

# Typology of contractors for forestry services: Insights from Slovakia

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## ABSTRACT

The forestry services market in Slovakia has begun to form in the early 1990s under unstable and changing conditions due to the restitution of forest property rights and the restructuring of state-owned enterprises. The transition of State Enterprise Forests towards outsourcing of forestry activities was completed in a relatively short time period, which was insufficient for an adequate formation of this sector. Therefore, it is weakly developed, undercapitalised and has a low competitive ability. On the other hand, at present, there is a high dependence on contractor firms, which carry out the most part of logging, silviculture and transport activities within the forestry. Nowadays, the forest business community consists of more than 10,600 contractors, 88% are self-employed persons and 12% represent business companies. According to the structure of revenues and cost items, the aim of the study was to identify and characterize the firm types of contractors in the forest service sector in Slovakia, with an emphasis on Limited Liability Companies. Methodologically, it is based on the analysis of basic economic data from a representative sample of 152 contractors and a vertical analysis of their income statements. A detailed analysis of revenue and cost items showed that the most significant part of total income of the selected companies comes from the sale of own products and services (58%). On the other hand, the highest value within the total expenses were found for production consumption (57.2%) and cost of merchandise sold (31.8%). Subsequently, five types of business strategies were identified and characterised. Business strategies of contractors are influenced by the current situation within the sector. Low prices for provided services and a lack of qualified workers in the labour market cause mean that it is not possible to apply the classic business strategies. Contractors try to apply their own strategies such as orientation to business or management of subcontractors. They mostly prefer the so-called „Classic strategy”, which focuses on providing services as well as trading activities to complement their business activities. We therefore expect an increased number of contractors who provide forestry services through their own employees. Another possible way is to allow contractors to implement new business strategies and innovations through a higher degree of the standing timber sale.

## 1. Introduction

Traditional forestry aims are associated with the establishment and cultivation of forests to produce timber (Bouriaud et al., 2011). However, in recent years, the business community of enterprises to provide forestry services was created; it mainly consists of small- and medium-sized enterprises (SMEs) with less than 50 employees (Eriksson et al., 2015). Such SMEs do not own and use forestlands, but only provide and ensure a wide range of forestry services (Bouriaud et al., 2011). Generally, the theory of outsourcing implies that in other sectors, companies usually outsource subsidiary activities which are not related to the core business. A specific characteristic of the forestry services market is

that the major forestry operations are outsourced instead of being carried out by forest holdings themselves. It is a curiosity of this market that it is related to other specificities of forestry production. Currently, 95% of the extraction and transport of timber are carried out by these companies (Ambrušová and Šulek, 2014; Häggström et al., 2013), which are often termed forest machine “owner-operators” (Drolet and LeBel 2010). Also, in most European countries, outsourcing of forestry services has become a common strategy (Janzen and Sanberg 1998; Poschen and Lovgren 2001; Lilley et al. 2002; Nordfjell et al. 2005; Rummukainen et al. 2006; Westermayer 2006; Novais, 2009; Paluš et al. 2011; Ager 2012; Eriksson et al. 2015; Zastocki 2016; Šporčić et al. 2017).

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According to Paluš et al. (2011), the outsourcing of these activities is more profitable for forest owners than owning or leasing machinery. The main motives for the outsourcing of forestry services represent cost and economic risk reduction (Clarke and Isaacs 2005; Siguaw and Simpson 2004; Westermayer 2006; Erlandson 2013), a decrease in bounded capital in machinery, paired with increased incitements for productivity development by paying contractors, a piecework rate (Norin 2002) and more rapid adjustments of the capacity level of current needs (Ambrušová and Šulek 2014).

Research within the extant forest sector is mainly focused on the primary and secondary wood industry (Hansen et al. 2011; Nybakk 2012; Stendahl and Roos 2008), with only a few studies among contractor firms (Nybakk et al., 2015; Eriksson et al. 2015). However, as D'Amours et al. (2004) state, the forest product value creation network is constituted of all companies and business units involved in the supplying, processing and distribution of a product for a market. Positioned at the beginning of the forest product value creation network and assuring the supply of timber, forest contractor firms could be considered as essential actors of this network.

### 1.1. The forestry services sector in Slovakia

The possibilities of forestry outsourcing in Slovakia were based on historical and good long-term relationships and rules and were created in unstable and changing conditions for the renewed property and use rights formation to forest land. In the early 1990s, the denationalisation (private property renewal) process was initiated because of the democratisation after the political transformation in 1989. Land ownership structure prior to socialism was implemented following the property register from 1948 (Klúvanková 2011). The socio-economic changes that occurred after the restitution process in Slovak forestry resulted, among other things, in the sub-capitalisation of non-state forest management entities, which led to their inability to efficiently ensure the planned economic measures implementation in their own direction (Paluš et al. 2011; Hajdúchová et al. 2014) and the subsequent creation of market structures on the supply side within the forestry services sector. The market economy and social changes have thus opened up space for entrepreneurial activities in forestry and for the formation of private entities providing forestry services.

In Slovak forestry, there is a strong dependence on private forestry contractors that ensure the full range of forestry services, such as timber harvesting, skidding and transport, wood handling (debarking, wood chipping, cross cutting), silviculture and forest protection. The community of forestry contractors consists of more than 10,600 business entities, mainly of self-employed tradesmen and business companies (mostly Limited Liability Companies).

There are mainly small-sized enterprises that mostly provide their services locally, especially in the surroundings of their business headquarters. About 60% of them have no or only one employee, or there are companies with up to 20 employees. Only 0.9% of the companies employ more than 20 people. Based on these data, the number of persons who work as employees for business companies in this sector is approximately 1600. The total income of business companies reaches around 226 million Euros annually (an average for 2015–2017) and consists of revenues from the sale of own products and services (60%), revenues from the sale of merchandise (30–35%) and other incomes (5–10%). The total expenses of business companies reach around 221 million Euros annually and consist mainly of services (40%), costs of merchandise sold (30%) and raw materials and energy consumption (20%). The total profit of enterprises is around 5 million Euros per year (Kovalčík 2017, 2018).

We focus our attention on a better understanding of contractor firms' business activities orientation, with an emphasis on Limited Liability Companies in the forest service sector in Slovakia. Based on the described main research focus, the following specific questions are addressed in this study:

RQ1: What is the structure of revenue and cost items in individual business companies providing forestry services in Slovakia?

RQ2: Based on the firms' business activities orientation, what types of contractor firms can be identified in the Slovak forestry service sector?

### 1.2. Conceptual framework – types of forestry contractors

In general, according to Westermayer (2006), it is possible to distinguish between the following four different types of contracting enterprises in forestry, connected not only with the size of the enterprises, but also with their business strategy in achieving their goals: (1) typical sub-contractors, (2) small forestry-contracting enterprises, (3) intermediate enterprises and (4) logistics companies. The relations between them are illustrated in Fig. 1.

*Typical sub-contractors* are usually extremely small enterprises, often with a strong dependence on larger enterprises, as well as other contracting enterprises that are their market partners, thus having a certain guarantee of workload and security. There exists also *the atypical sub-contractor*, who works as sub-contractor without any kind of integration, regulated only by market forces.

*Small forestry-contracting enterprises* are often family enterprises or single self-employed contractors, integrated into the work-flow of regional forest-owners. They often use a cooperative strategy, i.e. join forces to bid in calls for tender. Some of them work only part time as forestry contractor, earning other income as a farmer or from another rural occupation.

*The intermediate forestry-contracting enterprise* employs workers (usually from 4 to 12) and uses sub-contracting (with long-term relations with specific contractors) as rationalisation strategy and to ensure flexibility. Typically, it is still a family enterprise with some organisational framework of larger companies that traditionally work only in a specific territory in the region. Its activities range from contract work for regional forest-owners to engagement in the timber trade.

*Logistics companies* work as general contractors with the focus on logistics. They organise wood flows, buy wood from forest owners, use sub-contractors for timber harvesting and transport and sell timber to the wood-processing industries and the pulp and paper producers. For logistics companies, it is economically efficient to outsource the work, as well as the risks of securing machine workload and of social security, instead of employing workers and using machines themselves.

## 2. Material and methods

In our methodology, we focused on a better understanding of that part of the business strategies of Limited Liability Companies in the forest service sector in Slovakia, that is related to the business activities management. We focused on contractors with this legal form because it is the most preferred one within the category of capital partnership of SMEs in the sector. The added value of the study is the mapping of the entrepreneurial activity of these entities, with a focus on the analysis of their revenues and cost items and the subsequent identification and characterisation of the contractor firm types; such research has not been implemented in the forestry sector in Slovakia yet.

For the purpose of this study, quantitative data were collected from the publicly online available Register of Financial Statements of the Ministry of Finance of the Slovak Republic. As the size of the population was known (1164 companies in 2012–2017), the minimum sample size (89 companies) was determined according to the formula for determining the size of a random sample (U.S. Air Force and Ross 2006). The confidence level was 95%, with a confidence interval of 10%.

Although the total number of forestry contractors was 1164, there are many companies in the register that do not carry out forestry services, respectively do only a minimum number of activities with a minimum high of turnover. That means these companies do not regularly provide forestry services and therefore they are not included in

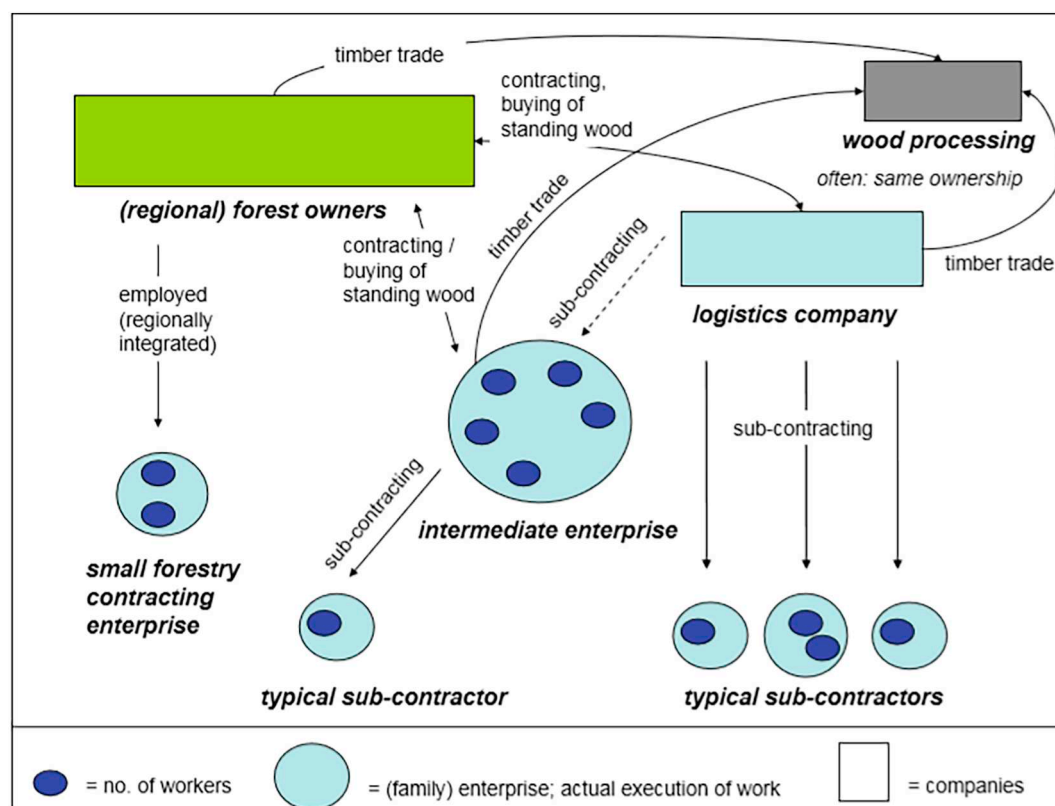


Fig. 1. Types of forestry contractors and the relations between them (Westermayer 2006).

the sample. These represent mainly companies that provide forestry services to non-state forest managers and their turnover is assumed to be relatively low as they provide their services mainly locally.

The main data sources represent publicly accessible financial statements (namely income statements and notes, balance sheets and annual reports, which the companies are required to publish for each accounting period) of a representative sample of 152 contractor companies selected from the suppliers' contact lists of State Forests Enterprise – the largest forest manager in the country, because only the state entities are obliged to publish contracts. We focused on enterprises with the main economic activities of SK-NACE (The Statistical Classification of Economic Activities in the European Community) 02 Forestry and timber harvesting for the period 2012–2017 to create an internal database of necessary information. Accounting periods in which companies reached zero sales or relevant data was missing were not included in the sample (Table 1).

The outcomes of the study are interpreted in the Results section, which consists of two main parts. The first part describes basic economic data of a representative sample. From the financial statements published by chosen entities, we collected and processed relevant information regarding to their achieved revenues, costs and economic results during the selected period.

The second part of the Results section analyses the gained data – individual revenue and cost items of companies and their shares in total income, respectively expenses, to better understand the composition of the financial statements. To identify the types of the companies, a vertical analysis of the income statements was performed. With the conversion of the income statement, total income/expenses take the

value of 100%, and all other items on the income statement are expressed as a fraction of these total values. It was crucial to find out what type of revenues, respectively cost items, produce the largest amount of the total income, respectively expenses in individual enterprises, as denoted by the orientation/predominant business activity of the enterprise, indicating its business strategy. We calculated this with the following formula (Zalai et al. 2007):

$$P_i = (B_i / \sum B_i) * 100\%$$

$B_i$  – the value of item  $i$ .

$\sum B_i$  – the sum of the item values within the examined unit.

$P_i$  – searched relationship.

Since similar research has not yet been carried out in Slovakia, we inspired by four types of forestry contractors described by Westermayer (2006). This classification was modified for local conditions and together with the analysis of the results and following criteria, it represents the basis for the identification of the five types of contractor firms (Table 2).

The companies were classified into the relevant groups on the basis of the mentioned criteria. Subsequently, the number of firms belonging to the individual groups as well as the total and average financial data per group was quantified. With the aim to confirm our results, statistical analysis - One-way ANOVA was done. The values of individual groups of contractors were compared to find out whether the differences are statistically significant. Finally, the descriptive method/approach was used to interpret the results.

### 3. Results

#### 3.1. Basic economic data of Limited Liability Companies in the forest service sector in Slovakia

The total income of a representative sample reaches around 100 million Euros annually, accounting for almost 46% of the total income

Table 1

Number of a representative samples for the period 2012–2017.

Year	2012	2013	2014	2015	2016	2017	Total
Number	120	138	144	152	149	147	850

**Table 2**  
Criteria for types of Limited Liability Companies in the forest service sector in Slovakia.

Firm type	Description	Criteria	
		Dominant revenue item	Dominant cost item
1 Traders	Focus on trade with goods and services and less orientation towards the production of own products and services	Revenues from the sale of merchandise	Cost of merchandise sold
2 Subcontractors managers	Oriented to obtaining contracts and subsequently reallocating work among subcontractors	Revenues from the sale of own products and services	Consumed raw materials, energy consumption and consumption of other non-inventory supplies + services
3 Personal companies	Based on profit maximisation, representing (after taxing) income for the business owner	Revenues from the sale of own products and services	Consumed raw materials, energy consumption and consumption of other non-inventory supplies
4 Contractors employing workers	A considerable part of work is ensured through their own employees	Revenues from the sale of own products and services	Consumed raw materials, energy consumption and consumption of other non-inventory supplies + personnel expenses
5 Contractors with classic strategy	A combination of the previous business strategies	Revenues from the sale of own products and services + revenues from the sale of merchandise	Consumed raw materials, energy consumption and consumption of other non-inventory supplies + services + personnel expenses + depreciation and amortisation expense

of all forestry companies. This confirms the relevance of the sample, which adequately represents forestry service providers in Slovakia. The most significant part of the total income of selected business companies comes from the sale of own products and services (58%). Revenues from the sale of merchandise generate almost 40% of the total income and represent an important revenue item. On the other hand, the highest values within the total expenses were found for production consumption (57.2%) and cost of merchandise sold (31.8%). The total profit of enterprises exceeds 2 million Euros per year (with the exception of 2012 and 2013, when companies suffered from a moderate loss), roughly representing 2% of the turnover. According to the methodology of the survey, the basic economic data of the representative sample were calculated (Table 3):

### 3.2. Types of Limited Liability Companies in the forest service sector in Slovakia

Based on a detailed analysis of revenues and cost items of individual companies, we identified significant differences in their shares of total income, respectively expenses associated with the management of their business activities and the ways how they achieve their goals. The statistical analysis (One-way ANOVA) showed that these differences are not random. With regard to these differences and the criteria set and described in the Methodology section (Table 2), the analysed companies were divided into five groups. The summaries of financial data and structure of revenues and costs of a representative sample according to the individual firm type are provide in Tables 4 and 5.

Based on the statistical significance of the differences in the structure of costs and revenues described above, as well as with the respect to the Westermayer study (2006), 5 firm types of forestry contractors in Slovakia were identified and characterised: Traders, Subcontractors, Personal companies, Contractors employing workers and Contractors with classic strategy.

#### 1. Traders - pure trading companies

The business companies in this group focus on trading, with more than 70% (79% on average) of the total income being derived from the sale of merchandise revenues. The cost of merchandise sold represents the highest cost item, generating 64% of total expenses on average. The average turnover of the company is 2,792,600 €, with profit after tax of 1.8% of turnover, which is highly above the average in the forestry service sector. Such companies account for 8.8% by number and 35.6% by turnover of all companies in this sector.

#### 2. Subcontractor managers - managers of consortia

The main business strategy of these companies is to obtain contracts and subsequently reallocate them to subcontractors. Services represent the highest cost item and generate more than 70% of the total expenses. The income structure is dominated by production, mainly revenues from the sale of own products and services, that form 98% of the total revenues. Profit after tax is 2.8% of turnover, which is twice the average for all service providers within the sector. The average turnover of such companies is 383,991 €, which is below average for this sector. These companies account for 27.4% by number and 15.3% by turnover of all companies in this sector.

#### 3. Personal companies - one-person companies

Their strategy is to maximise the profit from the goods and services delivery. After taxing, this profit represents the income for the company owner. These companies have a turnover below 50,000 €, and the profit is above the sector's average. Revenues from the sale of own products and services completely dominate and generate almost 100% of the total income. Within the expense structure, material and energy

**Table 3**  
Basic economic data of a representative sample (€).

Year	n	Total income	Sale of goods	Production	Other incomes	Profit/loss after tax
2012	120	77,473,343	35,373,008	40,001,272	2,099,063	– 92,971
2013	138	85,427,456	37,009,053	46,191,903	2,226,500	– 229,680
2014	144	105,407,747	45,524,435	58,104,719	1,778,593	2,190,616
2015	152	110,079,775	42,130,254	65,326,793	2,622,728	2,044,942
2016	149	103,110,430	37,157,911	64,295,672	1,656,847	2,117,926
2017	147	105,339,443	34,057,017	68,300,709	2,981,717	2,626,861
	850	586,838,194	231,251,678	342,221,068	13,365,448	8,657,694
<b>Share</b>			<b>39.4%</b>	<b>58.3%</b>	<b>2.3%</b>	

Year	n	Total expenses	Cost on goods	Production consumption	Personnel expenses - total	Other expenses
2012	120	77,287,462	29,427,669	39,187,747	3,589,978	5,082,068
2013	138	85,381,661	31,213,809	44,236,430	3,623,338	6,308,084
2014	144	102,432,274	35,896,820	56,552,168	3,909,900	6,073,386
2015	152	107,200,094	32,751,988	63,279,923	4,440,908	6,727,275
2016	149	99,958,344	28,077,029	60,814,136	4,969,853	6,097,326
2017	147	101,669,326	25,421,537	64,126,303	5,251,053	6,870,433
	850	573,929,161	182,788,852	328,196,707	25,785,030	37,158,572
<b>Share</b>			<b>31.8%</b>	<b>57.2%</b>	<b>4.5%</b>	<b>6.5%</b>

Sale of goods – includes revenue from the sale of merchandise; Production – includes Revenue from the sale of own products and services, changes in internal inventory and own work capitalised; Cost of goods – includes cost of merchandise sold; Production consumption – includes consumed raw materials, energy consumption and consumption of other non-inventory supplies and services.

**Table 4**  
Financial data and structure of revenues and costs of a representative sample according to individual firm type.

Strategy	Traders	Subcontractors	Personnel companies	Contractors employing workers	Contractors with classic strategy	Total
<b>n</b>	<b>75</b>	<b>233</b>	<b>7</b>	<b>49</b>	<b>486</b>	<b>850</b>
<b>Total income</b>	<b>€ 209,444,999</b>	<b>89,469,908</b>	<b>261,002</b>	<b>15,888,677</b>	<b>271,773,608</b>	<b>586,838,194</b>
Sale of goods	€ 166,139,028	1,193,869	0	3,103,004	60,815,777	231,251,678
	%(79.32)	(1.33)	0	(19.53)	(22.38)	(39.41)
Production	€ 38,982,700	87,329,895	260,968	12,103,124	203,544,381	342,221,068
	%(18.61)	(97.61)	(99.99%)	(76.17)	(74.89)	(58.32)
Other incomes	€ 4,323,271	946,144	34	682,549	7,413,450	13,365,448
	%(2.06)	(1.06)	(0.01)	(4.30)	(2.73)	(2.28)
<b>Total expenses</b>	<b>€ 204,077,118</b>	<b>86,152,505</b>	<b>190,966</b>	<b>15,554,323</b>	<b>267,954,249</b>	<b>573,929,161</b>
Cost on goods	€ 130,456,727	882,719	16,704	2,332,344	49,100,358	182,788,852
	%(63.93)	(1.02)	(8.75)	(14.99)	(18.32)	(31.85)
Materials and energy	€ 11,465,778	7,993,119	61,929	3,099,873	79,867,479	102,488,178
	%(5.62)	(9.28)	(32.43)	(19.93)	(29.81)	(17.86)
Services	€ 47,453,221	70,650,236	85,011	3,341,251	104,178,810	225,708,529
	%(23.25)	(82.01)	(44.52)	(21.48)	(38.88)	(39.33)
Personnel expenses - total	€ 3,604,560	3,129,535	17,586	5,450,238	13,583,111	25,785,030
	%(1.77)	(3.63)	(9.21)	(35.04)	(5.07)	(4.49)
Taxes and fees	€ 653,607	180,167	488	107,403	987,242	1,928,907
	%(0.32)	(0.21)	(0.26)	(0.69)	(0.37)	(0.34)
Depreciation	€ 5,496,276	2,277,449	4740	792,487	11,675,803	20,246,755
	%(2.69)	(2.64)	(2.48)	(5.09)	(4.36)	(3.53)
Other costs	€ 4,946,949	1,039,280	4508	430,727	8,561,446	14,982,910
	%(2.42)	(1.21)	(2.36)	(2.77)	(3.20)	(2.61)
Income tax	€ 1,562,846	859,688	13,749	90,428	1,724,628	4,251,339
	%(0.75)	(0.96)	(5.27)	(0.57)	(0.63)	(0.72)
<b>Profit/loss after tax</b>	<b>€ 3,805,035</b>	<b>2,457,715</b>	<b>56,287</b>	<b>243,926</b>	<b>2,094,731</b>	<b>8,657,694</b>
	%(1.82)	(2.75)	(21.57)	(1.54)	(0.77)	(1.48)

Sale of goods – includes revenue from the sale of merchandise; Production – includes Revenue from the sale of own products and services, changes in internal inventory and own work capitalised; Cost of goods – includes cost of merchandise sold; Production consumption – includes consumed raw materials, energy consumption and consumption of other non-inventory supplies and services.

consumption reach the highest amounts. This share is three times higher compared to the average value in the sector. Average turnover is 37,286 €, and the profit after tax represents 21.6% of the turnover. Such companies account for 0.8% by number and 0.04% by turnover of all companies in this sector.

#### 4. Contractors employing workers

This group of service providers ensures a considerable part of work through their own employees. As a result, personnel expenses account for more than 35% of the total expenses, and depreciation and



**Table 5**

Average revenues and costs of a representative sample according to individual firm type (€).

Strategy	Traders	Subcontractors	Personnel companies	Contractors employing workers	Contractors with classic strategy	Total
<b>n</b>	<b>75</b>	<b>233</b>	<b>7</b>	<b>49</b>	<b>486</b>	<b>850</b>
<b>Total income</b>	<b>2,792,600</b>	<b>383,991</b>	<b>37,286</b>	<b>324,259</b>	<b>559,205</b>	<b>690,398</b>
Sale of goods	2,215,187	5124		63,327	125,135	272,061
Production	519,769	374,806	37,281	247,003	418,816	402,613
Other incomes	57,644	4061	5	13,930	15,254	15,724
<b>Total expenses</b>	<b>2,721,028</b>	<b>369,753</b>	<b>27,281</b>	<b>317,435</b>	<b>551,346</b>	<b>675,211</b>
Cost on goods	1,739,423	3788	2386	47,599	101,030	215,046
Materials and energy	152,877	34,305	8847	63,263	164,336	120,574
Services	632,710	303,220	12,144	68,189	214,360	265,539
Personnel expenses - total	48,061	13,431	2512	111,229	27,949	30,335
Taxes and fees	8715	773	70	2192	2031	2269
Depreciation	73,284	9774	677	16,173	24,024	23,820
Other costs	65,959	4460	644	8790	17,616	17,627
Income tax	20,838	3690	1964	1845	3549	5002
Profit/loss after tax	50,734	10,548	8041	4978	4310	10,186

Sale of goods – includes revenue from the sale of merchandise; Production – includes Revenue from the sale of own products and services, changes in internal inventory and own work capitalised; Cost of goods – includes cost of merchandise sold; Production consumption – includes consumed raw materials, energy consumption and consumption of other non-inventory supplies and services.

amortisation expenses are considerably above the average for this sector. Income from the sale of own products and services represents a substantial proportion (76%) of the total income. The average turnover reaches 324,259 €. Profit after tax is at the level of 1.5% of turnover, which is in line with the sector's average. Such companies account for 5.8% by number and 2.7% by turnover of all companies in this sector.

#### 5. Contractors with classic strategy

These companies are focused on the provision of services as well as on trading activities to complement their business activities. Revenues from the sale of own products and services account for nearly 75% and revenues from the sale of merchandise for more than 22% of the total income. In the expense structure, services reach the highest value (nearly 39%). Other costs, such as material and energy consumption, personnel expenses and depreciation and amortisation expenses, are also above the sector's average. On the other hand, profit after tax is 0.8% of turnover, which is below average. The average turnover is 559,205 €. Such companies account for 57.2% by number or 46.3% by turnover of all companies in this sector.

Table 6 shows the number, respectively the share of companies belonging to individual groups during the selected period 2012–2017.

According to these results, the number of companies belonging to individual groups was more or less constant over the years. This leads us to infer that the enterprises did not change the orientation/focus of their business activities and applied the same business strategy to achieve their goals during the entire monitored period. The largest group represented Contractors with classic strategy, which can be explained by the characteristics of the market in Slovakia. On the other hand, Personal companies - one-person companies constituted the smallest group, which is related to the changes in the tax legislation in recent years. It is no longer beneficial to tax earnings like a business

company (as it was in the past), but rather as a self-employed person, who can apply a lump sum of 60% of revenues up to 20,000 € per year. This is also confirmed by our results in Table 6; there was not any company in 2017 belonging to this group.

#### 4. Discussion

Similar to the situation in other post-socialist countries in Central and South-Eastern Europe (Glück 2011; Nonić et al., 2014; Sarvašová et al., 2014; Šálka et al. 2006; Weiss et al. 2012; Zastocki 2016; Zivojinovic et al. 2017), political and economic reforms have significantly influenced institutional forestry reforms in Slovakia. In the past, forest owners were responsible for all stages of the forest product value creation network. The restitution process of returning forest property and restructuring of state-owned enterprises in the 1990s provided a base for the development of private enterprises, which today perform the most part of timber harvesting and transport activities. They play an important role in all forms of forest ownership and management regimes not only in Slovakia, but also on European and global levels (Louw 2004; Westermayer 2006; Baker and Dale Greene 2008; Kawasaki and Kohroki 2009; Kastenholz et al. 2011). Thus, the high dependence on contractors to carry out logging, silviculture and transport operations is obvious.

With this in mind, the added value of the study was to identify and characterize the firm types of contractors in the forest service sector in Slovakia. More specifically, we focus on the entrepreneurial activities, respectively on the management of the business activities, of Limited Liability Companies and use the vertical analysis of their financial statements to identify and characterize the predominant business activity of each enterprise. The organisation of forestry work seems to follow the typical model of western modernisation: heralded by political, social and technical developments, mechanisation and

**Table 6**

Numbers and shares of contractors according to individual firm types.

Firm type	2012		2013		2014		2015		2016		2017		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	14	11.67	11	7.97	13	9.03	12	7.89	13	8.72	12	8.16	75	8.82
2	27	22.50	38	27.54	40	27.78	48	31.58	44	29.53	36	24.49	233	27.41
3	2	1.67	1	0.72	2	1.39	1	0.66	1	0.67	0	0.00	7	0.82
4	9	7.50	8	5.80	8	5.56	6	3.95	9	6.04	9	6.12	49	5.76
5	68	56.67	80	57.97	81	56.25	85	55.92	82	55.03	90	61.22	486	57.18
<b>Total</b>	<b>120</b>	<b>100</b>	<b>138</b>	<b>100</b>	<b>144</b>	<b>100</b>	<b>152</b>	<b>100</b>	<b>149</b>	<b>100</b>	<b>147</b>	<b>100</b>	<b>850</b>	<b>100</b>

globalisation (Westermayer 2006; Cacot, 2015). The growth of the body of Slovak forestry contractors has mostly been encouraged between 2003 and 2007 due to a shift of State Enterprise Forests of the Slovak Republic, the largest forest manager in the country and currently the main user of contractor services, towards outsourcing of forestry activities. The state enterprise followed the idea to reduce overall organisational costs (mainly labour costs because of a high level of over-employment) and costs related to the acquisition and operation of own machinery. Similar developments of this sector have been reported for Sweden, Finland, Germany and Croatia (Lidén 1995; Westermayer 2006; Penttinen, 2011; Häggström et al., 2013; Šporčić et al. 2017).

As in other countries, for example Finland (Penttinen, 2011), Sweden (Häggström et al., 2013), Germany (Borchert and Benker 2015) and Macedonia (Stojanovski et al. 2015), the Slovak forestry service provider sector is characterised by small-sized enterprises. More precisely, micro-enterprises with no or one employee dominate. This is a specific feature of this sector in Slovakia and caused by the mentioned transition of the state forest enterprise to the supplying way of forestry services. This transition in state forestry was completed in a relatively short time period, which was insufficient for the formation of a forest services market. As a result, most of the employees went into the external environment and became a business partner of the company (Staník 2017), which led to a weakly developed business sector in Slovak forestry, undercapitalised and with low competitive ability. The total assets of the contractors are on average just 40% of the annual returns.

Nowadays, there are more than 10,600 forest contractors in Slovakia, 88% are self-employed persons and the remaining 12% represent business companies. Their number has more or less stabilised; however, in the last 3 years, due to the situation on the labour market, it has slightly decreased. It can partly be explained by an increasingly stressful and uncertain work environment, low prices of provided services and low salaries. To ensure at least the minimum profitability of the business, contractors have to offer their employees wages below the national average. This influences the workers' interest in such work and makes jobs outside this sector more attractive. As a result, the ability to hire competent machine operators and highly qualified managers is hampered. Moreover, these factors, in combination with the character of forestry work, seem to represent an increasing problem for the future; this is in line with the statements of Bergquist (2009), Karvinen and Nummelin (2015) and Kocel (2010). Similar experiences have also been reported from Finland and Romania (Penttinen et al. 2011; Rummukainen et al. 2009; Borriaud and Mazano 2014; Mutu and Jalubá 2012).

Another reason for the decline in the number of self-employed persons in forestry is the seasonal character of the work and the associated loss of income during a particular part of the year (Paluš et al. 2011; Štěrbová 2016). This issue is partially solved by some contractors through recruiting these tradesmen into employment, i.e. their business partners become their own employees. Based on stated facts, an increase in the proportion of contractors who provide forestry services through their own employees (Firm type 4: Contractors employing workers) can be expected in the future. This statement is supported by Šulek et al. (2018) and Lichý et al. (2018). According to the results of their questionnaire surveys, contractors are willing to work in forestry as employees, because it guarantees their income throughout the year. In addition, forestry companies, as contracting authorities of forestry services, also try to solve these problems by employing their own employees, especially in cultivation activities (Staník 2017).

Moreover, the forestry services sector in Slovakia has further specific features that limit its development. For example, contractors are under-equipped with modern technologies. This is supported by our results that show that the share of depreciation in total expenses of business companies is only 4–5%. The low level of innovation investments, despite the high innovation potential in the sector, is also confirmed by Štěrbová et al. (2018). Here, the main causes are high

acquisition costs and a lack of funding for machinery renewal. Especially in transition economies, access to financing is difficult, and financial support to SME development in forestry is low (Aidis 2005; Boter and Lundström 2005; Cull et al. 2006; Macqueen 2007). In addition, there is a high risk of service sales and the return on investment caused by short-term contracts between forest enterprises and contractor firms, as well as weak negotiating and market positions of contractors (Rummukainen et al. 2006). Forestry service providers are generally willing to conclude contracts requiring fixed investments under certain conditions related to minimise the risk, for example, by ensuring that the significant proportion of the investment will be reimbursed by the contract. The price of the contract in relation to the amount of the investment, as well as the duration and periodicity of the contract, play an important role (Paluš et al. 2011; Lichý et al. 2018; Šulek et al. 2018). Despite the higher transaction costs, emphasis is placed on long-term duration contracts (Paluš et al. 2011), which provide economic security and stable incomes and are therefore needed for the heavy capital investment in machines (Häggström et al., 2013). However, long-term contracts are not typical for the Slovak forestry service sector, which is reflected in the lower quality of the provided services.

Types of contractor firm are influenced by the above-mentioned situation in the forest sector. Within the Slovak forestry services market, it is not possible to apply the classic business strategies as described, for example in Bea and Haas (2005), Porter (2005), Thommen and Achtleitner (2006), due to the conservative approach of service customers who apply for traditional products and services. Another factor is a low-standing timber sale, and contractors could use more efficient ways of wood processing and selling, respectively its processing into products with higher added value. In this case, a new firm type of “Logistics companies”, as described by Westermayer (2006), could be developed. This would also open up a greater space for innovation implementation in the forestry services market.

## 5. Conclusions

In the past, forest enterprises organised and were responsible for all forestry activities including harvesting, processing and export. During the 1990s, the forestry sector started to open the space for private companies, such as those that were involved in this study, aiming to a better understanding of the business activities management of Limited Liability Companies in the forest service sector in Slovakia.

The forestry services market in Slovakia is extremely conservative and mainly based on the provision of services in the field of silvicultural and logging activities at the lowest possible prices. In the current boom of the economy, this brings problems to the forestry sector, mainly associated with low prices for the provided services and a lack of qualified workers on the labour market (as a result of low wages and a high demand for employees in other sectors). Due to these issues, the forestry services market in Slovakia is currently in recession.

A detailed analysis of revenues and cost items of individual companies showed the significant differences in their shares of total income, respectively expenses were identified. Moreover, the statistical analysis confirmed that identified differences are not random. Based on these, 5 firm types of forestry contractors in Slovakia was identified: Traders, Subcontractors, Personal companies, Contractors employing workers and Contractors with classic strategy.

Our results show that some forestry contractors in the Slovak Republic try to apply their own strategies such as orientation to business or management of subcontractors. Nevertheless, the most of them focus on providing services as well as on trading activities to complement their business activities, i.e. they represent “Contractors with classic strategy”.

To solve problems in the forestry services market, an increase in the number of contractors who provide forestry services through their own employees can be expected in the near future. In addition, it can be

expected that the environmental pressure on this sector will increase. It will be associated with increasing labour prices that will have unfavorable impact on this sector. A higher degree of the standing timber sale, which would allow contractors to implement new orientations of their business activities as well as innovations to a larger extent, could represent one of the possible solutions.

### Declaration of Competing Interest

None.

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