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Risk of investment in forestry and wood-processing industry

Rizik ulaganja u šumarstvo i drvnu industriju

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ABSTRACT • *Development of forestry and wood-processing industry together with the increase of their effectiveness requires the investment of a huge amount of capital. It is not possible to expect the achievement of development objectives without suitably allocated investment means, i.e. without specific projects. The success of investment is significantly affected by risk, which has to be taken into account when investment opportunities are evaluated in order to carry out the right assessments when making investment decisions.*

Key words: *forestry, wood-processing industry, investments, risk*

SAZETAK • *Razvoj i povećanje uspješnosti šumarstva i drvne industrije zahtijevaju velike investicije. Postizanje ciljeva razvoja nije moguće očekivati bez odgovarajuće usmjerenih investicijskih sredstava, tj. bez specifičnih projekata. Na uspjeh ulaganja velik utjecaj ima rizik te ga je nuzno uzeti u obzir prilikom procjene različitih mogućnosti ulaganja kako bi se pri investiranju u šumarstvo i drvnu industriju donijele pravilne odluke.*

Ključne riječi: *šumarstvo, drvna industrija, ulaganja, rizik*

1 INTRODUCTION
1 UVOD

Nowadays there are many companies in Slovakia facing bad economic situation. They are constantly trying to solve the issues "what to produce", "whom and how to sell", "who to cooperate with" and "how to realize their business plans". This means that it is not possible to identify in advance and with certainty the development and the expected results of most processes running not only in the company, but also in the national economy and world economy and hence we can say that they are uncertain. This uncertainty represents the risk, which can be determined as deviation from anticipated revenues. Therefore, if we want to provide a realistic assessment of the expected revenues effectiveness, we must also regard the risk factor, its identification, analysis and projection into concrete effectiveness evaluation criteria (Brealey and Myers, 1988; Hajdúchová, 1998; Holécy,

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1994; Kolenka and Hajdúchová, 1999; Levi, 1992).

In our opinion it is very important and also very hard to make decisions in forest economy (FE) as well as in wood-processing industry (WPI), especially in view of their influence on long-term development and prosperity of the company. Without investments, specific business aims cannot be accomplished. Decision making on investments involves accepting the actual basis, achieving the set goals and regarding the possible risks.

2 PROSPECTS OF FOREST ECONOMY AND WOOD-PROCESSING INDUSTRY
2 IZGLEDI ŠUMARSTVA I DRVNE INDUSTRIJE

The past development of economy shows that Slovak economy needs radical and deep restructuralisation. The economy needs urgent implementation of system solutions in order to provide long-term stable growth based on increase of the efficiency and competition rise. In order to increase the required effectiveness, large investments should be made in industrial branches having good prospects for future development of the Slovak economy and making better use of domestic raw materials.

So far forestry and wood-processing industry have not been highly ranked. Both industries take part in securing the active foreign trade balance by increasing export production. At the same time we can say that both industries can assure significant increase of listed indicators, which could then raise production of goods, increase employment opportunities and wood value. This could be realised only when based on accurate accessibility to investment sources to be used for projects related to both industries.

Nowadays there is a complete lack of economic policy actions and they would be helpful in capitalising wood process, i.e. ensuring the realization of the final stage of wood production in Slovakia, and not in other countries (we are referring to about SKK 1 billion loss incurred by our export of raw wood, lumber, intermediate materials). If wood-processing industry could carry out the entire wood production with maximum level of finalization, FE and WPI would gain a significant role in creating the added value and in GDP growth. This would have a positive impact on the Slovak economy (GDP/inhabitant, employment, regional development, etc.). Based on the analysis of the export structure - export of skid, lumber, semi-products, a.o. (Správa o lesnom hospodárstve v SR, 1995-2000), we can estimate the production growth or wood value to SKK 5-7 billion. Nowadays wood-processing industry has a share of approximately 6.7% in the production of goods in SR. The selected indicators are shown in Table 1.

Support provided to forestry and wood-processing industry by the state/government is also important because both industries are based on processing domestic raw materials, and manufacturing capacities of wood-processing industry exceed the production capabilities of forestry. Nevertheless the export of raw wood is increasing and recession in both industries is becoming even worse, as shown in Table 1.

Interventions of the state policy related to investments into forestry and wood-processing industry represent system risks and the recession in engineering sector is considered to be especially dangerous. This means that support of both industrial branches could also be indirect, through investments into development of civil construction, road construction, development of tourism, etc.

The example of developed countries (Finland, Sweden) proves that investments into forestry and wood-processing industry could be profitable, and even wood-processing and pulp and paper making industry can create substantial part of GDP and export. It requires increase of productivity, improvement of quality and placement on foreign markets, which is conditioned by investments.

There have been attempts of revival of wood-processing industry. Many of them have not been successful. One of the reasons is the fact that the risk was underestimated, or not regarded. The following Section deals with its identification and evaluation.

3 RISK AND ITS IDENTIFICATION
3 RIZIK I NJEGOVO UTVRĐIVANJE

In order to consider the risk by evaluating the effects of investments, it is necessary to identify the project risk and its influence on the project success. In theory, as well as in practice (Brealey and Myers, 1988; Holécy, 1994; Kolenka and Hajdúchová, 1999; Levi, 1992; Matuszewski and Drabek, 1996), there are different approaches to risk classification by investment projects (Figure 1).

System risk is established by the state policy and it cannot be influenced by the company. **Non-system risk** (industrial branches, business) is affected by the level of technical equipment, possibility of ensuring the company's own financial resources (failure of cash flow) and competitive envi-

ronment (domestic and powerful foreign companies), price and commercial policy (prices regulation, supplier-purchaser relationships), as well as by the extent of business activities, financial standing of the company and by the quality of preparation of investment projects. In forestry we have to regard additional specific risks, resulting from long production time, which means long pay-back-period. As a result of the listed risks, forestry and wood-processing industry are low effective. They are incapable to make profit (or capable of low level profit providing), which results in low reinvestments.

Table 1
Trend of the chosen indicators in forestry and wood-processing industry in relation to Slovak economy in the period 1995-1999 (s. c. 1995)
Tablica 1.
Kretanje izabranih pokazatelja u šumarstvu i drvnoj industriji u odnosu prema gospodarskim pokazateljima u Slovačkoj u razdoblju 1995-1999. (s. c. 1995)

P.č. *R.b.*	**Indicator** *Pokazatelj*	**Units** *Jedinica*	**Year -** *Godina*				
			1995	**1996**	**1997**	**1998**	**1999**
1	SR GDP *BDP R. Slovačke*	Bill. SKK *mlrd. SKK*	516.8	550.8	586.8	612.7	624.5
2	Forest economy GDP *BDP šumarstva (Š)*	Bill. SKK *mlrd. SKK*	3.7	4.2	4.3	4.2	4.1
3	FE GDP / SR GDP ratio *omjer Š BDP / RS BDP*	Percentage *postotak*	0.72	0.76	0.73	0.68	0.67
4	WPI GDP *BDP drvne industrije (DI)*	Bill. SKK *mlrd. SKK*	10.8	8.7	8.9	9.5	10.08
5	WPI GDP / SR GDP ratio *omjer DI BDP / RS BDP*	Percentage *postotak*	2.09	1.58	1.52	1.55	1.61
6	SR investments *ulaganja u RS*	Bill. SKK *mlrd. SKK*	146.6	206.4	214.0	225.1	194.9
7	Investment ratio *omjer ulaganja* $\left(m_i = \frac{I\ SR}{GDP\ SR} \right)$	Percentage *postotak*	28.37	37.47	36.47	36.74	31.21
8	FE investments *ulaganja u šumarstvo* thence – *iz toga* Capital investments *kapitalna ulaganja* Investment into forest soil *ulaganje u šumsko tlo*	Bill. SKK *mlrd. SKK*	1.502 0.679 0.823	1.469 0.624 0.845	1.452 0.516 0.936	1.388 0.487 0.901	1.254 0.419 0.835
9	WPI investments *ulaganja u DI*	Bill. SKK *mlrd. SKK*	2.959	2.726	5.324	5.298	5.972
10	Deflator *deflacija*	Index *indeks*	1.000	1.045	1.114	1.171	1.248
11	Export of wood *izvoz drva*	Thous. m^3 *tisuće* m^3	537	539	1 081	1 290	745
12	Employment in SR *broj zaposlenih u RS*	Thous. Pers. *tis. osoba*	2 138	2 036	2 194	2 003	1988
12	Employment in FE *zaposleni u šumarstvu*	Thous. Pers. *tis. osoba*	29	28	27	24	23
13	FE/SR employment ratio *omjer zaposlenih Š/RS*	Percentage *postotak*	1.37	1.37	1.23	1.20	1.16
14	WPI employment *zaposleni u DI*	Thous. Pers. *tis. osoba*	41.7	40.75	39.54	35.32	35.95
15	WPI/SR employment ratio *omjer zaposlenih DI/RS*	Percentage *postotak*	1.95	2.00	1.80	1.76	1.81

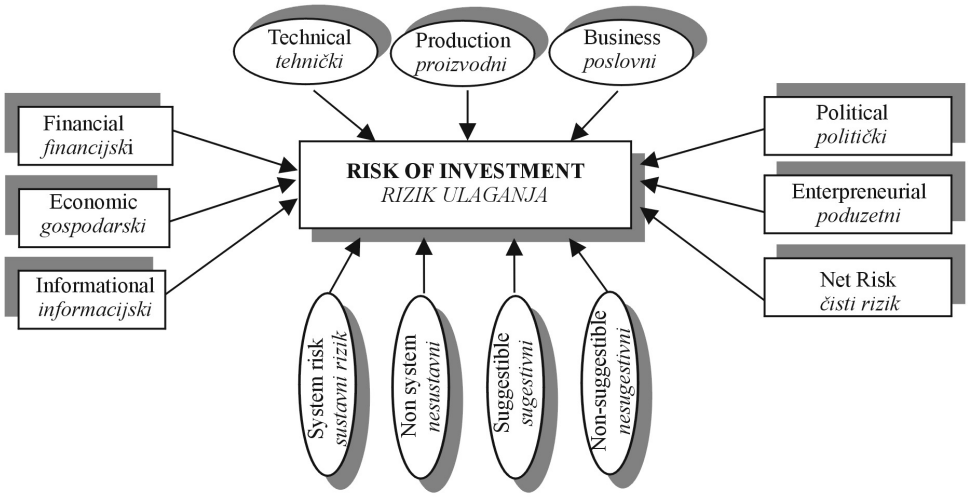
SR - Slovak Republic (RS - Republika Slovačka); GDP - Gross Domestic Product (BDP - bruto društveni proizvod); FE - Forest Economy (Š - šumarstvo); WPI - Wood-processing industry (DI - drvna industrija); I - Investment (I - investicije, ulaganja); Bill. SKK - Billions of SKK (mlrd. SKK - milijarde slovačkih kruna)

The author Holécy, 1994 deals with the classification of investment risk in forestry, and they elaborate its influence on the realization of projects, particularly on overall results of the company. In wood-processing industry, authors Matuszewski and Drábek, 1996 also deal with the classification of investment risk, they recommend the introduction of such classification and they support the possibility of risk evaluation by phase process following the investment process.

The question is how to act, when to evaluate the risk of investment and how to choose the best way of its projection into criteria of evaluation. We recommend the following method:

1. Classification of investment risk by projects (Fig. 1),
2. Evaluation of risk with the application of adequate methods (Brealey and Myers, 1988; Matuszewski and Drábek, 1996),

Figure 1
Classification of investment risk
Slika 1.
Razvrstavanje rizika ulaganja



Note: Regarding Figure 1 it is evident that large number of risk factors prevents the risk analysis of the project. It is therefore necessary to weigh the importance of factors in view of expected effects and to make the appropriate reduction, i.e. eliminate the factors of low significance. We recommend the use of sensitivity analysis (Section 4) for measuring the significance of factors.

3. Analysis of risk in view of project effectiveness (Section 4),
4. Evaluation of the project influence on the economic situation of the company.

4 SIGNIFICANCE OF RISK FACTORS
4 ZNAČAJ ČIMBENIKA RIZIKA

Significance of risk factors, implying possible uncertainty of the expected project result, could be measured by sensitivity analysis.

The method of sensitivity analysis is based on explicit presentation of influence of risk factors affecting the project, expressed e.g. by profitability of the project, net present value or by internal rate of return. The purpose of sensitivity analysis is to identify sensitivity of the economic result (profit - final income of investment) of investment project with regard to factors having influence on the expected profit. The basic factors of most projects are the following:
- selling price,
- production volumes (utilization of production capacity),
- price of basic material and price of energy,
- labour costs, and others.

The application of sensitivity analysis for the assessment of the significance of risk factors is showed in Table 2, compiled by use of the basic formula for sensitivity analysis (1):

$$Z = P \cdot c - \left[\left(v_1 + v_2 + \ldots + v_n \right) \cdot P + f_1 + f_2 \ldots + f_k + \frac{I}{T} \right] \qquad (1)$$

where are:
Z - annual profit from the project / *godišnja dobit od projekta,*
P - annual volume of production in natural expression / *godišnji obujam proizvodnje,*
c - selling price / *prodajna cijena,*
$v_1, v_2, \ldots v_n$ - variable costs / *promjenjivi troškovi (varijabilni),*
$f_1, f_2, \ldots f_k$ - fixed costs / *nepromijenjivi troškovi (fiksni),*
I - investment costs (capital expenses) / *troškovi ulaganja,*
T - assumed operating life time / *pretpostavljeno operativno vrijeme.*

Values in Table 2 were calculated by entering the relation (1) into table processor EXCEL, which means that variance of individual risk factors from the probable value could be easily changed and the influence of risk with absolute and relative change in profit could be simulated.

The results of sensitivity analysis show that a +10 % change of risk factors will cause a drop of profit:
- at 38.97 % by lowering selling price,
- at 22.41 % by decreasing production volume,
- at 10.73 % by increasing material costs,
- at 8.09 % by rising rental costs,
- at 3.67 % by increasing personal costs,
- at 3.19 % by lowering operating life time of technical equipment.
- influence of other risk factors ranges from 2.87 % to 0.06 %. Profit is only slightly affected by the change of costs of goods (0.06 %) and promotion costs (0.09 %).

Table 2
Analysis of project sensitivity
Tablica 2.
Analiza osjetljivosti projekta

Data *Veličina*	**Units** *Jedinica*	**Probability value** Predviđena vrijednost	**Deviation** Odstupanje ±10 %	**Change in profit** *Promjena profita* Thous. SKK *tisuće SKK*	**Change in profit** *Promjena profita* Percent *postotak*
Production capacity *kapacitet proizvodnje*	Thous. pcs *tisuće kom.*	970.20	873.18	502.10	22.41
Sale price *prodajna cijena*	SKK/pcs *SKK/kom*	9.00	8.10	873.18	38.97
Material costs *troškovi materijala*	Thous. SKK *tisuće SKK*	2 403.96	2 644.36	240.40	10.73
Cost of goods *troškovi proizvoda*	Thous. SKK *tisuće SKK*	14.25	15.68	1.42	0.06
Personal costs *troškovi rada*	Thous. SKK *tisuće SKK*	821.56	903.72	82.16	3.67
Transportation costs *transportni troškovi*	Thous. SKK *tisuće SKK*	147.00	161.70	14.70	0.66
Promotion *promidžba*	Thous. SKK *tisuće kom.*	20.00	22.00	2.00	0.09
Other variable costs *drugi promijenjivi troškovi*	Thous. SKK *tisuće SKK*	304.00	334.40	30.40	1.36
Rent *renta*	Thous. SKK *tisuće SKK*	1 812.00	1 993.20	181.20	8.09
Insurance *osiguranje*	Thous. SKK *tisuće SKK*	35.00	38.50	3.50	0.16
Other fixed costs *drugi fiksni troškovi*	Thous. SKK *tisuće SKK*	290.00	319.00	29.00	1.29
Capital expenditures *kapitalni izdaci*	Thous. SKK *tisuće SKK*	5 145.00	5 659.50	64.31	2.87
Operating life of tech. *životni vijek tehnol.*	Years *godine*	8.00	7.20	71.46	3.19
Profit *dobit*	Thous. SKK *tisuće SKK*	2240.905			

5 CONCLUSION
5 ZAKLJUČAK

Performed analysis (Drábek, 1999; Hajdúchová, 1997) confirms that forestry and wood-processing industry are promising industrial branches. In order to establish their cooperation it is necessary to create instruments of economic policy that would aim to higher valuation of wood and cause growth of GDP in SR. To do so, it is nece-ssary to provide sufficient capital resources.

The results of investment decisions depend not only on state policy, but especially on the quality of preparation and realization of projects, which should contain analysis and instruments for lowering risk (Matuszewski and Drábek, 1996). With this purpose it is necessary to:

- analyse investment process at various levels (state priority, regional development) and create incentives for investments,
- release favourable financial means (lower interest rates, tax allowance) in case of investing into technical facilities or tech nological process in order to increase the amount of production and production quality,
- set aims and provide financial resources for ensuring government program declaration related to business development, country side development and development of tourism,
- make projects, which would ensure the realization of the program WOOD - 21st century material,
- ensure that projects contain analysis and risk indication, methods and instruments of protection against risks, as well as consideration of their influence on business efficiency.

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