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## **TRENDS OF LONG-TERM TANGIBLE AND INTANGIBLE ASSETS IN THE REPUBLIC OF CROATIA**

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### **ABSTRACT**

The global economic crisis is affecting the movement of long-term tangible and intangible assets in the balance sheets of companies worldwide. This research aims to discover the trend of long-term tangible and intangible assets in the balance sheets of companies in the Republic of Croatia.

The objectives of the paper are to determine the trend of tangible and intangible assets in companies' financial statements in total assets from 2009 to 2012 and determine the increase or decrease of specific assets, as well as the trend of their share in total assets. The research of established objectives was conducted on the sample of companies operating on the Zagreb Stock Market based on the financial statements between 2009 and 2012.

The hypothesis that in the period of crisis there is not a statistically significant trend of long-term tangible and intangible assets was confirmed. The hypothesis that the share of tangible assets in total assets decreases was partially confirmed, and the third hypothesis that there is not a statistically significant change in intangible assets was also confirmed.

*Key words: tangible assets, intangible assets, economic crisis*

## **1. INTRODUCTION**

The disappearance of many companies from the business stage in the last several years have led to the change in value of long-term tangible and intangible assets in the balance sheet structures. The emergence of the economic crisis worldwide has been impeding business activities of companies, which, in search for funds have been forced to liquidate. This paper investigates the situation of balance sheets of companies in the Republic of Croatia from 2009 to 2012, in other words how the global crisis affected tangible and intangible assets.

The paper comprises seven parts, including introduction and conclusion. The second part focuses on theoretical provisions of long-term tangible and intangible assets in Croatian and international accounting standards. The third part provides insight into research heretofore. In the second part we establish objectives and hypotheses of research. The fifth part defines the research sample, as well as research methods. The sixth part presents the research results.

## **2. THEORETICAL PROVISIONS**

Long-term tangible and intangible assets are defined by the Croatian Financial Reporting Standards and the International Accounting Standards.

Long-term tangible assets are defined by the Croatian Financial Reporting Standards number 6 (hereinafter CFRS 6), International Accounting Standard number 16 (IAS 16). Long-term tangible assets according to the above stated standards comprise the following types of assets: land, construction facilities, plant and equipment, tools, machinery inventory, furniture, means of transport and all other excluded long-term assets except the long-term assets intended for sale, biological assets and right to exploration of mineral resources, such as oil, natural gas, etc.

Long-term intangible assets are defined by the Croatian Financial Reporting Standards number 5 (hereinafter CFRS 5), International Accounting Standard number 38 (IAS 38). Intangible asset (IAS 38, Item 8; CFRS 5, Item 3) is an identifiable non-monetary asset without physical substance. Intangible assets comprise the following types of assets (CFRS 5, Item 3): development outlays, patents, licences, concessions, trademarks, software, fishing licences, franchises and other rights, goodwill, advance payments for intangible assets and other intangible assets.

Long-term tangible and intangible assets are initially measured at the cost of acquisition. A company can choose the method of subsequent measure-

ment either as a cost model or revaluation model<sup>1</sup>. Long-term tangible and intangible assets can also be classified based on the time of useful life as finite life assets and indefinite life assets. Long-term tangible and intangible assets with finite useful life are amortised in accordance with the accounting policy.<sup>2</sup> Long-term tangible and intangible assets with indefinite useful life are assessed for impairment according to the IAS 36. Long-term tangible and intangible assets are derecognised upon disposal or when no future economic benefits are expected from its use or disposal.

### 3. RESEARCH BACKGROUND

Many authors in the country and the world Barbieri (2004), Grebović (2010), Kolačević (2005), Mykolaitiene and associates (2010), Svoboda (2007), Vujević (2005) have elaborated the theoretical provisions of accounting policies for long-term tangible and intangible assets regulated by the accounting standards in their countries and tax regulations.

The majority of research was conducted into intangible assets and mostly referring to the effects on intangible assets that are not measured or itemised in financial statements, such as intellectual capital and similar assets (Erdilek Karabay, 2011, García-Ayuso, 2003, Gerpott and associates 2008, Molloy and associates. 2011, Tomé, Gonzalez-Loureiro, 2012). The research into acquisitions revealed hidden measurements of intangible assets (Boekenstein, 2009), that did not previously meet the criteria for their recognition. Similar research (Busacca and Maccarone, 2007) showed that the most important sources of value of the telecommunication industry lay in intangible assets. Many researches worldwide show a rapid growth of investment in intangible assets in Japan, USA and Europe with significant influence on productivity (OECD, 2011). The research (Jerman, Kavčić, Kavčić, 2010) of the significance of intangible assets in post-transition countries and countries with market economies was conducted by comparing intangible assets on the sample of Croatian, Slovenian, Czech, German and American companies from 2004 to 2008.

However, except this research (Jerman, Kavčić, Kavčić, 2010) no research on the trends of long-term tangible and intangible assets in the period of economic crisis was found.

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<sup>1</sup> See more in CFRS 6 I. 6.29 to 6.38, IAS 16 I. 29 to 31

<sup>2</sup> See more in CFRS 6 I.6.47, IAS 16lt. 62

#### **4. RESEARCH OBJECTIVES AND HYPOTHESES**

The global crisis is leaving traces on the liquidity of companies in the world and in Croatia and forcing them to liquidate their tangible and intangible assets in order to maintain their business. It can be assumed that the trends of long-term tangible and intangible assets during crisis are unpredictable.

The objectives of this paper were based on the above-mentioned experiential assumptions. The objectives of the paper are to determine the trend of tangible and intangible assets in companies' financial statements in total assets from 2009 to 2012 and to determine the increase or decrease of specific assets, as well as the trend of their share in total assets.

In order to determine the objectives of this paper working hypotheses were established as follows:

**H<sub>1</sub> = during crisis there is not a statistically significant trend of the absolute value of long-term tangible and intangible assets for the period from 2009 to 2012 in the Republic of Croatia.**

**H<sub>2</sub> = during crisis the share of tangible assets in total assets, both in total and by economic activity: production and service, is decreasing.**

**H<sub>3</sub> = during crisis the share of intangible assets in total assets, both in total and by economic activity: production and service, levels off.**

#### **5. RESEARCH SAMPLE AND METHODS**

Hypotheses testing was conducted on the sample of companies listed on the Zagreb Stock Market (166) based on data on tangible and intangible assets shown in the non-consolidated financial statements in the period from 2009 to 2012.

The sample comprised 138 companies (83.13%), excluding financial institutions.

The data are comparable because all companies in the sample draft financial statements in accordance with the IFRS<sup>3</sup>. The data on tangible and intangible asset values are shown according to the present value in financial statements. The present value of tangible and intangible assets means that the acquisition price of an asset is reduced by the calculated depreciation or amortisation, i.e. impairment. The research of intangible assets took into account only the values shown in financial statements.

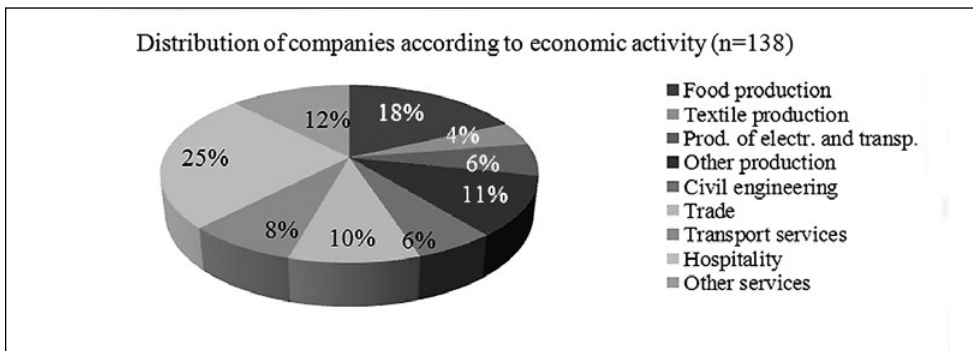
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<sup>3</sup> Accounting Act, Official Gazette 109/2007, 144/2012, Article 13.

The sample comprises 49.28% large companies, 39.86% medium-sized companies and 10.87% small companies<sup>4</sup>.

The distribution of companies according to economic activities was done in accordance with the National Classification of Activities 2007. The production companies comprise 44.93%, and service companies 55.07% of the sample. The majority of the sample 25.36% is comprised by hospitality service, and 18.12% food production as shown in Picture 1.

**Figure 1.** Structure of companies according to activity



Source: Authors

The structure of production companies comprises 62.90% of large, 30.65% of medium-sized and 6.45% of small companies, while the structure of service companies comprises 38.16% of large, 47.37% of medium-sized and 14.47% of small companies.

Intangible assets were itemised by 112 companies in 2012, i.e. 81.16% of the sample. 11.61% of the companies that itemised intangible assets, showed outlays for development, 88.93% concessions, patents, licenses, etc., 5.36% goodwill, 1.79% advance payments for intangible assets, 33.93% intangible assets in preparation and 14.29% other intangible assets. The structure of intangible assets in all years is similar to 2012 without significant deviation. The largest investment in intangible assets is in the group of Concessions, patents, licences, trademarks and service marks, software and other rights, more specifically in 23.12% of hospitality service activity and 16.07% of food production, due to the greatest number of usage of patents and licences in these activities.

For the movement of long-term tangible and intangible assets linear trend models  $y = \beta x + \alpha$  were determined, where  $x$  presents the observed period, i.e. years,  $y$  asset value (long-term tangible and intangible), coefficient  $\alpha$  the

<sup>4</sup> The size of enterprises determined in accordance with Article 3 of the Accounting Act, Official Gazette 109/2007, 144/2012

estimated value of asset in 2009, the coefficient  $\beta$  the average annual change of observed assets, and p-value the empirical level of significance. The programme package SPSS 21 was used for statistical research.

## 6. RESEARCH RESULTS

The first hypothesis is: during crisis there is not a statistically significant trend of the absolute value of long-term tangible and intangible assets for the period from 2009 to 2012 in the Republic of Croatia.

Linear trend models  $y = \beta x + a$  were determined for movement of total long-term assets, intangible assets and tangible assets where coefficient  $\beta$  represents the average annual change of the observed assets and *p-value* the empirical level of significance. The results are shown in Table 1.

**Table 1:** Coefficients and empirical values of linear trends of absolute values

	coefficient $\beta$	p-value
Long-term assets	1350.5	0.489
Intangible assets	4.5	0.929
Tangible assets	-219.1	0.824

Source: Authors

Although there was a decrease in tangible assets and increase in intangible assets the change was not statistically significant. Since all empirical levels of significance are higher than the usual threshold  $\alpha = 0.05$  we cannot reject the assumption that the *time* variable is superfluous, i.e. there is not a linear change in total long-term, intangible and tangible assets during the 2009 – 2012 period. The hypothesis that there is not a trend in the movement of assets was confirmed.

The movement of absolute value of long-term, intangible and tangible assets from 2009 to 2012 was observed with special reference to production and service activities. The research results are shown in Table 2.

**Table 2:** Coefficients and empirical values of linear trends of absolute values of long-term intangible and tangible assets according to activities

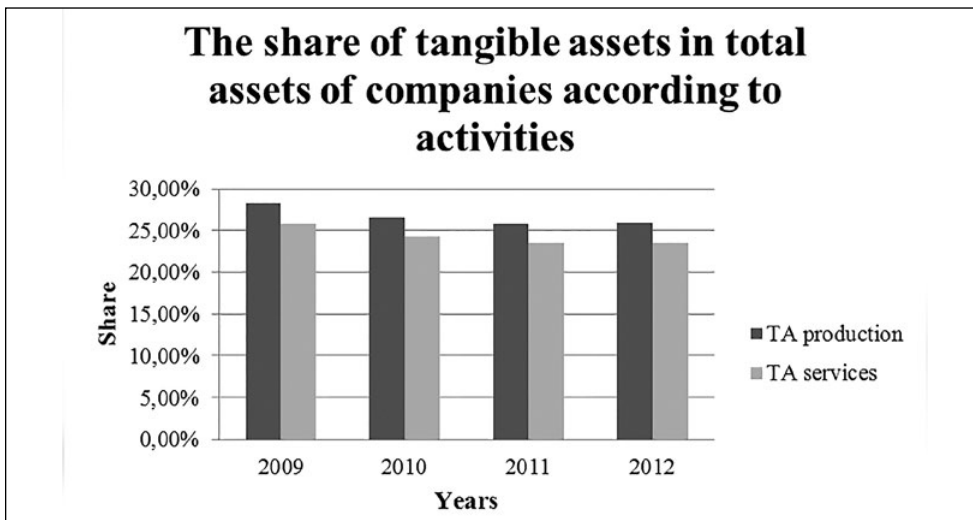
	coefficient $\beta$	p-value
LA production	531.9	0.375
LA service	818.7	0.556
IA production	-121.1	0.156
IA service	125.6	0.330
TA production	-68.8	0.888
TA service	-150.6	0.762

Source: Authors

As the empirical p-value is higher than  $\alpha = 0.05$  we can conclude that during the 2009 – 2012 period there was not a statistically significant change of the assets according to production or service activities.

The second hypothesis is: during crisis the share of tangible assets in total assets, both in total and by economic activity: production and service, is decreasing.

**Figure 2.** The share of tangible assets in total assets of companies according to activities and years



Source: Authors

Picture 2 shows that the average share of tangible assets in service companies is 24.29%, and in production companies 26.62%.

The research results of trends of the proportion of tangible assets in relation to total long-term assets, total assets and the total of intangible and tangible assets are shown in Table 3.

**Table 3:** Coefficients and empirical values of linear trends of the share of tangible assets

	coefficient $\beta$	p-value
TA in long-term assets	-1.475	0.120
TA in total assets	-1.566	0.091*
TA in total of intangible and tangible assets	-0.019	0.690

\*statistically significant at the level of significance 0.1

Source: Authors

During the 2009 – 2012 periods there was a statistically significant decrease in the share of tangible assets in total assets at the level of significance 0.1. In the observed period the share of tangible assets in total assets decreased on average by 1.566 percentage points every year. The proportion of tangible assets in long-term assets and the total of tangible and intangible assets also decreased, but the change was not statistically significant.

The trend of the share of tangible assets in total assets was observed separately for production and service activities, and the results are shown in Table 4.

**Table 4:** Coefficients and empirical values of linear trends of share of tangible assets according to activities

	coefficient $\beta$	p-value
TA production in total assets	-0.881	0.273
TA service in total assets	-2.568	0.233

Source: Authors

There was a decrease in the share of tangible assets in both activities, but the changes are not statistically significant.

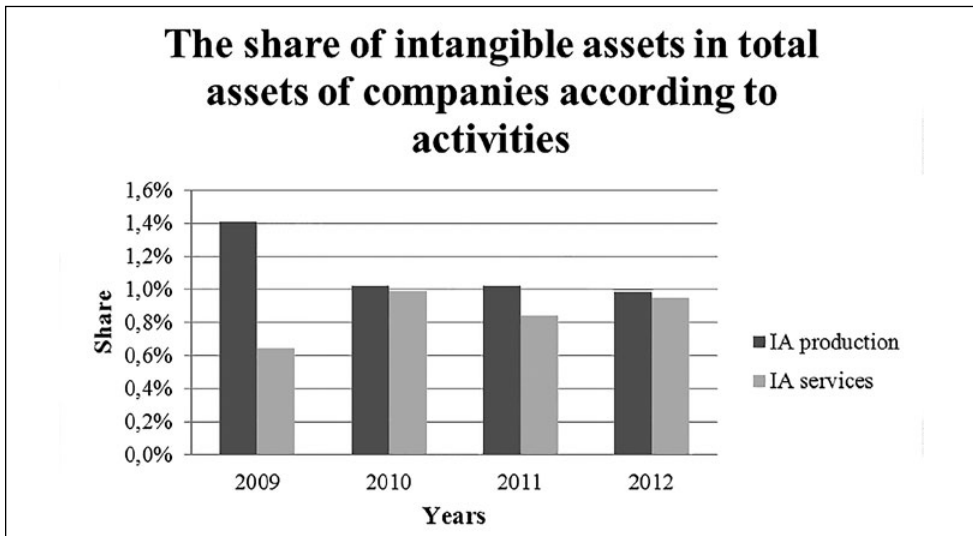
At the level of significance there was a decrease in the share of tangible assets in total assets, but according to individual activities the change was not statistically significant; therefore the hypothesis is partially confirmed.

The third determined hypothesis in this paper is: during crisis the share of intangible assets in total assets, both in total and by economic activity: production and service, levels off.

Picture 3 shows that the average of the share of intangible assets in service companies is 0.86% and 1.11% in production companies.



**Figure 3.** The share of intangible assets in total assets of companies according to activities and years



Source: Authors

The trend of the share of intangible assets in relation to total long-term assets, total assets and the total of intangible and tangible assets was tested. The coefficients  $\beta$  of linear trend models  $y = \beta x + \alpha$  are shown in Table 5.

**Table 5:** Coefficients and empirical values of linear trends of the share of intangible assets

	coefficient $\beta$	p-value
IA in long-term assets	-0.041	0.205
IA in total assets	-0.049	0.220
IA in the total of intangible and tangible assets	0.019	0.690

Source: Authors

Although there was a slight decrease in the share of intangible assets in long-term assets and total assets the change is not statistically significant. The trend of the proportion of intangible assets in relation to total assets was observed separately for production and service activities. The results are shown in Table 6.

**Table 6:** Coefficients and empirical values of linear trends of the share of intangible assets according to activities

	coefficient $\beta$	p-value
IA production in total assets	-0.204	0.119
IA service in total assets	0.152	0.294

Source: Authors

The shares of intangible assets in production activities decreased in the observed period, and increased in service industries. As all empirical values are higher than the usual level of significance  $\alpha = 0.05$  we can conclude that there are no statistically significant changes. Hypothesis 3 is confirmed; the changes in the share of intangible assets did change within the scope of statistical significance in the 2009 – 2012 period.

The research results were affected by the fact that companies were overburdened by debt, i.e. that the majority of assets, if not all assets were burdened by mortgages of financial institutions. The economic crisis led to a drastic decrease of asset market prices, especially real estate, which added to the liquidity of companies. Low market prices and the overburden of assets by mortgages affected the limitation of possibilities of free disposition of assets. If the assets had not been overburdened by mortgages, the research results would have painted a different picture.

## 7. CONCLUSION

The paper investigated the trends of long-term tangible and intangible assets in total assets of companies listed on the Zagreb Stock Market from 2009 to 2012. The research showed that during crisis there are not regular changes. This is why the changes were not statistically significant. The only statistically significant change was the decrease in the share of tangible assets in total assets. In the 2009 – 2012 period the share of tangible assets decreased annually by 1.566 percentage points on average.

The hypothesis that during crisis there is not a statistically significant trend of long-term tangible and intangible assets was confirmed. The hypothesis that the share of tangible assets in total assets decreased was partially confirmed. The third hypothesis that there is not a statistically significant change in intangible assets was confirmed.

Future research could investigate the trends of financial liabilities in relation to the trends of tangible and intangible assets of companies and compare this with other countries in the region and the world. The research showed that the trends of long-term tangible and intangible assets during crisis are unpredictable.

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## TREND KRETANJA DUGOTRAJNE MATERIJALNE I NEMATERIJALNE IMOVINE U REPUBLICI HRVATSKOJ

### SAŽETAK RADA

Globalna ekonomska kriza utječe na kretanje dugotrajne materijalne i nematerijalne imovine u bilancama trgovačkih društava u cijelom svijetu. Ovim istraživanjem pokušat će se otkriti trend kretanja dugotrajne materijalne i nematerijalne imovine u bilancama trgovačkih društava u Republici Hrvatskoj.

Ciljevi ovog rada su utvrditi trend kretanja dugotrajne materijalne i nematerijalne imovine u financijskim izvještajima trgovačkih društava u ukupnoj aktivni u razdoblju od 2009. godine do 2012. godine i utvrđivanje porasta ili smanjenja određene imovine, te kretanje njihovih udjela u aktivni. Istraživanje postavljenih ciljeva izvršilo se na uzorku trgovačkih društava koja posluju na Zagrebačkoj burzi temeljem financijskih izvještaja za razdoblje od 2009. do 2012. godine.

Hipoteza kako u kriznim vremenima ne postoji statistički značajan trend kretanja dugotrajne materijalne i nematerijalne imovine je prihvaćena. Hipoteza kako se udio materijalne imovine u aktivni smanjuje je djelomično prihvaćena, te treća hipoteza da nema statistički značajne promjene nematerijalne imovine je također prihvaćena.

*Ključne riječi:* materijalna imovina, nematerijalna imovina, ekonomska kriza