PROCEEDINGS FOR GRADUATE SESSION

THE 5th INTERNATIONAL CONFERENCE ON FINANCE AND ECONOMICS

ICFE 2018

September 20th – 22nd, 2018

Ton Duc Thang University, Ho Chi Minh City, Vietnam

PREFACE

Dear conference Participants!

Welcome to the 5th International Conference on Finance and Economics (ICFE 2018) on September, 20th - 21st, 2018 at Ton Duc Thang University, Ho Chi Minh City, Vietnam. The Conference is co-organized by:

> Ton Duc Thang University, Ho Chi Minh City, Vietnam
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> Tomas Bata University, Czech Republic
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> The Institute of Chartered Accountants in England and Wales, United Kingdom
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> Corvinus University of Budapest, Hungary
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> University of the West of England, Bristol, United Kingdom
>
> University College of Northern Denmark, Denmark

We are also grateful to the support and cooperation of our partners:

> University of Economics, Prague, Czech Republic
>
> Feng Chia University, Taiwan
>
> European Cooperation Center

Highlighting of prior conferences' success as well as contributing for our university's 21st ceremony with many recently obtained dramatic achievements, we would like to present a forum of cutting-edge research in the field of Accounting, Finance, Economics and Management. We have four magnificent keynote speakers who have significant domination in academia and industry for this year. Further, all papers submitted to the ICFE 2018 went through a double peers reviewed process. In addition, acceptance was based on quality and relevance of the research.

Furthermore, for ICFE 2018, Ton Duc Thang University; University of Economics, Prague and European Cooperation Center of Ton Duc Thang University have cooperated to organize a designated "Graduate Session". The primary goal of this session is to bring together international friendship, promote the exchange of scholars and improve the quality of scientific research/publications of graduate students of organizing institutions. From many submissions, 10 articles have been selected to publish in this special proceedings for Graduate Session. This proceedings is a recognition of participants' contributions and their research results.

On behalf of Organizng Committees, we would like to thank you for attending the 5th International Conference on Finance and Economics (ICFE 2018). Hopefully our diverse and dynamic group of speakers and discussants have provided you with in-depth insight as well as

practical models and methods to assist you with future's research. We wish you all the best and hope that you continue to be engaged with the conference in the years to come.

Yours sincerely,

The Organizng Committee of ICFE 2018

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ANALYSIS OF CAUSES AND CONSEQUENCES OF DECLINING TREND OF UNEMPLOYMENT RATE IN THE CZECH REPUBLIC SINCE 2008

Marianna Švecová - Gabriela Horníčková - Petra Fučíková

Abstract:

Unemployment rate, defined by OECD as the number of unemployed people as a percentage of the labour force, is one of the major indexes showing the state of country's economics. Nowadays it is also one of the major economic topics in the Czech Republic, where the rate is on a long-term basis not just below the average, but also the lowest in the European Union. Reaching a level of 2,3 % in the end of 2017, according to Eurostat data, and still dropping, we now speak about so called full employment which causes an imbalance on the market when, on the one hand companies have a potential to grow but on the other hand are struggling to find new employees. In the first part of the paper, we will introduce the main trends of the unemployment development in the Czech Republic since the economic crisis in 2008 emphasizing current development and compare them with trends in the European Union. In the second part, we will analyse a current state of Czech economics and present the main reasons leading country to reach this unprecedented historical minimum of unemployment rate. The third part will be an analysis of possible consequences and a prediction of the future trends and challenges on the Czech market also in connection with emerging revolution of Industry 4.0. The paper will therefore help better understand the current atypical situation in labour market of the Czech Republic and analysis of causes and consequences then lead us to comprehend functioning of country's economics at the macro-economic level.

Keywords: unemployment rate, Czech Republic, decline.

JEL Classification: E24.

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1. INTRODUCTION

In order to have health and well-functioning country's economy, several economic indicators are being measured and evaluated, so we could know which steps and policies need to be taken and adopted. One of the most well-known and used indicators is an unemployment rate, which measures the number of people in a country being without work in a defined period of time. Unemployment rate is therefore an index connecting both social and company level, as it affects the companies' decision-making as well as social behaviour of unemployed people. Nowadays, when we can observe a rise of the economy after the world financial crisis in 2008, the trends in unemployment in the Czech Republic are largely discussed not only on national, but also on international level. The unemployment rate in the country has dropped so quickly and radically, that now we can speak about a so-called full employment which can have important impacts on the further functioning of state's economy. In order to analyse the situation on Czech labour market, we can ask several questions: What have been the trends in economy, and specifically in unemployment rate in the Czech Republic in recent years that led to this situation? How does Czech Republic stand in this index comparing with other members of the European Union? What are causes and consequences of the low unemployment rate and how can the upcoming Industry 4.0 era affect it (or vice versa)?

The aim of this paper is to present the trends of the unemployment rate in the Czech Republic in recent years and analyse the main causes and consequences of current situation. The theoretical part explains the term unemployment rate and the importance of its measuring. The discussion is divided into several chapters which in the first part present statistical background of economic indicators focusing on unemployment rate in the Czech Republic and in the European Union. The second part of discussion is dedicated to an analysis of causes and consequences of the low unemployment rate in the country and their connection to Industry 4.0 era. The sources used in this paper are available on the Internet and comprise statistical information, academic articles and media articles both in English and Czech language. As the trend of historically low unemployment rate in the Czech Republic can be considered as new and unprecedent, the limit of this paper consists mainly in lack of availability of updated and credible sources, so it is based also on articles from online media servers.

2. THEORETICAL BACKGROUND

Unemployment rate, by OECD defined as "the number of unemployed people as a percentage of the labour force, where unemployed people are those who report that they are without work, that they are available for work and that they have taken active steps to find work in the last four weeks"[1] is one of the most current and discussed macroeconomic index. Unemployment rate is usually stated in percentage; therefore, it is calculated by dividing unemployed people the total number in the labour force and then multiplied by 100.[2] It can be measured in different time periods; the most used approaches are measuring the unemployment rate monthly, quarterly and yearly. In the Czech Republic this index is mainly measured and reported by Czech Statistical Office.

The importance of following this index is consists in several factors. We can show the complexity of this index by the citation of financial writer and investor Stephen Simpson who said that "labour is a driving force in every economy – wages paid for labour fuel consumer spending, and the output of labour is essential for the companies […] Unemployed workers therefore represent wasted potential production within an economy."[3] Rising and declining of the rate affects not only labour force itself, but it has an important impact to the health of the country economy and can be used as "a gauge of economy's growth rate"[4]. Unemployment rate is also stated as a lagging indicator. It means that "it measures the effect of economic events, such as recession"[5] and therefore "confirms what has recently happened in the economy and establish a trend"[6]. Confirming an upcoming trend is therefore an important signal for companies about when to start hire new employees or lower their number due to recession that has started. It also plays a role in setting of a monetary policy by a central bank as it can show the health of an economy, or it can show which

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[1] OECD (2017). *Unemployment Rate*. [ONLINE]. Available at: https://data.oecd.org/unemp/unemployment-rate.htm [Accessed 27 June 2018].

[2] Lumen Macroeconomics. Calculating the Unemployment Rate. [ONLINE]. Available at: https://courses.lumenlearning.com/wm-macroeconomics/chapter/calculating-the-unemployment-rate/ [Accessed 28 June 2018].

[3] Investopedia. Macroeconomics: Unemployment. [ONLINE]. Available at: https://www.investopedia.com/university/macroeconomics/macroeconomics8.asp [Accessed 26 June 2018].

[4] The Balance. (December 16, 2017). *Unemployment rate Effects and Trends* [ONLINE]. Available at: https://www.thebalance.com/unemployment-rate-3305744 [Accessed 6 June 2018].
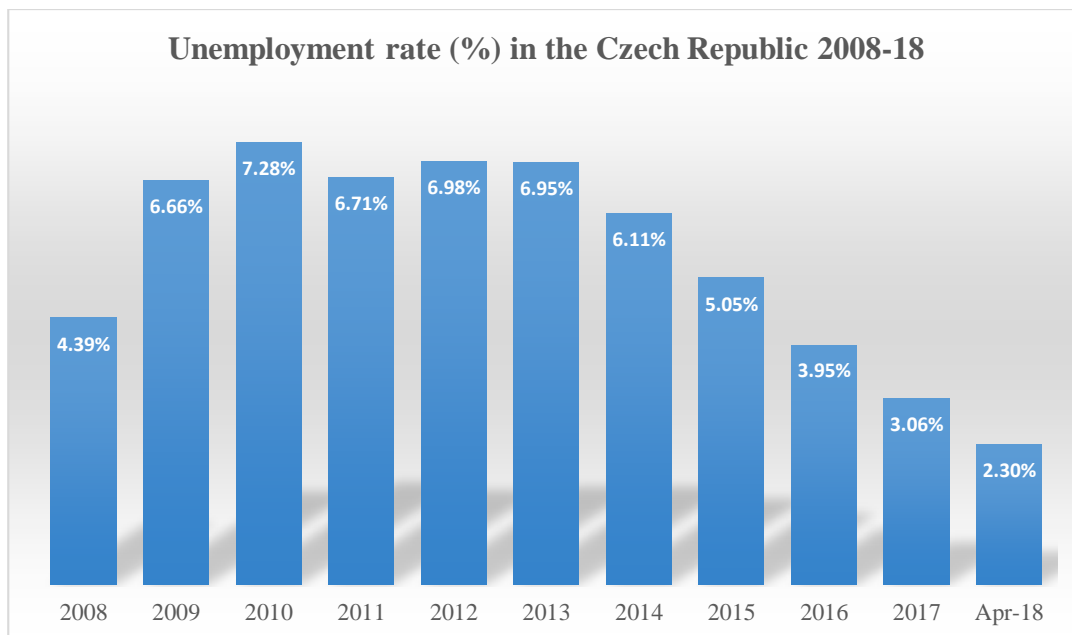
[5] The Balance. (December 16, 2017). *Unemployment rate Effects and Trends.*

[6] The Balance. (June 2, 2018). *What Lagging Economy Indicator Tells You* [ONLINE]. Available at: https://www.thebalance.com/lagging-economic-indicators-list-index-and-top-3-3305860 [Accessed 28 June 2018].

sectors are losing jobs faster than others and therefore threatened in the specific economy. The unemployment rate is, together with inflation, one of the main indicators in so-called misery index.[7] Except of an importance in the connection with the economy growth, the rise of unemployment rate can have an impact in different social indicators; for example it can encourage the rise in crime an uneasiness in population or an increase of the phenomenon of so-called "discouraged workers" who give up seeking a job after a long period of unemployment.[8]

3. DISCUSSION

Fig. 1: Development of unemployment rate in the Czech Republic in 2008-2018

World Bank. (November 2017). *Unemployment, total (% of total labor force) (modeled ILO estimate).* [ONLINE].
Available at: https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=CZ [Accessed 27 June 2018].

In this chart (Fig. 1) we can see the development of the unemployment rate in the Czech Republic in the last 10 years. Employees moved from agriculture and industry to the service sector. Employees are later educated and retire at a later age. Wages have risen by an average of 3.5 %

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[7] The Balance. (December 16, 2017). *Unemployment rate Effects and Trends.*

[8] Tyton Capital. Why Is the Unemployment Rate Important? [ONLINE]. Available at:
https://www.tytoncapital.com/investment-advice-japan/why-is-the-unemployment-rate-important/ [Accessed 27 June 2018].

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per year over the last ten years. The fastest increase was in health and social care, by 51 %. The slowest, namely 23 %, increased in finance and insurance. The best performing profession now include ICT and human resources executives and top executives. Low wages have shopkeepers and security staff. The highest wages are for employees working in the capital city of Prague.

We can observe an increase in the years following the financial crisis, particularly in 2010, when unemployment rate was in its peak reaching 7,28 %. After 2012 there is a declining trend – unemployment rate has started to fall rapidly. As for April 2018 (the last data available at this date by the Czech statistical office), the unemployment rate reached its minimum – it has fallen almost 4 times in six years to 2,2 % of economically active population in the country.

Followed by Malta and Germany, the Czech Republic has therefore the lowest unemployment rate in the European Union.[9]

4. THE STATE OF THE CZECH ECONOMY IN THE FIRST QUARTER OF 2018

The population of the Czech Republic amounted to 10,613,350 at the end of the first quarter of 2018.[10] Average annual inflation rate (it is the value of the same indicator in December of the given year) is 2.5%. The rate of inflation in May 2018 was 2.3% (Inflation rate as an increase in average annual CPI characterizes the percentage change of the average price level of latest twelve months against the average level of previous twelve months).[11]

The gross domestic product was by 0.4 % higher in the first quarter of 2018 compared to the previous quarter, in the year-on-year comparison it increased by 4.4 %. Faster growing investment expenditure supported by continuing growth of household consumption was the main growth factor of the Czech economy. The gross value added (GVA) increased by 0.7% quarter on quarter and grew by 4.5 % year-on-year.

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[9] Eurostat (2018, April). *Unemployment Statistics*. [ONLINE]. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistics [Accessed 28 June 2018].

[10] CZSO. (March 2018). *Population*. [ONLINE]. Available at: https://www.czso.cz/csu/czso/population [Accessed 26 June 2018].

[11] CZSO. (June 2018) *Inflation, Consumer Prices*. [ONLINE]. Available at:
https://www.czso.cz/csu/czso/inflation_consumer_prices_ekon [Accessed 28 June 2018].

Manufacturing was the biggest contribution to the year-on-year growth of GVA growth. The GVA growth in this factor was 0.2 %, quarter on quarter and 6.1 % year-on-year. Especially the following were growing in manufacturing: manufacture of computer, electronic and optical products, manufacture of electrical equipment, and manufacture of machinery. In the traditional key sector of the Czech economy, production of transport equipment, the growth of GVA was slackened. Both year-on-year and quarter-on-quarter drop of the GVA was recorded in mining and quarrying and in production of electricity. Construction was successful, the gross value added there increased (also due to favourable climatic conditions) by 7.1 %, quarter-on-quarter (7.6 %, year-on-year).

The GVA grew also in most of economic activities of services, especially in information and communication and in financial and insurance activities. The external trade balance at current prices decreased by 11.2 billion CZK year-on-year in the first quarter of 2018 and the external trade thus stopped contributing to the GDP growth after more than four years. Imports of goods and services increased by 6.5% year-on-year (1.4% quarter-on-quarter), exports increased by 4.1% year-on-year (0.5% quarter on quarter). [12]

Development of the Czech Labour Market – 1st quarter 2018

All the statistics used show the peak period in the Czech labour market. Unemployment is around 130,000 people, which is historically the lowest level. At the same time, the demand of labour is also highlighted by the number of vacancies. This corresponds to a strong earnings growth when the average wage grew by 8.6 % in the first quarter of 2018, and by 6.6 % in real terms, which is the highest since 2003. The results of the CZSO (Czech Statistical Office) business statistics also showed a significant increase in the registered number of employees by 2.1%. Total number of unemployed persons according to International Labour Organisation (ILO) methodology declined to 129.800 in the first quarter of 2018. The unemployment rate thus reached a historically low record value of 2.4%. The number of long-term unemployed declined rapidly to 40.900 persons. The lowest unemployment rate is among residents with higher education. Unemployment rate among university educated persons in the Czech Republic is only 1.2%.

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[12] CZSO. (June 2018). *GDP Resources and Uses - 1st Quarter of 2018.* [ONLINE]. Available at: https://www.czso.cz/csu/czso/ari/gdp-resources-and-uses-1st-quarter-of-2018 [Accessed 26 June 2018].

In the first quarter of 2018, the median wage was 25,674 CZK (990 EUR), 1,965 CZK (75 EUR) (i.e. 8.3%) higher that in the same period of the previous year. Wage ranges were wide, with one tenth of employees with the lowest wages earning less than 12,135 CZK (470 EUR) and with one tenth of employees with the highest wages earning more than 48,199 CZK (1,850 EUR). Men have a considerably higher wage level. In the first quarter of 2018, the median wage for women was 23,084 CZK (890 EUR), while for men it was 28,031 CZK (1,100 EUR), i.e. by 21%. At the same time, the male wages are spread at a considerably larger extent, especially the area of high earnings in men is incomparably higher than for women, the men had the highest decile 54,283 CZK (2,090 EUR), the women only 41,054 CZK (1,580 EUR). In the case of low earnings, the difference is less, the lowest decile had 12,772 CZK (490 EUR) for males and 11,792 CZK (450 EUR) for women.[13]

5. THE STATE OF THE EUROPEAN UNION IN THE FIRST QUARTER OF 2018

The gross domestic product in the European Union rose 2.4 percent year-on-year in the first quarter of 2018, unrevised from the second estimate and below 2.7 percent in the previous period. [14]The inflation rate in European Union was recorded at 2 percent in May 2018.[15]

Development of the European Union Labour Market – April 2018

The EU28 [16] unemployment rate was 7.1% in April 2018, stable compared with March 2018 and down from 7.8% in April 2017. This remains the lowest rate recorded in the EU28 since September 2008. Eurostat estimates that 17.462 million men and women in the EU28 were unemployment in

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[13] CZSO. (June 2018). *Vývoj českého trhu práce – 1. čtvrtletí 2018*. [ONLINE]. Available at: https://www.czso.cz/documents/10180/60863791/cpmz060418_analyza.pdf/103d4445-0ff9-4051-856e-6416000bc5a8?version=1.0 [Accessed 26 June 2018].
[14] Trading Economics. (June 2018) *European Union GDP Annual Growth Rate*. [ONLINE]. Available at: https://www.czso.cz/documents/10180/60863791/cpmz060418_analyza.pdf/103d4445-0ff9-4051-856e-6416000bc5a8?version=1.0 [Accessed 28 June 2018].
[15] Trading Economics. (May 2018). European Union Inflation Rate. [ONLINE]. Available at: https://tradingeconomics.com/european-union/inflation-rate [Accessed 28 June 2018].
[16] The European Union (EU28) includes Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden and the United Kingdom. (56)

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April 2018. Compared with March 2018, the number of persons unemployed decreased by 53 000 in the EU28. Compared with April 2017, unemployment fell by 1.633 million in the EU28.

In April 2018, the Czech Republic had the lowest unemployment rate (2.2%) in the EU28. Malta (3.0%) and Germany (3.4%) also had a very low unemployment rate. The highest unemployment rates were observed in Greece (20.8%) and Spain (15.9%). The largest decreases were registered in Cyprus (from 11, 7% to 8.6%), Croa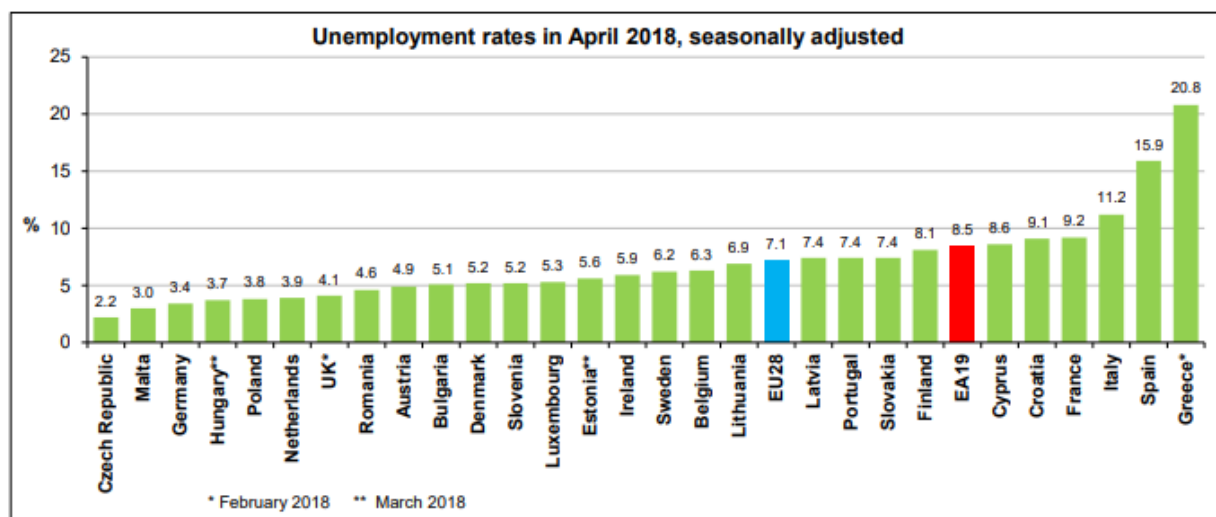tia (from 11.5% to 9.1%) and Portugal (from 9.5% to 7.4%). In April 2018, 3.426 million young persons (under 25) were unemployed in the EU28. Compared with April 2017, youth unemployment decreased by 464 000 in the EU28. In April 2018, the youth unemployment rate was 15.3% in the EU28. In April 2018, the lowest rates were observed in Germany (6.0%), Malta (6.8%), the Netherlands (6.9%) and the Czech Republic (7.2%). While the highest were recorded in Greece (45.4% in February 2018), Spain (34.4%) and Italy (33.1%).[17] Eurostat produces harmonised unemployment rates for individual EU Member States, the euro area and the EU. These unemployment rates are based on the definition recommended by the International Labour Organisation (ILO). The measurement is based on a harmonised source, the European Union Labour Force Survey (LFS). Based on the ILO definition, Eurostat defines unemployed persons as persons aged 15 to 74. These people are without work, available to start work within the next two weeks and have actively sought employment at some time during the previous four weeks. The unemployment rate is the number of people unemployed as a percentage of the labour force. The labour force is the total number of people employed plus unemployed. In this news release unemployment rates are based on employment and unemployment data covering persons aged 15 to 74. The youth unemployment rate is the number of people aged 15 to 24 unemployed as a percentage of the labour force of the same age.[18]

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[17] Trading Economics. (May 2018). *European Union Inflation Rate*. [ONLINE]. Available at:
https://tradingeconomics.com/european-union/inflation-rate [Accessed 28 June 2018].
[18] Eurostat. (May 2018) *EU28 unemployment at 7.1%*. [ONLINE]. Available at:
http://ec.europa.eu/eurostat/documents/2995521/8939932/3-31052018-AP-EN.pdf/a5d2c7ec-01c3-4cf8-ba33-a2ccadd91b93 [Accessed 28 June 2018].

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Fig. 2: Unemployment rates in European Union by country in April 2018

Unemployment rates in April 2018, seasonally adjusted

* February 2018   ** March 2018

Eurostat. (May 2018) *EU28 unemployment at 7.1%.* [ONLINE]. Available at: http://ec.europa.eu/eurostat/documents/2995521/8939932/3-31052018-AP-EN.pdf/a5d2c7ec-01c3-4cf8-ba33-a2ccadd91b93 [Accessed 28 June 2018].

6. THE MAIN REASONS FOR LOW UNEMPLOYMENT RATE IN THE CZECH REPUBLIC

Low unemployment rate in the Czech Republic is resulted from a combination of several important factors. One of the most important was continued economic growth, which was mainly reflected in industry and services. The key factor of economic growth in recent years in the Czech Republic is the economic link to the growing German economy. Foreign demand was the most important factor at the start of the growing phase of the economic cycle. This was accompanied by rising domestic consumption of households, growth was further supported by low interest rates and CNBs (Czech National Bank) intervention policy for the weaker crown. Demographic developments in the Czech Republic also affected very low unemployment rates. Employment is also rising in the number of employees in state administration, self-government and its contributory organizations. Another factor is the unwillingness to recruit workers from abroad. Currently, 380 thousand foreigners work in the Czech Republic, accounting for 7 percent of total Czech employment. Just the unwillingness to employ workers from abroad may be a problem for

the Czech Republic and may stop the continuation of the economic growth. [19] There is not enough staff on the Czech market, especially technically focused, which is already a problem for further development of companies. Construction workers, production assistants, lorry drivers, assemblers and welders, as well as chefs and cleaners are also missing.[20] Companies do not have enough staff and offer different benefits. As one of the benefits companies are beginning to offer Home – office or flexible working hours.[21]

7. UNEMPLOYMENT AND INDUSTRY 4.0

As the Czech Republic is dealing with the negative trend of declining unemployment rate in last decade, the relation with phenomenon Industry 4.0 should be mentioned. The Czech Republic is considered as a country manufacturing product with low added value in comparison to other European countries, and so is sometimes called "the assembly shop of Europe". with negative connotation. If the declining unemployment rate is considered as a threat instead of a positive sign of healthy economy, the Czech Republic should react immediately. Even though economy of the Czech Republic in on a rise and companies flourish across the sectors, the situation can promptly change if Czech companies would not invest to digital technologies in order to boost the innovations and sustainable long-term growth.

Industry 4.0 (i4.0) is a phenomenon related to remarkable confluence of technologies. The next production revolution is not just robotics and automatization, but the i4.0 is a broad term: "*from variety of digital technologies which include 3D printing, Internet of Things (IoT), advanced robotics, to new materials (bio- or nano -based) to new processes (data driven production, artificial intelligence (AI) or synthetic biology)"*.[22]

Key terms for i4.0 related to the Czech Republic are the following:

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[19] Finance.cz. (August 2017). *Plná zaměstnanost v ČR: čím jsme si jí zasloužili?* [ONLINE]. Available at: https://www.finance.cz/496233-nezamestnanost-srpen-2017/ [Accessed 27 June 2018].

[20] iROZHLAS. (Február 2018). *Nejsou lidi! Jak českou ekonomiku brzdí rekordně nízká nezaměstnanost.* [ONLINE]. Available at: https://www.irozhlas.cz/ekonomika/analyza-nizka-zamestnanost-cesko-ekonomika_1802150700_pek [Accessed 26 June 2018].

[21] MANAGEMENTnews. (February 2018). Rekordně nízká nezaměstnanost zvyšuje fluktuaci zaměstnanců. Co udělat, aby ti vaši zůstali? [ONLINE]. Available at: https://www.managementnews.cz/manazer/rizeni-firmy-id-147972/rekordne-nizka-nezamestnanost-zvysuje-fluktuaci-zamestnancu-id-3318425 [Accessed 27 June 2018].

[22] OECD (2017), *The Next Production Revolution: Implications for Governments and Business*. [ONLINE]. Available at: https://doi.org/10.1787/9789264271036-en [Accessed 27 June 2018].
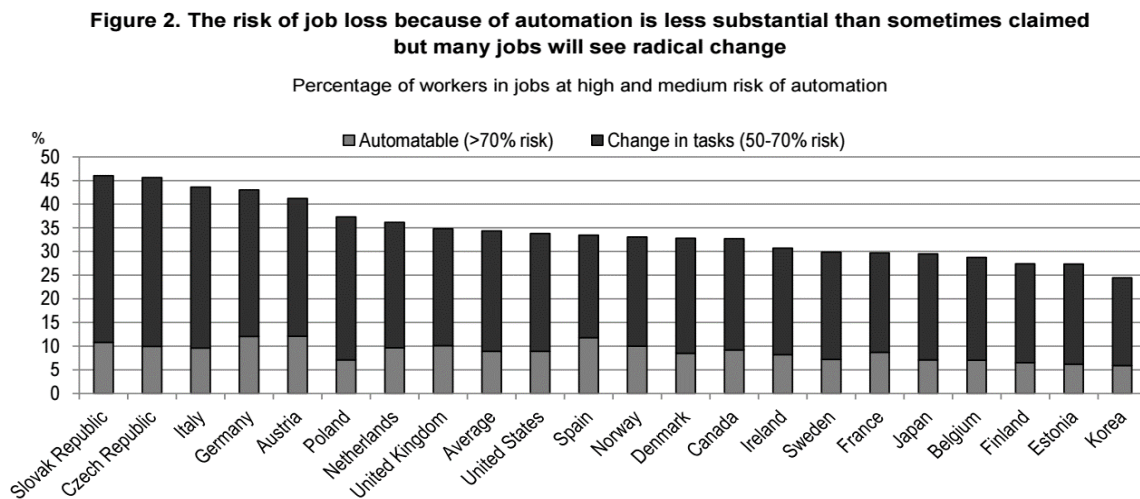
Automation: Technique, or method that allows to carry out process in full without external human interaction, utilizing technical of software means.
Digitalization: Process of digitizing available inputs and utilizing their data value through integration with software solutions. Also, widely used as a term for integration of digital technologies to everyday life.
Robotics: Interdisciplinary engineering branch dealing with design, construction, operation, and use of robots.[23]

According to OECD findings from last few years, the Czech Republic seems to be one of the most vulnerable country regarding the risk of job loss because of automation as shown at below presented OECD calculation:

Fig. 3: The risk of job loss due to automation by country, in percentage

Figure 2. The risk of job loss because of automation is less substantial than sometimes claimed but many jobs will see radical change

Percentage of workers in jobs at high and medium risk of automation

Note: Data for the United Kingdom corresponds to England and Northern Ireland. Data for Belgium corresponds to the Flemish Community.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) and Arntz, M. T. Gregory and U. Zierahn (2016), "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis", _OECD Social, Employment and Migration Working Papers_, No. 189, OECD Publishing, Paris.

The automation itself should not be seen as the total replacement of human workforce by robotics:

"Majority of jobs themselves have partial potential to be automated, meaning that the whole job process cannot be simply automated, but the particular activates in the jobs could be replaced by an automated process to a smaller or greater extent."[24]

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[23] Brunet-Thornton, Richard and Martinez, Felipe. (2018). _Analyzing the Impacts of Industry 4.0 in Modern Business Environments_. University of Economics, Czech Republic.
[24] Brunet-Thornton, Richard and Martinez, Felipe. (2018). _Analyzing the Impacts of Industry 4.0 in Modern Business Environments_.

Czech government reacts to this calling by issuing the official document by Ministry of Industry and Trade which should facilitate the decision-making for Czech companies and let them better understand the i4.0. [25]

Digital transformation is changing the demand for jobs, the required skills and redefine current task content of occupations. The biggest governmental and non-governmental organization are recently publishing the studies about occupation distances and skills needed from employees in upcoming years. One of the latest documents issued by OECD named some key findings related to this topic as follows:

- *"Skill distances in terms of cognitive skills are found to be higher among low skilled occupations or from mid-skilled to high-skilled occupations than among higher skilled occupations. These results call for policies aimed at developing general cognitive skills complemented by task-related skills for workers in low skilled occupations.*

- *Occupational moves within the higher skilled occupations, in particular from professionals to managers or within the group of professionals, conversely show that skill distances are large when it comes to task-based skills and relatively small for cognitive skills, thus suggesting the need for on-the-job or other types of training for these occupational moves.*

- *In terms of task-related skills, moves to the upper group of occupations require workers to acquire specific mix of skills which depend on the occupation of origin. For instance, to reach managerial positions, professionals would need to acquire higher accounting and selling and communicating and managing skills. Conversely service workers would mainly need to increase their ICT skills to move to clerical support occupations.*

- *Being ready to learn seems important for some of these transitions.*"[26]

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[25] Available in Czech language from here:
https://www.mpo.cz/assets/dokumenty/53723/64358/658713/priloha001.pdf

[26] Bechichi, Nagui, Grundke Robert, Jamet Stéphanie and Squicciarini Mariagrazia. (june 2018). *Moving Between Jobs: An analysis of occupation distances and skill needs*. OECD Science, Technology and Industry and Policy Papers, n. 52. [ONLINE]. Available at: https://doi.org/10.1787/d35017ee-en [Accessed 27 June 2018].

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As the "old" (or traditional) jobs could disappear, the whole world, not just the Czech Republic, should be ready for this digital change. The crucial skill across the sectors seems to be the ability to learn and adjust instantly to changing working environment, conditions and processes. It is necessary to keep the mind open for turbulent changes of job scope and required skills in concrete occupation and industry. The Czech Republic is now forced to invest in such digital technologies because of lacking the workforce. In short-term view perspective is the substitution of people by robotics, especially for manufacturing companies, seen as a threat. From another point of view, this is a big opportunity for the Czech Republic how to keep up with other developed and high-tech oriented countries. If the economy is healthy, people and society thrive, and the unemployment rate is dangerously low, there is no better time to implement such digital technologies. It will certainly go through the difficult transition period on a labour market when some occupations may disappear, and workers could be reluctant to this change. However, the positive approach to the disruption of nowadays labour market is a key; Czech people can be retrained and invest their time more effectively and so produce more end products with higher added value. Moreover, it allows the manufacturing companies to save labour costs and invest more to research and development or to the training programs. As mentioned, all this change is now happening, but the transitional period will take time.

8. CONCLUSION

Unemployment rate in the Czech Republic is nowadays at the historical low levels, reaching 2,3 % of workforce of the country in April 2018 and still dropping. The rate is the lowest in whole European Union and is more than 2-times lower than the average of 28 countries and almost 10-times lower than the rate in Greece, where it reaches the highest level. Unemployment at this low level is even in country, where unemployment is usually below EU average level, unprecedent and can have serious consequences to state's economy. Therefore, we need to analyse what led to this situation and what can be the short- as well as long-term effects.

As the main reasons for the dropping rate of unemployment we recognized a well-performing Czech economy, as well as German economy to which is Czech one strongly tied in export and import trade relations. Reasons can be also demographic; high level of emigration prevailingly

from post-Soviet countries means additional workforce mostly in low-skilled jobs. Also, the intervention of the Czech National Bank concerning interest rate and Czech crown could have affected the demand of Czech goods and therefore demand for workforce in local companies.

As for the consequences, we can observe a huge rise in wages during the 1st quarter of 2018 reaching more than 8 % in this period that can create a pressure on companies which need to dedicate more resources to wages of employees. This is also related to the second main consequence – lack of employees in Czech labour market. Companies are understaffed and in order to attract future employees they need to focus more on other benefits than competitive wages, which can in one hand improve working conditions in the country, on the other hand can be for many companies, not following those trends, liquidating. That is also one of the reasons why Czech Republic and the labour market must react promptly to the upcoming era of Industry 4.0, so country can get rid of the offending nickname of "the assembly shop of Europe". In the 4th Industrial Revolution, a great number of jobs could disappear, which is an alarming situation for the Czech Republic as it is, after Slovakia, predicted to be the most affected country with a job loss due to an automation. Country therefore need to adapt to these changes and re-direct to hi-tech and high-skilled jobs, so the effect of changes of Industry 4.0 cannot just be minimalised, but so the country can profit of them. The unemployment rate, in this case, could be kept in low levels and economy could thrive also in the near future.

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BOARD CHARACTERISTICS AND INCOME SMOOTHING IN LISTED COMPANIES ON VIETNAMESE STOCK MARKET

Pham Nhat Tuan, Nguyen Phuc Thien

Abstract

Purpose: The purpose of this paper is to determine the influence of board characteristics, such as Director's education degree, Chairman's education degree, the separation is between CEO and chairman, the number of board meetings and the number of board members of listed companies on the Income smoothing in listed companies on Vietnam's stock market.

Design/methodology/approach: Dependent variables represented the firm performance are measured by financial ratios, such as ROA. The research sample comprises of 100 companies listed in the Vietnam stock exchange from 2007 to 2017, which had the highest market capitalization at the end of the year 2017 with a total of 480 observations. The authors collected and analyzed data from the audited financial statements, management reports, annual reports of companies.

Findings: The research results show that Director's educational level, the separation is between CEO and chairman and the number of Board meetings have negatively affect smoothing. The boards meet more often following poor financial performance. The Chairman's education degree has positively affect Income smoothing. In addition, the Board size is not significant on income smoothing practice.

Research/practical implications: The findings of this study will help identify income smoothing practice and the factors affect to income smoothing practice of listed companies on Vietnam's stock market.

Future studies may expand the sample size and study period, as well as take into account other related variables: gender, age, director's professional certificate to clarify the relationship between these factors and income smoothing.

Originality/value: provide empirical evidence about income smoothing regarding Vietnamese context. This result will help investors, management and business owners to make effective economic decisions.

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INTRODUCTION

The basic objective of financial statements is to provide useful information for the internal and external users in making economic decisions. Although all information contained within the financial statements is crucial to the users, it is conceivable that the users' attention is often focused only on the statement of earnings information (Beattie et al., 1994), or more specifically, the earnings figure, which is the most important indicator in providing useful information about the firm's valuation, thus highly influential in decision-making process (Francis et al., 2004). This attention might pressure the management into manipulating the company's income by using earnings management tactics, such as income smoothing.

Income smoothing is a behavior in which managers take action to increase income when income is relatively low and to reduce income when income is relatively high (Ben-Hsien Bao, 2004). In practice, the reduction of income varies in some periods, or aims at an expected level of income within a certain period of time (Beattie et al., 1994). These adjustments improve earnings informativeness should managers use their discretion to communicate their assessment of future earnings. The process of manipulating income makes profits less volatile while income itself does not increase over time (Fudenberg and Tirole, 1995). The management reduce the fluctuations in reported earnings to match their desired target, either artificially through accounting methods, or practically through transactions (Fields et al., 2001). Income smoothing is one of the four tactics of earnings management Scott (2006). There are two main types of income smoothing: natural smoothing and intentional smoothing, both are identified by Eckel (1981); as well as by Albrecht & Richardson (1990).

Previous research have been studied income smoothing in various aspects, such as different types of enterprises utilizing income smoothing as mentioned in the work of Eckel (1981), Francis et al. (2004), Kothari et al. (2005). Other studies have been conducted to examine the factors which are allegedly motivate the management to execute income smoothing on listed companies in various countries, for instance in Indonesia (Sherlita & Kurniawan, 2013), Nurliyasari (2017), Dewi et al.

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(2018), on Singapore stock exchange (Ashari et al. 1994), on Turkish stock exchange Atik (2009), and on Europe stock exchange Gassen & Fuelbier (2015).

Sherlita & Kurniawan (2013) examined factors associated with the incidence of income smoothing, which are: firm size (total assets), profitability (net income after tax to total assets), industry (industrial and commercial, hotels and properties, others), and nationality (Singaporean and Malaysian companies). Their primary findings are that income smoothers tend to be less profitable companies, companies in more 'risky' industries, and Malaysian companies. In addition, the results of the study also show that the income smoothing is affected by the firm size: the larger firm size, the larger level of income smoothing. This result is consistent with Agency's theory.

Under another perspective, Atik (2009), Sherlita & Kurniawan (2013), Aziatul et al. (2015) find that the profitability ratio are significantly influenced income smoothing. Further research carried out by Suranta and Merdiatusi (2009), Albrecht & Richardson (1990); Sherlita & Kurniawan (2013), Nurliyasari (2017) on the factors that influence the practice of income smoothing show that firm size positively affects income smoothing practices. Meanwhile, financial leverage negatively affect income smoothing practices.

Additionally, Bannister & Wiest (2001) proved that better auditing quality (usually by Big 4 firms) can actually limit income smoothing. Research carried out by Yermack (1996) shows that board size has significantly influence the practice of income smoothing. A more diverse boards possess more diverse knowledge, as well as the perspectives necessary to develop and evaluate solutions to complex problems (Van der Walt et al. 2006), Hoang et al. (2016). The separation of the board's CEO and chairperson also results in reduced agency problems, because it allows more independence of the board from the management in decision-making process. Studies suggest that the separation of chairperson from CEO is an important element in preventing earnings management Rahma & Mohamed Ali (2006); Lee & Shailer (2008); Robert et al. (2008), Hoang et al. (2016).

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LITERATURE REVEW AND HYPOTHESIS

Literature review

A hypothesis proposed by Gordon (1964) that income smoothing emerges with managers' rational behaviour. The assumption of income smoothing are the managers act to maximize their utility, income fluctuation, unpredictable earnings, managers' utility depends on the firm's share value.

Eckel (1981), Albrecht & Richardson (1990), Sherlita & Kurniawan (2013) distinguishes two different type of smoothing income stream. Those that are naturally smoothed, or, intentionally smoothed by management. Natural smoothing is alignments resulting from transactions that inherently produce a smoothed earning. In other words, the company's operations to generate income by collecting revenues and expenses inherently eliminate fluctuations flow of income. On the other hand, an intentionally smoothed income stream could be the result of real smoothing or artificial smoothing techniques. Real income smoothing indicates management action that seeks to control economic conditions affecting corporate's future earnings. Artificial income smoothing occurs when management manipulate the timing of accounting entries to produce smooth income streams.

Ashari et al. (1994) examined factors associated with the incidence of income smoothing by the company are firm size (total assets), profitability (net income after tax to total assets), industry (industrial and commercial, hotels and properties, and others), and nationality (Singaporean and Malaysian companies) on public companies in Singapore. The sample comprises of 153 companies listed in the Singapore stock exchange during the period 1980 to 1990. Descriptive statistics indicate that income smoothing occurs and operational income is the most common income smoothing practice. They find income smoothers tend to be less profitable companies detail is the incidence of income smoothing is greater in less profitable companies, companies in more 'risky' industries, and Malaysian companies. In addition, the results of the study also show that the income smoothing is affected by the firm size, the larger firm size has the larger income smoothing, this result of research fit with Agency theory.

Atik (2009) study 75 companies listed in the Istanbul stock exchange during the period 1998 to 2013 and perform tests using discretionary accounting changes (DACs). Income smoothing is perceived as one motivation of DACs and the sampled firms are classified into smoothers and non-smoothers by using Moses' smoothing behavior index. Results show that possible motivations of

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DACs are: income smoothing, economical characteristics of the periods in which the DACs are made, and the desire of Turkish firms to have net incomes close to zero.

Following an identical mission, Sherlita & Kurniawan (2013) examines the factors that influence income smoothing practice for manufacturing companies listed on the Indonesian Stock Exchange. The research sample a total of 68 companies with a sub-sample of 204 financial reports from 2008 to 2010. Statistical analysis by binary logistic regression is used to determine the factors that influence income smoothing. The results show that the variables of profitability and net profit margins have significant differences between smoothing and non-smoothing company, while the variable of firm size and financial leverage has no significant difference. Test results using a multivariate binary logistic regression, either simultaneously or separately, on the four independent variables thought to affect the practice of income smoothing apparently has no proved influence.

Gassen & Fuelbier (2015) investigate the interplay between creditor financing and the smoothness of earnings reported by European private firms. The authors use an international sample of more than 700,000 firms across 24 European countries from 1998 to 2007. A concept established by prior literature (e.g., Leuz & Wysocki (2003); Francis et al. 2004) is used to define dependent variable is SMOOTH. The results indicate that in weak debt contracting environments, smoother earnings are related to lower cost of debt.

Additionally, Hoang et al. (2016). investigate the effect of board diversity on earnings quality in a sample of 150 Vietnamese listed firms by using the financial statement data over a period of seven years (from the fiscal years 2005 to 2011) to measure individual earnings quality and using five-year rolling windows from 2006 to 2010 to generate the 2010 earnings quality measures for the sample, similar to Francis et al. (2004). They find a significant positive linear relationship between diversity of boards (dissimilarities among firm boards, i.e., board structure) and earnings quality, whereas the relationship between diversity in boards (dissimilarities among directors within a board, i.e., demographic attribute of board members) and earnings quality is non-linear.

Recently, Bui, D. V., & Ngo, D. H. (2017) examines the impact of the Board of directors, firm size, financial leverage and return on assets (ROA) on Accrual-based Earnings Management. The results demonstrate that Board size, the proportion of Board financial expertise, and the proportion of female members of the Board have a significant positive correlation with abnormal Discretionary Accruals (DA). Firm size, financial leverage and ROA are significant negative

correlated with DA. In addition, the study results also indicate that CEO duality (Chairman and CEO), the proportion of independent board members and the number of Board meetings are not significant towards Accrual-based Earnings Management. This study was carried out based on the data of Financial Statements, Annual Reports and Management Reports of 430 non-financial listed companies on Vietnam's stock market over the period 2010-2015.

Another article also mentions the factors influencing income smoothing among pharmaceutical companies listed on Indonesian market by Nurliyasari (2017). The variables used in this research are share price, ownership structure, company size, profitability and leverage. This research uses logistic regression analysis model. This research comprises of 45 observation in 2009-2013 period. The results of this research show that the share price and profitability variables have no influence on income smoothing, yet the ownership structure, company size, and leverage variables influence income smoothing.

Finally, Dewi et al. (2018) collects sampling of 65 companies throughout 2011–2013 to find why income smoothing (IS) still exists in Indonesia Stock Exchange (IDX) by analyzing its effect on the market performance (MP). The study divides MP into three perspectives: market response representing current investor; market risk (MR) representing potential investor; and market value (MV) representing the management. Using three models to analyze each of the relation, the results shows that IS only significantly affects the MP of companies in the aspect of market response, while the other aspects, MR and MV, yield insignificant results.

Hypothesis development

DDEGREE AND CDEGREE

Hambrick & Mason (1984) suppose Director education degree is viewed as an indicator of directors' knowledge, cognitive orientation and skills base. Top management team members have more experience as senior managers, which helps to upgrade the quality of manpower (Cohen et al. 2005). The find of Jiang et al. (2013) that the appointment of a new, financially experienced CEO lessens real earnings management and appointing a CEO without financial experience increases real earnings management, including income smoothing. Xie et al. (2003), Park et al. (2004) demonstrates that Director has financially experienced contributes to limiting the earning management. Previous research documents that a high level of education among directors on

boards results in a greater ability to adopt new ideas and accept innovations. (Post et al. 2011) found no statistically significant relationship between the proportion of highly educated board members and environmental corporate social responsibility. According Hoang et al. (2016) suppose more diverse boards possess more diverse knowledge bases, as well as the perspectives necessary to develop and evaluate solutions to complex problems (Van der Walt et al. 2006). Rencently, Wei-Kang Wang et al. (2018) about relationship between management characteristics and corporate performance of Chinese chemical companies. The finding show that the human quality dimension (include CEOs and Chairman) have the impact corporate performance. Overall, this study present the following hypothesis:

H1: Director education degree is related to Income smoothing.

H2: Chairman education degree is related to Income smoothing.

CONCURENTLY

In Vietnamese stock exchange Most Corporate Practice recommendations strongly suggested the separation between the roles of board chairman and the CEO. The role of the board chair is to monitor the CEO, if the CEO is also the board chair, there is likely to be a lack of independence between management and the board. Prior studies suggest that the separation of chairperson from CEO is an important element in preventing earnings management, special is income smoothing Rahma & Mohamed Ali (2006). However, the result of Roodposhti & Chashmi (2010) show that CEO dominance is positively related to income smoothing. As shareholders perceive that reduction of monitoring caused by CEO dominance increases earnings management and reduces the reliability and relevance of accounting earnings. The reason it is defined differently from prior studies is that shareholder suppose CEO/chair separation will make management more efficient and then owners and managers do not want to affect the prestige of the company will limit the income smoothing. Therefore, it is hypothesized that:

H3: CEO/chair separation (CONCURENTLY) is positively related to income smoothing.

MEETING

Empirical research has documented that board size and number of board meetings may be related to income smoothing. Vafeas (1999) has demonstrated that boards meet more often during periods

of turmoil, and that boards meeting more often show improved financial performance and limit earning management Xie et al. (2003). A board that meets more often should be able to devote more time to issues such as income smoothing. A board that seldom meets may not focus on these issues and may perhaps risk control is not effective. Therefore, this study expect the income smoothing to be negatively related to the number of board meetings.

H4: The number of board meetings is negatively related to the income smoothing.
BSIZE

The total number of board members is called the board size. The evidence on the role of board size is different. Yermack (1996) concludes that the smaller board size is also more effective than the larger board. These studies show that the board size is positively related to the corporate performance. If the smaller board size helps improve the efficiency of monitoring, it also helps to reduce income smoothing in companies. Ayemere & Elijah (2015) argue that there is an inverse relationship between the number of board members and the earnings management similar to the results of Abed et al. (2011), Xie et al. (2013), Abbadi et al. (2016). Most studies have suggested that there is an negative relationship between the board size and the earnings management or income smoothing. If the number of board members larger, the company will contribute the strength and wisdom of many people to help improve the effectiveness of company supervision, so the following hypothesis:

H5: The number of board members is negatively related to the income smoothing.

RESEARCH DATA AND METHODOLOGY

The sample
The sample in this study were extracted by hand from the Ho Chi Minh Stock Exchange (HOSE) for which the required data items were available, except for banks and financial institutions because their financial statements are prepared in accordance with their special regulatory environment. To be included in the sample, each firm must have had an income statement, balance sheet and cash flow statement for all ten fiscal years from 2007 to 2017. Our final sample, with all required data available, includes 100 companies had the highest market capitalization at the time 31/12/2017 listed in the Vietnam stock exchange.

Research Methods

Research methodology is implemented through by using quantitative research method. For the multivariate regression analysis to determine the factors influencing the income smoothing in listed companies of Vietnam's stock market, the research used SPSS 20.0 to analyze the correlation between variables and regression models. Descriptive statistics; testing the research model, analyze the correlation between variables and regression models. Based on the regression model, the study will select the most suitable model for conducting the analysis.

Regression model

$$\text{IS} = \alpha + \beta1\ \text{DDEGREE} + \beta2\ \text{CONCURENTLY} + \beta3\ \text{CDEGREE} + \beta4\text{MEETING} + \beta5\text{BSIZE} + \beta6\text{SIZE} + \varepsilon$$

Where;

DDEGREE	: Director education degree
CONCURRENTLY	: CEO/chair separation
CDEGREE	: Chairman education degree
MEETING	: Number of board meetings
BSIZE	: Board size
SIZE	: Firm size

Income smoothing

This study adopts the measure of income smoothing (IS) in Francis et al. (2004) as the ratio of firm i's standard deviation of net income before extraordinary items scaled by beginning total assets, to its standard deviation of cash flows from operations scaled by beginning total assets. Larger values of IS imply lower earnings quality.

Income Smoothing Index:

$$\frac{\textbf{STDEV}.\textbf{\textit{S}}\ (\textbf{NI/TAS})}{\textbf{STDEV}.\textbf{\textit{S}}\ (\textbf{CFO/TAS})}$$

NI: Net income before extraordinary items

TAS: Beginning total assets

CFO: Cash flows from operations

STDEV. S: standard deviation sample

Independent variables

Director education degree (DDEGREE)

Hambrick & Mason (1984) suppose Director education degree is viewed as an indicator of directors' knowledge, cognitive orientation and skills base. Using modified Blau's index with a classification of four subgroupings: PhD & Master's, Bachelor's, Associate's and Others (Hoang et al., 2016)

CEO/chair separation (CONCURENTLY)

Previous studies suggest that the separation of chairperson from CEO is an important element in preventing earnings management, special is income smoothing (Rahma & Mohamed Ali (2006). However, the result of Roodposhti & Chashmi (2010) show that CEO dominance is positively related to income smoothing. Bui, D. V., & Ngo, D. H. (2017) examines the impact of the Board of directors on Accrual-based Earnings Management. All of studies measure the separation between CEO and chairman use dummy variables 1 if the chairperson also serves as the CEO and 0 otherwise (Hoang et al., 2016).

Chairman education degree (CDEGREE)

Similar to the variable Director education degree, the variable Chairman also education degree. The using modified Blau's index with a classification of four subgroupings: PhD & Master's, Bachelor's, Associate's and Others (Hoang et al., 2016).

Number of board meetings (MEETING)

Empirical researches have documented that board size and number of board meetings may be related to income smoothing Vafeas (1999), Xie et al. (2003). Number of board meetings is measure the natural logarithm of the total number of board meetings.

Board size (BSIZE)

The total number of board members is called the board size. These studies show that the board size is negatively related to earnings management or income smoothing as Ayemere & Elijah (2015); Abed et al. (2011), Xie et al. (2013), Abbadi et al. (2016). Most studies have measure number of board members by the natural logarithm of the total members of the board of directors at the end of the financial year. Thus, this study measure **Board size** variable by the natural logarithm of the total number of board meetings.

Control variables

The size of the company is one of the important factors affecting the income smoothing. According to previous studies by Ashari et al. (1994); Sherlita & Kurniawan (2013); Aziatul et al. (2015) ... show that a significant linear relationship between firm size and income smoothing. In this study, the author selects the firm size according to total assets at the end of the financial year and measures the natural logarithm of the total assets as Ashari et al. (1994); Aziatul et al. (2015).

Size = Ln (The total assets at the end of the financial year)

So, the firm size included in the model as a control variable in this study

Table 1.Description of variables

Variables	Definition	Measure
Income smoothing	The ratio of firm i's standard deviation of net income before extraordinary items scaled by beginning total assets, to its standard deviation of cash flows from operations scaled by beginning total assets, Francis et al. (2004)	$\dfrac{\text{STDEV.S (NI/TAS)}}{\text{STDEV.S (CFO/TAS)}}$
DDEGREE	Director education degree	Using modified Blau's index with a classification of four subgroupings: PhD & Master's, Bachelor's, Associate's and Others.
CONCURENTLY	CEO/chair separation	1 if the chairperson also serves as the CEO and 0 otherwise.
CDEGREE	Chairman education degree	Using modified Blau's index with a classification of four subgroupings: PhD & Master's, Bachelor's, Associate's and Others.
MEETING	Number of board meetings	Ln (Number of board meetings)
BSIZE	Boards size	Ln(The total members of the board of directors at the end of the financial year)

Variables	Definition	Measure
SIZE	Firm size	Ln (The total assets at the end of the financial year)

Source: own

RESULTS AND DISCUSSIONS

Descriptive statistics

The author used SPSS 20.0 software to determine descriptive statistics, correlation analysis, multi-collinear testing, and regression analysis.

Table 2. Description Statistics of variables quantitative

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Independent					
MEETING	485	2.3979	6.5568	4.004805	.8125721
BSIZE	485	1.0986	2.4849	1.797061	.2354657
Control					
SIZE	485	5.2339	12.2728	8.185975	1.1754368
Dependent					
IS	480	.0465	4.9876	.582335	.5722524

Source: own

Table 2 presents the descriptive statistic for the dependent variable, independent variable and control variable used in this study. This table reports on the minimum, maximum, mean and standard deviation value for each variable in this study. The empirical results show that income smoothing is reported in a range 0.0465 to 4.9876. Meanwhile, the mean value of income smoothing is reported at 0.582335. This value is slightly lower compared to the study of Francis et al. (2004) who reported a mean value for income smoothing is 0.640 for an average of 1471 firms per year from 1975–2001 in the United States. In comparison, Leuz & Wysocki (2003) report a mean smoothness measure of 0.765 (for all U.S. firm-year observations, 1990–1999), and is slightly higher compared to the study of Hunt & Shevlin (2000) report descriptive data implying a mean ratio of income volatility to cash volatility of 0.51 and had a mean value in the study of Hoang et al. (2016). of 150 firms from 2005 -2011 in Vietnam is 0.49.

As shown in Table 2, MEETING variable has a range between 2.3979 and 6.5568, and its mean value is 4.004805, in comparison, Xie et al. (2003) for a sample of 282 firms report a mean smoothness measure of 8.26.

BSIZE variable has a range of 1.0986 to 2.4849 and its mean value is 1.797061.

Table 3. Description Statistics of variables variables qualitative

Independent Variables		Quantity	Percentage
DDEGREE	Others	19	3,9%
	Associate's	10	2,1%
	Bachelor's	277	57,1%
	PhD & Master's	179	36,9%
CONCURENTLY	None-concurrently	346	71,3%
	Concurently	139	28,7%
CDEGREE	Others	20	4,1%
	Associate's	8	1,6%
	Bachelor's	298	61,4%
	PhD & Master's	159	32,8%
	Total	485	100,0%

Source: own

Table 3 presents the descriptive statistic for the independent variable qualitative used in this study. The results show that, the rate of the directors have Bachelor's degree is highest (57.1%) and the directors have Associate's degree is lowest (6%) and the rate of the chairman have Bachelor's degree is highest (61.4%) and the chairman have Associate's degree is lowest (1.6%).

Table 4. The Pearson correlations of our variables

		IS	DDEGREE	Concurrently	CDEGREE	MEETING	BSIZE	SIZE
IS	Pearson Correlation	1						
	Sig. (2-tailed)							
DDEGREE	Pearson Correlation	-,008	1					
	Sig. (2-tailed)	,869						
Concurently	Pearson Correlation	-,121**	-,242**	1				
	Sig. (2-tailed)	,008	,000					
CDEGREE	Pearson Correlation	,095*	,346**	-,093*	1			
	Sig. (2-tailed)	,038	,000	,040				
MEETING	Pearson Correlation	-,075	-,008	-,053	-,045	1		
	Sig. (2-tailed)	,099	,869	,243	,326			
BSIZE	Pearson Correlation	-,010	-,050	-,106*	,000	,189**	1	
	Sig. (2-tailed)	,822	,273	,020	,999	,000		
SIZE	Pearson Correlation	,046	,113*	-,095*	,017	,122**	,190**	1
	Sig. (2-tailed)	,309	,013	,036	,703	,007	,000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).
Source: own

Correlation coefficient of variables is described in Table 4. Based on the matrix results in table 4, the results showed that there are no correlation coefficients of variables higher than 0.35 (the highest of 0.346). It can be confirmed that as using the regression model, it will be less likely to encounter the phenomenon of multicollinearity. For a more secure test, this study also re-tested by using coefficient of Variance Inflation Factor (VIF) when running the regression and results revealed no phenomenon of multicollinearity (VIF<5) (Tab. 6).

Table 5. Model testing

Model		Sum of Squares	F	Sig.
1	Regression	5.657	2.949	.008[b]
	Residual	151.203		
	Total	156.859		

a. Dependent Variable: IS

b. Predictors: (Constant). SIZE. CDEGREE. Concurrently.
MEETING. BSIZE. DDEGREE
Source: own

Regression analyses

Implementing the dependent variable of income smoothing and all independent variables are the factors influencing the degree of smoothing of income into the multivariable regression model to determine whether there is a relationship between dependent variable and independent variables, between the independent variables with another.

The results of table 5 model testing show that P-value = 0,008 is less than 0.01. which means model is statistically significant with the reliability of 99%

Table 6. Results using the multivariate regression model

Model		Unstandardized Coefficients B	Standardized Coefficients Beta	Sig.	VIF	Adjusted R Square
1	(Constant)	.701		.015		
	DDEGREE	-.071	-.086	.086	1.221	
	Concurrently	-.169	-.134	.005	1.083	
	CDEGREE	.090	.107	.027	1.140	0.024
	MEETING	-.058	-.082	.078	1.051	
	BSIZE	-.057	-.023	.618	1.084	
	SIZE	.027	.056	.227	1.065	

a. Dependent Variable: IS

Source: own

Based on regression results using the multivariate regression model, table 6 show that the significance value of DDEGREE (0.086) and significance value of MEETING (0.078) less than 0.10, which means DDEGREE and MEETING are statistically significant with the reliability of 90%. Thus, H1 and H4 are supported, which means that DDEGREE and MEETING have a negative relationship with Income smoothing.

The significance value of CDEGREE (0.027) less than 0.05, which means CDEGREE is statistically significant with the reliability of 95%. Thus, H2 are supported, which means that CDEGREE has a positive relationship with Income smoothing.

Similarlly, the significance value of Concurrently (0.005) less than 0.01, which means Concurrently is statistically significant with the reliability of 99%. Thus, H3 are supported, which means that Concurrently has a negative relationship with Income smoothing.

Additionally, BSIZE no have statistically significant with the reliability of 90%. Thus, H5 is denied.

In order to find the effective model, the study examines the effects of variables and leaves variables no have statistically significant. The regressive results for all variables in the model no **BSIZE** as follows table 7 and table 8:

Table 7. Model testing no BSIZE

Model		Sum of Squares	F	Sig.
1	Regression	5.577	3.495	.004[b]
	Residual	151.283		
	Total	156.859		

a. Dependent Variable: IS

b. Predictors: (Constant). SIZE. CDEGREE. Concurrently.
MEETING. DDEGREE
Source: own

Table 8. Results using the multivariate regression model no BSIZE

Model		Unstandardized Coefficients B	Standardized Coefficients Beta	Sig.	VIF	Adjusted R Square
1	(Constant)	.621		.009		
	DDEGREE	-.069	-.084	.093	1.209	
	Concurrently	-.166		.005	1.072	0.025
	CDEGREE	.089	.106	.028	1.139	
	MEETING	-.061	-.086	.061	1.022	
	SIZE	.026	.052	.253	1.035	

a. Dependent Variable: IS
Source: own

The results of table 7 model testing show that P-value = 0.004 is less than 0.01, which means model is statistically significant with the reliability of 99%

And table 8 shows that results similar to previous model with H1, H2, H3 and H4 are supported.

CONCLUSION

From the empirical analysis that has been taken, it can be concluded that the results of the study are as follows:

Research model regression analysis shows that Director education degree has a negative significant effect on Income smoothing. While Chairman education degree has an insignificant positive effect to the Income smoothing.

Research model regression analysis shows that the CEO/chair separation has a negative significant effect on Income smoothing. This result is similar to the previous research of Roodposhti & Chashmi (2010)

And number of board meetings has a negative insignificant effect to the Income smoothing at the 0.10 level, indicating that when boards meet more often, income smoothing are lower. This finding is consistent with the idea that an active board may be a better monitor than an inactive board. This result is similar to the previous research of Xie et Al. (2003)

In another hand, board size don't have relationship with Income smoothing. This result is in accordance to the previous researches such as Gulzar et al. (2011), Nugroho et al. (2012).

LIMITATION AND FURTHER RESEARCH

The sample size of the study may limit the general is ability of our results. Only 100 companies listed on the HCM stock market in the period from 2007 to 2017. Future studies may expand with the larger sample size.

The R-square of the model is 0.025 it means the variables only explain 2.5% for the dependent variable, there are still 97.5% other factors not explained by this model.

About literature review, there is only one paper published in Vietnam so the author limited reference for this study in the same economy environment

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FACTORS AFFECTING TO TAX COMPLIANCE BEHAVIOUR: AN ACADAMIC RESEARCH REVIEW

Thien Nguyen Huu, Phong Duong Thanh

Abstract: In the context that the state budget is facing with difficulties due to the significant decrease of revenues because of cooperation's inefficient operation as well as the declining price from exporting crude oil and especially the import tax due to Free Trade Agreement-FTA from ASEAN and a series of other countries, the enhancement of efficiency in tax collection will be a critical issue currently. Thus, this research was conducted to find out how many factors that influence the tax compliance behavior of businesses as well as taxpayers. Further, data was obtained from 21 empirical studies published between 1985 and 2016 from across the globe and the result show that there were three groups of factors affecting tax compliance behavior comprising attitude, phenomenon and perceive of control as well as some theories and foundation model was used to study about this area. Hence, these findings informed policymakers about factors can affect compliance behavior of taxpayer and proposed policies to help tax agencies improve collecting tax control as well as the method how researchers can to practice in the future about this field in Vietnam.

Purpose: This study aim to summarize prior studies about factors affecting to tax compliance behavior as well as theoretical framework to motivate future research in Viet Nam.

Design/methodology/approach: Qualitative method, with a meta-analysis method particularly and the vote counting technique (Hedges & Olkin, 1980), was used and data was collected from 21 empirical studies published between 1985 and 2016.

Findings: The result revealed that there were three groups of factors affecting tax compliance behavior comprising attitude, phenomenon and perceive of control as well as some theories and a foundation model was used to study about this area.

Research/practical implications: The paper categorized what factors, theoretical framework and research model for future studies about tax compliance behavior in academic.

Originality/value: This research would played a role as a motivation for any researchers who will have interesting about this issue conduct more study in the future .

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INTRODUCTION

A series of developing countries are now trying to reduce over-dependency on aid or diversifying revenues' resources which tax collection is main resource. Take Botswana as example, in an effort to widen the tax base, the Income Tax Amendment Act of 2011 was passed (Benza, 2013). The Act makes it compulsory for every person with taxable income in excess of P36, 000 (about US$5,000) per year to apply for a Taxpayer Identification Number (TIN) to enhance accountability for taxation. As Viet Nam is consistent with that trend when enacted the Income Tax on high - Income earner Order in from 1990 but until in 2007 promulgated the personal tax law which effecting every one person.

In addition the International Development Committee (2012) recommended that UK's aid program should focus on supporting tax authorities to generate tax revenues are threatening by widespread tax evasion among taxpayers in many countries. Tax revenues lost through tax evasion from multinational companies around US$ 500 million annually (IMF, 2017) and worldwide is estimated to be above US$ 3.1 trillion which accounts for about 5.1% of world GDP. The impact of deliberate failure to pay tax to government is more intense in the developing countries. For example, 97.7% and 138.5% of health care budget is lost to tax evasion in African countries and South American countries respectively (Tax Justice Network, 2011). Furthermore, Vietnam are in the same situation with the loss of tax revenue from over online business, enterprises' and personal income up to VND thousands of billion.

Hence, the desire to evade tax is prevalent in every country and this phenomenon has attracted numerous scholars to investigate the factors behind it like Jackson and Milliron (1986) reviewed 46 tax compliance articles and identified eleven important factors including tax system complexity, level of tax information services, withholding and information reporting, tax return preparer responsibilities and penalties probability of being audited, progressively and actual level of tax rates, education and income. And after Jackson and Milliron, many studies have been carried out and illustrated a myriad of factors that are more or less similar to Jackson and Milliron's findings as Riahi-Belkaoui (2004); Trivedi et al. (2005); Chau & Leung (2009); Saad (2014);... as well as

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Nguyen Minh Ha & Nguyen Hoang Quan (2012); Le Xuan Truong & Nguyen Dinh Chien (2013); Dang Thi Bach Van (2014); Le Thi Anh Tuyet (2016); Phan Thi My Dung (2015); Le Chi Cong (2017); Nguyen Thi Ly & Tra Van Trung (2018);…

Therefore, because of no shortage of literature on this subject and revealed many factors affecting to tax evasion or compliance behavior, this research has evaluated the collective adequacy of the factors employed in these studies with four main dimensions as follows:

- *Recognizing what factors that affecting on taxpayer compliance behavior;*
- *Evaluating the collective adequacy of the factors conducted in various researches;*
- *Conceptualizing the various factors of tax compliance behavior as meaningful whole;*
- *And suggesting policies to boost tax collecting activity of tax agencies in Vietnam.*

LITERATURE REVIEW

Taxation is believed in that it is the central revenue resource to economic, social and political development. A strong tax system could encompass three critical roles in nations' development: revenue generation, lessen inequality and promote good governance (Cobham, 2005). Three main prospects was discussed as below:

First, revenue generation is the most transparent and direct role of taxation. Tax revenue are used to finance of public infrastructural services such as roads, airports, hospitals and schools... And income from aid and natural resources can substitute tax income, and might ensure that important development goals are reached but not stability (Moore, 2004; Ross, 2001). In addition, compared to income from aid and natural resources, tax revenues based on a more robust domestic resource mobilization are relatively predictable (Bulír & Hamann, 2007).

Second, tax revenues contribute income for a government to distribute as welfare transfers as reducing extreme poverty. Human poverty in middle-income countries, such as those in Latin America and the Caribbean as well as Asia, is more clearly the result of levels of income inequality than absolutely low income (Cobham, 2005).

Third, tax revenues also create building up institutions and democracy through making the state accountable to its taxpayers. A casual observation reveals that bad governance depend of revenue from taxation of citizens and businesses. For example, in developing countries whose income derives mainly from sources other than taxation of their citizens, for instance from natural

resources like oil and minerals, are generally characterized by bad governance and poor public institutions (Odd-Helge & Rakner, 2009).

RESEARCH METHOD

A meta-analysis method was conduct to analyze findings of the reviewed studies and approach to synthesizing a literature stream. Meta-analysis is a set of statistical techniques for summarizing the results of several studies into a single estimate of the effect. Due to collected papers researched in a range of sample size, object, method and many places, so characteristics of tax compliance behavior was unable measured and approached as heterogeneity way. Therefore, the form of meta-analysis was weak and needed to use another technique which was named as the vote counting technique (Hedges & Olkin, 1980). Critically, the vote-counting approach would summarize for each independent factor, a positive effect or a negative effect, or a non-significant effect on tax compliance behavior (Zou, 1998). Hence, the vote-counting technique would interpret a simple and clear picture to readers with regard to the likely sign of the true effect of a factor. Using the vote counting method, an attempt of author was then made to summarize findings of the reviewed paper and using the Theory of Planned Behaviour (TPB) as the conceptual framework to categorize predictor variables.

DATA

The review is this research were summarized by a systematic process. First a series of papers was collected over the period between 1985 and 2016. Then, only papers that met qualified criteria for final inclusion was accepted in use comprising: (1) papers examining the determinants of tax compliance or evasion; (2) papers that used tax compliance or evasion as the dependent variable; and (3) papers that are empirical based on data from taxpayers (individuals or organizations) as its subjects.

The author found that there were 21 studies meeting the above criteria. Table 1 provides a list of researchers of these papers as well as information on year of publication, theory or model used if any, the statistical method employed, sample size and the country. In addition, most of the data have been collected in this year, and from North America, Asia, Africa, Europe, Middle East and world-wide. Moreover, data have been collected from different countries also reduces the

comparability of the studies. Thus, the results could only be compared under the assumption that people/firms in different countries operate under fairly similar general tax conditions.

RESULTS AND DISCUSSIONS

From data on table 1 below, it illustrated an abstract about studying in tax compliance behavior from 1985 to 2016. The result show that these research was conducted based on a variety sample size between 15 and 23111 as well as from individual taxpayer to tax officer and other position. And it also revealed that the research method as t-test; ANOVA test and regression are usually used and the theory encompass Theory of Reasoned Action; Economic Theory; Theory of Planned Behavior; Institutional Anomie Theory; Fiscal Exchange Theory; Social and Psychological Theory.

Tab. 1 - Summarizing prior studies about the tax compliance behavior

No	Author	Year	Theory/model	Country	Sample	Method
01	Slemrod	1985	Allingham and Sandmo amended by Yitzhaki Model (1974)	USA	23111 individual taxpayers	Multiple regression
02	Alm, Jackson, & Mckee	1992	Allingham and Sandmo model (1972)	USA	15 students	Multiple regression
03	Hanno & Violette	1996	Theory of Reasoned Action	USA	73 students	Correlation test
04	Fjeldastad & Semboja	2001	None	Tanzania	221 individual taxpayers	Descriptive statistics
05	Parka & Hyunb	2003	Allingham and Sandmo model (1972)	Korea	15 students	Multiple regression
06	Riahi-Belkaoui	2004	None	Multination	30 countries	Multiple regression
07	Trivedi, Shehata, & Mestelman	2005	Economic Theory & Theory of Planned Behavior	Canada	79 students	Multiple regression
08	McGee & Smith	2007	None	USA	638 students	Descriptive & Inferential statistics
09	Singh & Mbekomize	2009	None	Botswana	149 students	t-test & Independent t-tests
10	McGee & Gelman	2009	None	USA	2000 students	Descriptive & Inferential statistics
11	Fagbemi, Uadiale, & Noah	2010	None	Nigeria	36 tax officer	Descriptive & Inferential statistics
12	Ahangar, Bandpey, & Rokny	2011	None	Iran	I44 Tax Specialists	Descriptive statistics
13	Bame-Aldred, Cullen, Martin, & Parboteeah	2011	Institutional Anomie Theory	Multination	3331 firms	Hierarchical Generalized Linear Modeling (HGLM)

14	Hai & See	2011	Extension of Theory of Reasoned Action	Malaysia	196 individual taxpayers	Multiple regression
15	Palil & Mustapha	2011	None	Malaysia	1073 individual taxpayers	Multiple regression
16	Benk, Çakmak, & Budak	2011	Theory of Planned Behavior	Turkey	369 individual taxpayers	Factor Analysis & Multiple regression
17	Maciejovsky, Schwarzenberger, & Kirchler	2012	None	UK	253 individual taxpayers and 463 students	Analysis of Variance ANOVA and (Mann–Whitney test
18	Damayanti	2012	Theory of Planned Behavior	Indonesia	114 individual taxpayers	Regression analysis
19	Aronmwan, E., Imobhio, E., & Izedonmi, F.	2015	Fiscal Exchange Theory, Social and Psychological Theory	Nigeria	400 individual taxpaters	Regression analysis
20	Richardson, G.	2016	None	Multination	45 countries	OLS regression
21	Alasfour, F., Samy, M., & Bampton, R.	2016	None	Jordan	354 auditors, Accountant and financial managers	T-test and ANOVA test

Source: Own summary

Furthermore, from an overview, author also compacted the independence variables from these papers. According to the review process, the number of different operationalized variables of 21 above papers was 101. And, in several cases, an operationalized variable was unique to a single study. This created difficulty to compare results between different studies. Hence, author divided all that variables into 3 groups as table follows:

Tab. 2 - Summarizing variables relating to tax compliance behavior

Name	Positive	Negative	None	Total
ATTITUDE	*23*	*10*	*2*	*35*
Summative Attitude	4			4
Perception of equity and fairness	5	2		7
Affective priming (Emotions)		1		1
Cognitive priming (ease with which to retrieve tax-related info	1			1
Perception of provision of public good	3		1	4
Tax knowledge/tax education	2	1		3
Expected costs of non-compliance	1			1
Ethics	2	1		3
Unfair treatment of Citizens		3		3
Religious Observance	1			1
Freedom of Speech	1			1
Freedom of Worship (Tolerance)	1			1

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Name	Positive	Negative	None	Total
Individualism		1		1
Achievement orientation	1			1
Assertiveness	1		1	2
Perceived tax burden		1		1
Subjective phenomenon	7	2		9
Summative Subjective Norms	3			3
Normative expectations	1			1
Referral group		1		1
High Moral norms	1			1
Known number of tax evaders		1		1
Unapproved tax preparer influence	1			1
Unapproved account preparer influence	1			1
PERCEIVED BEHAVIORAL CONTROL	*28*	*23*	*6*	*57*
income derived from agriculture	1			1
Summative Perceived Behavioral Control	2			2
Legal sanctions (penalties and fines)	5	1	1	7
Probability of being audited	5	1		6
The role of tax authority	1			1
Corrupt Government		2		2
Level of Education	1			1
Rule of law	1			1
Corporate tax burden		1		1
Gross National Product (GNP)			1	1
Firm size	1			1
Individual ownership			1	1
Industry: agriculture			1	1
Industry: construction		1		1
Effective competition laws	1			1
Economic freedom	1			1
Importance of equity market	1			1
Poor working conditions of tax agent		1		1
Weakness of tax information system		1		1
Accumulation of tax cases		1		1
Complexity of tax law		2		2
Lack of proper tax culture		1		1
Poor enforcement of direct tax law		1		1

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Name	Positive	Negative	None	Total
Lack of systematic crimes prosecution		1		1
Corruption of tax agents		1		1
Vast and various exemptions		1		1
Income/ability to pay	5	3	2	10
Tax rate	1	4		5
Humane orientation	1			1
Affiliation to current government	1			1
OTHERS	*5*	*1*	*3*	*9*
Marital status/Married		1		1
Age	3		1	4
Gender	2		2	4
Total	**56**	**34**	**11**	**101**

Source: Own summary

According to table 2, the figure showed a range of variables was used to employed study about tax compliance behavior. There were a positive or negative or unassociated relationship with the tax compliance behavior. In which, the positive correlation almost popular relation.

Further, while theoretical framework was the foundation of building researched Hypothesis and intensify understanding about main factors what effect on tax compliance behavior, the data from table 2 show that more than a half of studies did not base on any theories. Thence the identifying of theory to conduct study about tax compliance behavior and support for building hypothesis about relationship between factors and tax compliance behavior was critically essential. From above papers, we summarized and supposed theories to use in researching tax compliance behavior as a picture follow:

Fig. 1 – Theoretical framework for building hypothesis
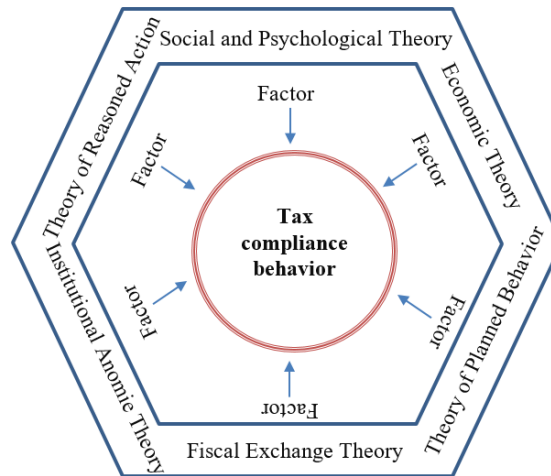
Source: Own summary

Moreover, the research model also kept a vital role in quantitative method. And from prior studies, author would propose use the Allingham and Sandmo (1972) model as foundation model in researching about tax compliance behavior. This model depended on the assumption that the taxpayer have an income A and denounced an income B which would be taxed at the tax rate **r** (Alm, Jackson, & McKee, 1992). In contrast, the taxpayer would have to face with the probability of detection **p** and received a fine **f**. Thus, the taxpayer has two strategies for making decision encompassing: (1) enacted the true income or (2) proclaimed the misstated income. When case 2 happened, he/she would be confront with whether or not was investigated by tax authorities. Hence, the taxpayer had a tendency declaring income B to maximize the expected utility. This framework suggests that enacted income would depend on **A**, **r**, **p** and **f** as:

$$B = f(A, r, p, f)$$

Allingham and Sandmo (1972) model conceded that income B and A was not equivalent and depended on directly the probability of fraud detection, the penalty and the tax rate. Further, Allingham and Sandmo considered that the income B could be modified to reflect individual's receipt about Government expenditures G as follows:

$$B = f(A, r, p, f, G)$$

This was an approach basing on dimension of economics-of-crime and concluding the assumption that the taxpayer likely paid tax according to the consequences of the evasion gamble although they fear detection and punishment. Nonetheless, Allingham and Sandmo (1972) model could not

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illustrate entirely every dimension in tax compliance behavior. Thus, researchers should applied this model under consideration of other environmental factor of studied object or used the amended by Yitzhaki Model (1974) (Slemrod, 1985).

CONCLUSION AND FURTHER RESEARCH

In general, over the 21 prior studies, the result acknowledge that there were no homogeneity measurement on tax compliance behavior and so many predictor variables was discovered with more than 50. It lead to the obstacle how to choose suitable factor to conduct study. Furthermore, a series of studies had hypothesis which did not build from theoretical frame work and foundation model. In contrast, after an overview, the consequence of research spotlight that there was six theory used to investigate about tax compliance consist of Theory of Reasoned Action; Economic Theory; Theory of Planned Behavior; Institutional Anomie Theory; Fiscal Exchange Theory; Social and Psychological Theory and one foundation model as Allingham and Sandmo (1972) model.

Hence, from the prior literature review, author would like to suggest that future research use above theories to shape hypothesis as well as Allingham and Sandmo (1972) model under consideration of the amended by Yitzhaki Model (1974) in Slemrod' study. Moreover, researcher should focus on adopting taxpayers as respondent more than students like some above papers.

In addition, follow the study, inference for public policy makers who want to increase and enforce tax compliance behavior of the taxpayer that they should use method base on combination of persuasive (changing attitudes and phenomenon) as well as conventional coercive solution (subjective control).

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HOW DIFFERENT FACTORS AFFECT AGILE TEAMS

Ekaterina Melnichuk - Tomáš Huňáček - Michal Tichý

Abstract

This paper analyses different factors that affect teams managed by agile methodologies. The paper presents dominant factors and defines their impact on a team management and the team itself. The output of this paper can be used as a resource for agile methodology implementation, as every agile methodology implementation should resonate with the subject team.

Keywords: agile, team, methodology, management

JEL Codes: M15.

INTRODUCTION

Agile software development methodologies define approach to software development where emphasis is put on self-organization, iterative approach, cross-functional team distribution and customer orientation. This is an alternative approach over rigid (waterfall) methodologies where emphasis is put on control, planning and sequential design. (Appelo, 2011)

Agile methodologies are based on an Agile manifesto (Fowler et al., 2001); this defines basic principles of an agile approaches:

- We value: Individuals and interactions over processes and tools,
- Working software over comprehensive documentation,
- Customer collaboration over contract negotiation,
- Responding to change over following a plan

Agile methodologies are gaining positive recognition and are being implemented not only to software teams, but also to business teams and organizations as whole. One of the main selling points of agile methodologies is team efficiency improvement (Appelo, 2011).

Success of agile methodology implementation and usage is based surely on multiple factors. By success we mean magnitude of positive impacts, mainly efficiency.

The goal of this paper is to provide guidance to teams implementing and using agile methodologies as based on review how dominant factors affect success of a given methodology. Teams can use the knowledge to enhance and understand usage of agile approach.

First part of the paper defines dominant factors in regards to agile methodology implementation and usage as based on a conclusion from multiple (empirical) studies.

Second part elaborates on how these dominant factors affect given teams and how teams can influence this.

PURPOSE OF THIS PAPER

Agile methodologies are becoming popular and used increasingly in the last few years. Many teams are switching to adopt agile practices in their daily use.

What are factors on which team should focus that would lead to the success of the project and team itself? There are potentially many factors to focus on. What is interesting to know are the dominant success factors.

In this paper, based on current literature related to agility, we try to identify the most important factors affecting agile teams, to evaluate its impact on team's productivity and to suggest several measures how to utilize these findings for future implementation to enhance agility in organizations. This may help future teams to adopt agile practices in their projects.

METHODS

The primary goal of this paper is to provide guidance for teams and organizations in the form of an overview essay. Therefore, our argumentation is based on *review of existing literature*, authors' own *observations and experience* with working in agile teams.

LITERATURE REVIEW

Which factors are the most critical for agile team productivity?

Most studies written about Agile software development (abbr. ASD) mainly focus on studying the impact of implementation of agility principles on software development productivity. Some of these studies were devoted to developing a comprehensive measurement model, as there are still

some disagreements among researchers about how to measure the productivity of software development teams.

Nevertheless, several papers including empirical researches dedicated to studying important factors of agile teams' productivity were identified and reviewed, namely Dybå (2008), Chow (2008), Melo (2011) and many others. Although there are not too many similarities in terms of the nature, size, scope, methodology and results among existing works, several researchers (Melo, 2011; Chow, 2008; Misra, 2009) agree on the main categories of productivity factors based on the review of previous works. These factors could be consolidated as follows:

- *Product factors* (software characteristics and specifications; reuse of software products)
- *People factors* (team capabilities, competencies, experience, motivation)
- *Project factors* (project scope and nature; project planning; management; resource and time limits)
- *Processual factors* (development processes; documentation; communication)
- *Organizational factors* (management commitment; executive sponsorship; organizational culture; customer collaboration and satisfaction)
- *Technical factors* (agile methods and practices; delivery strategy; agile facility)

Factors mentioned above are the ones supported by several empirical works studying the impact of various productivity factors (Melo, 2011). Comparing these dimensions between each other, *people-related factors* seemed to have a higher weight than others (Chow, 2008), confirming the common intuition that success of software projects predominantly depends on humans (Trendowicz, 2009).

The second important category is *agile engineering techniques* for software development. Nevertheless, tools and agile methods itself are not sufficient for agile teams' success and cannot substitute highly-skilled staff and efficient coordination processes (Trendowicz, 2009).

While reviewing current literature, we identified many different factors which were confirmed to have an impact on agile teams. However, these factors considerably differ in the magnitude of its influence on the productivity. Therefore, we will first focus on the most significant ones with attempt to explain its nature and influence. Then, we will mention other important factors frequently discussed in professional literature. Lastly, we will briefly mention other possible factors, which could be found in some papers, but were not fully understood.

Dominant productivity factors

One of the factors frequently studied by most researchers is **team composition and allocation.** *Team composition* refers to attributes, qualifications and characteristics (e.g. the amount of knowledge, skills, experience and competencies possessed by team members), which greatly impact their productivity (Bell, 2007; Berry, 2011). Apart from these professional qualities, many practitioners (Lindvall, 2002; Stankosky, 2010; Nguyen, 2016) agree on the personal characteristics (such as honesty, sense of responsibility, ability to learn new things and be collaborative etc.) to be equally significant for agile team members, if not more.

Among those personal qualities of project team members, one of the critical characteristics for individuals' as well as teams' performance is ability to deal with *cultural differences* (Fatema, 2017). According to some product owners interviewed by Fatema (2017), most of the challenges arise because of time-distance difference (different time zones, inability of instant reactions on urgent issues) and cultural difference (different expectations, language barrier, different perception of time and quality etc.)

Team allocation (also known as *team distribution*) is mostly associated with the size of the team, the number of full time members versus non-permanent workers (part-timers or external force), length of employment (newcomers versus long-term employees) and level of team centralization (Misra, 2009; Melo, 2011).

External dependencies stand for external, mostly uncontrollable factors in a project which could be hardly influenced by team members. It might involve different types of constraints faced by a team such as limited resources, prerequisite restrictions and required sequence of tasks and subtasks, which a project team needs to follow (Malone, 1993). Waiting for additional product specifications, external task completion, customer response, acceptance or publishing of a system or data model might extend product development cycle and therefore might influence team's productivity (Melo, 2011; Hannay, 2009). Requirements specifications (specifically requirements of quality and volatility) are especially important drivers of development productivity (Trendowicz, 2009).

Staff turnover is mentioned to be another significant factor influencing agile team productivity. An outflow of current members as well as an inflow of new force seem to bear a certain risk for any software development project (Wallace, 2004). Moreover, a common practice in software

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development companies known as *job rotation* may lead to lower team performance, as key members leading the project are frequently transferred (Melo, 2011).

Using **agile software engineering techniques and methods** is core feature which differentiates traditional software project teams from those implementing agile strategies. There are numerous tools (e.g. daily standups, continuous integration, stories, retrospectives etc.) originated from 12 Agile Manifesto principles and widely supported by different agility models (e.g. Scrum, XP etc.) The most influential practices were identified by practitioners (Melon, 2011) as follows:

- *pair programming*

Pair programming is the main XP technique, which suggests involvement of two programmers cooperating on software development (Balijepally, 2009). According to some researchers (Dyba, 2007) implementing pair programming technique might lead to contradictory results, either having positive impact or being counter-productive depending on the type of task and project members' level of expertise (Dyba, 2007).

- *collocation*

Collocation is another popular agile practice implemented within Scrum and XP methodologies. This technique, as its name implies, is based on placing all team members "under the same roof", which aims to increase productivity due to face-to-face communication and instant information sharing (Dyba, 2007). However, similar to pair programming, it might affect the team's performance in both positive and negative way.

Although implementing of agile techniques seems to have favorable impact on team performance, it's obvious that relying heavily on using these practices itself is not sufficient for long-term productivity increase.

Customer participation (also known as *customer collaboration* or *customer commitment*) refers to continuous customer involvement into development process. It requires from customers not only be available on-site, but also be proactive in problem-solving and be motivated to collaborate with software development team. High customer involvement is one of the twelve key principles for successful software development mentioned in Agile Manifesto. The necessity of this factor for ASD was supported by several empirical research findings. For instance, Rumpe and Schroder (2002) showed that constant presence of customers is vital for XP projects. Active customer

participation seems to be even more critical in the early stages of the software development, when product specification and quality requirements are established (Trendowicz, 2009).

Executive sponsorship and/or management support is widely believed to be a critical factor to software development project in order to succeed (De O. Melo, 2013). Furthermore, leadership with effective decision-making and project management skills as well as appropriate leadership styles usage also effect project outcomes (N.Vithana, 2015). However, some study findings failed to support this assumption (Chow, 2008).

Important factors frequently reviewed in the literature

Well-organized **project management processes** are believed to have large contribution to project success. Following regular working schedule and face-to-face meetings help teams to stay focused on delivering the results (N.Vithana, 2015).

Appropriate **corporate culture and organizational environment** is undoubtedly one of the most important prerequisites of the agile teams and projects success. It's might be intuitive that agile practices are more likely to succeed in dynamic and learning organizations and might lead to the disaster in highly bureaucratic organizations. The main determinant of success is ability of the organization to be adaptive to change (Lindvall, 2002).

In terms of specific organizational factors which have the biggest impact on team productivity, practitioners define subfactors as follows (Chow, 2008):

- organization structure, norms and habits
- communication type
- agile facility
- appropriate reward system etc.

However, other research findings showed little evidence of corporate culture to be important for team agility (Chow, 2008).

Agile-friendly facility (e.g. programming stations, communal areas, wall spaces etc.) is commonly viewed in the literature about Agility as a precondition for effective software development. Nevertheless, in some studies this belief wasn't supported (Chow, 2008). Furthermore, some analysis indicated even negative relationship between agile-friendly environment and team productivity in terms of Timeliness and Cost productivity measurement (Chow, 2008).

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Other factors with uncertain impact

Other factors which were not completely understood or examined in professional literature, were as follows:

- Software characteristics
- Product complexity
- Delivery strategy
- Decision-making process and time
- other agile engineering technics (such as reuse, daily builds etc.)

However, in order to make any inferences in regard to its impact on team productivity, more studies and examinations need to be conducted.

FINDINGS

How do selected factors impact an agile team?

The factor of ***team composition and allocation*** is very important because it can affect a lot of circumstances. These circumstances are mainly associated with the customer. It is customer satisfaction, customer co-operation, and long-term commitment between the company and the customer (Cohn and Ford, 2003; Lindvall et al., 2002; McMahon 2004; Nerur et al., 2005; Opperthauser, 2003; Turner and Boehm, 2003. This is the reason why it is recommended that teams will be given the responsibility and the right to make decisions according to the best judgement. Agile practices require immediate response to customer feedback and teams must be able to act quickly (Fowler and Highsmith, 2001). It is recommended that the teams must be small. It is not that the small teams have a big advantage, but rather that the big teams can be considered disadvantageous due to possible chaos, mismatch and waste of time (Camel and Bird, 1997). This is mainly about communication and coordination. However, the project phase and degree of completion must be considered during agile team process.

One of the possible ways how to deal with ***cultural differences*** and ***staff turnover*** is to build trust and cultural sensitivity among team members. As geographical boundaries between software development teams and customers are gradually blurring, leaders and team members have to be culturally flexible and aware of cultural specifics in order to deal effectively with other parties with different backgrounds. This approach helps to prevent misunderstandings as well as to

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optimize overall team performance, particularly in terms of electronic communication (N.Vithana, 2015). For example, special mentoring and trainings might be provided for employees on regular basis.

It is optimal to use appropriate communication media to prevent over-rotation of team members. Face-to-face communication is still the best way to communicate. It is proved that in the fulfillment of simple tasks the electronic ways of communication are sufficient. For more complex tasks, on the contrary, they can reduce productivity and negatively affect the motivation of team members. Therefore, it is recommended to use face-to-face communication for complex tasks (Carey and Kacmar, 1997). It can positively influence the factor of *staff turnover*. A good idea may also be to allocate a certain amount of working time to common tasks and, on the contrary, to separate tasks (Ambler, 2004).

It is recommended to place great emphasis on organizational culture as it is the peak of agile teams (Lindvall et al., 2002). This *organizational culture* must respect the cultural differences of individual team members and help to unite. Agile team emphasizes individuals and interacts over processes and tools, that is why each individual must be treated with all seriousness. (Misra, 2009). However, this factor is greatly influenced by the place where the team operates, that is, local culture. Agile practices recommend using motivated individuals who are able to learn from each other, share experience and work together. It also eliminates cultural differences and a team works as an agile team (Fowler and Highsmith, 2001).

As some studies show (Chow, 2008), success of agile projects isn't strongly determined by organizational factors. Agile teams might succeed in terms of schedule and within cost even if there is obvious lack of some favorable organizational attributes such as cooperative culture, open communication, common acceptance of flexible approach, encouraging employee incentive system, etc.). There might be the following explanation: whenever the team members are skilled, have efficient communication, are able to deal well with external forces and efficiently manage the whole process, a widely-accepted agile culture is not a prerequisite for success (Chow, 2008). In the Misra study (2009) it was proven that *customer commitment* is the strongest factor among the three customer-related factors mentioned above. It is an important factor of success and so it must be approached. It is important to listen to the customer, incorporate it into the process and

use its advice and wishes. At the same time, it is necessary to think that the team is still agile, so the customer must be close and able to quickly answer important information.

It is very important for teams to be close to the core of the company and benefit from the factor of ***management support***. Thanks to this, they can benefit from the connections to the right people on the basis of agile principles. These advantages mean close cooperation with the top management of the company, as cooperation always comes directly from the highest placed manager in the top-down system to the lowest-hierarchy workers (Trendowicz, 2009). As for team leaders and leadership, it is always necessary to use individuals who are competent to lead people, accustomed to the stress and dynamics of agile teams. Individuals must be effective in communicating with people and willing to constantly educate themselves. Training and learning are even more important for team leaders than team members (Lindvall et al., 2002).

DICUSSION

In our paper we studied different productivity factors separately, assuming no fundamental connections and interdependencies between them. Nonetheless, project team productivity is influenced by various controllable and uncontrollable factors which might be substantially interrelated. Moreover, influence of some factors might change under new organizational or project assumptions. Clearly, there is a need to test these relationships.

Moreover, any explanations or suggestions made by authors are based on current knowledge of the topic and/or personal experience and should be proved experimentally.

CONCLUSION

This paper defined critical factors in regards of agile methodology implementation and usage as based on conclusion from multiple (empirical) studies, these are: team composition and allocation, cultural differences, cultural sensitivity, external dependencies, staff turnover, agile software engineering techniques and methods, customer participation, executive sponsorship and/or management support

Additionally, paper defined how these factors affect given teams and how teams can influence this. Paper provided guidance to teams implementing and using agile methodologies in regards how teams can use, enhance and understand usage of agile approach as based on critical factors review.

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ORGANIZATIONAL MANAGEMENT IN

THE DIGITAL ERA

Radek Liska - Tereza Markova - Jan Vanis

Abstract:
The paper outlines the challenges and future problematics of the new digital era. Multiple stakeholders including employees, business leaders, and governments are listed together with specific issues related to them in the upcoming years. After a general overview of world trends, follows the analysis of a sample of countries that discuss these trends within the states. A set of solutions and recommendations on how to steer the transformation is mentioned for both the business world and stakeholders outside the business world. Later, future research opportunities are briefly discussed while narrowing the view to the managerial viewpoint. The final part of the paper reaches conclusions in the management field and talks about the shifts in the labor market given the upcoming changes such as digitalization, robotics, and automation.

Design/methodology/approach: Extensive amount of published reports were merged to provide overview of i4.0 trend implications for organizational management. Principle of selected literature review is applied as baseline for the paper.

Findings: Multiple managerial recommendations and key variables relevant to research topic are identified in the conclusions.

Research/practical implications: Conclusions presented in this paper outline possible implications for multiple sectors (education, corporate, state administration, academia).

Originality/value: This scientific review features comprehensive analysis of phenomenon based on global wide researches from world leading research institutions.

Key words: Automation, Collaboration Platforms, Digitalization, Labor Redeployment, Robotics.

JEL Classification:

O570 Comparative Studies of Countries.

O140 Industrialization; Manufacturing and Service Industries; Choice of Technology.

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1. INTRODUCTION

Digital transformation represents a challenge to everyone in modern industry and governments, businesses and general public have to fully appreciate the extent of the digital transformation sweeping through.

For major challenges such as this one, it is important to consider the nature and scale of the change and construct strategies that will endure rapid development and will be able to adopt emerging technologies. This paper focuses on business and social development associated with current i4.0 transformation and gives a set of recommendations on how to deal with them, while pointing out possible future challenges and opportunities.

This paper provides businesses, organizations and policymakers with findings of large-scale studies such as ones carried out by OECD, McKinsey & Company, KPMG and Harvard University, which can be used as a basis for numerous decisions which will have to be taken in order to take the advantage of the digital transformation of our economy and society. The reason for selection of these studies for this scientific review is they vast scope. The consulting companies, global economics organizations and world-renowned universities currently present one of only institutions that have access to enough data to produce such comprehensive reports. While many papers were published by individual research centers, by their nature and scope size, they are not relevant for such high-level scientific review research as this one.

2. THE ERA OF DIGITAL MANAGEMENT

It is crucial that company executives understand what challenges they will have to deal with in upcoming years, as well as what should be considered to deliver successful business transformation in changing and innovative world.

Issues, Controversies, and Problems

Digital transformation impacts not only technical aspects of the global industry, but it also brings new challenges in the field of managerial work. The arising challenges are ubiquitous in the business world, however, some of the specifics are exclusive to Industry 4.0 (i4.0) transformation. There are four main areas of interest that should be considered by individuals with a somewhat leading role in organizations dealing with i4.0 phenomenon:

- Change in structure of teams and employees' skillset in the desired education and skill background,

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- Possible jobs reduction of employees currently occupying automatable jobs,

- *Lack of motivation among company employees* due to significant change in jobs framework possibly leading to outplacements and requalification,

- *The company in post i4.0 environment* that might possibly need a new managerial model respecting different processes and employee structure.

Impact of automation and i4.0 on OECD countries and industry segments

Highly structured physical activities, data collection and processing are the categories which are expected to be automated in the upcoming future. To show the extent of the changes, these activities account for 51% of economic activity in the United States (Manyika, J., & Chui, M. 2017). The same study also estimates that more than 50% of work activities carried out by humans today could be automated by 2055.

The speed of the automation and other i4.0 aspects are likely to be implemented into business processes in depending on the following aspects (Liska, R. 2018):

- *Technical feasibility of solutions and its implementation*. In some activities the technology can outperform human workers, however, there is still a necessity for further R&D to invent technical solutions for less automation-prone fields of industry. Combination of multiple currently available solutions can produce either speedups due to multiplied efficiency or slowdowns due to multiplied complexity (D. Pyle & C. S. Jose, 2015).

- *Implementation and development costs.* Costs are one of the most visible factors influencing companies' decisions on implementation of automatization. Cost structure varies significantly depending on the industry sector, but it also differs based on the level of advancement of software solutions - with countless levels of hardware and software combining solutions in between (D. Pyle & C. S. Jose, 2015). Applying Moore's law, exponential drop in costs can be expected. Therefore, the implementation of i4.0 solution is expected to accelerate rapidly in the upcoming years.

- *Dynamics of the labor market and its geographical diversity* represent one of the key factors influencing the implementation of digital transformation. Attention should be paid especially to the levels of supply and demand on the labor market. Consequently, automation is more likely to occur on markets with higher average wages.

- *Economic benefits related to increased productivity, improved quality and higher safety* should be considered as well. Lower maintenance costs for large-scale facilities can be one of the main economic drivers for automatization in advanced industrial economies.

- *Social acceptance and regulations* as usually represent slowdowns for the implementation of i4.0. Inefficiencies can arise from the fear of being replaced by machines. However, once society fully understands and accepts possible overall benefits, governments will be more likely to deploy the same process of subsidizing such projects (Gates, D., & Bremicker, M. 2017).

According to Manyika and Chui (2017), automated processes could reach the production equivalent of up to 1.2 billion of currently working employees (considering global workforce as a whole). That would also represent almost 15 trillion USD in allocated wages. In comparison, the five largest economies in Europe (UK, France, Germany, Spain and Italy) have potential of up to 62 million full-time jobs to be automated, equaling 1.6 trillion EUR in wages. China and India could be facing a challenge of about 700 million automated full-time jobs, representing the highest automation potential globally (Liska, R. 2018). However, the jobs reduction linked to the introduction of automatization can boost productivity. Based on modelling considered earlier, the production growth is expected to be from 0.8% to 1.4% per year (Manyika, J., & Chui, M. 2017). *Figure 1* shows which countries are expected to be impacted the most by the automation of production. For three out of the top four countries, automotive industry is the main export article of the economy (Slovakia 27%, the Czech Republic 20% and Germany 18%; CID, Harvard University, 2017). The Slovak and Czech Republics have been on top of the list when it comes to car production per capita for a considerable amount of years in row. Both countries are dependent on automotive industry and car exports, which makes them very vulnerable to challenges linked with automation (Liska, R. 2018).

Fig. 1: The risk of job loss due to automation – percentage of workers in jobs at high and medium risk of automation.
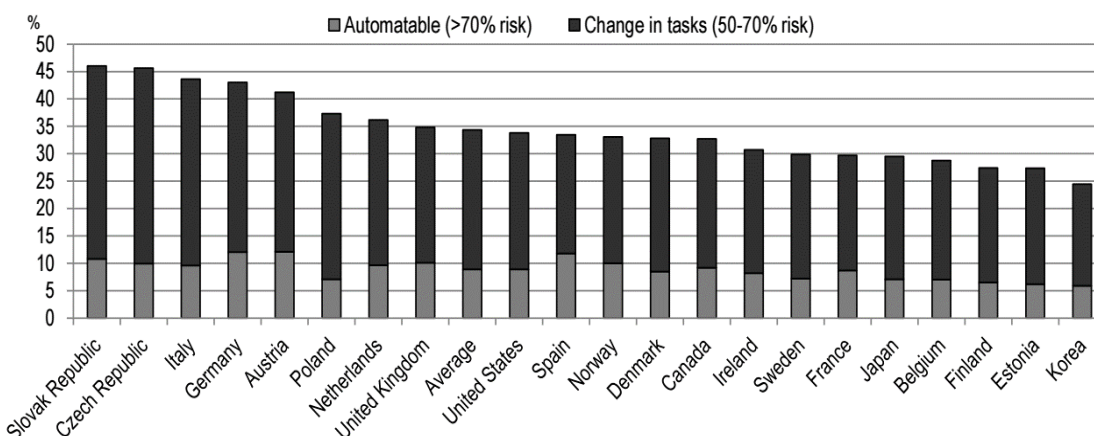
Note: Data for the UK corresponds to England and Northern Ireland, data for Belgium corresponds to the Flemish Community.

Source: OECD calculations based on the Survey of Adult Skills (2012) and Arntz, M., T. Gregory and U. Zierahn (2016), "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis", OECD Social, Employment and Migration Working Papers, No. 189, OECD Publishing, Paris.

By contrast, other two OECD countries with a significant automotive production industry, Japan and South Korea, rank among bottom five (*figure 1)*. Japan ranks as a third globally in total number of produced cars (fifth in per capita production) making 22% of its exports revenue from automotive industry. South Korea globally ranks sixth in total and third in per capita car production, while automotive represents 12% of its exports (CID, Harvard University, 2017).

What can countries in Central Europe learn from their Asian counterparts to reduce possible negative impact of automation? Viewing the top three least automation vulnerable EU countries, Estonia, Finland and Belgium, there are significant structural differences in focus of these countries compared to the above-mentioned economies. Finland leads exports with paper production, Estonia with its telecommunications and Belgium with pharmaceutical industry (CID, Harvard University, 2017).

A possible solution to mitigate the negative impact of automation in Europe seems to be obvious – changing the structure of the economy. However, such solution is not feasible, nor desirable - it is crucial to take advantage of all the benefits to boost overall productivity. Some of possible ways on how to overcome the challenges of automatization are addressed on the following pages.

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Readiness for changes in work structure

One of the aspects that has proven to be a key success in the last decades is the information and communication technology (ICT) knowledge among workers. Furthermore, research suggests that ICT will continue to gain on importance (Berger and Frey, 2016). Some knowledge of ICT is currently required in majority of jobs. According to OECD report, up to 95% of corporate business employees use the internet for their work; the number is slightly lower (85%) for medium-sized enterprises and for small businesses (65%).

Some countries might struggle with finding qualified workers with ICT knowledge in the years to come. While demand for workers with ICT skills is rising, the supply side is not flexible enough to meet the needs of the market in some countries. A possible solution could be transferred from top-ranking states in ICT skills, however, this would be difficult to execute, considering the socio-politic situation in some of the low-ranking states.

3. SOLUTIONS AND RECOMMENDATIONS

Given the uniqueness of each company and its business model, it is rather impossible to give the reader a set of general recommendations. Despite that, aim of this part of the paper will be to at least list some of the variables and challenges that will be common for majority of businesses during the i4.0 era.

Data as a double-edged sword

Sensors and other means of connecting things allowing tracking almost in real time are one of the features of internet of things which provides advantages for customers but also challenges for the businesses. From the customers' perspective, this comes in handy when monitoring, for example, the time of delivery. Today virtually any package, pallet or container equipped with a sensor empowers companies to gather and analyze huge amounts of data and better manage their value chain processes (Schwab, 2016). As a result, this technology can be a double-edged sword for the companies as they have unprecedented possibilities to improve their value chain operations, yet they also must keep in mind customers' satisfaction (or rather dissatisfaction) when the company does not fulfill its promises of the speed of delivery. The solution lies within the change itself, the data generated from the sensors and the way how they are processed and analyzed in order to optimize the shipping routes.

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Another example that customers are gaining more power over the businesses is the availability of data. The visibility on prices, quality, and levels of services narrows the information gap between these two sides. The reaction of businesses is clear, they can no longer focus only on one or two channels of information and influence. They need to deepen the knowledge of their customers to the levels that were unimaginable not even a decade ago (Renjen, 2017). Not to even mention the specific buying behaviors and demands of millennials who are coming to the age when their share of the total consumption is going to grow each year.

Leadership in the age of digital disruption

According to the study among U.S. CEOs conducted by KPMG, three quarters are concerned with the fact that new entrants are disrupting their business model. With the business environment changing so quickly, it is getting more difficult to have a reliable long-term vision, yet the goal for CEOs should be clear – innovate and create more intelligent and data-driven experience for their customers. In order to achieve that, companies are forming partnerships with their competitors, universities or start-ups (Doughtie, 2016).

This situation should be perceived by the CEOs (or any other business leaders) as an opportunity to reinvent their business. To achieve this, they should build and maintain an organization which promotes and embraces innovation and at the end of the day also rewards innovative efforts by the employees. As a key example, the KPMG study suggests to focus on automation, speed and agility if a company wants to be well-positioned for the future business landscape (Doughtie, 2016).

Collaborative innovation

As was mentioned earlier, innovation is one of the ways how to tackle the challenges of the i4.0 while retaining current and possibly attracting new customers. But innovation itself also requires an innovative approach such as collaboration. This is true, for example, in the relationship between established and young, dynamic firms. While the former often lacks specific skills and have lower sensitivity to evolving customer needs, the latter are usually capital poor and lack the vast amount of data generated by daily operations (Schwab, 2016).

Sharing resources through collaborative innovation can create advantages not only for the collaborating parties but also for the economy or the community. The World Economic Forum's *Collaborative Innovation: Transforming Business, Driving Growth* describes this approach as a way for young firms and incumbent players to complement one another for mutual benefit. The

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study highlights the importance of collaborative innovation in numbers. For example, from their continuous research, they found out that 71% of the respondents expect the share of revenue resulting from collaborative product and service innovation to reach at least 25% in the near future (Rösler, 2015).

The implementation phase of this partnership is divided into three principles. Firstly, there is the principle of preparation which lays the critical foundation for future collaboration. This includes defining objectives, finding the right partners, preparing both organizations culturally and through incentives to support collaboration and lastly connecting with the right potential partners. The second is the partner principle which focuses on negotiating and tailoring the projects between partners to ensure adequate definition of benefits, risks and governance aspects. Last but not least, the pioneer principle is implemented in order to ensure that partnerships adapt and thrive for the mutual benefit of all parties as they are executed and as context changes (Rösler, 2015).

The larger picture

Given the depth and the breadth of disruption that i4.0 brings, there are structural changes already happening in the whole economy. One of them can be found on the labor market where the fears of the impact of technology on jobs – outlined by John Maynard Keynes in 1931 as "technological unemployment" – can be observed.

On one hand, we have the case of the app economy which boomed after Steve Jobs introduced the marketplace for outside app developers in 2008 and today generates over $100 billion in revenues, surpassing for example the film industry, which has been in existence for more than a century. On the other hand, we have the evidence from the Oxford Martin Program on Technology and Employment that so far, the i4.0 generated less jobs in new industries compared to the three previous industrial revolutions (Schwab, K. 2016). What we are seeing now is rather a growth in productivity by replacing existing labor rather than growth of employment due to innovations (Liska, R. 2018).

We must also keep in mind that it is not only about talent and skills in the digitalized era. Technology allows efficiency improvements, but people nowadays want to feel that they are part of something bigger than themselves or that they are not merely just part of a process. This is particularly the case of the young generation that might feel constrained by the rules of big

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corporations. The search for personal fulfilment as well as work-life balance and integration are also characteristics of the i4.0 labor force (Schwab, K., 2016).

The way how one should prepare himself or herself for these changes lays in education. Uncoordinated initiatives will not change the whole economy and therefore governments and educational institutions should be actively cooperating with business leaders to define the skillsets and knowledge that will be required in the future. A call for basic ICT skills is frequently mentioned as part of the common literacy (Henke, N. & Bughin, J., 2016). This education does not have to be acquired in the institutionalized environment but nowadays it is more common to be part of MOOCs (massive open online courses) or OERs (open educational resources). These platforms offer wide range of courses that are certified or lead by universities officials and thus making the education more affordable and narrowing the educational gap.

Business leaders acting as change agents

Considering the above-mentioned changes on the labor market together with the importance of digitalization and automation of repetitive processes, some employees might percept the upcoming digital era in a negative way. In extreme circumstances, they might even want to slow down the pace of transformation of the company in a fear of job loss (Gates, D. 2017). It is up to the business leaders to prepare these employees to be part of the company in the future while redeploying them to tasks with higher value added and tasks that are hard to automate such as those requiring human judgement or emotional intelligence (Liska, R. 2018).

The employee's skillset should be composed as a balanced mix of hard technical skills together with soft skills depending on the job position. Technologies enabling cooperation of multinational teams across the globe are one of the examples of the skillset mix. Knowledge of ICT will be required as well as good level of self-control and communication skills in order to make the communication clear and efficient (Gates, D., & Bremicker, M. 2017).

Standardization as a catalyst for cooperation

Companies, industries and countries should become more involved in international standardization in order to catalyze cooperation between the agents.

Standardization in general is a key aspect to create interoperability between different technologies. International standards enhance open, flexible and successful ecosystems for agents. Increased activity in standardization processes will allow them to discover more quickly which directions

have more advanced economies or businesses taking, and it will possibly allow them to go with the correct solutions.

It is very likely that there will not be a single industry 4.0 standard, but instead, various standards will exist (Acatech study, 2017). Therefore, businesses and nations can also be actively involved in research and development, and this way to become drivers of standardization.

Education needs of students and workforce

With the advancement of industry 4.0, some jobs will disappear, other jobs will grow and jobs that don't even exist today will become common. According to an EY study (2017), 65% of children joining a primary school in 2016 will eventually end up having jobs that do not even exist today. Therefore, the future workforce will need to adapt its skillset to keep pace with the rapidly changing environment.

According to a PwC study (2014), the need for employees with knowledge of mathematics, data science and IT will increase. As it is stressed in the study, successful implementation of industry 4.0 will require a broad support of policy makers. First, they should support the development by encouraging enthusiasm for these fields at an early age. Second, they should ensure that curriculums will progress hand in hand with changes in the requirements of the internet of things. Last, they should work on unification and standardization of education internationally, as standards are catalyze cooperation (see section 2.6 above).

Hand in hand with changing needs in labor market comes the new concept of education responding to the needs of industry 4.0 - Education 4.0. It "puts the learner at the center of the ecosystem and empowers him or her to structure individual paths keeping in mind the final outcome" (EY, 2017). The concept is based on personalized learning, learning at different times and places, data interpretation, mentoring and industry engagement.

IT and data security

The importance of IT and data security grows in time of Industry 4.0 with the increasing use of smart and connected technologies, responsive supply networks and autonomous technologies. It is estimated that more than 20 billion IoT devices will be in use worldwide by 2020 (Gartner, 2015), and a substantial part of these devices will be used in manufacturing and production lines. Companies will have to adequately address strategic approach to cyber risk and proactively ensure IT and data security in order to provide secure environment.

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Cybersecurity should be a part of the strategy and operations of every organization from the beginning, however, with advanced (inter)connection and data sharing, this should be intensified. According to a Deloitte study (Waslo, R., Lewis, T., Hajj, R., Carton, R., 2017), companies should ensure secure, vigilant and resilient approach to cybersecurity. As every organization had its specific needs, companies should take measured approach to security and look for potential threats. They should continually monitor all used devices, personnel, networks and systems for vulnerabilities and potential threats, both external and internal. And finally, they should be prepared for emergencies and ensure quick responsiveness, recovery and mitigation of effects of possible incidents.

Strategic approach to Industry 4.0

We have listed some of the most pressing problems and topics of industry 4.0 nowadays. However, before getting down to work, companies should first assess their market position, capacities, competences and willingness to invest and opt for the most suitable way to pursue their goals within the following few years. The PwC study (2014) mentions three possible ways for companies to react to changes linked to industry 4.0.

First, companies acting quickly may take the opportunity and lead the way. Such companies may participate on creating standards (see chapter 2.6) and expect higher gains in case of success, on the other hand, being a leader carries substantial risks.

Companies who are not willing to invest (and to potentially lose) money in initial research and development may adapt to current situation at the market and adjust their offer and behavior to the ones of the leaders. Such companies cannot, however, expect to realize breakthrough profits.

More risk averse companies can wait for the leaders and their followers to find the way to success and then use the already proven concepts. This approach carries little risk, however, waiting companies will have to count with lower profits. Furthermore, as there is always a lag between plans and their realization, such companies may substantially fall behind the competing firm.

However, in the course of time company's approach may change given its success, market position and the behavior of competitors.

Sustainability of Industry 4.0

Even though the issues of population growth, environmental and climate changes and the decrease of natural resources might seem far from the topics of this paper, it is necessary to consider them

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in order to ensure sustainability of Industry 4.0. Furthermore, Industry 4.0 can actually enhance sustainability of resources if the allocation of resources is realized in a more efficient way on the basis of intelligent modules (Stock, Seliger; 2016).

Opportunities of sustainable manufacturing include, for example, realizing closed-loop product life cycles, that would help to keep products in life cycles of multiple use phases with remanufacturing in between them or efficient allocation of resources and processes (e.g. smart logistics, self-sufficient supply etc. using smart devices) supported by the concept of gasification to attract employees.

4. FUTURE RESEARCH DIRECTIONS

Every topic that has been discussed in this paper represents a possible research opportunity for the future. Nonetheless, we can narrow it down to these points:

- Strategies for business transformation regarding new technologies and shift on the labor market
- Engagement of governments in the educational process and the results of their actions
- The skillset of employees in the future for the i4.0

New behavioral models and case studies might be elaborated as the results of the possible research. These could serve as useful guides and resources for any i4.0 stakeholder to successfully navigate through the waters of the new digital era.

5. CONCLUSION

It is clear that the structural changes of the economy as a whole that i4.0 brings must be reflected on the business level. There is no one solution that would fit all the businesses, but some common takeaways can be spotted, such as not relying solely on technological tools as the bearers of the transformational effort or the call for an agile management of the transformation.

Automation, digitalization, and other features of the upcoming digital era will impact the labor market and business leaders must find a way how to manage the redeployment process smoothly. Government bodies are also one of the key stakeholders as they need to adapt existing educational frameworks to the needs of the future. Part of the responsibility also lays on the labor force which will have to adjust their skillset and, in some cases, accept new roles within the organization.

Social impacts, especially those of automation, remain one of the crucial non-business implications of the i4.0. Initiatives such as machine taxation, shorter workweeks, and universal basic income might be taken more seriously by the governments in the future (Brynjolfsson, E. 2014). Initial tests of these concepts are nervously awaited by the general public, though we already know that the first experiment with universal basic income in Finland ended without satisfying results.

A systematic approach toward driving the changes within the organization must be taken with the highest priority if the company wants to safely navigate through the transformational period. Incomplete implementation, investments into technology without a clear long-term strategic framework or chaotic organizational changes lacking a clear vision are some of the traps that lay along the way (Gates, D., & Bremicker, M. 2017).

All in all, companies are facing disruptive times with an unprecedented pace of change. The i4.0 is not only about job automation – it is about activities automation (Manyika, J., & Chui, M. 2017). Keeping this big picture in mind shall help the business leaders steer the transformational changes in their favor.

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KEY WORDS

Automation: Technique, or method that allows to carry out process in full without external human interaction, utilizing technical of software means.

Collaboration Platform: Category of business software allowing to interact in virtual space using ICT technologies.

Digitalization: Process of digitizing available inputs and utilizing their data value through integration with software solutions. Also, widely used as a term for integration of digital technologies to everyday life.

Key Performance Indicators (KPIs): Set of measurable values that demonstrates how effectively is a measured process carried out.

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Labor Redeployment: Process of placing employees to re-education initiatives and to new workplaces instead of displacement.

Organization Agility: The capability of the business to adapt and rapidly change if needed. The overall balance of flexibility and stability of business processes.

Robotics: Interdisciplinary engineering branch dealing with design, construction, operation, and use of robots.

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THE RELATIONSHIP BETWEEN AUDIT QUALITY AND EARNINGS MANAGEMENT: THE CASE OF LISTED CONSUMER GOODSFIRMS ON VIETNAM STOCK MARKET

Lua Thanh Nguyen - Tiep Thi Nguyen – Lam Thanh Nguyen

Abstract

Purpose: This research aims to provide the evidences about the relationship between audit quality and earnings management of listed companies in consumer goods group on Vietnam stock market.

Design/methodology/approach: The research sample consists of 35 listed companies in consumer goods group on Vietnam stock market from 2008 to 2016. In order to identify earnings management of these companies, the author used Modified Jones model 1995.

Findings: The regression results of this study suggest that there is a relationship between audit quality and earnings management of listed companies in consumer goods sector on Vietnam stock market, for instance, the prestige of audit companies has a relationship with earnings management. Besides, audit specialization is likely to limit eanings management.

Research/practical implications: There are several methods to measure the discretionary accruals of listed companies on the stock market in Vietnam. In the next study, we should use other models to identify the earnings management. Understand the characteristics of the consumer goods industry to have a more comprehensive view on the relationship between audit quality and earnings management of listed companies which specialize in consumer goods on the stock market of Vietnam. In addition, the future research should add more independent variables such as audit fees, years of experience of the auditors, etc., to better understand the impact of audit quality on earnings management

Originality/value: Empirical studies focusing on the relationship between audit quality and earnings management are still rare in a developing country like Vietnam. This study is one of the first studies to contribute such an issue in the case of Vietnam.

Keywords: Earnings management, Listed Company, Vietnam.

JEL Codes: M41, G34.

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INTRODUCTION

Under the condition of development of the economy as well as Vietnam stock market, the demand for financial information of listed companies is very essential to investors. In the past few years, although the financial statements of listed companies disclosed on stock market have been audited by the auditing firms, the concern is that the pre-audit and post-audit figure are different. Financial statements have material misstatements which might not be figured out by auditing. Besides, a profit gap up to hundreds of billions of dong between the financial statements before and after the audit is also a hot issue.

For investors, audited statements are used to evaluate the financial reporting quality. The development of the stock market has led to a large increase in investor participation in the market. Thus, auditing reports of public firms and listed firms get attention from a number of investors. Connie L. Becker et al. (1998) pointed out that there is a negative relationship between auditing quality and earnings management in the companies. Tran Thi Thu Thao (2014) found that the auditors' experience has contributed to the quality of audit, thereby providing the users with more reliable financial reporting information.

According to the latest statistics from General Office For Population Family Planning (Ministry of Health), as of 01/07/2016, the population has reached 91.7 million people, ranked No. 8 in Asia and No. 3 in Southeast Asia. General Statistics Office of Vietnam also said that the size of economy in 2017 at current prices reached VND 5,007.9 trillion, GDP per capita is approximately VND 53.5 million, equivalent to USD 2,385, increasing USD 170 compared to the year of 2016. With the increase in income per capita, Vietnamese market promises to be a new star in consumer goods field in Asia.

With the goal of providing more empirical evidence of the importance of auditing quality in business operations, this study examines the relationship between auditing quality and earnings management of listed companies in consumer goods group. In addition, this study will provide further evidence for these relationships in the context of developing countries such as Vietnam.

The remainder of this paper is organized as follow: Section 2 will present literature review. Database and research methodology will be mentioned in section 3. Section 4 will show the research results and discussions. Section 5 is the conclusion.

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LITERATURE REVIEW

Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to modify financial reports to either mislead stakeholders about the economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers. There is a number of prior studies on the relationship between auditing quality and earnings management of listed companies. Rusmin (2010) showed that the magnitude of earnings management is significantly lower amongst companies engaging a Big 4 specialist audit firm relative to companies using the audit services of a Non-Big 4 specialist. Mahdi Safari Gerayli et al. (2011) tested the assosiation between auditor independence and earnings management, indicating that the more auditing firms benefit from independence, the more the auditing quality increases, thus, firms which are audited by high quality auditors are more likely to have less earnings management.

Nhut M. N. (2016) provided empirical evidence on the relationship between audit opinions and earnings management, suggesting that audit opinions may warn the investors about the earnings management of management board of company. My N. V. L. (2017) proposed that prestige and specilization of audit companies have an impact on earnings management. In other words, prestige and specialization of audit companies have a negative relationship with eanings management. This also shows that the nature of audit firm plays the role in limiting the eanings management through the provision of credit risk.

HYPOTHESIS DEVELOPMENT

The prior studies stated that customers always have a demand for a certain lever of audit quality, depending on the level of harmony with benefit between managers and shareholders (Francis & Wilson, 1988; Defond, 1992). DeAngelo (1981) figured out that large audit firms have abilities to carry out the high-quality audit and reduce incentives to lower audit quality opportunistically; in order to ensure the quality of audit, large audit firms are always interested in enhancing the quality of auditors through education programs, training and career exchange forums.

Based on aforementioned discussion, the first hypothesis set up as follow:

H₁: There is a relationship between earnings management and audit firm's prestige.

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Inheriting the theory of earnings management through discretionary accrual of Becker et al. (1998), Krishnan (2003) examined whether audit quality influences the price of accrual. Krishnan (2003) found that the discretionary accruals of a company whose auditor is an industry specialist are lower than the discretionary accruals of a company whose auditor is not a specialist. Meletta & Wright (1996) stated that there is a potential in audit risks according to every different field such as manufacturer, trading or service. Audit firms which have high specialization will be more convenient in assessing and addressing these risks by using appropriate audit methods and procedures. A Wright & S Wright (1997) concluded that specialized audit firms are expected to have an impact on earnings management.

Based on aforementioned discussion, the second hypothesis set up as follow:

H₂: There is a relationship between earnings management and audit specialization.

Myers et al. (2003) suggested that increased auditor tenure leads to limitation of earning management, but increasing in financial reporting quality. Phuong H. L. (2013) showed that in Vietnam, auditor tenure and audit quality, measured by discretionary accruals, have a linear relationship (at least within the first 5 years). The longer auditor tenure will be result in the higher quality of audit, which means discretionary will be lower. Besides, the author also makes conclusion that there is no association between audit firm's tenure and auditing quality, in other words, tenure of auditing firms has no influence on earnings management.

Based on aforementioned discussion, the third hypothesis set up as follow:

H₃: There is a relationship between earnings management and auditor tenure.

METHODOLOGY

Earnings management

This research also employs model of Modified Jones (1995) to examine earnings management as follow:

First, we use a cash flow approach to estimate total accruals. This approach involves deducting the cash flow from operations obtained from statement of cash flows from the amount of net income (before extraordinary items) from the income statementas follow:

TA_{it} = Net income–Cash flow.

Where TA_{it}: Total accruals of firm i in year t

Second, the modified Jones model seeks to measure the total discretionary accruals using the following variables, as described by Kothari et al (2005):

$$\frac{NDA_{it}}{A_{it-1}} = \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{A_{it-1}}\right)(1)$$

Where:

NDA_{it}: Non-Discretionary Accruals for firm I in year t;

A_{it-1}: Total assets for firm i in year t-1;

ΔREV_{it}: Change in net revenues for firm i in year t;

ΔREC_{it}: Change in net receivables for firm i in year t;

PPE_{it}: Net property, plant and equipment scaled by assets;

Where, $\alpha_1, \alpha_2, \alpha_3$ are industry-specific coefficients estimated from ordinary least squares (OLS) for all firms in our sample at time t

$$\frac{TA_{it}}{A_{it-1}} = \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \varepsilon_i (2)$$

ε_i: The residuals from the regressions are used as proxy for discretionary earnings management.

Having estimated nondiscretionary accruals (NDA) form equation (1) above, the number of discretionary accruals (DA) for firm I for year t is calculated as the residual value from equation (3).

$$DA_{it} = TA_{it} - NDA_{it} (3)$$

Additionally, at the different point of time, managers have motives to inflate earnings (DA>0) or deflate earnings (DA<0) within the period, thus, DA value can be positive or negative depending on each company. Therefore, we have to use absolute value of DA as a dependent variable in regression equation to represent earnings management in research year.

Prestige of audit firms

According to previous research, quality and prestige of audit firms are divided into 2 groups: Big 4 and Non-Big 4. With regard to the actual situation in Vietnam, this paper classifies audit firms

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based on the criteria for assessment of the quality of audit enterprises according to the Vietnam Association of Certified Public Accountants as follow: revenue, number of customers, number of employees and number of practical auditors in every business. To be suitable in Vietnam circumstances, this paper classified audit firms into 2 groups:

Group 1 includes the enterprises with symbols: KPMG, E&Y, DEL, PwC, AASC, A&C, GTV, DTL, AISC, AFC VN, AAC, VAE, TDK, CPA HN, A.A, which meet these criteria:

Belong to Top 10 of audit firms with the first 4 criteria issued by VACPA;

Belong to Top 10 of leading audit firms in term of revenue issued by VACPA;

Belong to Top 10 of audit firms with at least one of the top four criteria outlined by VACPA;

Group 2: The rest of other audit firms.

Accordingly, the author proposes a method for measuring variable AUDSIZE: equalto 1 if listed company is audited by audit firms in group 1, equalto 0 if otherwise.

Audit specialization

Krishnan (2003) found that the discretionary accruals of a company whose auditor is an industry specialist are lower than the discretionary accruals of a company whose auditor is not a specialist. Meletta & Wright (1996) stated that there is a potential in audit risks according to every different field such as manufacturer, trading or service. Audit firms which have high specialization will be more convenient in assessing and addressing these risks by using appropriate audit methods and procedures.

Based on one of four measures of Wright (1997) including number of customers, number of audits in the industry, number of staff training hours in the auditing industry, and years of audit experience in the industry, the author choseto measure the number of customers to represent audit specialization variable. The reason for this is that there is no consistent way of measuring the specialization of audit firms, thus, to consider whether a company that specializes in consumer goods audits the company or not, the author based on the criteria of listed companies audited by the leading audit firm in term of number of customers. Ministry of Finance coordinating with the Vietnam Association of Certified Public Accountants (VACPA) conducted that ranking in 2012. Therefore, the author proposes a measurement methodology for audit specialization variable: equal to 1 when listed company is audited by 10 audit firms with the largest number of customers in 2012 including KPMG, E&Y, DEL, PwC, AASC, A & C, DTL, AAC, TDK, CPA HN, equal to 0

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if otherwise.

Auditor tenure

The long auditor tenure for the same business during a period of time will limit earnings management of managers and enhance the financial reporting quality (Myer et al., 2013; Phuong L. H, 2013)

In Vietnam, according to Law on Independent Audit (2011), the mandatory auditor rotation lasts 3 years. Nevertheless, as the report of VACPA (2012), there is a shortage of auditors working in small and medium-sized audit enterprises, thus, to comply auditor rotation time is difficult, which makes audit quality decrease.

As aforementioned discussion, the author suggests a method of measuring auditor rotation by counting the number of consecutive years that an auditor performs an independent audit for a company.

Control variables:

In addition to above independent variables, this research proposes some control variables about earnings management used in prior research (Verrecchia, 1983; Ali et al., 2008; Wuryani Eni, 2012) to ensure the relevance of research model.

Size of listed company

According to agency cost theory, large-sized company has a clear separation between management authorities and ownership. Besides, large-scale companies are under pressure from their target performance from shareholders and investors, therefore, these listed companies usually have earnings management to ensure investors' confidence.In addition, large-scale enterprises can easily be scrutinized by investors and managers compared to small-scale firms (Verrecchia, 1983). Some prior studies found that the larger the scale of company, the less earnings management implementation is (Ali et al., 2008; Wuryani Eni, 2012; Dwi Lusi Tyasing Swastika, 2013). The data of this variable is measured by the logarithm of the total asset reported on the company's financial statements.

Audit firm tenure

Managers always make attempts to find audit firms which provide the high security for shareholders on financial information. Shareholders would like the auditors to be capable of conducting audits in accordance with the requirements of the professional standards, detecting

material misstatements and providing appropriate advice on the business situation. Managers tend to change audit firms as soon as they receive unexpected audit opinions. They often create a good image of themselves as a good manager with the investments of the shareholders. Thus, disagreements occur when they are dissatisfied with the auditor, who gives unfavourable auditing opinion to discredit their shareholders. Last but not least, customers with signs of being in a crisis have the motivation to change their auditing business, seeking another auditor to maintain a manager's reputation.

The data of this variable is measured by counting the number of years in which an auditing firm performs audit work for a company.

DATA

The date used in this research was collected from companies in consumer goods group listed on Vietnam stock market in the period between 2008 and 2016. This research chose the data from 2008 because there is a scarce of data before this time. Information released on Vietnam stock market before this period is unstable and inadequate. This research also eliminated some observations which have revenue, total assets, or market capitalization less than or equal to 0, or lack of data. This study filtered out 35 firms of companies, corresponding to 315 observations in the period of 9 years, from 2008 to 2016.

This data was collected from information on the financial statements, annual reports and so on published on the website of HOSE, HNX and securities companies. From the regression results, the authors carried out analysis, evaluation and drew conclusions about the relationship audit quality and earnings management.

RESULTS AND DISCUSSIONS

This research use SPSS 22 software to determine descriptive statistics, correlation analysis and regression analysis to assess the relationship between audit quality and earnings management. Research model has one dependent variable (earnings management), 5 independent variables corresponding to three hypotheses and two control variables for the period between 2008 and 2016.

Tab. 1 - Descriptive Statistics.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Earnings management (DA)	315	0,0004	2,0010	0,1370	0,1771
Firm's prestige (AUDSIZE)	315	0	1	0,84	0,369
Audit specialization (SPEC)	315	0	1	0,67	0,471
Firm's size (SIZE)	315	4,7300	7,4700	5,7627	0,5314
Auditor tenure (APT)	309	1	3	1,45	0,661
Audit firm tenure (AFT)	315	1	11	4,08	2,702
Valid N (list wise)	309				

Sources: Author's calculation

Table 1 shows that the values of DA amongst companies in sample have a large difference. Specifically, the value of Min is 0,0004; Max value is 2,0010; Mean value is 0,1370 and standard deviation is 0,1771. The results show that total accruals of listed companies are very different. The difference between profit after tax and net cash flow from small business activities of listed companies shows that managers are likely to implement earnings management to lower profit. However, some listed companies reported very high profit in the period but net cash flow is significantly negative. Thus, it shows that the profit in the period of the enterprise does not originate from cash revenue (cash, bank deposits), but mainly originate from receivables (accrued basis), leading to total accrual (TA) of listed companies within the period is too high and value of discretionary accrual (DA) is also high (Max value is 2,0010 shows that DA is higher than 2,0010 times of revenue).

The dummy variable AUDSIZE has an average value of 0.84, indicating that most of listed companies in the sample choose audit firms that fit their requirements, achieve auditing objectives and meet the requirements for information disclosure on stock market without choosing Big4. It shows that domestic audit firms are still trusted by listed companies for their quality and reasonable costs. In contrast, it shows us another negative side of small and medium-sized audit companies, managers have the opportunity to negatively negotiate more about audit fees and to pressure auditors about the audit program, scope and audit procedures. Therefore, the managers will be easier to implement earnings management.

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The SPEC variable of 0,67 indicates that most managers focus on the selection of leading auditors in terms of number of clients.

The APT variable has a maximum value of 3 years, with an average of 1,45. As a result, listed companies changed their auditors at an average level in accordance with Decree 105/2004/ND-CP of the Government and Circular No. 64/2004/TT-BTC of the Ministry of Finance. Therefore, all audit firms must comply with regulations on rotation of auditors every 3 years. The second reason cannot be excluded from the subjective desire of managers which is to change the auditor and incumbent audit firm. As discussed above, managers have a certain power to change and appoint new auditors as well as change auditors. The motives of managers may stem from disagreements with the auditor or incumbent; or a conflict of interest between the manager and the auditor; or cost of audit.

AFT variable represents the audit firm's tenure. Similar results show APT variable (Min is 1 and Max is 11) with mean value of 4,08. Thus, it can be seen that firms often change incumbent auditors rather than changing audit firms. This problem can be explained by the cost of rotation and the audit companies also tend to retain customers while still complying with the provisions of Decree 105 and Circular 64 about auditor rotation.

Tab.2 - Audit quality and earnings management

	Stdd. Coeff (Beta)	t	Sig.	Collinearity Statistics	
				Tolerance	VIF
(Constant)		2,098	0,037		
AUDSIZE	0,191	2,627	0,009	0,596	1,679
SPEC	-0,212	-2,840	0,005	0,567	1,764
Size of listed company	-0,088	-1,471	0,142	0,880	1,136
APT	-0,052	-0,910	0,364	0,970	1,031
AFT	-0,009	-0,150	0,881	0,945	1,058
No. Observation:	315				
Adj- R^2 :	0.03				
a. Dependent Variable: HVĐCLN (DA)					
b. Auditor tenure (APT), Audit specialization (SPEC), Audit firm tenure (AFT), Size of listed company (SIZE), Prestige of audit firm (AUDSIZE)					

Sources: Author's calculation

Table 2 show regression results as follow:

Variable of firm's prestige (AUDSIZE), p-value is 0,009 less than significance level 10%, positively correlated with dependent variable |DA|, showing the relationship between firm's prestige (AUDSIZE) and DA, i.e. the change in AUDSIZE affects the change in the DA.shows the relationship between corporate credit variable Audits (AUDSIZE) and DA, i.e. the change in AUDSIZE affects the change in the DA. With a regression coefficient of 0,092, the firm's prestige in this sample positively correlates with earnings management. Listed companies always ask for a certain level of quality of audit, which depends on the size, business situation, strategy, vision of the managers. Customer's dissatisfaction with the audit service may lead to the changing ofaudit firms, which will also affect the audit firm's prestige.

Variable of audit specialization (SPEC) has significance level of 0,005 < 10%, indicating the relationship between audit specialization and earnings management. This is in line with the second hypothesis, as well as previous studies of Wright & Wright (1997), Baltham et al. (2003). In the research model, there is a negative correlation between the audit specialization and earnings management. This suggests that audit firms with a reputation and expertise (or high expertise) have a significant impact on limiting earnings management of listed companies.

The variables of SPEC, SIZE, APT, AFT have the positive correlations between each other, except for the negative correlation of AUDSIZE. However, except of AUDSIZE and SPEC, the other variables have no statisticalsignificance level.

Regression equation is written as follow: $DA_{it} = 0,485 + 0,092\ AUDSIZE_{it} - 0,080\ SPEC_{it}$

CONCLUSION

The purpose of the study was to determine the relationship between audit quality and earnings management as measured by discretionary accruals in listed companies on the Vietnamese stock exchanges on HOSE and HNX in the consumer goods sector from 2008 to 2016.

By looking at previous studies and theories related to earnings management, as well as how to measure the discretionary accruals. The author finds that the identification of earnings management is very sophisticated and complicated,thus, it is difficult for the investors to detect it. Therefore, it is necessary to have the support of calculation tools and especially the research on

earnings management. It will help investors identify what factors influence and pay special attention to these factors. Through estimation and verification, we find that most listed companies have earnings management.

The regression results of this study suggest that there is a relationship between audit quality and earnings management of listed companies in the consumer goods group on the stock market of Vietnam. For example, prestige of audit firms is related to earnings management. Next, the audit specialization has the capability to limit earnings management.

LIMITATION AND FURTHER RESEARCH

Firstly, the model for identifying earning management used in this study was Modified Jones model (1995), while there are different models for estimating earnings management. In further studies, earnings management should be verified by other models. Secondly, the study did not find the specific characteristics of the consumer goods sector related to audit quality and earnings management. The third is the limitations on data collection methods, which are based only on information and data on audit reports, audited financial statements and annual reports disclosed over the years.

From the above limitations, the authors propose the following research recommendations.

There are several methods to measure the discretionary accruals of listed companies on the stock market in Vietnam. In the next study, we should use other models to identify the earnings management. Understand the characteristics of the consumer goods industry to have a more comprehensive view on the relationship between audit quality and earnings management of listed companies which specialize in consumer goods on the stock market of Vietnam. In addition, the future research should add more independent variables such as audit fees, years of experience of the auditors, etc., to better understand the impact of audit quality on earnings management.

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THE RELATIONSHIP BETWEEN FINANCIAL REPORTING QUALITY AND FIXED ASSETS INVESTMENT EFFICENCY: EMPIRICAL OF THE LISTED PRODUCTION FIRMS IN VIETNAM

Vu Tien Pham - Thanh Dang Huynh – Truong Thi Thuy Dung

Abstract

The main purpose of this paper is considering the relationship between financial reporting quality and investment fixed assets efficiency of the production companies listed on HCMC stock market. Author conducted with 39 companies listed from 2008 to 2015 on HCMC stock market. In order to achieve this purpose, author used model that is to combine models to measuring information on financial reporting quality variance of Mc. Nichols (2002) & Francis (2005) which developed form Dechow & Dechew model (2002) and investment fixed assets efficiency variance by Mc. Nichols & Stubben model (2008). Beside, this model used adding the control variance to fit general model. The result showed that there are the positive correlation between information on financial reporting quality and investment fixed assets efficiency of the production companies listed on HCMC stock market. Addition, this research also discovery at the production companies, when big size and high leverage, investment fixed assets efficiency in those companies will be better. Otherwise, Tobin q ratio is lower, investment fixed assets efficiency are higher.

Keywords: Financial Reporting Quality, Investment Efficiency, Fixed Asset, Vietnam, Production firm.

JEL Codes: M41, G3, G341.

INTRODUCTION

Financial reporting has the important role on the stock market both the world and Vietnam. Based on considering the financial reporting, managers have made strategies for motivating to achieve the firm's goals, or investors will depend on them to analyze for investment decisions, or owners

will appreciate the performances and ability to return the capital and government organizations, relevant others. Therefore, the improving financial reporting quality is one of the subjects which recently concerned of the authors in the world for significantly reducing asymmetric information and making the transparent market. Specially, with the developing economy in Vietnam, the financial reporting on the Vietnam stock market give the important significance of providing truly and appropriated information to shareholders, investors and other governors.

A large body of literature shows that firms can reduce information asymmetries by enhancing financial reporting quality (Gomariz and Ballesta, 2014; Bushman and Smith, 2001, Healy and Palepu, 2001). On beside, the asset investment efficiency affects stronger to the performance and durable development of the firms. This criteria uses to evaluate ability and potential development of the firms in the future. So that, this criteria is very important by managers, investors, owners and relevant governors (Biddle and Hilary, 2006; Mc. Nichols and Stubben, 2008; Biddle et al., 2009; Chen et al., 2011; Gomariz and Ballesta, 2014). They suggests that reducing adverse selection and moral hazard and allowing managers to identify better investment opportunities, higher financial reporting quality increases investment efficiency.

"The declare financial reporting of the equitation state owned enterprises in year 2015 is the positive signal with the banks which are the firm's owners, this is advantage to improve credit ratings" as Moddy's said.

Since Chen et al., 2011 examine "boundary conditions" for the effect of financial reporting on investment efficiency, and find that financial reporting quality influences investment efficiency in private firms in emerging countries, we also expect to find this association in a sample of the production companies listed on HCMC stock market (Gomariz and Ballesta, 2014). As an extension of our research, we examine details whether the effect of information on financial reporting quality at year t is increasing or decreasing with level investment assets efficiency at year t. Regard to the investment assets efficiency at year t, author considers revenue at year t to affect investment assets year t.

We measure the investment fixed assets efficiency basing on model developing from Mc. Nichols and Stubben, 2008; and the information on financial reporting quality variance uses Mc. Nichols model, 2002 developed from Dechow and Dechew, 2002. Our findings also demonstrate how to limit for over-investment and under-investment.

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Our findings provide the general vision and orientation for the analysis, consideration of information on the financial reporting Vietnam listed production firms on the HCMC stock market to investors, managers, owners and other parties.

Our paper contributes to a growing body of literature providing empirical evidence of information on financial reporting quality roles in improving and managing investment fixed assets efficiency. This paper helps controlling managerial behavior and reducing information demand conflicts.

The remainder of the paper proceeds as follows: Section 2 is literature review and hypothesis, Section 3 describes in detail the research design with the models, measures of variables and the sample. Section 4 shows the result of model regression. Section 5 summaries conclusion and the limitation of this paper presents in Section 6.

LITERATURE REVEW AND HYPOTHESIS

Literature review

Recently, the financial reporting quality, transparence, declare information on the financial reporting and investment efficiency is studied very ardent and attracted many researchers both the world and Vietnam. Specially, after passed Sarbanes-Oxley 2002, the public firms have to declare information for internal control weakness on the financial reporting to protect investors, making transparent market. Therefore, there are many papers for this subjects to finding relationship, factors and resolving them to improving transparence, information declare, financial reporting quality and investment efficiency, with fixed asset investment efficiency will improve for making manager and investor's decisions.

G. Biddle et al., (2009) studied the relationship between financial reporting quality and investment efficiency at USA and Japan. Result showed that there are the negative (positive) relation between financial reporting quality and investment efficiency for establishing under-investment (over-investment) tendencies. So that, the financial reporting quality with higher helped increasing investment efficiency and reducing deviated ability compare to predicted investment.

FengChen (2011) examined the role of financial reporting quality in private firms for 79 emerging markets from year 2002 to 2005. FengChen found the relationship between financial reporting quality and investment efficiency will be increasing in banking financing and decreasing in incentives to minimize earning for tax purposes. Such a connection between tax-minimization

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incentives and the informational role of earnings has often been asserted in the literature. Compare with USA public firms to emerging markets, the firms from emerging markets less faced pressure with asking declare regulations and recording accounting book.

Addition, Mohammadi also investigates the link between the financial reporting quality and investment efficiency of 93 firms listed on stock Tehran from 2009 to 2012. This result is fit previous papers which there is the positive correlation between financial reporting quality and investment efficiency.

 The Gomariz & Ballesta's paper (2014) examined the role of financial reporting quality and debt maturity in investment efficiency by conducted with a sample Spanish listed companies during the period 1998-2008. Gomariz and Ballesta found financial reporting quality mitigated the over-investment problem. Likewise, lower debt maturity can improve investment efficiency, reducing both over-investment and under-investment problems. On Beside, financial reporting and debt maturity are mechanisms with some degree of situation in enhancing investment efficiency: firms with lower (higher) use of short-term debt, exhibit higher (lower) financial reporting quality effect on investment efficiency.

Hypothesis development

Based on the conflict between information demand, management and asymmetric for providing, using these information, transparency, quality and efficiency are very important problem. As papers of Gomariz and Ballesta (2014) or Tran Thi Thuy Linh and Mai Hoang Hanh (2015) provided general vision the relationship between financial reporting quality and investment efficiency. Authors also made many previous literatures in the word to prove this result.

FengChen et al.'s model (2010) aimed at the relationship between financial reporting quality and investment efficiency from emerging markets.

FengChen used Biddle et al.'s research (2009) and examined whether financial reporting quality of the private firms from emerging market mitigated over-investment and under-investment. Moreover, FengChen investigated that if financial reporting quality also reduced in-efficiency capital investment under less conducive conditions than those examined in period research.

Specially, this paper is interest in whether firms that more on bank financing have a stronger relation between financial reporting quality and investment efficiency than do other private firms in emerging economies.

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Base on the above argument, the following hypothesis is tested as followings.

H1: Production firms with higher financial reporting quality will present higher fixed assets investment efficiency.

RESEARCH DATA AND METHODOLOGY

There are many methods to measure for financial reporting quality variable and fixed assets investment efficiency variable which they have been used popular in previous papers, but which one of the model will affect to analyze this relationship listed of production firms on HCMC stock market. Following of FASB, IASB, ASB, AASB identified: financial reporting quality showed that financial reporting provides useful information and truly about real finance and performance of firm. Addition, as Gomariz and Ballesta (2014), investment efficiency is level of investment favorable fixed asset compare with revenue growth in financial year, or also known that is net increasing in tangible and intangible assets of firm i in year t based on sale growth, and mitigated over-investment and under-investment.

Fixed assets investment efficiency:

$$INV_{i,t} = a_0 + a_1 Rev_{i,t} + f_i$$

Including: $IVN_{i,t}$: net increasing fixed assets of firm i in year t.

$Rev_{i,t}$: revenue growth of firm i in year t.

Author used model to measure financial reporting quality by Mc. Nichols (2002) & Francis (2005) developed from Dechow & Dechew (2002) model and Mc. Nichols & Stubben (2008).

Financial reporting quality

Using the Mc. Nichols 2002 model developed from the model of Dechow and Dechew

Including: $WCA_{i,t} = a_0 + a_1 CFO_{i,t-1} + a_2 CFO_{i,t} + a_3 CFO_{i,t+1} + a_4 PPE_{i,t} + a_5 Sale_{i,t} + e_{i,t}$

$WCA_{i,t}$ is the accrual accounting variable (total current assets)

CFO is the change of operating cash flow

$Rev_{i,t}$ is the change of revenue

$PPE_{i,t}$ is property, machinery, equipment

Control variables

The size of the company is one of the important factors affecting the quality of financial information and efficiency of fixed assets investment. The higher size of the company leading to

the higher of financial reporting quality and investment efficiency. According to research by Tran Thi Thuy Linh and Mai Hoang Hanh (2015), the size of the company (measured by total revenue) is positively correlated to the investment efficiency of fixed assets.

$$Size = Ln \text{ (market value of the company)}$$

Gomariz & Ballesta (2014) indicated that the impact of financial performance on investment performance is stronger when the company has a low level of short-term debt. At the same time, the higher leverage, the lower return on investment. This is explained by the bonding relationship between the company and the creditor, while the company wants to invest more fixed assets in order to target production and take opportunity. Creditors conserve their capital so they consider investing more fixed assets, resulting in conflict between the parties.

$$Lev = \frac{\text{Total Debt}}{\text{Total Asset}}$$

Le Thi My Hanh (2014) showed that there is a positive impact between the profitability of financial information disclosure in companies listed on the Vietnamese stock market. In addition, profit margins are an important financial indicator for assessing the performance of an enterprise. This ratio indicates whether the business is operating effectively or not. This is one of the indicators that managers combine with other information to make short-term and long-term decisions, including fixed asset investment. In addition, this indicator also helps the manager adjust the profit according to the company's objectives, so it affects the quality of financial statements.

$$Pro = \frac{Profit\ after\ tax}{Net\ sales}$$

Whether the audited financial statement is quality or not depends on the quality of the auditor and the company. Often, the financial statements audited by Big4 are attracted by many Vietnamese investors in the context of transparency of financial information on the stock market in Vietnam.

If the financial statement is audited by Big4 is 1, otherwise 0.

Under the 2002 Saxons Oxley Act, the company is required to disclose information related to the weaknesses of the internal control system. Therefore, the investors have more information on the process of operation of the business when the internal control system monitoring this process? This provides an overview of the structure and effectiveness of the business.

If the company has internal control system *is 1, the opposite is 0.*

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Based on the timing of the establishment of previous studies, the topic choosing the time listing of companies to determine the relationship between listing time and investment efficiency of fixed assets.

From the IPO in Vietnam Stock market.

This variable shows the firm's valuation on the market. According to previous research by Gomariz & Ballesta (2014) and Tran Thi Thuy Linh & Mai Hoang Hanh (2015), there is a negative correlation between growth opportunity and efficiency of fixed assets investment.

$$TobinQ = \frac{\text{Equity market value } + \text{ book value of debt}}{\text{Book value of total assets}}$$

According to Gomariz & Ballesta (2014), financial strength is negatively correlated to the efficiency of fixed asset investment. Financial strength shows the ability of a business so the investors and executives evaluate the business's future.

Financial strength measured by formulas:

$$Z = 0.012X1 + 0.014X2 + 0.033X3 + 0.006X4 + 0.999X5$$

In it, X1 is the rotational capital / total asset

X2 is retained earnings / total assets

X3 is earnings before taxes and interest / total assets

X4 is the market value of the equity / book value of total assets

X5 is the turnover / total assets

According to Feng Cheng et al. (2010), tax incentives help businesses improve asset efficiency. Therefore, the research used the variable corporate income tax rate to assess correlations with fixed asset performance and control variable. This variable will use the tax rate applied by the Treasury Department.

Variables	Definition	Measure
Asset	The net increase in fixed assets / lag of total assets	
	Sales growth rate of year t-1 to t	
Rev	The absolute value of the remainder in the model	$Asset_{i,t} = a_0 + a_1 Rev_{i,t} + e_i$
Re1	multiplied by -1	
CFO	The change in cash flow works	
WCA	Total deductions	
PPE	Property, machinery, equipment	
Sale	Change in annual sales revenue	

Variables	Definition	Measure
Re2	The absolute value of the remainder in the model multiplied by -1	$WAC_{i,t}=a_0 + a_1CFO_{i,t-1} + a_2CFO_{i,t} + a_3CFO_{i,t+1} + a_4PPE_{i,t} + a_5Sale_{i,t} + e_{i,t}$
Stdebt	Short-term debt	$Stdebt = \dfrac{Short-term\ debt}{Total\ debt}$
Size	Market value of the company	Ln (Market value of the company)
Lev	Financial leverage	$Lev = \dfrac{Total\ debt}{Total\ asset}$
Pro	Profit margin	$Pro = \dfrac{Profit\ after\ tax}{Net\ revenue}$
TobinQ	Growth opportunities	$TobinQ = \dfrac{Equity\ market\ value\ +\ book\ value\ of\ debt}{Book\ value\ of\ total\ assets}$
Z	Financial strength	$Z = 0{,}012X_1 + 0{,}014X_2 + 0{,}033X_3 + 0{,}006X_4 + 0{,}999X_5$
AUD	Audit company	Big4 is 1, NonBig4 is 0
INT	Internal control systems	Have internal control system is 1, other is 0
Tax	Corporate income tax rate	Circular regulating
Age	Listed time of company	Year of data retrieval - Year of IPO

Sample

Data collected from audited financial statements, annual reports and management reports of the production companies listed on the stock market in Ho Chi Minh City. Next to, companies must disclouse sufficient information in the years 2008 to 2015. Through this, the study selected 39 companies eligible for research.

Research Methods

For the multivariate regression analysis to determine the factors influencing the quality of information on financial statements and efficiency of fixed assets investment, the reserach used STATA 12 to analyze the correlation between variables and regression models. Three Pooled OLS methods are using, (Robust) Fixed Effect and Random Effect. Based on the regression model by the three methods, the study will select the most suitable model for conducting the analysis.

Regression model

INVi, t = B0 + B1xFRQi, t + B2xCOVi, t + ei.

FRQi, t: Quality of financial statement in year t

INVI, t: Effective year t

COVi, t: Control variables of year t

Fig 3.1: The relationship between the quality of financial statements and efficiency of fixed assets investment

RESULTS AND DISCUSSIONS

Matrix correlation coefficient between variables

Correlation coefficient (r): linear relationship between independent variables and dependent variables in the model, values ranging from -1 to +1 and absolute values of r more higher the correlation between the variables more greater. According to Hoang Trong, if the absolute correlation coefficient> 0.5, the multi-collinear phenomenon will appear.

Based on the matrix results, the correlation coefficients between the variables are shown in Table 4.1 as follows:

Table 4.1: Correlation coefficient matrix between variables in the model

	re1	re2	STDEBT	Z	TOBINQ	SIZE	LEV	PRO	TAX	AGE
re1	1.0000									
re2	0.1960	1.0000								
STDEBT	0.1207	-0.0825	1.0000							
Z	-0.0524	-0.0254	0.4279	1.0000						
TOBINQ	-0.3757	-0.1034	-0.1552	-0.0547	1.0000					
SIZE	-0.1507	0.0137	-0.4336	-0.3465	0.5154	1.0000				
LEV	-0.0968	0.0045	-0.1947	0.0497	0.1559	-0.0109	1.0000			
PRO	-0.0034	0.0039	0.1086	0.0775	0.1528	-0.0491	-0.1047	1.0000		
TAX	-0.2653	0.0834	0.0111	0.0741	0.0108	-0.1485	0.0148	-0.0616	1.0000	
AGE	0.2895	0.0130	0.0612	-0.1857	-0.2161	0.0822	-0.3332	0.0419	-0.6462	1.0000

Source: STATA

The table shows that the majority of variables have a linear relationship and absolute correlation coefficient <0.5. Others, there are some variables with relatively values <0.2, indicating that the correlation between them is very weak such as the quality of financial statement information and efficiency of fixed asset investment with r = 0.196 or control variables are weak correlated with the quality of financial information and efficiency of fixed asset investment. Time listing variable and tax rates with high correlation coefficient > 0.5 but <0.8, research still uses these two variables in the model as control variables to analysis relationship.

Analysis of multivariate regression model

The study used 3 models to analyze the relationship between the quality of financial information and the efficiency of fixed asset investment. In addition, the study will examine the relationship between asset efficiency and control variables.

 Specifically, the following three models:

> Pooled OLS model,
>
> Fixed Effect Model (FEM)
>
> Random Effect Model (REM)
>
> Robust Fixed Effect (if needed).

The Robust Fixed Effect model is an addition to the Fixed Effect model, in which the Fixed Effect model has variations in variance and is not an optimal model.

Table 4.2: Pooled OLS model results

Source	SS	df	MS			
Model	1.3316e-11	11	1.2106e-12			
Residual	3.5777e-11	300	1.1926e-13			
Total	4.9093e-11	311	1.5785e-13			

Number of obs = 312
$F(11, 300) = 10.15$
Prob > F = 0.0000
R-squared = 0.2712
Adj R-squared = 0.2445
Root MSE = 3.5e-07

re1	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
re2	5.75e-07	1.46e-07	3.95	0.000	2.88e-07	8.62e-07
STDEBT	2.15e-07	9.26e-08	2.32	0.021	3.26e-08	3.97e-07
Z	-4.09e-08	2.99e-08	-1.37	0.172	-9.98e-08	1.79e-08
TOBINQ	-4.51e-07	8.02e-08	-5.62	0.000	-6.09e-07	-2.93e-07
SIZE	2.80e-08	2.19e-08	1.28	0.202	-1.50e-08	7.10e-08
LEV	2.20e-08	1.08e-07	0.20	0.839	-1.91e-07	2.35e-07
PRO	6.45e-09	2.75e-08	0.23	0.814	-4.76e-08	6.05e-08
INT	-7.62e-08	4.67e-08	-1.63	0.104	-1.68e-07	1.57e-08
AUD	-7.71e-08	5.47e-08	-1.41	0.159	-1.85e-07	3.05e-08
TAX	-5.69e-06	1.53e-06	-3.73	0.000	-8.70e-06	-2.69e-06
AGE	4.00e-09	9.79e-09	0.41	0.683	-1.53e-08	2.33e-08
_cons	7.74e-07	7.46e-07	1.04	0.300	-6.94e-07	2.24e-06

Source: STATA

Basing on the regression results using the Pooled OLS model, the quality of financial information and efficiency of fixed asset investment were positively correlated with p-value = 0.000 <10% and positive coefficient (5.75x10-7). Therefore, the higher the quality of financial information and investment efficiency, the higher the investment efficiency of the asset. On beside, the results show that variables such as debt term have a positive correlation with fixed asset efficiency (beta = 2.15x10-7) when p-value = 0.021 <10% and the opportunities investment, taxes have a negative correlation with fixed asset performance with p-values of 0.000 <10% and beta of -4.09x10-8 and -5.69x10-6. This proves that the debt term improves the effectiveness of fixed asset investment, it is in line with research by Tran Thi Thuy Linh and Mai Hoang Hanh (2015) and Gomariz & Ballesta (2014).

In addition, the lower the tax rate, the more likely that the firm will have the opportunity to increase its investment in fixed assets to increase fixed asset investment efficiency (this is different from that of Tran Thi Thuy Linh and Mai Hoang Hanh in 2015). Investment reversal with efficiency of fixed asset investment (this is justified by research by Gomariz and Ballesta (2014).

Table 4.3: Fixed Effect model result

```
Fixed-effects (within) regression          Number of obs      =        312
Group variable: ct                         Number of groups   =         39

R-sq:  within  = 0.3530                     Obs per group: min =          8
       between = 0.0945                                    avg =        8.0
       overall = 0.0238                                    max =          8

                                            F(11,262)          =      12.99
corr(u_i, Xb)  = -0.8087                    Prob > F           =     0.0000

        re1 |      Coef.    Std. Err.       t     P>|t|     [95% Conf. Interval]
------------+----------------------------------------------------------------
        re2 |   4.79e-07    1.51e-07      3.17    0.002     1.81e-07    7.77e-07
      STDEBT |   2.03e-07    1.71e-07      1.19    0.236    -1.34e-07    5.39e-07
           z |  -1.28e-07    5.87e-08     -2.17    0.031    -2.43e-07   -1.19e-08
      TOBINQ |  -8.18e-07    1.08e-07     -7.55    0.000    -1.03e-06   -6.05e-07
        SIZE |   2.94e-07    5.20e-08      5.65    0.000     1.91e-07    3.96e-07
         LEV |   7.18e-07    2.06e-07      3.49    0.001     3.12e-07    1.12e-06
         PRO |   2.16e-08    2.83e-08      0.76    0.446    -3.42e-08    7.74e-08
         INT |  -9.46e-08    1.14e-07     -0.83    0.409    -3.20e-07    1.31e-07
         AUD |  -2.26e-08    8.78e-08     -0.26    0.798    -1.95e-07    1.50e-07
         TAX |  -3.90e-06    2.24e-06     -0.17    0.862    -4.80e-06    4.02e-06
         AGE |   1.67e-08    1.78e-08      0.94    0.350    -1.83e-08    5.17e-08
       _cons |  -7.72e-06    1.62e-06     -4.77    0.000    -.0000109   -4.54e-06
------------+----------------------------------------------------------------
     sigma_u |   4.571e-07
     sigma_e |   3.147e-07
         rho |   .67848658    (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:       F(38, 262) =      2.62              Prob > F = 0.0000
```

Source: STATA

Based on the results of the Fixed-effect model, the research found that the quality of financial report information positively correlated with efficiency of fixed asset investment with p-value =

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0.002 $<10\%$ and beta is $4.79 \times 10^{-7} > 0$. Fixed-Effect model with p-value (Prob> F) = 0.0000 $<10\%$, indicating that the Fixed Effect model is better than the Pooled OLS model.

Table 4.4: Results of the Random Effect regression model

```
Random-effects GLS regression                  Number of obs      =       312
Group variable: ct                              Number of groups   =        39

R-sq:  within  = 0.2696                         Obs per group: min =         8
       between = 0.2840                                         avg =       8.0
       overall = 0.2669                                         max =         8

                                                Wald chi2(11)      =    109.49
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000

        re1 |     Coef.    Std. Err.      z     P>|z|     [95% Conf. Interval]
------------+----------------------------------------------------------------
        re2 |   5.69e-07    1.47e-07    3.88    0.000     2.82e-07    8.56e-07
     STDEBT |   2.59e-07    1.07e-07    2.43    0.015     4.97e-08    4.68e-07
          z |  -4.89e-08    3.49e-08   -1.40    0.161    -1.17e-07    1.95e-08
     TOBINQ |  -4.96e-07    8.51e-08   -5.83    0.000    -6.63e-07   -3.29e-07
       SIZE |   4.62e-08    2.50e-08    1.85    0.064    -2.76e-09    9.52e-08
        LEV |   1.34e-07    1.25e-07    1.07    0.283    -1.10e-07    3.78e-07
        PRO |   1.23e-08    2.75e-08    0.45    0.655    -4.17e-08    6.63e-08
        INT |  -8.63e-08    5.58e-08   -1.55    0.122    -1.96e-07    2.31e-08
        AUD |  -8.53e-08    6.12e-08   -1.39    0.163    -2.05e-07    3.46e-08
        TAX |  -5.04e-06    1.61e-06   -3.14    0.002    -8.19e-06   -1.89e-06
        AGE |   8.04e-09    1.11e-08    0.72    0.470    -1.38e-08    2.99e-08
      _cons |   6.28e-08    8.41e-07    0.07    0.940    -1.58e-06    1.71e-06
------------+----------------------------------------------------------------
    sigma_u |   9.364e-08
    sigma_e |   3.147e-07
        rho |   .08134629   (fraction of variance due to u_i)
```

Source: STATA

Based on Hausman's test results, p-value (Prob > chi2) = 0.0000 $<10\%$ means that the Fixed Effect model is more suitable than the Random Effect model.

Table 4.5: Hausman test results

```
                 ———— Coefficients ————
                   (b)          (B)           (b-B)      sqrt(diag(V_b-V_B))
                  mhfe          re          Difference          S.E.
------------+----------------------------------------------------------------
        re2 |   4.79e-07     5.69e-07       -9.01e-08          3.77e-08
     STDEBT |   2.03e-07     2.59e-07       -5.61e-08          1.33e-07
          z |  -1.28e-07    -4.89e-08       -7.86e-08          4.72e-08
     TOBINQ |  -8.18e-07    -4.96e-07       -3.22e-07          6.71e-08
       SIZE |   2.94e-07     4.62e-08        2.47e-07          4.56e-08
        LEV |   7.18e-07     1.34e-07        5.84e-07          1.64e-07
        PRO |   2.16e-08     1.23e-08        9.33e-09          6.64e-09
        INT |  -9.46e-08    -8.63e-08       -8.31e-09          9.98e-08
        AUD |  -2.26e-08    -8.53e-08        6.28e-08          6.30e-08
        TAX |  -3.90e-07    -5.04e-06        4.65e-06          1.56e-06
        AGE |   1.67e-08     8.04e-09        8.62e-09          1.39e-08

                     b = consistent under Ho and Ha; obtained from xtreg
          B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

               chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =        51.06
            Prob>chi2 =        0.0000
            (V_b-V_B is not positive definite)
```

Source: STATA

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Through the regression results of 3 models show that the Fixed Effect model is most suitable for research. The research will continue to test the multi-collinear phenomenon, self-correlation to find the optimal results.

After completing the verification with 3 models and testing the multi-collinear phenomenon, the research found that the Fixed Effect model was not yet the optimal model. To resolve the variation of the Fixed Effect model, the study uses the Robust Fixed Effect model. This model is shown in the table below:

Table 4.6: Results of the Robust Fixed Effect model

```
Fixed-effects (within) regression        Number of obs      =       312
Group variable: ct                       Number of groups   =        39

R-sq:  within  = 0.3530                  Obs per group: min =         8
       between = 0.0945                                 avg =       8.0
       overall = 0.0238                                 max =         8

                                         F(11,38)           =      7.00
corr(u_i, Xb)  = -0.8087                 Prob > F           =    0.0000

                      (Std. Err. adjusted for 39 clusters in ct)
```

re1	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
re2	4.79e-07	2.78e-07	1.72	0.093	-8.44e-08	1.04e-06
STDEBT	2.03e-07	3.65e-07	0.55	0.582	-5.37e-07	9.42e-07
Z	-1.28e-07	9.78e-08	-1.30	0.200	-3.25e-07	7.04e-08
TOBINQ	-8.18e-07	3.01e-07	-2.72	0.010	-1.43e-06	-2.09e-07
SIZE	2.94e-07	1.69e-07	1.74	0.090	-4.75e-08	6.35e-07
LEV	7.18e-07	2.56e-07	2.80	0.008	1.99e-07	1.24e-06
PRO	2.16e-08	2.66e-08	0.81	0.421	-3.23e-08	7.56e-08
INT	-9.46e-08	1.07e-07	-0.88	0.384	-3.12e-07	1.23e-07
AUD	-2.26e-08	1.14e-07	-0.20	0.845	-2.54e-07	2.09e-07
TAX	-3.90e-07	1.62e-06	-0.24	0.811	-3.67e-06	2.89e-06
AGE	1.67e-08	1.57e-08	1.06	0.296	-1.51e-08	4.85e-08
_cons	-7.72e-06	4.70e-06	-1.64	0.109	-.0000172	1.80e-06
sigma_u	4.571e-07					
sigma_e	3.147e-07					
rho	.67848658	(fraction of variance due to u_i)				

Source: STATA

Based on the results of the Robust Fixed Effect model, the research found that the quality of financial information was positively correlated with the efficiency of fixed asset investment (10%). As a result, the four models using show the quality of information on financial statements have a positive relationship with the effect of fixed asset investment, it means the higher the quality of financial information, the greater the investment efficiency of fixed assets. On beside, the size of

the company, financial leverage has a positive correlation with the effect of fixed asset investment, while the investment opportunity has a negative correlation of 10%, the other variables in the model were not statistically significant.

Table 4.7 Summarizes the results of four models

Variable (Re1)	Pooled OLS	Fixed Effect	Random Effect	Robust Fixed Effect	Means
Re2	*0.000*	*0.002*	*0.000*	*0.093*	*0.1*
Stdebt	*0.021*	0.236	*0.015*	0.582	None
Z	0.172	*0.031*	0.161	0.200	None
TobinQ	*0.000*	*0.000*	*0.000*	*0.010*	*0.01*
Size	0.202	*0.000*	*0.064*	*0.090*	*0.1*
Lev	0.839	*0.001*	0.283	*0.080*	*0.1*
Pro	0.814	0.446	0.655	0.421	None
Int	0.104	0.409	0.122	0.384	None
Aud	0.159	0.798	0.162	0.845	None
Tax	*0.000*	0.862	*0.002*	0.811	None
Age	0.683	0.350	0.470	0.296	None

CONCLUSION

The analysis of the regression results from Stata included analysis of descriptive variables, analysis of correlations between variables, modeled regression based on Pooled OLS, Fixed Effect, Random Effect and Robust Fixed Effect. Based on the regression results, the research conducted analyzes the results and found the relationship between the quality of financial statement information and the efficiency of fixed asset investment in manufacturing companies listed on the stock market. This proves the fact that the higher the quality of information on the financial statements, the higher the investment efficiency of the asset and vice versa.

This result is also consist with previous research by Feng Cheng et al. (2010) in emerging markets, Gomariz & Ballesta (2014) in Spain and Tran Thi Thuy Linh and Mai Hoang Hanh (2015) in the stock market of Vietnam. In addition, the research also found that in the manufacturing companies, the higher the scale and financial leverage, the higher the investment efficiency of the asset, and

the lower in investment opportunity, the higher in investment efficiency of the asset. Therefore, using relationships between the quality of financial reports, company size, leverage and investment opportunities with fixed asset performance should be considered and combined with the other factors.

LIMITATION AND FURTHER RESEARCH

Research sample in the research is not much, only 39 companies listed on the HCM stock market in the period from 2008 to 2015. Next, the variables in the research model are not optimal. After analyzing the three Pooled OLS regression models, Fixed Effect, Random Effect, and Robust Fixed Effect models, they only resolved the variance of variance.

The R-square of the model is 0.353 it means the variables only explain 35.3% for the dependent variable, there are still 64.7% other factors not explained by this model. The research focused on financial factors, but not on the non-financial factors, and the model used to analyze the quality of financial information is based on Mc. Nichols (2002) model and Kothari et al. (2005) developed from the Dechow & Dechew (2002) model, but have not yet used the other authors' model of financial reporting.

In Vietnam, there is no specific and comprehensive guidance on how to measure the effect of asset investment and the quality of information on financial statements. At present, the study only applies to the model of the world and may not be suitable with the situation in Vietnam, the reason is that Vietnamese accounting standards still have many differences compared to accounting standards International and IFRS interpretation.

This is also a narrow that the following research to improve, about the model and the theorem in analyzing the correlation between the quality of financial information and investment efficiency in combination with other control variables.

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THE STUDY OF FACTORS AFFECTING THE TIMELINESS OF FINANCIAL REPORTS: EVIDENCE FROM LISTED BUILDING MATERIALS COMPANIES IN VIETNAM

Ngan Le Vu Thanh - Tam Huynh Luu Thanh

Abstract: This research aimed to investigate the impact of selected factors on the timeliness of financial reports among 66 building materials companies listed in Vietnam for a five-year period from 2013 to 2017. And, the timeliness of the financial reports was measured by audit report lag (ARL). The result of a multiple regression analysis indicates that the determinants such as board independence, board experience, profitability had positive effects on the timeliness of financial reports. In contrast, the factors including the type of financial reports, duality of CEO, foreign ownership and leverage were negatively related to the timeliness of financial reports. Furthermore, the findings showed that there were no relationships between board size, board diligence, company size and the ARL. Thus, the study suggested some recommendations with the aim of enhancing the timeliness of financial reports published by building materials companies on the stock exchange.

Purpose: This study investigated what factors and affecting level of them on the timeliness of financial reports of building materials companies listed on the Vietnam stock exchange.

Design/methodology/approach: Quantitative method was conducted on secondary data collected from 66 building materials companies listed for an interval from 2013 to 2017. The data, then, was handled and analyzed by multiple regression with OLS model, FEM and REM through software Stata edition 13

Findings: The result revealed that the determinants such as board independence; board experience; profitability had positive effects, whereas the type of financial reports; duality of CEO; foreign ownership and leverage were negatively related to the timeliness of financial reports. Furthermore, the findings showed that there were no relationships between board size; board diligence; company size and the ARL.

Research/practical implications: The paper identified what factors had the relationship with the the timeliness of financial reports of building materials companies listed in Vietnam.

Originality/value: This research had broaden the knowledge on financial information quality at general, the timeliness of financial reports in particularly.

Keywords: Timeliness of financial reports, audit report lag, financial information quality

JEL Codes: M41, M42, G14

INTRODUCTION

In the context of market economy, the important objective of the financial reports is to provide the quality information for users to make their decisions. That objective would be accomplished when financial reports available on time for users. Therefore, the timeliness becomes one of the most important qualitative characteristics of financial reports. The affecting of factors on the timeliness of financial reports was a topic that has been studied around the world such as Dyer and McHugh (1975), Ashton *et al* (1987), Carslaw and Kaplan (1991), Owusu-Ansah (2000), Abdullah (2006), Abdelsalam and Street (2007), El-Masry (2008), Afify (2009), Al Daoud *et al* (2015), Hashim (2017), … Arcording to Owosu-Ansah (2000), the timeliness of financial reports was a significant mechanism to minimize insider trading, leaks and rumors among emerging capital markets. Providing the annual reports in a timely manner was not only a matter of satisfying the legal requirements, it was a matter of responsibility (Abdullah, 2006). Improving the timeliness of the financial reports would reduce the information asymmetry and then help the investors to make decisions effectively. Ashton *et al* (1987) have indicated that the success to submit financial reports on time would provide greater benefits to the company.

In Vietnam, the building materials industry has been enjoying rapid growth in recent years. However, for the years upcoming, this industry will face a number of challenges rooted in several internal and external factors such as lack of technological innovation, most companies were either small or midsize, the rising cost of raw materials, the challenging from foreign competitors, …Facing that difficult situation requires the building materials companies in Vietnam should take more efforts to take chances from the investors, and publishing financial reports on time was one

of the most the important thing. Because the timelier quality financial information comes to the investors, the more chances and advantages comes to the company.

There have been a lot of researches about the timeliness of financial reports conducted in Vietnam in recent years. However, there were some gaps of previous studies such as small study sample size, sample data for study collected from short period, companies in sample data selected randomly, not using much non-financial variables, not concerning on typical business industry, just only testifying the differences without regression estimations, …Aware of the importance of the timeliness of the financial reports, the development of the building materials industry and the limitations of previous studies, the authors aimed to identify factors affecting the timeliness of financial reports of the listed building materials companies in Vietnam and suggested some recommendations to improve the timeliness of financial reports of businesses.

LITERATURE REVIEW

Theoretical Framework

The agency theory was developed by Jensen and Meckling (1976), based on the relationship between the principal and the agent. The principal and the agent are engaged in cooperative behavior, but have different goals and attitudes towards risk, there was a benefit conflict (agency problem) between them. The theory further assumes that principals because of information asymmetry cannot adequately observe actions that agents were taking in their benefit (Barac and Klepo, 2006). The most important basis of agency theory was that the managers were usually motivated by their own personal gains and work to exploit their own personal interests rather than considering shareholders' interests and maximizing value.

The concept of asymmetric information was first introduced in 1970 by George Akerlof. Information asymmetry occurs when some economic agents have more information than others. As a consequence, uninformed investors negotiate with informed investors, generating problems related to adverse selection (Akerlof, 1970) and/or moral hazard (Jensen and Meckling,1976). In the context of market economy, information asymmetry also occurs when the investors have less information than the company so that the company could postpone the timeliness of quality information to the investors when there is disadvantage for them. In corporate governance, there was an information asymmetry between the manager and the owner where the manager has more

information about the company than the owners and other stakeholders. Information asymmetry can be anticipated by the disclosure of information more qualified. Therefore, the manager was obliged to provide signal information regarding the condition of the company to the owner.

The signaling theory deals with the issue of information asymmetry problems (Akerlof, 1970), which shows how information asymmetric problems can be reduced by the parties with more pieces of information signaling it to others. According to signaling theory, managers who expect a high level of future growth signal that to investors. Managers of firms with neutral news also have an incentive to report positive news, and they were not suspected of having poor results as well as not to report bad news when firms had poor performance (Cotter, 2011).

The Concept of Timeliness

According to the FASB (2010), timeliness means having information available to decision makers in time to be capable of influencing their decisions. Audited financial reports were the main official and reliable information source for investors. The timelier audited financial reports were announced, the more usefulness of the information to the users and less asymmetric information, therefore, it helps investors to make decisions timely and effectively. However, there was always a gap exists between the end of the financial year and the audited financial reports publication. Several studies have criticized audit report lag as being responsible for the delay of financial reporting and lead to lower quality of financial reports (Al-Ajmi, 2008; Leventis et al., 2005; Afify, 2009; Mohamad-Nor, Shafie & Wan-Hussin, 2010). Hence, in this study, the timeliness was defined as audit report lag (ARL), measured by the period of days it took for the auditor to sign the report after the financial year-end.

Futher, Carslaw và Kaplan (1991) investigated the timeliness in New Zealand for the period 1997-1998, the findings showed that company size and sign of income negatively related with the audit delay. Owusu-Ansah (2000)' research in Zimbabwe for the year 1994, the analysis indicated that company size, profitability and company age were significantly associated with the timeliness. Abdullah (2006) argued that the factors such as board independence, duality of CEO, leverage and profitability affected on the audit delay. In 2015, Al Daoud et al argued that the board independence, CEO duality, board meeting effecting on the timeliness of the financial reports in the positive way. The study of Hashim (2017) among 288 companies listed in Malaysia for period 2007-2009 documented that ownership structure have significant relationship with the audit report

lag, however, there was no relation between foreign ownership and the timeliness of the financial reports.

RESEARCH METHODOLOGY

Hypothesis Development

Board size was one of the characteristics of corporate governance and the appropriate size would help the board to extend their role and function in governing the company. According to agency theory, larger boards were positively related with quality financial reporting. Peasnell et al (2005) argued that board size effected on the quality of financial reports in positive way. Xie et al (2003) indicated that larger boards would provide more expertise, experience and independent directors to increase the boards monitoring capacity. On the contrary, Al Daoud et al (2015), Ahmed and Che-Ahmad (2016) revealed that there was a negative related between board size and the timeliness of financial reports. Consequently, this study proposes the following hypothesis:

H1: The board size was associated positively with the timeliness of financial reports

Arcording to Abdelsalam & Street (2008), CEO duality occurs when the CEO also plays the role of the chairman of the board of directors. Haniffa and Cooke (2002) stated that based on the agency theory, the two roles should be separated as two positions with different responsibilities to increase the corporate governance. Jensen (1993) advocated the separation of the positions of the CEO and chairperson to avoid conflicts of interests. There were lots of study about the effect of CEO duality to the timeliness of financial reports in the world. Afify (2009), found a positive association between CEO duality and audit report lag, which means the company without CEO duality would published their financial reports timelier than the others. Al Daoud et al (2015) revealed similar results. Thus, based on the above findings, the second hypothesis was as follows:

H2: The CEO duality was associated negatively with the timeliness of financial reports

Evidences from previous researches have supported for the link between the board independence and the timeliness of the financial reports. The board independence measured based on the proportion of non-executive directors to the total directors (Abdelsalam & Street, 2007). Abdullah (2006) study in Malaysia showed that board independence was associated with timelier reporting. Abdelsalam and El-Masry (2008), Al Daoud et al (2015) also showed that board independence related positively to the timeliness of financial reports. Therefore, we posit:

H3: The board independence was associated positively with the timeliness of financial reports

Carcello, et al. (2002) and Latendr, (2004) argued that the frequency of board meetings was related with the effectiveness of a board. Because when the board members meet together more often, they could discuss and make solutions for various issues that the company was facing. Hashim and Rahman (2010) revealed that frequency of board meetings would facilitate reliance of auditors on a firm's strong internal controls and thus decreased the audit report lag. Thus, we hypothesized that:

H4: The board meeting was associated positively with the timeliness of financial reports

Executives with different age show variety in the risk tendency and behaviors, which affects firm strategy and performance (Xiong, 2016). Arcording to Hambrick and Mason (1984), Prendergast (1996), an older Chairman tends to choose conservative strategy and becomes risk-averse tendency. Meanwhile, the older Chairman has lower passion and involvement to work, and was willing to live a peace condition. Furthermore, the older Chairman has higher reputation and experience compared with younger, so that they would take more attention to risk management and promotes the control activity in effective way. Abdelsalam and Street (2007) document that there was a significant relationship between board experience, age and length of service by executive directors on financial reporting timeliness. Therefore, we propose the following hypothesis:

H5: The board experience was associated positively with the timeliness of financial reports

Haniffa and Cooke (2002) stated that companies with the higher proportion of foreign ownership would disclose more information in the financial reports. The ownership type also plays an important role in financial disclosures and timeliness (Sepasi, Kazempour, & Mansourlakoraj, 2016). However, Hashim (2017) documented that there was no association between foreign ownership with audit report lag. The hypothesis was as below:

H6: The proportion of foreign ownership was associated positively with the timeliness of
financial reports.

Profit was a variable to be considered in many previous studies. Carslaw and Kaplan (1991) indicated that the sign of income effected on the timeliness of financial reports. Therefore, if the companies have bad information such as loss in profit, they would delay the publication of the financial statements Afify (2009). Earnings per Share (EPS) was generally considered one of the

most important factors to determine firm value. Santhosh et al (2013) stated that dividend policy could affect the investment decision of a firm. Thus, investors were likely to fund firms with higher EPS because investors expect consistent returns from their investment. Hence, companies with higher EPS will published their financial reports as soon as possible to take chances from investors. The research of Ziyad Mustafa M. AL- Shwiyat (2013) also stated that EPS effected on the timeliness of financial reports. Thus, we hypothesize that:

H7: The profitability was associated positively with the timeliness of financial reports

Agency theory argues that large companies have more information asymmetry and higher agency cost. Carslaw and Kaplan (1991) revealed in their study that company size significantly affected audit delay across the two years 1987 and 1988. Have a similar result, the two studies of Ahmed and Che-Ahmad (2016), Hashim (2017) both stated that there was a positive relationship between the company size and the timeliness of the financial reports. Therefore, this study developed hypothesis:

H8: The company size was associated positively with the timeliness of financial reports

Research of Owusu-Ansah (2000) as well as Ahmed and Hossain (2010) suggests that there was a negative relationship between financial leverage and the timeliness. Because the high leverage means that the company was poor performance and was facing ability to be bankrupt so that the auditors usually take more time on their audit work, and then make the audit report lag to be longer. Therefore, the hypothesis was constructed as follows:

H9: The leverage was associated negatively with the timeliness of financial reports

The results of Ashton et al (1989) showed that the explicitly of activity and the quality of internal control Aktas and Kargin (2011) said that the complexity of financial reports also affected timeliness of financial reports. It means that the companies which set up consolidated financial reports usually published their financial reports later than other companies. Therefore, the last hypothesis was developed as below:

H10: The type of annual financial reports was associated negatively with the timeliness of financial reports.

Research Model

Based on the research overview and the hypotheses, a regression model was designed to investigate the influence of the selected factors on the timeliness of financial reporting of the companies in the sample as follows:

$$ARL = \beta_1 * BOARDSZ + \beta_2 * DUAL + \beta_3 * IND + \beta_4 * MEET + \beta_5 * EXP + \beta_6 * FOREIGN + \beta_7 * PROFIT + \beta_8 * SIZE + \beta_9 * LEV + \beta_{10} * REPORT$$

This study has three types of variables, namely dependent variable (ARL), independent variable and control variables. Summary of all variables were presented in Table 1.

Tab. 1 – Variables Measurement

Variable		Definition	Measurement	Dimension effect
Dependent	**ARL**	Audit report lag	the number of days between the end of the fiscal year of the company to the day the audit report signed.	
Independent	**BOARDSZ**	Size of the board	The total number of directors on the board at the year-end.	+
	DUAL	Duality of CEO	DUAL = '1' if CEO was the chairman and '0' otherwise	-
	IND	Boards independence	Non-executive directors on the board divided by the total number of directors on the board at the year-end.	+
Independent	**MEET**	Board meeting	Number of board meeting for the financial year	+
	EXP	Board expertise	The age of the Chairman of the board	+
	FOREIGN	Foreign Ownership	Percentage of shares owned by foreign shareholders to total number of shares issued	+
Control	**PROFIT**	Profitability	Earning per share taken from year-end financial reporting of the company.	+
	SIZE	Company Size	Natural log of year-end total assets	+

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	LEV	Leverage	The ratio of debt/equity	-
	REPORT	Consolidated financial statement	Consolidated Financial Statements value 1 and value 0 otherwise	-

Source: Owns' summary

Research Data and Methods

The data used in this study were collected from the annual audited financial reports and annual reports of 66 building materials companies listed on the Ho Chi Minh Stock Exchange and the Ha Noi Stock Exchange for five-year period from 2013 to 2017. Only companies which disclosed fully from 2013 to 2017 were chosen. Those reports were available on the website of the company and on websites such as ssc.gov.vn, fpts.com.vn and finance.vietstock.vn. Therefore, the total observation for this study was 330.

The research data were aggregated in the form of tables (panel data). A multiple regression analysis method was used to test the hypotheses, including OLS, FEM and REM through software Stata edition 13, to ensure reliability for quantitative research results.

RESULTS AND DISCUSSIONS

Summary Statistics

The statistical data in table 2 below shows that the medium time of the audit report lag was about 75 days, in which the earliest was 21 days after the end of the fiscal year and the latest was after 176 days. The medium size of board was 5 members, the medium board meeting was 9 meetings and the average age of the Chairman of board was 50 ages. Among the surveyed companies, the percentage of non-executive directors on the board to the total members of the board on average was 59.6%, the maximum of foreign ownership of enterprises was 77.17% and 13,461 billion for Earning per Share. The results show that financial leverage ratio of average companies was 1.92.

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Tab. 2 – Descriptive statistic among variables in the model

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
ARL	330	75.55152	17.33889	21	176
BOARDSZ	330	5.369697	1.032742	3	10
DUAL	330	0.366667	0.4826262	0	1
IND	330	59.62097	18.23949	20	100
MEET	330	9.945455	13.70832	1	141
EXP	330	50.97576	6.751293	24	70
FOREIGN	330	7.105996	12.749	0	77.17
PROFIT	330	1,819.8	2,834.104	-10,609	13,461
SIZE	330	27.08	1.538513	24.03	31.6
LEV	330	1.928081	2.386642	0.0019827	26.92383
REPORT	330	0.3727273	0.4842647	0	1

Source: Owns' Analysis from collected data

In the period 2013-2017, the audit report lag of the companies is 75 days, in which the year 2017 was the latest with 80.43 days and the 2013 was the fastest year with the number of day average was 72.92. However, in the three year of 2014, 2015, 2016, the days of the audit report lag was as the same with average time to publish audited financial statement was about 1 day less or more than 73 days. In general, the building materials companies tend to take more time to publish their financial reports over the period from 2013 to 2017.

Fig.1 – Average number of audit report lag from 2013 to 2017
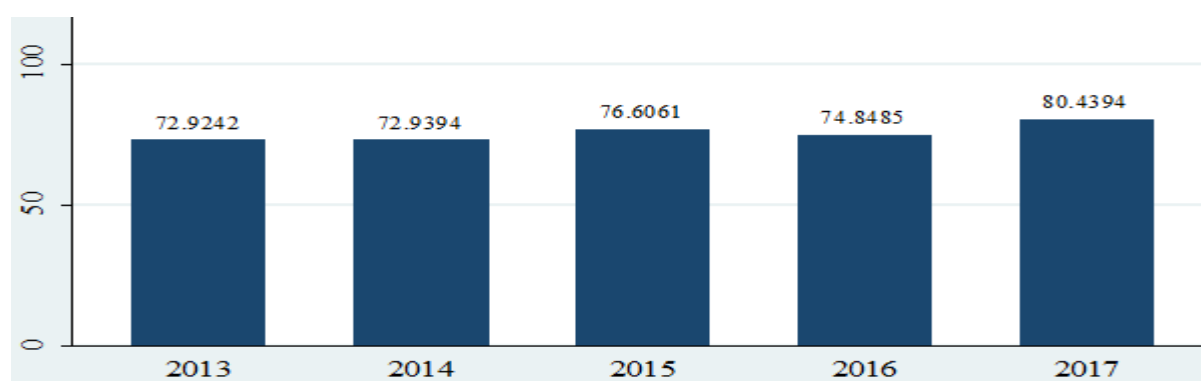
Source: Owns' Analysis from collected data

Correlation analysis

Tab. 3 – Correlation matrix

	ARL	REPORT	BOARD SZ	DUAL	IND	MEET	EXP	FOREIGN	PROFIT	SIZE	LEV
ARL	1.00										
REPORT	0.153	1.00									
BOARDSZ	0.005	0.209	1.000								
DUAL	0.194	-0.040	-0.077	1.000							
IND	-0.127	0.154	0.105	-0.390	1.000						
MEET	-0.095	0.221	0.016	0.106	0.055	1.000					
EXP	-0.246	0.040	-0.001	-0.098	0.091	0.049	1.000				
FOREIGN	0.017	0.237	0.185	0.012	0.181	0.186	0.315	1.000			
PROFIT	-0.254	0.108	0.005	0.033	0.107	0.273	0.094	0.222	1.000		
SIZE	0.081	0.493	0.447	-0.043	-0.002	0.336	0.104	0.233	0.148	1.000	
LEV	0.167	0.191	0.156	0.028	-0.121	0.093	-0.006	-0.088	-0.340	0.334	1.000

Source: Owns' Analysis from collected data

Tab. 4 – The result of VIF test

Variable	VIF	1/VIF
REPORT	1.41	0.710989
BOARDSZ	1.34	0.748181
DUAL	1.24	0.804712
IND	1.31	0.762835
MEET	1.27	0.784839
EXP	1.14	0.875289
FOREIGN	1.31	0.762544
PROFIT	1.35	0.740197
SIZE	2.00	0.500404
LEV	1.42	0.706188
Mean VIF	1.38	0.706188

Source: Owns' Analysis from collected data

As the results from table 3 and table 4, the correlation coefficients among the variables were all less than 0.60, the variance inflation factor (VIF) indicates all variables have a value below three which was within the acceptable range of 10. This implies that multicollinearity was not a problem in the regression model. The correlation results show that there were positive correlations between the ARL variable and the independent variables included REPORT, BOARD_SIZE, DUAL, FOREIGN, SIZE, LEV. On the other hand, there were negative correlations between the ARL variable and the independent variables such as IND, MEET, EXP AND PROFIT.

Regression Analysis

This study conducts three regression models included OLS, FEM, REM, then appropriate tests such as Breusch and Pagan Lagrangian multiplier test and Hausman test were performed in order to test the hypothesis and find out which models was the most appropriate for the study.

Tab. 5 – Multivariate regression results

	OLS		REM		FEM	
Independent variable	**Regression coefficient**	**Statistical significance level**	**Regression coefficient**	**Statistical significance level**	**Regression coefficient**	**Statistical significance level**
BOARDSZ	-1.51846	0.115	-1.250763	0.333	-0.4805729	0.785
DUAL	6.448141	0.001	**5.278575**	**0.012**	4.558556	0.062
IND	-0.03224	0.550	**-0.0965916**	**0.065**	0.103833	0.089
MEET	-0.1702087	0.016	-0.0827967	0.380	0.0531256	0.680
EXP	-0.6622658	0.000	**-0.398512**	**0.004**	-0.2681821	0.085
FOREIGN	0.1891526	0.015	**0.2335218**	**0.016**	0.3279874	0.011
PROFIT	-0.0014947	0.000	**-0.0010503**	**0.001**	-0.0007961	0.025
SIZE	1.294581	0.101	1.100568	0.346	5.430096	0.019
LEV	0.3201514	0.454	**1.04396**	**0.013**	1.489978	0.001
REPORT	5.500863	0.009	**6.261237**	**0.008**	5.9677	0.029
CONS	75.90783	0.000	68.04352	0.029	-62.04019	0.334
Observation		330		330		330
R-squared within		22%		18.22%		20.66%
Breusch and Pagan Lagrangian multiplier test	**Chibar2(01) = 217.15** **Prob > chibar2 = 0.0000**					
Hausman test			**Chi2(9) = 14.29** **Prob>chi2: 0.1125**			

Source: Owns' Analysis from collected data

The table 5 shows the result of the *Breusch and Pagan Lagrangian multiplier test* was Prob > chibar2 = 0.0000, smaller than statistical significance level of 5%, which means random-effects (RE) model outperforms ordinary least squares (OLS). After that, the authors have run model FEM

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and REM. Results from FEM and REM models lead the authors to conduct Hausman test to identify whether FEM or REM model was more appropriate for the study. The Hausman test with Prob>chi2: 0.1125, bigger than statistical significance level of 5%, therefore, random effects model (REM) was suitable than the fixed effects model (FEM).

Research Results Discussions

The R^2 within was 0.182, which indicates that this model was capable of explaining 18.22% of the variability of the audit report lag in the sample companies under study.

The relationship between **CEO duality** and ARL model was positive and significant at 5% level ($p = 0.012$). It means that the companies which separates the role of the Chairman and the CEO publish their financial report faster than the others. This result supports the hypothesis *H2* and was consistent with studies of Afify (2009), Al Daoud et al (2015).

As for the relationship between **board independence** and timeliness of financial reports, the results show that board independence had a significant and negative effect on audit report lag at 10% ($p = 0.065$), so hypothesis *H3* was accepted. This means that the greater the percentage of non-excutive director in the board would increase the timeliness of financial reports. This finding was consistent with Afify (2009), Abdullah (2006), Abdelsalam and El-Masry (2008), Al Daoud et al (2015).

Consistent with expectations, the study reveals that the age of the chairman as measurement of the **board experience** has a significant negative effect on the audit report lag at 5% level, so hypothesis *H5* was accepted. The study shows that the older the chairman of the company was, the earlier the issuing financial reports was because the older chairman would have more valuable experiences and take more attention in corporate governance, so that they could sole variety problems the company facing, therefore the financial reports were facilitated to be published on time.

In addition, the research also shows a significant and positive relationship between the ARL and the **foreign ownership** at 5% level, this rejects hypothesis *H6*. It means companies with a higher proportion of foreign shareholders disclosed their financial reports later than the others. However, study results were contrast with research of Haniffa and Cooke (2002), Hashim (2017).

Among the control variables, the study shows that **profitability, leverage and the type of financial report** were significant associated with audit report lag at 5% level, those hypothesis *H7, H9, H10* were accepted. This was in line with the results of most prior studies.

The other finding of this study was that there were no relationship between the timeliness of financial reporting with the board size, the number of board meeting and the company size.

CONCLUSION

The purpose of research was to investigate which factors effect on the timeliness of financial reports among 66 listed building materials companies in Viet Nam from 2013 to 2017. Multiple regression analysis method was used to analyze the data. The result shows that the random effects model was the most appropriate for the study. There were seven factors have significant relationships with the timeliness of financial reporting, they were CEO duality, board independence, board experience, foreign ownership, profitability, leverage and type of financial reporting. On the contrast, there were no associations between the audit report lag with variables including board size, board meeting and company size.

This study was not without limitations. First was limit in selecting variables. The study only covers a five-year period from 2013 to 2017, the findings would be more beneficial if a ten-year period data was used. Besides looking at the timeliness of annual report, it was also important to examine on the other reports such as interim and quarterly report since these reports were important in assessing company performance. Besides, this study does not consider all relevant factors that might affect timeliness in reporting and other limitations. Therefore, this study addresses few ideas for further researches in the future.

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THE ANALYSIS OF MACROECONOMIC INDICATORS OF VISEGRAD GROUP AFTER ECONOMIC CRISIS IN 2009

Petra Viktorinová - Kateřina Pechová - Veronika Kotlantová

Abstract

The paper focuses on the development of macroeconomic indicators of Visegrad Group in the reaction on economic and financial crisis in 2009. The paper analyses macroeconomic data of so called Magic square, specifically development of GDP, unemployment rate, inflation and current account balance. The aim is to evaluate development of these indicators and compare the impact of economic crisis on countries in Visegrad Group (Czechia, Slovakia, Hungary and Poland). Theoretical part clarifies the principle of Magic square and its indicators. Analytical part is focused on development of these indicators and their comparison in aforementioned countries.

Keywords: GDP, economic crisis, Visegrad group, inflation, unemployment

JEL Codes: H12

INTRODUCTION

In the history we can find only few economic situations that had so huge impact for humanity. If we concentrate on the 21st century, everybody definitely remembers unpredicted worldwide crisis in 2009. There existed a few indicators already some years ago, that maybe some problems can come, but nobody would say that it would be so big and have such a long impact. It brought lots of changes and not only for companies, but of course for countries also. In this paper we describe how this change influenced main macroeconomics indicators in four European countries also known as a Visegrad Group (consist of Czech Republic, Slovakia, Hungary and Poland). As usual this crisis did not have the biggest impact on the economy only in the year 2009. It is very important to concentrate on the development of the economy few years before the crisis and also few years after. Simply because of that our analyses will describe the development of four important macroeconomics indicators from year 2007 till year 2017 (present).

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Visegrád group

Visegrád group, also known as a V4 is an alliance of four Central European countries: Czech Republic (CZ), Slovakia (SK), Poland (PO) and Hungary (HU). Originally this alliance was established by three important leaders from Czechoslovakia, Poland and Hungary during their summit meeting in city called Visegrád in Hungary (15th Februrary, 1991). After two years it was changed for V4 instead of V3, because of the dissolution of the Czechoslovakia into two separated countries – CZ and SK. From that time, there were none extension with other countries even though there were some propositions. In the beginning existed three important reasons of this cooperation – cultural, economic and military. Alliance V4 was supposed to help these countries during their integration in the EU and also NATO. Other goals were to totally eliminate existing economic, social and spiritual remains of the totalitarian system; to build parliamentary democracy in all four countries; to strengthen and respect human rights and observe fundamental freedoms; to fully engage in the European political, economic, security and legal system. Cooperation of V4 exists up to now. Every year is held official summit, where national representatives of each country meet. (International Visegrad Fund, ©2006 – 2018)

Magic square

To evaluate the economical state of each country and its performance we can use magical square, which assesses four important indicators – economic growth (measured by the annual growth rate of GDP), full employment (measured by average annual unemployment rate), price level stability (measured by average annual inflation) and external economic balance (measured by a current account as a percentage of nominal GDP). Really important is that one indicator affects the others and at the same time they are so contradictory. As a goal of each country, should be to keep sustainable GDP growth, low unemployment, low stable inflation and trying to make the deficit of economic balance not too high. After evaluation of these indicators we can see simple representation of the state economy, but definitely is needed to do to a complex analysis of each parameter to have an objective evaluation of all economy´s performances. (Soukup, Pošta, Neset, Pavelka, Dobrylovský, 2010)

Development of macroeconomic indicators after economic crisis in 2009

Czech Republic

Economic crisis had a particular impact on macroeconomic indicators in the Czech Republic, however, the impact was not so significant as in case of other countries. The crisis was caused by a significant drop in foreign demand – therefore the Czech Republic was not affected by global financial crisis but only global economic crisis that occurred later. In the following paragraphs there will be a thorough description of the macroeconomic indicators, namely GDP growth, inflation, unemployment rate and current account as a share of nominal GDP, their development and absolute value between 2007 and 2017.

Real GDP growth in the Czech Republic dropped in 2009 by -4,8 %. However, the drop was in line with the drop of the whole EU. The following table shows that other drops occurred in 2012 and 2013. Since 2014 the GDP has been always increasing. This is probably caused by economic expansion which has been experienced by the whole Europe for last two or three years.

Table. 1: GDP real growth in the Czech Republic (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP %	5,6	2,7	-4,8	2,3	1,8	-0,8	-0,5	2,7	5,3	2,6	4,4

Source: Eurostat.

http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00115&plugin=1

Compared to the other countries, the Czech Republic was not influenced by the crisis to the great deal. For example, the drop in GDP was more significant f.e. in Germany (-5,6 % in 2009). When we compared countries in Visegrad group, Czech Republic experienced the lowest decrease apart from Poland whose GDP even grew slightly by 2,8 % (Slovakia dropped in 2009 by -5,4 % and Hungary by -6,6 %). Generally, nowadays the GDP growth is balanced and dynamic and driven by domestic as well as foreign demand. The positive impact on GDP has also dynamic Czech industry and services, higher salaries and higher consumption.

Unemployment rate in the Czech Republic was influenced by the economic crisis as well. The unemployment rate increased from 4,4 % in 2008 to around 7 % throughout the years 2009 and 2013. The following table shows unemployment rates between 2007 and 2017.

Table. 2: Unemployment rate in the Czech Republic (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Unemployment rate %	5,3	4,4	6,7	7,3	6,7	7,0	7,0	6,1	5,1	4,0	2,9

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Table. 4: Current account balance in the Czech Republic (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Current account balance (% of GDP)	-4,7	-1,9	-2,4	-3,5	-2,2	-1,5	-0,5	0,22	0,25	1,1
Mil. CZK	-	-75 254,7	-89 203,0	-141 776,5	-84 800,8	-63 313,0	-21 784,4	7 882,7	11 283,1	74 219,3

Source: the World bank group.

https://data.worldbank.org/indicator/BN.CAB.XOKA.GD.ZS?end=2016&locations=CZ-

PL&name_desc=false&start=2007&view=chart;

CNB,https://www.cnb.cz/analytics/saw.dll?Dashboard&PortalPath=%2

Fshared%2FUNIBOP_WEB%2F_portal%2FBISTAT&Page=DBOP_R&P1=dashboard&Action=Navigate&ViewSt

ate=duu3353rsi0cjh8cun4vgab4gq&P16=NavRuleDefault&NavFromViewID=d%3Adashboard~p%3Atdppn6rbilu6

v8m0

The current account experienced the biggest deficit in 2010. This result was caused by economic crisis. Since then the balance has been improving and has been in surplus for last 4 years. The main trigger for this surplus has been probably the trade in services. The development of balance of payments has been now really dynamic and stable.

Poland

Poland´s economic performance was not influenced by the economic crisis such severely as other countries in EU. While EU was in recession in 2009, Poland experienced quite continuous growth and therefore the nation has improved its position within Europe. The country even rose its GDP per capita from 54 % of the EU average in 2007 to 65 % in 2011. The reason could actually be internal strength of the economy such as lower labour costs and higher labour market flexibility and also the fact that Poland is not a member of Eurozone. Long term depreciation of the zloty has led to the logical shift from imported to domestic goods and helped to increase exports. (Orlowski M., 2012)

Real GDP growth rate between 2007 and 2017 is pictured in the following table. In 2009 Poland did not drop, on the contrary, real GDP growth was positive on 2,8 %. Nowadays, the growth of real GDP is between 3 and 4 % and is influenced by current economic expansion in Europe

Table. 5: GDP real growth in Poland (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP growth (%)	7,0	4,2	2,8	3,6	5,0	1,6	1,4	3,3	3,8	3,0	4,6

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Source: Eurostat:

http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00115&plugin=1

Unemployment rate in Poland is generally higher than average, however, in 2016 Poland hit the lowest level in country´s post-communist history. This is especially because of continuous economic growth even at the time of the economic crisis. The following table deals with the development of unemployment rate between 2007 and 2017.

Table. 6: Unemployment rate in Poland (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Unemployment rate %	9,6	7,1	8,1	9,7	9,7	10,1	10,3	9,0	7,5	6,2	4,9

Source: Eurostat:

http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00203&plugin=1

According to Financial Times, around 2008 the number of economically inactive young people started falling. Increased activity of young people is also partly the reason for the current fall in unemployment in Poland (Wisniewska, 2016).

Inflation has always been a concern for Poland. In the table below the reader can see that until 2012 the inflation was always at a high level around 4 %. However, in 2013, Poland managed to decrease it under 1 %. This decrease was caused especially by monetary policy of Poland that has been to keep interest rates down. We can observe even a negative price level in 2015 and 2016. In 2017, there is an inflation 1,6 % which is considered healthy for the economy.

Table. 7: Inflation in Poland (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HICP Inflation (%)	2,6	4,2	4,0	2,6	3,9	3,7	0,8	0,1	-0,7	-0,2	1,6

Source: Eurostat:

http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00118&plugin=1

External economic balance represented by current account as a % of nominal GDP is shown in the following table. Throughout the past 10 years it has always been negative apart from last year.

Table. 8: Current account balance in Poland (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
% of GDP	-6,4	-6,7	-4,1	-5,4	-5,2	-3,7	-1,3	-2,1	-0,6	-0,3	0,3
Mil. USD	-27429	-35829	-17867	-25875	-27355	-18605	-6749	-11444	-2659	-1369	x

Source: the World bank group.

https://data.worldbank.org/indicator/BN.CAB.XOKA.GD.ZS?end=2016&locations=CZ-

PL&name_desc=false&start=2007&view=chart; Index Mundi: https://www.indexmundi.com/facts/poland/current-

account-balance

Current account balance in Poland is in deficit since 1995. However, the deficit is slowly decreasing, especially in last two years. The decreasing deficit is caused by dynamic consumption and EU-funded infrastructure investment (Poland current account, © 2018). However, according to ING, the balance is supposed to deteriorate in 2018 due to accelerated imports (Rybacki, 2018).

Slovakia

The impact of economic crisis on Slovakian economy was much more severe than in Czech Republic and Poland. Slovakia is highly open economy which is in a great deal dependent on export to other European countries (more than 80 %), especially Germany (Anonymous, 2010). Moreover, out of other Visegrad countries, only Slovakia is part of the Eurozone (since 2009) and has euro as its national currency. This has limited Slovakia in devaluating its currency, which would have helped to improve its trade balance. Therefore, the drop in foreign demand and limited monetary policy option has significantly affected Slovakian economy.

In the table below is described the real GDP growth in Slovakia during and after the global crisis until recent years. As we can see, the real growth before the crises achieved double digit numbers, but was hit by the economic turmoil and dropped by -6,5 % in 2009. This drop was along with the development of GDP in Hungary the steepest. On the positive note, the Slovakian economy managed to recover swiftly. The GDP growth rate kept above 2 % until recently and managed to keep this positive growth rate even during the European dept crises, which came soon after the global financial crises. Nowadays (2017) the Slovakian GDP growth rate reaches the highest value out of the countries of Visegrad group.

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Table. 9: GDP real growth in Slovakia (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP %	12,1	8,6	-6,5	5,6	4,5	2,9	2,0	2,6	3,7	2,9	4,7

Source: NBS (2018), retrieved from: https://www.nbs.sk/en/md/_b5bd6028-6fd7-4208-b755a90900f777 32#chart

Unemployment rate in Slovakia compared to other countries in Visegrad group kept the highest level not only during the crisis and following years, but also until now. Unemployment rate in Slovakia is well above the Visegrad group average at 8,1 %, despite the fact, that the labour costs are the second lowest. During the global crises the unemployment rate rose to double digit number and it reached its peak in 2010 at 14,4 %, which is far the highest value out of the Visegrad group countries. Since 2013 is the unemployment rate decreasing below the pre-crises level.

Table. 10: Unemployment rate in Slovakia (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Unemployment %	11,0	9,6	12,1	14,4	13,6	13,9	14,2	13,1	11,5	9,6	8,1

Source: NBS (2018), retrieved from: https://www.nbs.sk/en/md/_f88e8762-ec5e-4d63-8edca90900f8ba98#chart

The following table summarizes the development of inflation in Slovakia, measured by HICP (Harmonized Indices of Consumer Prices). As we can see, the inflation rate was below the 2 % target almost throughout the whole reviewed period, except from the years 2008, 2011 and 2012, when inflation rate rose above 2 %. It peaked during the European debt crises at 4,1 % and in 2014 inflation rate headed into negative territory, as the oil and food prices begun to drop significantly. To reverse this negative trend, the European Central Bank introduced unconventional monetary tools such as quantitative easing in 2015. The quantitative easing program is still in operation and it should be terminated in fall this year. As we can see, since 2017 Slovakia is no longer in deflation and it is on its way to the Central Bank 2 % target.

Table. 11: Inflation in Slovakia (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HICP %	1,9	3,9	0,9	0,7	4,1	3,7	1,5	-0,1	-0,4	-0,5	1,41

Source: NBS (2018), retrieved from: https://www.nbs.sk/en/md/_2dd20135-0ddc-4c05-94d4-a90900f7f725#chart

The current account balance measured as percentage of GDP in Slovakia kept in positive territory only in years 2012, 2013 and 2014. In comparison with other Visegrad group countries, the

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development of current account balance (as of % of GDP) is very unstable and in last analysed years (2015, 2016) it reaches the lowest number out of Visegrad group countries.

Table. 12: Current account balance in Slovakia (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
% of GDP	-5,4	-6,3	-3,4	-4,7	-4,9	0,9	1,8	1,2	-1,7	-1,4	x
Mil. EUR	-3302,5	-4262,1	-2207,1	-3183,5	-3496,9	683,7	1379,0	870,4	-1367,4	-1182,6	-1776,6

Source: WB (2018), retrieved from:

https://data.worldbank.org/indicator/BN.CAB.XOKA.GD.ZS?end=2016&locations=CZ-PL-SK-HU&name_desc=false&start=2007&view=chart; NBS (2018), retrieved from:

https://www.nbs.sk/en/md/_4a0ea5dc-a62a-43e3-a4a0-a90900f998f3#chart

Hungary

The global financial crisis has hit Hungary hardest of all among the Visegrad group countries and Hungary had to draw the financial assistance of the International Monetary Fund. These struggles were caused by high government debt (the highest among V4) and structural weaknesses in the public sector (government spending eats up more than 50 % of GDP). When the crisis hit the economy, the interest rates ballooned, causing the financial market to dry up (Darvas, 2008). Hungary had to turn to the IMF and accept condition, which were not helping to the shrinking economy – the government had to cut expenditure - the opposite what other countries were doing to help to boost the economies.

As you can see from the table below, Hungarian GDP has dropped by 6,6 % in 2009, which was the highest number of all V4 countries. The recovery came slowly. European debt crisis did not leave out Hungary, which fall into recession again in 2012. This trend was successfully reversed the following year and since 2013 is the GDP growth rate above 2 %. The level of GDP growth in 2017 has not leave Hungary far behind its V4 counterparts and peaked at 4 %.

Table. 13: GDP real growth in Hungary (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP %	0,4	0,9	-6,6	0,7	1,7	-1,6	2,1	4,2	3,4	2,2	4,0

Source: MNB (2018), retrieved from: http://www.mnb.hu/en/statistics/statistical-data-and-information/statistical-time-series/i-main-economic-and-financial-indicators

Unemployment rate in Hungary has kept itself at similar level as unemployment rate in Poland. It reached its peak in 2010 and its successfully declining since then. In 2017 it reached very low level of 4,2 %, which is far below the pre-crisis period and twice as low as unemployment rate in Slovakia. In comparison to the other member states of the European Union, Hungary has the fourth lowest unemployment rate (first is the Czech Republic with 2,9 %, then Germany with 3,8 % and Malta with 4,1 %). Even though this positive development, it is important to mention a constant population outflow, especially of the younger generation, leading to lower unemployment rate but bringing significant problem for Hungary's economy and social system in the future. (Kowalczyk, 2017)

Table. 14: Unemployment rate in Hungary (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Unemployment %	7,4	7,8	10,0	11,2	11,0	11,0	10,2	7,7	6,8	5,1	4,2

Source: MNB (2018), retrieved from: http://www.mnb.hu/en/statistics/statistical-data-and-information/statistical-time-series/i-main-economic-and-financial-indicators

Turning to inflation, we can see disturbing level of 8 % before the global crisis hit the European countries. Ever since the level was declining but still far above the 3 % target, which is set by the Hungarian central bank and above the inflation rate of other V4 countries. During the years 2014 and 2015 the trend has turned around and the economy faced deflation as most of the European countries. Since 2016 is the inflation rate kept above zero and nowadays is at level close to the target (close to 3 %).

Table. 15: Inflation in Hungary (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HICP %	8,0	6,1	4,2	4,9	3,9	5,7	1,7	-0,2	-0,1	0,4	2,4

Source: MNB (2018), retrieved from: http://www.mnb.hu/en/statistics/statistical-data-and-information/statistical-time-series/i-main-economic-and-financial-indicators

Hungary is perspective market for foreign investors with its open economy and high-quality infrastructure and central location in Europe. It is an export-oriented market economy and foreign trade plays very significant role. Key sectors include automotive, IT, electronics, logistics and Shared Service Centers (Anonymous, 2018). Even throughout the crisis Hungary managed to

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maintain a trade and current account surplus, as can be seen in the table below. Recently has the current account balance measured as percentage of GDP reached 6 %, which is far highest number among V4 countries, even though three out of four of them are small export-oriented economies.

Table. 16: Current account balance in Hungary (2007 – 2017)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
% of GDP	-7,1	-7,0	-0,8	0,3	0,7	1,8	3,8	1,5	3,5	6,0
Mil. EUR	-7219	-7620	-754	274	754	1752	3892	1587	3880	6865

Source: MNB (2018), retrieved from: http://www.mnb.hu/en/statistics/statistical-data-and-information/statistical-time-series/i-main-economic-and-financial-indicators

CONCLUSSION

In the text above was described the economic situation in four central European countries from 2007 till 2017. Even though banks in these countries have not bought so much toxic securities from USA, the economies have not escaped the aftermath of the global crisis. All V4 countries have experienced challenging period and the GDP has dropped by 3,8 % on average. The bright exception was Poland, whose economy was experiencing growth despite the world economy downturn. All these countries experienced a second wave of slowdown or recession in 2012, when eurozone was hit by the debt crisis and was facing possible disintegration. From 2014 until now V4 economies are experiencing continuous growth, nowadays above 4 % GDP growth per year.

Alongside with recession in 2008 came increase of unemployment rate reaching to 10,5 % on average in 2012. Since then the countries were able to reverse the upturn trend and lower the average unemployment rate by half - to 5 %. Moreover, Hungary and Czech Republic manage to lower the unemployment to such a low level, that they score among the forth lowest in European union.

The most divergent indicator among V4 countries was inflation rate, reaching to very high level especially in Poland (9,7 % in 2010) and to very low level in Slovakia (0,7 % in 2010 and even lower in recent years). Nowadays is the inflation level quite stable, reaching to 2,8 % on average. Anyways, this indicator should be carefully observed as the fluctuation is very inconvenient for the economy, as it disturbs long-term planning for the businesses and government.

The current account balance as a percentage of GDP in V4 countries keeps at very healthy level and was not significantly affected by the global crisis. On average the level is kept above -5 % and

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its increasing to positive territory since 2013. This is due the fact that V4 countries (with exception of Poland) are small open export-oriented countries and especially in Hungary and Czech Republic the development is in positive territory.

To sum up, we can say that the global crisis has hit central Europe economies as well as others, but the negative effects were quite soon reversed. The recession was not so deep as in other west European countries. On the other hand, the V4 countries were hit by the second wave of the crisis as well – with European debt crisis, leading to very long period of uncertain economic development. Nowadays we can finally say that the crisis is overcome and the countries show very positive economic developments, often above the average of other European Union countries.

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USE OF PROJECTION SYSTEMS IN OOH ADVERTISING

Jiří Nováček - Michaela Pokrupová - David Lorenc

Abstract

This contribution aims to assess the possibilities of using projection systems in advertising. The projection systems are innovative and effective solutions for outdoor as well as indoor advertisement. It impacts directly the methods of promoting companies or their product. The listeners will get acquainted with brief history of development of advertisement and with current trends that made projection systems perspective format of advertisement for various industry fields. The detailed insight into this problematic was acquired by personal interviews with directors of the companies focusing on OOH advertising. The aim of this research was to uncover hidden potential of the advertisement format mentioned within various fields of industry and various advertisement strategies. With technology moving fast forward in recent years, the focus is usually on the social media and internet in general. Our work however focuses on traditional physical advertisement which might seem forgotten in the digital world. However, both worlds are currently meeting on an intersection. Using technologically advanced techniques of advertisement as projection systems can bring the best of the both worlds. In the end of the presentation the listeners will be presented with practical case of how the projection systems are currently being used by companies that does not afraid of wholly new and fresh approaches in advertisement.

Keywords: Outdoor, Advertisement, Marketing, Projection, Lumitrix

JEL Codes: M37

LUMITRIX Company

LUMITRIX is a Czech company that produces advanced tools for projection mapping. The company was founded in 2012 after one of the founders, Lukas Brus, cooperated on a projection mapping project. He found the solutions used for such production 'awkward' and decided to build something better. Something that would be easier to operate and would follow the trends of the 21st century.

Since 2012, company grew from 2 to 18 employees and is expected to exceed the 1M EUR revenue this year. LUMITRIX has also gone through the A-level investment of 1M USD from the venture capital fund Y Soft Ventures.[27]

Technology

LUMITRIX combines a hardware and software development to create a worldwide unique technology.[28] To understand the difference, let us have a look on traditional projection mapping setups.

Picture. 1 : Traditional projection mapping setup

As projection mapping is quite a new discipline the traditional projection mapping setup is quite
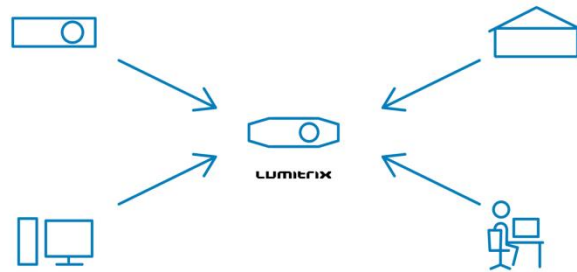

complicated. First, you need the projectors of course. The other thing that you must learn is a special software in which projection mapping can be produced. This is an obstacle for artists that are not fully interested in projection mapping as learning new software just for a certain discipline might be a big barrier to entry. That's how we get to designers – people that know how to operate such software and can design the content that would fit the illuminated object. Finally, you need a case to cover all the expensive technology to protect it from the weather conditions (mainly raining).

This is exactly the thing that LUMITRIX solved the first. The developers basically put all these things together and created a standalone unit that grasps and houses all these elements.

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[27] https://www.ysoft.com/cs/company/press-center/press-releases/2016/y-soft-ventures-invests-usd-2-3-million-in-greycor

[28]Based on authors' research, no similar technology has been found on the market. The only alternative is inserting a projector to an outdoor enclosure (tempest.org or similar) and connect all the peripherals externally.

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Picture.2 : LUMITRIX projection mapping setup

The LUMITRIX outdoor unit is IP43 protected so it can withstand standard weather conditions like rain and snow. Apart from the projector it houses a media server (mapping computer) inside that takes care of the unit and makes it autonomous. Under the lens, the outdoor unit houses a camera as well that can scan the shape of the building that the projector illuminates. This scan can serve as a background for artist's creation and thus, the artists can use any software they are used to use.

Let us sum up the LUMITRIX projection mapping workflow once again:

First, fix the projector on a pole or on a wall in front of the object you plan to illuminate. Plug the device to the electricity, insert a SIM card to a SIM card slot and switch the device on. At this moment, you can leave the site and control the unit remotely. At night, the scanning process can be launched. The scanning result is a pixel by pixel background for your artworks. Now use this result as a background for the project (e.g. Adobe After Effects). After you have the artwork ready, you can export it and send it remotely back to the projector. Then in the control interface just schedule when your artwork should be launched, and the device will take care of the rest (will automatically heat the lamp before the start and will activate the projection at the scheduled time). This is how LUMITRIX made the workflow for projection mapping much easier and allowed more people without actual mapping skills be involved in projection mapping creation.

Out of home advertising was a sector with a huge potential at that time. However, let us focus on the use of the technology in this industry in the next chapter and let us now finish the introduction to the LUMITRIX technology with the last important piece – Lumiverse App which came to the LUMITRIX products as a software release last year and it changed the potential of use in advertising by adding the interactive features.
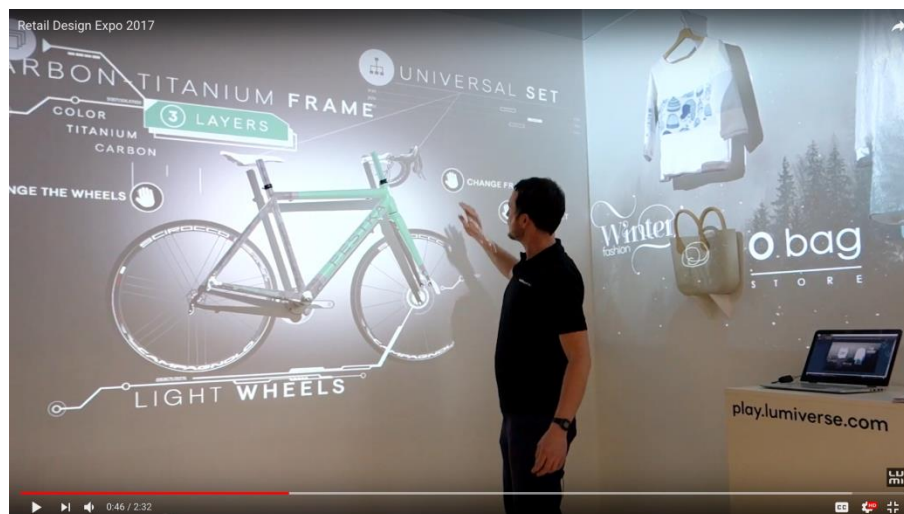
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Lumiverse App

Lumiverse App goes beyond the original user interface in terms of simplicity and easiness of use. Literally anyone can now place different animations, widgets, games, and apps on the wall without any motion picture designing skills at all.

Lumiverse App brought a simple library of content where the user can choose an object and place it on the scene. The scene is basically the screen that the projector covers. Once the object is on scene it can be positioned anywhere on the screen, can be resized and most importantly, can be mapped (i.e. deformed). Directly from a smartphone or any other mobile device that can run an internet browser you can deform any object on the scene so that it fits the perspective. If the projector is positioned in the way that it projects from an angle, by this corner deformation the object can be contra deformed so that it still fits the viewer's perspective. And that's where the mapping magic begins – if one decides to project on a bottle, on a shelf, on a book on the shelf etc. it's all possible in a matter of minutes. Just place the object on the scene and deform it in the way that it fits the intended object.

However, for the needs of this text we are mainly interested in the interactive features that Lumiverse App brings. Generally, Lumiverse App offers two ways of interactivity. The first one is the gesture interactivity and the second one is a mobile device interactivity.

Picture.3: Lumiverse App explained

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Source: https://youtu.be/GaUxasER8eA

The gesture interactivity works based on camera recognition. The objects called 'triggers' can be placed on the scene and their functions can be modified – for example once you wave your hand in front of the trigger, the system can change the video which is being played, can add a new object on the scene, etc. This is quite a known form of interactivity and mappers used for example an Xbox Kinect for similar ways of interaction.[29] LUMITRIX just made it simpler again.

Most interesting from the perspective of this article is the mobile device interactivity. Not only the owner/admin of the device can design the scene via mobile device. There is also a so-called public mode where the interaction with the projection is available for wide public. Thus, passers-by can play a simple game just via their mobile device. No application needs to be downloaded. All works again directly from the web browser.

Picture. 4: Public playing Tetris game on a 20-meter high wall

Source: https://youtu.be/HJeKA26S3K8
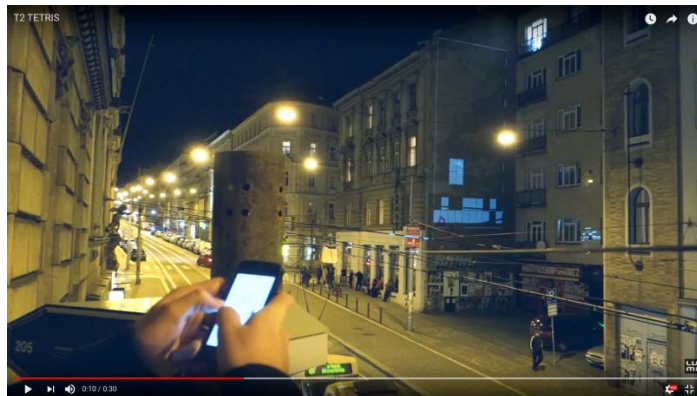
All games and applications have two different interfaces – one for the creator of the scene who positions and deforms the object to fit the screen and second for public. In this case, once you visit the dedicated website or scan a QR code, you will see in your browser only arrows that allows controlling the game.

Lumiverse App has an open API, so the options are vast. Anyone can create their own HTML 5 application and upload it to Lumiverse. LUMITRIX developers have created a kind of operating system for projectors. If we get back in time to the first iPhone release we find out that the first version of iOS was quite empty, and the system had pre-installed just some basic applications.

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[29] http://genekogan.com/works/kinect-projector-toolkit/

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However, throughout the years the App Store filled with various apps from external developers and nowadays we cannot imagine our lives without some of these apps. Let's see if something similar will happen in the world of projections and if LUMITRIX will be successful with such vision.

LUMITRIX technology in OOH advertising

In the previous chapters and subchapters, we described what kind of advanced technology is now available in the world of projection mapping. At the beginning of this text you may find some examples of how projection mapping was used for advertising in the past. Let us now reflect on how the advancements in technology can accelerate the use of projections in OOH advertising. Let us now examine, what can be the main tractions in this newly discovered industry.

First of all, a qualitative research has been done by one of the authors of this text on use of LUMITRIX technology in OOH advertising.[30] However, this research was done in times when Lumiverse App, described in the previous chapters, was not available yet. The research worked with the state of the technology described in the 'Technology' subchapter of this text.

The qualitative research based on in-depth interviews with the owners of OOH media in the Czech Republic showed clearly that the potential of using this technology in advertising is immense. One of the main outcomes was that the LUMITRIX outdoor units can fully replace the technology called dynamic backlight.[31] It is a backlighted billboard that can highlight certain parts of the static visual on the billboard at night. From the interviews at the research, it became obvious that the following advantages make the use of LUMITRIX projection systems a better option when compared to the standard dynamic backlight technology:

1) The initial hardware costs per billboard are lower
2) Reprogramming (i.e. creation of the new content) is easier and less costly
3) Maintenance is easier and less costly
4) The possibility of remote control and camera check

The dynamic backlight has one disadvantage that is common for all OOH carriers. OOH is not measurable. Even if the dynamic backlight is replaced by LUMITRIX, the impact is still not measurable. However, this changes with the Lumiverse App and its interactivity features.

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[30] The research can be found here: https://vskp.vse.cz/eid/69504 (only in Czech language though).
[31] http://backlight.cz

The main idea thought concept or outcome of this article is, that LUMITRIX technology with Lumiverse App brings measurability to OOH advertising. If we look at online marketing, we see that it became so popular mainly because of its measurability and clear tracking of the impact of paid ads. In other words, thanks to online marketing you can see your spending on the ad and then track it to interactions (people click on the banner, check the goods, eventually purchase some). Thanks to LUMITRIX and Lumiverse App similar scenario is possible.

Thanks to an open platform (API) it is possible for companies to design completely new concepts for advertising in public spaces. During the night, suddenly a projected display is visible on a building. People on the street see a huge QR code. Someone understands it and scans the QR code. The QR code disappears and a simple game appears. Let's assume there's a ball, an arrow moving from side to side and a goal. Your task is to press the button on your smartphone at the right time and strike a goal with a ball. If you do that 10 times successfully, a scene on the wall changes back to the QR code and the 'customer experience' continues the smart phone. For example, for such effort, the player can get a % discount on the product/service. The player just fills the details about himself via his smartphone and the result might be a successful sale. From the side of the marketer – he sees how many people played the game at a particular date and can track down how many of them bought the product in the end.

Let's take the previous paragraph as just an example of what is possible. Now it's in the hand of marketers, communication specialists and advertising agencies in general. One of the main advantages of a projection as a media is, that people are not yet blind to it. If a projection shows up somewhere, general public is used to stare on it and perceive it as something new and interesting. Therefore, marketers shall take advantage of this interesting media that is just gaining on popularity at the moment. The background technology is ready and the time for breakthrough concepts and ideas in communication is yet to come again.

Videomapping

There is virtually no literature on videomapping. We have to rely solely on electronic resources. The reason for the lack of literature is probably the short history of this discipline and its low level of incidence.

Videomapping is a combination of two words "video" and "mapping". The synonym of the term videomapping is also "projection mapping". According to Business News Daily page "Projection

mapping is a video projection technology where video is mapped onto a surface, turning common objects – buildings, runways, stages, even water – into interactive displays"[32]. Projection Mapping Central page describes projection mapping as "the display of an image on a non-flat or non-white surface"[33]. We can use any projection any video projector for this projection. The object is then "mapped onto any surface, turning common objects of any 3D shape into interactive displays"[34]. Videomapping or projection mapping is used for example in advertising, live concerts, theater, computer games or decorations. It finds other and other uses. It is hard to guess how this new medium will develop.

History and present of videomapping

The history of videomapping is very short. The first mention of this term is dated into the last third of 20ᵗʰ century. Although the projector itself was invented a few centuries earlier (the first surviving design of such a device dates back to 1420[35]), the history of mapping should be dated only when the projector was first used to illuminate the uneven surface, and when the light generated by the projector interact with the object to which it was exposed.

The first implemented videomapping projects are the installation in Haunted Mansion in Disneyland (New Orleans, United States of America), which was opened in 1969[36]. This attraction included several mapping installations. There are five busts on the picture that "sang" a song called Grim Grinning Ghost. Those busts are physical and they are illuminated by the projectors. The motion picture creates the illusion that the busts faces are moving. The first mapping installations have therefore found their place in the entertainment industry. Videomapping is still often used for this purpose until today.

The first videomapping installation

The first videomapping installation in the field of art was the project called "Displacements" by the American author and Michael Naimarka, a prominent researcher of the widespread and virtual reality. In the Displacements project, Naimarka prepared a simple room in the exhibition area,

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[32] https://www.businessnewsdaily.com/10527-projection-mapping-what-is-it.html
[33] http://projection-mapping.org/what-is-projection-mapping/
[34] http://projection-mapping.org/what-is-projection-mapping/
[35] MARPLES, Gareth. The History of Projectors: The Battle for Brightness. In: Historic Camera: History Librarium [online]. Available at:
http://www.historiccamera.com/cgibin/librarium/pm.cgi?action=display&login=projector_history
[36] JONES, Brett. The Illustrated History of Projection Mapping. In: Projection Mapping Central [online]. 2012. Available at: http://projection-mapping.org/the-history-of-projection-mapping/

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where he let two figurants do their normal activities, while filming them on a camera attached to a rotating table. Subsequently, the entire room had a white acamer-colored splatter to be replaced by the projector. The result is a projection that exactly interacts with the real objects in the room.

Picture. 5: Grim Grimming Ghost mapping installation

Source: Projection Mapping Central [online]. 2012. Available at: http://projection-mapping.org/the-history-of-projection-mapping/

When we say the word "videomapping" nowadays, most people will be delighted with large, often epic, and especially spectacular projections on large buildings such as cathedrals, city halls etc. These kinds of projections are famous also in the Czech Republic. There is Signal festival, which takes place annually in Prague. These actions are very demanding concerning their production. These large-scale video installations require a great deal of powerful technology (several high-power projectors that weigh up to a hundred kilograms) and associated software (such as Adobe After Effects, MadMapper, Resolume Arena, HeavyM, etc.), experts (projection and camera experts, the so-called VJ [Wizards], people involved in projections and creating animation content). An example of what such a powerful assembly can produce is shown below.

Picture. 6: Swan Lake

Source: US, Alexander. Swan Lake. In: Sila Sveta [online]. Available at: http://silasveta.com/work/swan-lake

There are hundreds if not thousands of today's classic mapping projections created every year. The prizes for such turnkey projects range from hundreds of thousands to millions of crowns. It is

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therefore not cheap. These projects are most often created during the celebrations of the anniversaries of cities, the honor of an institution, or the occasion of several specialized events such as the Czech Signal Festival or the world-famous Fête des Lumières in Lyon, France. Of the Czech companies that produce such one-off events we can name, for example, Prague's Lunchmeat Studio or The Macula.

Videomapping in advertising

In addition to these purely decorative, artistic, and narrative projections, videomapping is gradually being promoted in advertising as well. Projection mapping can be used as an advertisement to communicate with mass audiences. It can communicate several messages: a new product, promotion, or it simply presents brand or logo in a creative and inspirational way.

In a broader perspective, videomapping is a new tool of storytelling. It can "tell" a story to mass audiences in a very affective way. In general, people love stories. That is why storytelling is so popular in many fields nowadays (and advertising is not an exception). As countless online marketing experts say: stories sell. Videomapping's power is exactly this point. If the projection mapping is edited correctly, and if it's also thoughtful about the sound (music, sound effects etc.), it can become a truly memorable experience for spectators.

Regular outdoor projection as we know it is merely projecting images onto the flat surface of a building. On the other hand, videomapping requires a pre-production process during which images are fitted onto a 3D graphic model, which usually means on the building or on the object. When these images are projected onto the actual building, they "wrap" over the physical features of the building, appearing as if they are painted on – or part of – its structure.

Nevertheless, videomapping is also broadly used on a smaller scale in the advertising sector. For example, to project images of virtual clothing onto mannequins, or images onto apparel, shoes, or automobiles to simulate changes in the color and texture of these things.

According to marketing agency OBLSK, there are 3 ways videomapping brings value to the business:

1. "Videomapping reaches mass audiences in a short amount of time and creates an impactful experience for the viewer which results in a long lasting sensorial memory that is shared.

2. With videomapping every surface becomes a projection screen, including buildings, trucks, silos, cars, people, props, sculptures

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3. Videomapping makes advertising easy and convenient with the possibility of new information being projection on a daily basis**."**[37]

This is why big companies such as Nokia, Samsung, BMW, and many others use videomapping in their advertising strategy. The impact of videomapping is broad. The biggest have undoubtedly its direct viewers. However, companies also share the videos on their websites and so their social impact is much wider.

When videomapping started in advertising, its first focus was on its visual-art and live-music show aspects. This was changed. Today, production companies working in projection mapping incorporate cinema-style narratives. The show tells a story through the animated visuals and music.

Examples of videomapping

The first example was made by Muse Amsterdam for H&M Company that brought its flagship store in Amsterdam to live with a 3D videomapping on the historic building. The show is 3 minutes long, full of lights and effects. There is a red ribbon, wrapped around the building that untangles and transformed the building into a colorful dollhouse where nothing is what it seems. The show took a place on 22nd, 23rd and 24th November 2010.[38] This videomapping is an example of a brand presentation.

Picture. 7: H&M

Source: YouTube. Available at: https://www.youtube.com/watch?v=2W6Eabefezg

The second example is Samsung videomapping that took a place in Amsterdam. The aim was to enforce the launching of the new Samsung 3D TV. The videomapping was designed and developed by NuFormer Projections. The show was an impressive 3D projection on the façade of the Beurs

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[37] http://www.oblskinc.com/projection-mapping-1/
[38] https://www.youtube.com/watch?v=2W6Eabefezg

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van Berlage in Amsterdam. The projection took a place on May 20 and lasted till May 22, 2010.[39]

This videomapping is an example of product presentation.

Picture. 8: Samsung video mapping

Source: YouTube. Available at: https://www.youtube.com/watch?v=qWDHGRh37mY

The third example is another brand presentation. Ralph Lauren presents the ultimate fusion of art, fashion, and technology in celebration of 10 years of digital innovation. The show took place in 2010 in London. [40] Business of Fashion page commented this event: "BoF experienced the spectacle on both sides of the Atlantic, as digital projection mapping technology made both flagship buildings seem to suddenly disappear, then reappear, block-by-block, before they each opened up like a dollhouse to unleash a 3D parade of four-story tall models, a gigantic virtual polo match, and larger-than-life products. As a collection of perfume bottles appeared, the air was filled with Ralph Lauren's Big Pony fragrance, giving the event what the brand called a "4D twist."[41]

Picture. 9: Ralph Lauren videomapping

Source: YouTube. Available at: https://www.youtube.com/watch?v=E7ryMzZQICA

The next example is a product videomapping presenting Toyota Auris Hybrid. Its name is "Get your energy back" and it took a place on 22nd September 2010 in London. Glue Isobar has produced

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[39] https://www.youtube.com/watch?v=qWDHGRh37mY
[40] https://www.youtube.com/watch?v=E7ryMzZQICA
[41] https://www.businessoffashion.com/articles/bof-exclusive/digital-scorecard-ralph-lauren-4d-projection-mapping

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the movie. Gavin Rothery, the VFX expert behind the special effects on Bafta-winning film Moon, is one of its team members. The videomapping was designed to portray the vehicle's ability to constantly recycle the energy it uses.[42]

Picture. 10: Toyota videomapping

Source: YouTube. Available at: https://www.youtube.com/watch?v=UJ7E7uEZN00

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[42] https://www.marketingweek.com/2010/10/05/toyota-to-launch-ground-breaking-film/

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