitable contractor by using the construction companies' multi-criteria competitiveness evaluation model (Juodis and Šiškina, 2004). The expedience of construction project management is estimated according to a methodology that uses the neural networks model (Juodis and Apanavičienė, 2003). The most efficient construction process implementation decisions are selected during the construction engineering setup, using mathematical programming, correlation and series theory models (Juodis and Viliūnienė, 2004). Application of these and other construction task models allows preparation of more efficient construction decisions. Implementation of such decisions allows decreasing construction expenses by 20-30%, and decreasing construction time up to 50% (Juodis, 2001; Juodis, 2005). Currently, a model for efficient building maintenance is being created (Juodis and Varnas, 2003; Juodis and Varnas, 2004). Research results are being used in practice by construction companies as well as in the study process. Cooperation among universities from various countries is very important in solving scientific and study problems of the construction sector, as well as in improving the competitiveness of this sector.

## 5. Conclusions

The internationalization of the EU economic and other processes has a major influence on the transformation processes of Lithuanian economy. The construction sector is very important for the national economy. This sector is the fastest developing sector in the country's economy. However, considering the impact of internationalization processes, a strategic issue appears how to ensure the international competitiveness of the Lithuanian construction sector. An analysis of Western European construction experience has allowed us to estimate the level reached as well as the opportunities for increasing the sector's competitiveness, areas of relevant scientific research and construction improvement.

The beginning of the XXI century can be called the age of intellectualization of construction business engineering and management decisions. Knowledge and methods of various sciences are needed in solving complex construction project management problems. More efficient, and therefore competitive construction decisions can be prepared by using not only the knowledge of civil engineering, but also that of system theory, system engineering, applied mathematics, cybernetics, economics, informatics and psychology. Preparation of competitive construction decisions requires highly qualified specialists and more funds. However, the final positive result is much bigger than the expenses related to the preparation of efficient decisions and their implementation.

In this respect, important issues appear for universities which prepare civil engineering specialists and integrate studies with scientific work. The analysis of the best practices in such study programs and cooperation among universities can ensure competitive development of the construction sector on the national as well as the EU level.

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