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## The assessment of the impact of small and medium-sized enterprises on the manufacturing sector in Taiwan and Latvia: a comparative analysis

**Abstract.** The authors make a comparative analysis of two countries - Taiwan and Latvia, assessing the role of small and medium-sized businesses in the economies of both states. Special attention is focused on the industrial sector and the participation of SMEs in it. A number of small and medium-sized businesses registered in both countries are analysed with regard to the number of employees and the turnover of SMEs. The authors show the impact of SMEs on the whole economy of Taiwan and Latvia.

**Keywords:** Region; Small and Medium-sized Businesses; Manufacturing Industry; Taiwan; Latvia

**JEL Classification:** H54; O40; O54

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**Оцінка впливу малих і середніх підприємств на виробничий сектор Тайваню та Латвії: порівняльний аналіз**

**Анотація.** У статті проведено порівняльний аналіз двох країн – Тайваню та Латвії. Авторами досліджено роль малого та середнього бізнесу (МСБ) в економіці зазначених держав. Особливу увагу приділено промислового сектору двох країн та участі в ньому МСБ. Проведено аналіз кількості зареєстрованих в обох країнах фірм малого та середнього бізнесу, а також числа осіб зайнятого населення й обороту МСБ. Також показано вплив МСБ на економіку двох держав.

**Ключові слова:** регіон; малий і середній бізнес; промисловість; Тайвань; Латвія.

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**Оценка воздействия малых и средних предприятий на производственный сектор Тайваня и Латвии: сравнительный анализ**

**Аннотация.** В статье проведен сравнительный анализ двух стран – Тайваня и Латвии. Авторами исследована роль малого и среднего бизнеса (МСБ) в экономике государств. Особое внимание уделено промышленному сектору двух стран и участию в нем МСБ. Проведен анализ количества зарегистрированных в обеих странах фирм малого и среднего бизнеса, а также числа занятых лиц и оборота МСБ. Также показано влияние МСБ на экономику двух государств в целом.

**Ключевые слова:** регион; малый и средний бизнес; промышленность; Тайвань; Латвия.

**1. Introduction**

The European Union as an economic alliance sets itself a number of tasks in the formation of regional economic policies. The main program for the implementation of its economic policies is the Europe 2020 strategy, in which the main economic indicators for the implementation by the state are fixed. The goal of the strategy is to align national economies of the EU member states with EU standards. On the basis of the strategy, each state has developed its national program of economic development until 2030. Also, it should be pointed out that small and medium-sized businesses play a significant role in the development of the economy of the member states.

A research conducted on the basis of an analysis of the economies of Taiwan and Latvia shows that the development of innovative production with the involvement of small and medium-sized business provides both GDP growth and increases employment of the countries' population.

**2. Brief Literature Review**

Scientists, politicians and the wide public search for models of economic development contributing to sustainable economic growth. The striving of countries for transition to a postindustrial economy leads to an artificial reduction of production and the creation of a larger segment of services. Scientists, such as David Alan Aschauer [1], Joachim Lamel, Hasegawa Ryoji, Hirofumi Nakayama [4], Takayuki Shimoaka, Josef Richter, Werner Teufelsbauer [5] and Mateo Hoyos López [7], deal with the issues relating to the structure of the economies of states and try to answer the question whether the similar artificial transition to the service sector and the closure of production in different countries is always justified and whether another way of development is possible.

**3. The purpose** of the article is to conduct a comparative analysis of the structure of the industrial sector in both Taiwan and Latvia, and to study the participation of small and medium-sized businesses in it.

4. Results

Over the past 60 years, the following countries have shown rapid growth of their economies: Hong Kong, China, Singapore, Taiwan, South Korea, Japan, Argentina, Brazil, Mexico, Chile, the USA, Germany, France, Sweden, etc. In particular, China and the Asian Tigers (Hong Kong, Singapore, Taiwan and South Korea) attract close attention. Today, along with the USA, Japan and the European Union, they are competing for their leadership in the world market. Nowadays, Taiwan is the world leader in the production of the following goods (Table 1).

Tab. 1: The products which helped Taiwan to take its place among the three world's largest producers in 2015

	Items	Taiwan's Global Market Share,%
1	Motherboards	89.9
2	Cable CPE	84.5
3	Notebook PCs	83.5
4	Golf heads	80.7
5	PND	71.7
6	Foundry	70.3
7	DSL CPE	65.7
8	WLAN	62.4
9	Glass fiber	61.1
10	IC packaging and testing	54.2
11	LCD monitors	27.0
12	LED	19.0
13	Touch panel	13.1

Source: [10]

Indeed, this is a significant indicator: the production of 89.9% of motherboards or 82% of notebooks made the country one of the leaders in the innovation sector. At the same time, it is worth noting that the main employment of the population falls on the companies relating to small and medium-sized businesses.

Let us carry out an analysis of the ratio of the number of employees in general in the field of both small and medium-sized, and large business in Taiwan. For this purpose, let us identify the requirements for SMEs in Taiwan. The basic rules for the formation of SMEs are described in the *Standards for Identifying Small and Medium-sized Enterprises*: SMEs paid-in capital of TWD 80 million or less, or less than 200 regular employees; sales revenue of TWD 100 million or less in the previous year, or has less than 100 regular employees or less than TWD 80 million, which equals USD 2.42 million for manufacturing, construction, mining, and quarrying industries. This means that if either criterion is met, the business qualifies as an SME. In the 13 service and commerce sectors, micro enterprises are defined as those that have fewer than 5 employees, while SMEs must have fewer than 50 employees, with preceding year sales revenue of less than TWD100 million, which equals USD 3.03 million (Ministry of Economic Affairs, 2012). The Law introduces the definition of a «small-scale enterprise» which has fewer than 5 regular employees. The data referring to the number of employees in both SMEs and large companies in Taiwan are represented in Table 2.

Tab. 2: The analysis of employed people in the field of SMEs and large business in Taiwan for the period of 2008-2016, thousand people

Years	Employment by SMEs	Employment by large enterprises
2008	7,966	1,479
2009	8,066	1,173
2010	8,191	1,253
2011	8,337	1,334
2012	8,484	1,349
2013	8,588	1,359
2014	8,669	1,387
2015	8,759	1,415
2016	8,810	1,432

Source: Compiled by the authors based on [11]

As shown in Table 2, the number of people employed in small and large businesses of Taiwan for the period from 2008 to 2016 increases annually. Such an increase has a linear character. It is worth emphasising that the number of

those who are employed by large companies is increasing. Thus, in 2008, the number of employed people in large business made up 1,479 thousand people. In 2009, a decline of 20.7% was noted and the relevant number of employees made up 1,173 thousand people. Since 2010 annually, the trend towards an increase in the number of employees in large business from 1,253 thousand people in 2010 to 1,432 thousand people in 2016 has been observed, i.e. the number of employees relevant to the year 2008 has practically been restored.

On the basis of the data presented in Table 2, let us construct a diagram reflecting the dynamics of people employed in small and medium-sized, and large businesses. In 2008, the number of people employed in SMEs (Figure 1) made up 84%, however in 2016 the number made up 86%, a significant part of employees working for SMEs.

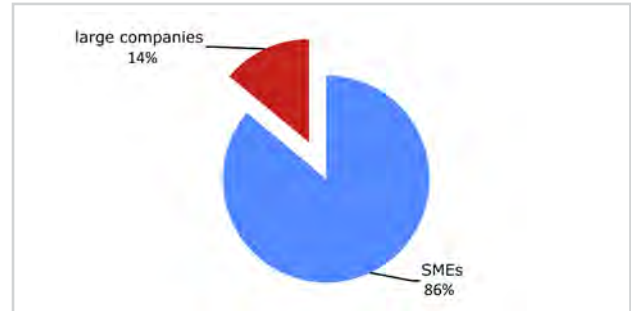


Fig. 1: The number of SMEs and large companies in Taiwan, 2016

Source: Compiled by the authors based on [10-11]

As we can see from Figure 2, the number of employees working for SMEs increases and makes up a significant share - 84% of employed people in Taiwan. Respectively, the share of employees in large business has reduced from 16% in 2008 to 14% in 2016.

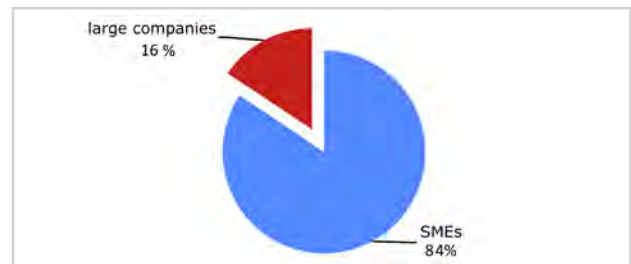


Fig. 2: The number of SMEs and large companies in Taiwan, 2008

Source: Compiled by the authors based on [10-11]

Let us determine the share of SMEs in Taiwan.

The goal of our research is to assess the role of the production industry in the country's GDP and to identify the impact of SMEs on the economic growth of the country. It should be noted that the production industry of Taiwan makes up almost half of the country's GDP (Figure 3). According to the data for 2016, the volume of services in the country made up 52.38%, while the production was 47.41%. The country's

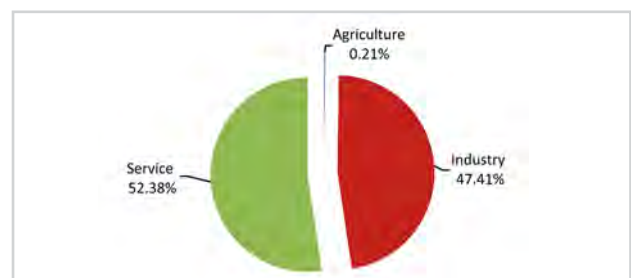


Fig. 3: The structure of Taiwan's GDP in 2016

Source: Compiled by the authors based on [10-11]

agricultural sector made up 0.21% of GDP. These indicators characterise the country as an industrial one.

The development of the production sector and its significant share does not reduce the quality of life and the income level of citizens.

The production sector is represented according to the OECD classification by the following sectors: mining and quarrying, manufacturing, electricity and gas supply, water supply and remediation activities, and construction. The authors have made an assessment of a number of SMEs in Taiwan in the production sector and represented the amount of sales for 2016 (Table 3).

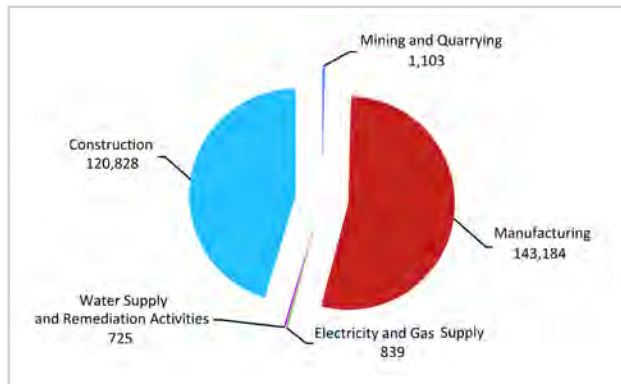
**Tab. 3: The number of SMEs of Taiwan in the production sector and their sales in 2016**

Area	Number of SMEs	Sales of SMEs, TWD Million
Mining and Quarrying	1,103	29,147
Manufacturing	143,184	4,070,669
Electricity and Gas Supply	839	6,611
Water Supply and Remediation Activities	725	55,809
Construction	120,828	1,417,221

Source: Compiled by the authors based on [10-11]

The data presented in Table 3 show that the main share of SMEs of Taiwan is concentrated in the production industry (143,184) and construction (120,828). Further, according to the number of companies, follows the mining and quarrying industry (1,103) and the electricity and gas supply industry (839), followed by water supply and remediation activities (725).

Let us represent graphically the share of companies relating to SMEs in Taiwan in 2016 by industries of production (Figure 4).



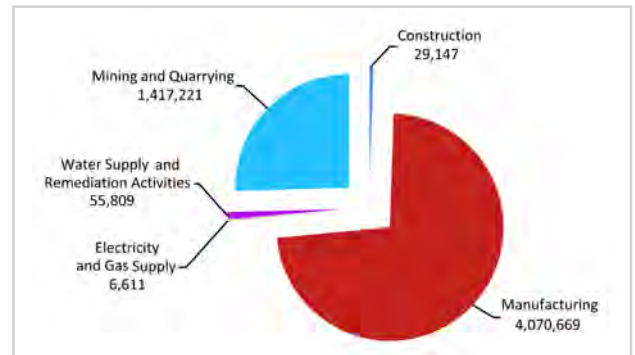
**Fig. 4: The number of companies relating to SMEs in Taiwan in 2016 by industries of production**  
Source: Compiled by the authors based on [10-11]

The analysis of the structure of Taiwan's GDP shows that an insignificant part SMEs (835) is registered in water supply, 839 companies are related to gas supply and electricity. 1,103 operate in the industry of the extraction of mineral resources. Meanwhile, the majority of companies are registered in the field of production (143,184) and construction (120,828).

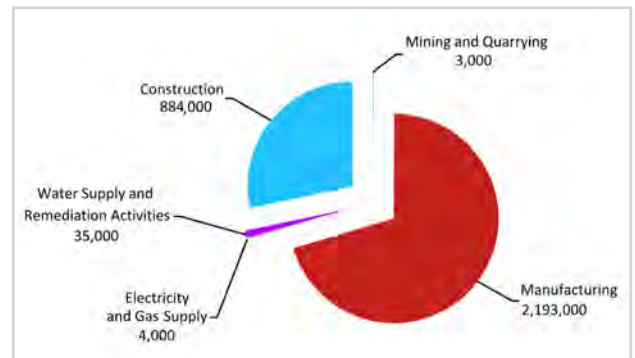
As we can see from Figure 5, the industrial sector makes up a significant part in the volume of sales of small and medium-sized companies of Taiwan, with its TWD 4,070,669 million. The SMEs referring to construction in Taiwan also represent a significant share in GDP - TWD 1,417,221 million. Electricity and gas supply accounts for TWD 6,611 million. Water supply and remediation activities makes up TWD 55,809 million, while mining and quarrying comprises TWD 29,147 million.

Further, let us represent the number of employees working for SMEs involved in the industries of Taiwan in the form of a diagram (Figure 6).

Thus, the majority of employees working for small and medium-sized businesses is involved in



**Fig. 5: The volume of sales of SMEs in Taiwan by industries of production in 2016, TWD million**  
Source: Compiled by the authors based on [10-11]



**Fig. 6: The number of employees in SMEs in Taiwan in 2016 by industries of production**  
Source: Compiled by the authors based on [10-11]

the manufacturing industry - 2,193,000 people. The construction industry is also significant in terms of the employment of the population in Taiwan - 884,000 people. 4000 employees are engaged in the electricity and gas industry. Water supply and remediation activities employs 35,000 people, and there are 3,000 employees in mining and quarrying.

To conduct a comparative analysis of the role of SMEs in the EU member states, the authors of the article examined of the number companies registered as SMEs, the number of persons employed and value added of Latvian companies (Table 4).

As we can see from Table 4, the role of SMEs in Latvia and in the EU member states is significant. Micro-enterprises account for 91% of all registered companies. Meanwhile, this indicator equals 92% for EU-28. The majority of persons

**Tab. 4: A comparative analysis of the number of companies both in Latvia and EU-28 in 2015**

Class size	Number of enterprises			Number of persons employed			Value added		
	Latvia		EU 28	Latvia		EU 28	Latvia		EU 28
	Number	Share %	Share %	Number	Share %	Share %	Billion €	Share %	Share %
Micro	94,147	91.4	92.8	193,548	31.5	29.5	2.5	23.3	21.2
Small	7,276	7.1	6.0	147,929	24.1	20.2	2.3	22.3	18.0
Medium	1,419	1.4	1.0	143,212	23.3	17.0	2.8	26.5	18.2
<b>SMEs</b>	<b>102,842</b>	<b>99.8</b>	<b>99.8</b>	<b>484,689</b>	<b>79.0</b>	<b>66.8</b>	<b>7.6</b>	<b>72.1</b>	<b>57.4</b>
Large	198	0.2	0.2	129,165	21.0	33.2	2.9	27.9	42.6
<b>Total</b>	<b>103,040</b>	<b>100</b>	<b>100</b>	<b>613,854</b>	<b>100</b>	<b>100</b>	<b>10.5</b>	<b>100</b>	<b>100</b>

Note: In the table are presented the estimates for 2015 produced by DIW Econ, based on 2008-2013 figures from the Structural Business Statistics Database (Eurostat). The data cover the «non-financial business economy», which includes industry, construction, trade, and services (NACE Rev. 2 sections B to J, L, M and N), but not enterprises in agriculture, forestry and fisheries and the largely non-market service sectors such as education and health. The advantage of using Eurostat data is that the statistics are harmonized and comparable across countries. The disadvantage is that for some countries the data may be different from those published by the national authorities.

Source: Compiled by the authors based on [8-9]

employed in the country is observed in SMEs - 79%. This indicator makes up 66.8% in the EU-28 as a whole.

Let us assess the role of the industrial sector and the participation of Latvia's SMEs in it. Value added of SMEs in Latvia makes up 72.1%, whereas it is 57.4% in the EU. Thus, the role of SMEs both in the EU member states and Taiwan is significant. Let us consider the structure of Latvia's GDP (Figure 7). As can be seen from the diagram presented by the authors, the main part of the country's GDP in 2016 is represented by the services sector - 72% and the industrial sector - 25%. The share of agriculture accounts for 3% of GDP.



Fig. 7: The structure of Latvia's GDP in 2016  
Source: Compiled by the authors based on [8-9]

Further, to fulfil the goal set in the work, let us carry out an analysis of the role of production sector in the economy of Latvia and study the participation of SMEs in it. Criteria for small and medium-sized businesses both in Latvia and other EU countries are regulated by the recommendations of the EU (Table 5).

It should be noted that Eurostat keeps records of SMEs with the division into the following groups: the number of employees from 0 to 9 people - the enterprises of micro business; from 10 to 19 people, 20-49 people - companies of small business; and from 50 to 249 people companies of medium-sized business. This division allows examining the structure of SMEs in more detail (Table 6).

On the basis of the data presented in Table 6, Figure 8 shows that the number of SMEs in the industrial sector in Latvia is 99.8%. Yet, according to the 2016 data, the large enterprises in Latvia's industry account for 76. Further, let us estimate the number of registered enterprises within the manufacturing industry of Latvia (Figure 8).

Figure 9 shows that, unlike Taiwan, the majority of SMEs in the industrial sector of Latvia is in the construction industry (49%). In Taiwan, the majority of companies is in the production industry, whereas 46% of companies are registered in the production industry in Latvia. 2% of companies are registered in both water supply and electricity, and gas supply. 1% of companies is registered in mining and quarrying.

Further, let us estimate how the employed are distributed in the field of the manufacturing industry in Latvia (Figure 10).

Figure 10 shows that the majority of employees in SMEs in Latvia are in the production sector (56%), yet only 37% of employees are in the construction sector, although, according to the number of SMEs registered in the manufacturing industry the construction industry is the leader. 3% are employed in the industries of water supply and electricity, and gas supply, while 1% is employed in mining and quarrying.

Let us carry out an analysis of the turnover of SMEs in the industrial sector in Latvia. From Figure 11 we can see that, like

in Taiwan, most of the turnover of the industrial sector falls on the production sector (56%), while the construction industry accounts for 36% of the total turnover of SMEs. However, the turnover of the electricity and gas supply industry is increasing, with its 5%; the water supply industry accounts for 2% of the turnover, and mining and quarrying comprises 1% of the turnover of SMEs in the industrial sector of Latvia.

Thus, the main share of GDP in the economy of Taiwan accounts for 52% of services. However, a significant part (47%) falls on the industrial sector of the country. In Latvia, the main share belongs to services (72%), whereas the production has only 27%. The development of an innovative economy, according to the authors' opinion, is impossible without the development of the industrial sector. Production directly impacts the development of studies carried out by research institutions, which in turn leads to the creation of competitive products of the country. Table 7 represents the main economic indicators of development of Taiwan and Latvia, which differ in the structure of GDP.

As we see from Table 7, the economy of Taiwan is growing, including the active participation of small and medium-sized businesses in the industrial sector of the country. The country's GDP per capita makes up EUR 25,370. In the Latvian economy, priority is given to the services sector. The country's economic growth makes up 2% in 2016, with Latvia's GDP per capita equal to EUR 12,721 in 2016. Also, the indicator of employment is not so favourable for

Tab. 5: The classification of micro-, small and medium-sized enterprises in the EU

Company category	Staff headcount	Turnover	Or	Balance sheet total
Medium-sized	< 250	≤ € 50 m		≤ € 43 m
Small	< 50	≤ € 10 m		≤ € 10 m
Micro	< 10	≤ € 2 m		≤ € 2 m

Source: European Commission, Recommendation 2003/361

Tab. 6: The analysis of the number of companies registered as SMEs, and the turnover of SMEs in the production sector in 2016

Number of staff	Number of SMEs	Number of persons employed	Turnover (thousand euro)
<b>Mining and quarrying</b>			
0-9	207	448	22,191
10-19	20	254	-
20-49	27	887	61,609
50-249	13	1,244	68,939
<b>Total SMEs</b>	<b>267</b>	<b>2,131</b>	<b>130,548</b>
250<	1	457	-
<b>Manufacturing</b>			
0-9	8581	19,993	518,554
10-19	794	11,085	392,833
20-49	649	19,926	1,124,436
50-249	445	43,911	3,349,530
<b>Total SMEs</b>	<b>10,469</b>	<b>94,915</b>	<b>5,385,352</b>
250<	54	24,496	2,130,463
<b>Electricity, gas, steam and air conditioning supply</b>			
0-9	429	1,111	205,604
10-19	44	571	146,600
20-49	38	1,363	83,241
50-249	16	1,303	68,263
<b>Total SMEs</b>	<b>527</b>	<b>4,348</b>	<b>503,708</b>
250<	6	6,996	1,577,890
<b>Water supply, sewerage, waste management and remediation activities</b>			
0-9	261	785	33,726
10-19	26	330	-
20-49	45	1,393	63,893
50-249	28	2,980	124,166
<b>Total SMEs</b>	<b>360</b>	<b>4,373</b>	<b>188,059</b>
250<	3	2,036	-
<b>Construction</b>			
0-9	9,734	23,268	1,013,553
10-19	677	8,874	431,453
20-49	451	12,799	675,161
50-249	183	17,401	1,402,749
<b>Total SMEs</b>	<b>11,045</b>	<b>62,342</b>	<b>3,522,916</b>
250<	12	5,089	483,537

Source: Compiled by the authors based on [8-9]

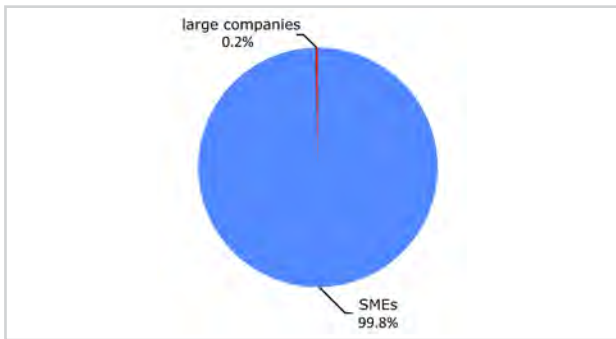


Fig. 8: The number of SMEs and large companies in the industrial sector of Latvia in 2016  
Source: Compiled by the authors based on [8]

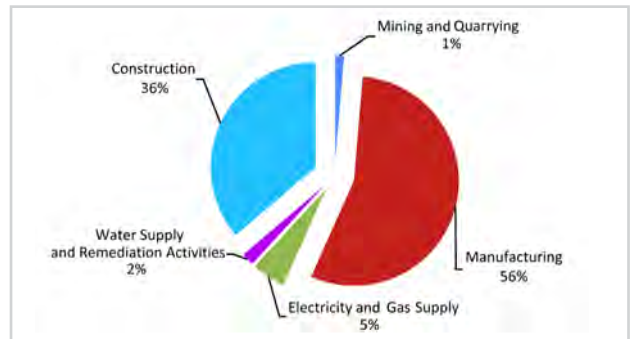


Fig. 11: The turnover of SMEs in the industrial sector of Latvia in 2016  
Source: Compiled by the authors based on [8-9]

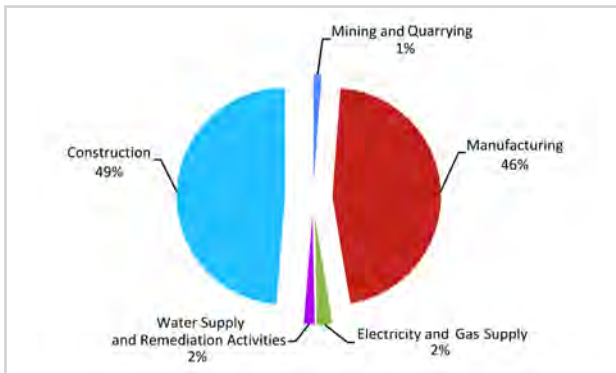


Fig. 9: The number of SMEs in Latvia by industries of production in 2016  
Source: Compiled by the authors based on [8-9]

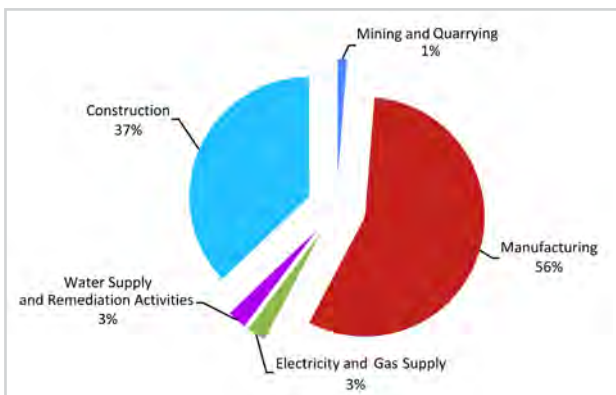


Fig. 10: The number of employees in SMEs representing the industrial sector of Latvia in 2016  
Source: Compiled by the authors based on [8-9]

Tab. 7: Comparative analysis of economic indicators of Taiwan and Latvia for 2016

Indicators	Taiwan	Latvia
GDP growth, % per year	1.41	2.0
Expenditures on R&D, % of GDP	3.1	0.44
GDP per capita	EUR 22,651 <sup>1</sup> /25,370	EUR 12,721
Level of unemployment, %	3.7	9.5

Note: <sup>1</sup> - TWD/USD 32.587 on May 2016; USD/EUR 1.12

Source: Compiled by the authors based on [8-9]

the Latvian economy. In Latvia, the level of unemployment is almost 2.5 times higher than in Taiwan.

**5. Conclusions**

The research conducted by the authors shows that Taiwan, a country with the balanced industrial and service sectors of the economy, is spending significant means on research and development and successfully implements its innovative policies, stimulating the inclusion of SMEs in the production industry at the same time, as far as the majority of small and medium-sized companies operate in the field of manufacturing and construction. In Taiwan, 84% of all the registered companies are SMEs, whereas in Latvia they count for 99.8%. However, Latvia's industrial sector has an insignificant share in the economy (25%) comparing with the Taiwanese one (47.41%).

Latvia's spending on R&D is not high either and corresponds to only 0.44% of GDP in 2016, while Taiwan spent 3.1% of GDP in the same period. The level of GDP per capita in Latvia is twice as low as in Taiwan, and the level of the unemployed is 2.5 times higher. A change in the policy in the field of funding of R&D in Latvia could lead to the development of innovations in the country's industrial sector and result in an increase in both the employment rate and the incomes of the population, thereby improving the quality of life.

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