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GAS EMISSION AND PARTICULAR MATERIAL OF DIFFERENT ECONOMIC SECTORS IN HUNGARY BETWEEN 2000-2015

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Abstract

The study analysis of correlations is done among the different economic variances of different kind of gases and particular materials polluting the air surrounding environment of our economy. The economic sectors have been characterised by different measured gas emission and particular materials for several decades or even centuries. The study aims at analysing the role of the economic sectors from point of view of their realising pollutions [Nitrogen-oxides (NO_x), Sulphur-dioxide (SO_2), Ammonia (NH_3), Particulate matter (PM_{10}) and Particulate matter ($PM_{2.5}$)]. The Household as a main economic sector indicator has caused a large amount of pollutions for natural environment, because share of the Household has considerably increased in different gas and particular material emissions for the period of 2000 and 2015, mostly in fields of PM_{10}, $PM_{2.5}$ and NH_3. The SPSS (Special Program for Social Sciences) according to Sajtos -Mitev as the methodology, which can ensure better way of the research to discover the main and deep correlations among the economic variances as gas and pollution particular materials belonging to the different economic sectors. Analyses focus on demonstrating different gas emission and particular material conditions of economic sectors or industries/economic branches in Hungary and strengthen of correlations among economic sectors' gas emissions and particular materials. Middle correlation is between NOX1 and PM104, also middle strong correlation between SO22 and NH33, and very strong correlation between PM104 and PM255 variances. Because of the Household as family unit has remained one of the biggest responsible for the increasing gas and particular material emissions in Hungary in spite that the SO_2 gas emission has decreased at the national level for the same period, therefore the new strategy should be followed. This new environmental conservation strategy demands from all sectors to decrease their gas emission in order to follow the sustainable economic growth accompanying with sustainable environment.

Keywords: *SPSS, SO_2, Pollution, Household, Global warming, Natural environment*

1. INTRODUCTION

In general, environmental pollution is the main challenge facing all countries in the world [1]. The quality of life on earth is determined primarily by air purity. Pollutants pose a direct threat to human health, damage the vegetation and destroy our environment. One of the major environmental tasks today is to reduce air pollution, one of the underlying causes of climate change and its adverse effects. The main basis link in these processes is to link air pollution to specific industries/economic branches [2]. Hungary is a small open economy that has enjoyed strong economic growth over the last decade. In one hand, the country's dependence on oil and gas imports for energy supply, as well as intensive industrial and agricultural activities and increasing road traffic have aggravated environmental challenges. On the other hand, the share of renewable energy sources in total final energy consumption reached 14.5% in 2015, a threefold increase since 2000, and likely to exceed the national target of 2020 [3].

This case-study focuses on analysing correlations among the economic variances by the other name as gases and particular materials polluting the atmosphere of the economy. At

present economic branches/industries are characterised by different measured gas emissions and particular materials. The study analyses the importance of the economic sectors resulting different measured pollutions. The Household as economic sector has resulted considerable pollutions for natural environment, because for the latest period the Household has considerably increased its share in pollutions by different gas and particular material emissions, mostly in fields of PM_{10}, $PM_{2.5}$ and NH_3. Also recently the NO_x gas emission has increased by the activities of water supply, sewerage, waste management and remediation activities, wholesale and retail trade, repair of motor vehicles and motorcycles, administrative and support service activities, the public administration and defence (compulsory social security), education, human health and social work activities, arts, entertainment and recreation, other service activities. Also activities of households as employers; undifferentiated goods- and services- producing activities of households for own use have contributed to increase more NO_x gas emission for the last one and two decades. The importance of the object in this research is the wronging negative tendency in field of the pollution measure caused by the human activities and the gas and particular materials emission of whole performance. This negative tendency can increase the more negative influences of greenhouse gas (GHG) emissions leading the danger global warming. Therefore the performance should avoid of influences of the increasing GHG and additional materials emission in the future. This force needs for the international cooperation of all nations in the world economy.

In general, acidification (NO_x SO_2, NH_3) causes damage mainly to soil, water and forest. While, the higher attention on PMs with a diameter of less than 10 micrometers (μm) results from there has adverse effect on health. So, inhalation of these substances plays a role in the formation of many serious diseases such as heart diseases and lung cancer [2]. Additionally, particles (PM_{10} and $PM_{2.5}$) are considered as potential pollutants that cause economic losses and health consequences on society [4]. Fine particles which are very small in size usually have long residence time in the atmosphere and generally tend to spread in a large geographic area and thus exert the greatest impact on vegetation and ecosystems by virtue of the mass loading of its chemical constituents and vegetation [5].

2. REVIEW OF RELEVANT LITERATURE

Air pollution is a major key issue of environmental and social problem and also, it's a complex problem that poses multiple challenges in terms of managing and reducing harmful pollutants. Air pollutants are caused by human activities and natural sources; they may be either emitted directly or formed in the atmosphere. They have a number of effects on health, the built environment and the climate [6]. Hence, under increasing numbers of population and economic growth, environmental pressures, problems and challenges are becoming more and more complicated due to excessive use of natural resources [1].

However, since the 1970s, a broad range of environmental legislation has been put in place to assessment, management and mitigation of harmful air pollutants. The body of EU environmental law - amounts to some 500 directives, regulations and decisions. Further, over the same period, the level of environmental protection has improved in most parts of Europe. And also, emissions of specific pollutants to the air have generally been reduced significantly such as SO_2. These improvements and reductions are largely the result of comprehensive environmental policies and legislation in Europe (e.g., the European Commission's proposed Clean Air Policy Package. Also, the UNECE, Gothenburg Protocol in Sweden in November 1999 and amendments Gothenburg Protocol in Geneva in May 2012) and they are delivering a range of environmental, economic and societal benefits [7]. Furthermore, the Convention on Long-range Transboundary Air Pollution of 1979 (CLRTAP) in Geneva addresses some of the major environmental problems of the United Nations Economic Commission for Europe (UNECE) region through scientific collaboration and policy negotiation, the Convention protocols identify specific measures to be taken by Parties to cut their emissions of air pollutants for protecting the environment and human health. Moreover, the UNECE, Gothenburg Protocol of 1999 in Sweden;

sets emission ceilings (e.g., SO_2, NO_x and NH_3) to regulate/control the emissions of transboundary air pollutants, which came into force in 2005. More recently, in May 2012 in Geneva, adopting historic amendments to the Gothenburg Protocol (1999) Convention's on CLRTAP. In general, this Protocol was amended (2012) to regulate acidifying compounds (e.g., SO_2, NO_x and NH_3), which include national emission reduction commitments to be achieved by 2020 and beyond. So, the EU Member States agreed to reduce emissions of SO_2, NO_x and NH_3 by 59%, 42% and 6% respectively for the EU as a whole by 2020 and beyond compared to 2005 emission level, while Hungary committed to cut these air pollutant emissions by 46%, 34% and 10% respectively for the same periods [8].

According the Hungarian force to degree the gas emission there are some international experiences in this field, for example the governments of these countries (e.g., China and Germany) are also increasing their efforts to reduce gas emissions through the Clean Development Mechanism (CDM) strategy [9, 10]. Foreign Direct Investment (FDI) inflows in Africa primarily target investments in services that are considered to be low-risk sectors, but these sectors do not require costly investments but promise a significantly more profitable business [11, 12, 13, 14].

The balance of payments consists of two parts: the current account, the capital and financial account. We must also mention the third part of the balance of payments, the central bank reserve as a balancing item, which is a kind of ultimate stabilising effect or an option concerning the environmental strategy [15]. For developing countries, financial support from developed countries and various international organisations is indispensable for their economic growth, which is complemented by investment in FDI, as they also mobilise significant financial resources for developing countries [16, 17, 14]. The development of renewable energy sources concentrated mainly on two countries, China and South Korea, and Japan has also made significant improvements in this area. China spent nearly $ 10.8 billion in environmental investments, one of which was one of China's major investments in the Three Gorges waterworks [14]. An important task of the China CDM Foundation, with the approval of the Chinese government, is that: - integrate government and market functions, - implement national development and sustainable development in order to expand CDM cooperation under the Kyoto Agreements [9, 18].

Finally, air pollution in urban areas is an important issue with different socio-economic and climatic aspects in different parts of the World, it can cause a serious environmental problem as well as a negative impacts on human health and on climate [19, 20]. Therefore, the rapid growth in population, urban and industrial activities resulted in deterioration of air quality in urban environments [4]. So urbanisation, industrialisation and fossil fuel-based transportation have led to a significant increase in air pollution in urban areas [21].

3. MATERIALS AND METHODS

The SPSS (Special Program for Social Sciences, see more detailed in Sajtos -Mitev [22]) as the methodology, which can ensure better way of the research to discover the main and deep correlations among the economic variances as gas and pollution particular materials belonging to the different economic sectors or industries/economic branches. Analyse emphasises the unfavourable importance of the Household in field of increasing measured pollutions. The cluster analyses focuses on the similarity and difference among the different economic sectors by the measured pollutions caused by the sectors. In addition, the data base of these analyses was selected from the Hungarian Central Statistical Office [23]; Tables (STADAT) published in 2017 for the period of 2000 and 2015 in Hungary in tons (2000 = 100%). The analyses of this study focus on the demonstrating the different gas emission and particular material conditions of the economic sectors or industries/economic branches in Hungary as shown in Table 1 [23], and the name of these sectors in short form (abbreviations) for SPSS analyses as listed in Table 2.

Table 1: Emission of NO_x, SO_2, NH_3 and Particulate matters (PM_{10} and $PM_{2.5}$) by sectors (industries/economic branches) in Hungary between 2000 and 2015 (2000 = 100%) [tons]

Sectors (industries/economic branches)		**NO_x**	**SO_2**	**NH_3**	**PM_{10}**	**$PM_{2.5}$**
		2000-2015				
A 01–03	Agriculture, forestry and fishing	3.8	-98.4	-12	-5.5	-12.5
B 05–09	Mining and quarrying	-2.3	-99.8	150	0.5	-4.5
C 10–33	Manufacturing	-38	-84	-45	-37	-40
D 35	Electricity, gas, steam and air conditioning supply	-48	-98	91	-58	-44
E 36–39	Water supply; sewerage, waste management and remediation activities	91	-70.7	-88	13	11
F 41–43	Construction	9.3	-17	370	-30	-28
G 45–47	Wholesale and retail trade; repair of motor vehicles and motorcycles	150	-86	77.7	22.4	9
H 49–53	Transportation and storage	-23	-85	42	-30	-35
I 55–56	Accommodation and food service activities	15.8	-90	-38	-30	-37
J 58–63	Information and communication	0.6	-88	-22	-32	-38.5
K 64–66	Financial and insurance activities	-20	-87.4	-39	-40	-46
L 68	Real estate activities	-30.5	-90	49.6	-34	-37
M 69–75	Professional, scientific and technical activities	-5.6	-85	-22	-22	-28.6
N 77–82 O 84 P 85 Q 86–88 R 90–93 S 94–96 T 97–98	Administrative and support service activities Public administration and defence; compulsory social security Education Human health and social work activities Arts, entertainment and recreation Other service activities Activities of households as employers; undifferentiated goods- and services- producing activities of households for own use	31	-87	-14	-17	-29.5
Household		-27.4	-50	67.2	47.7	47.4
Total emissions		**-20.6**	**-94.4**	**-11**	**2.9**	**12.4**
Household/ Total emissions in 2000		21	*5.1*	*4.5*	*47.6*	*66.2*
Household/ Total emissions in 2015		19.2	*47*	*8.4*	*68*	*86.7*

Source**:** Hungarian Central Statistical Office (2017): Themes - Environment: Tables (STADAT) - Time series of annual data - Environment: Air pollution data. Update: 25.09.2017. *Hungarian Central Statistical Office (HCSO)*, 2017. Available at: http://www.ksh.hu; [Accessed at: 04 September 2018].

In Table 1 there are *5 variances*, which are as follows:

NOX1 NO_x Nitrogen oxides
SO22 SO_2 Sulphur dioxide
NH33 NH_3 Ammonia
PM104 PM_{10} Particulate matters with a diameter of 10 μm or less (PM_{10})
PM255 $PM_{2.5}$ Particulate matters with a diameter of 2.5 μm or less ($PM_{2.5}$)

The coordinate system, as score system, is useful to over view the distance among sectors based on volume of pollutions as gas and particular materials caused by these sectors for the period of 2000 and 2015. Therefore also the score system can select the sectors into four sessions of the score based on the increasing or decreasing gas and polluting material emission of their activities.

Table 2: Name of sectors in short form (abbreviations), of the Table 1 for SPSS analyses

Sector (industries/economic branches)		In Short Form
A 01–03	Agriculture, forestry and fishing	AgrForFish
B 05–09	Mining and quarrying	Mining
C 10–33	Manufacturing	Manufact
D 35	Electricity, gas, steam and air conditioning supply	ElectrGasSup
E 36–39	Water supply; sewerage, waste management and remediation activities	Water
F 41–43	Construction	Constr
G 45–47	Wholesale and retail trade; repair of motor vehicles and motorcycles	WholRetTrad
H 49–53	Transportation and storage	Transport
I 55–56	Accommodation and food service activities	AccomFood
J 58–63	Information and communication	Inform
K 64–66	Financial and insurance activities	FinaInsure
L 68	Real estate activities	RealEstate
M 69–75	Professional, scientific and technical activities	ScientTech
N 77–82 O 84 P 85 Q 86–88 R 90–93 S 94–96 T 97–98	Administrative and support service activities Public administration and defence; compulsory social security Education Human health and social work activities Arts, entertainment and recreation Other service activities Activities of households as employers; undifferentiated goods- and services- producing activities of households for own use	AdminOther
Household		Household

Source**:** Based on Table 1.

4. RESULTS AND DISCUSSION

Air pollution is one of the most important global issues which involve conducting research, policy and strategy at national and international level to improve air quality [24]. In general, energy consumption, transportation (especially road traffic), industrial processes, agricultural activities and waste management are the main sources of air pollution causes by human activities and economic growth. Additionally, European countries have significantly reduced emissions of SO_2 air pollutant in recent decades. While, in the cases of PM and reactive nitrogen substances are still a significant threat to human health, premature deaths, and damage to ecosystems [25].

In some areas of Hungary [26, 27], the PM_{10} concentration in the air is annually higher than the permissible 35-fold higher than the health limit value. During the winter, pollution in these areas can reach 4-5 times the daily limit. The impact of this meteorological situation can be traced very well with this pollutant. In those years when the so-called atmospheric inversion periods occurred in larger numbers (November 2005 to March 2006 and November 2010 to March 2011) and there was little rainfall, and air pollution more frequently exceeded the daily limit. The trend shows that the rate of exceedance of annual limit values is decreasing: in 2005-2006 the annual PM_{10} content exceeded the 20% to 30% of the PM_{10} content, while in 2010-2011 the rate of exceedances was below 10%, and overtime between 2012 and 2014 did not happen. The regular $PM_{2.5}$ study began in Hungary for 12 years. In 2012, pollutants were measured in air. It can be seen that the limit from 2015 was only exceeded in some cases but the compliance with the limit set by 2020 is challenging. It is worth noting that in the current World Health Organisation (WHO) guidelines 10 Microgrammes per cubic metre ($\mu g/m^3$) is the annual value of $PM_{2.5}$. Based on the measurement data, 50-80% of PM_{10} is particle diameter smaller than 2.5 μm [26, 27]. Concerning nitrogen oxides (NO_x) emissions continue to be driven by transport and 44% of the pollutants emitted from this sector [26, 27]. The emission of specific pollutants

from newly installed vehicles has been steadily declining due to tighter regulation. The reduction in the total emissions of transport is limited by the increase in the number of vehicles and the reduction in the rate of change. The average age of road vehicles has risen again in the last 9-10 years. The nitrogen dioxide load in the air has fluctuated over the last 10 years [26, 27].

As mentioned above, the analyses of this study focus on the demonstrating the different gas emission and particular material conditions of the economic sectors or industries/economic branches in Hungary (see Table 1) and shows strengthen of correlations among economic sectors' gas emissions and particular materials (see Table 3). The Table 3 shows strengthen of correlations among main sectors, namely the middle correlation is between NOX1 and PM104, also middle strong correlation between SO22 and NH33, and very strong correlation between PM104 and PM255 variances. The strong correlation means that when the NOX1 decreases the other variance PM104 also decreases or little increases, therefore the economic development stimulates the NOX1 decrease, namely the Nitrogen oxides gas emission, so in the same time also this development stimulates little increase of the PM104 and PM255, as particular materials. When the SO22 considerably decreases the other variance NH33 also decreases little, when the PM104 and the other variance PM255 also little increase, because of the reason of the economic development.

Table 3: Correlation Matrix

		NOX1	**SO22**	**NH33**	**PM104**	**PM255**
Correlation	NOX1	1.000	.066	-.055	**.524**	.425
	SO22	.066	1.000	**.618**	.253	.323
	NH33	-.055	.618	1.000	-.001	.084
	PM104	.524	.253	-.001	1.000	**.973**
	PM255	.425	.323	.084	.973	1.000
Sig. (1-tailed)	NOX1		.407	.423	.022	.057
	SO22	.407		.007	.181	.120
	NH33	.423	.007		.498	.383
	PM104	.022	.181	.498		.000
	PM255	.057	.120	.383	.000	.425

Source: SPSS system based on the Hungarian Central Statistical Office (2017): Themes - Environment: Tables (STADAT) - Time series of annual data - Environment: Air pollution data. Update: 25.09.2017. *Hungarian Central Statistical Office (HCSO)*, 2017. Available at: http://www.ksh.hu; [Accessed at: 04 September 2018].

For the period of 2000 and 2015 the NOX1 has decreased by 20.6% and the PM104 little increased by 2.9% and PM255 also little increased by 12.4%, while the SO22 has considerably decreased by 94.4% and the NH33 little decreased by 11%. For the same period PM104 has little increased therefore the PM255 also little increased. It can be declared that in spite that the SO22 has sharply decreased, the other two variances namely PM104 and PM255 little increased according to Table 1 and Table 3 [26, 27].

The Figure 1 shows places of the different economic sectors separated in four sessions of this coordinate system. The places of the economic sectors are determined by the special gas emission of each economic sector of Hungary in the coordinate system. The each economic sector is characterised by its gas emission. The coordinate system very clearly shows differences among sectors based on their gas emission and particular materials [23].

The economic variances, as gas emission and particular materials of the Component-1 are lying at the principle line "X", namely NOX1 (Nitrogen oxides), PM104 (Particulate matters with a diameter of 10 μm or less, PM_{10}), PM255 (Particulate matters with a diameter of 2.5 μm or less, $PM_{2.5}$). The economic variances, as gas emission of the Component-2 are lying at the principle line "Y", namely SO22 (Sulphur dioxide), NH33 (Ammonia).

According to the Figure 1, in the first session of the score - coordinate system - the principle lines "X" and "Y" are positive valued, this means that two variances, namely Household and Mining are increasing or little decreasing. Generally the place of each economic sector in the score is determined by mostly the average values of the gas emissions and particular materials belonging to the sectors. Therefore the Household as economic sector is in this session, because

it has had large NH33 (NH_3) gas emission increase for this period, but its other two variances [PM104 (PM_{10}) and PM255 ($PM_{2.5}$)] of Component-1 have less increased. In the second quarter session of the coordinate system the variances as NOX1, PM104 and PM255 of the line "X" in the minus share of this line decreases only in case of one economic sector, namely Constr, The other two kinds of gas emissions of this economic sector remain mostly increases concerning the positive part of line "Y". This Constr variance has highly increase in NH_3 (ammonia) gas emission. In the third quarter session of the score the variances as NOX1, PM104 and PM255 at the line "X" in the positive share of this line increased or less decreased in cases of the economic sectors, as WholRetTrad, Water, AdminOther and AgrForFish, while their gas emission concerning the Component-2 contenting SO22 and NH33 at the negative share of the Principle Line "Y" decreased or less increased in the same period. In the fourth quarter session of the score the economic variances namely NOX1, PM104 and PM255 at Principle Line "X" and Component-2 including SO22 and NH33 gas emissions at Principle Line "Y" are both of them in the negative lines. This means that those economic sectors of this session, as Manufact, ElectrGasSup, Transport, AccomFood, Inform, FinaInsure, RealEstate and ScientTech have had decreasing trends in fields of gas emissions or less increasing for the period of 2000 and 2015.

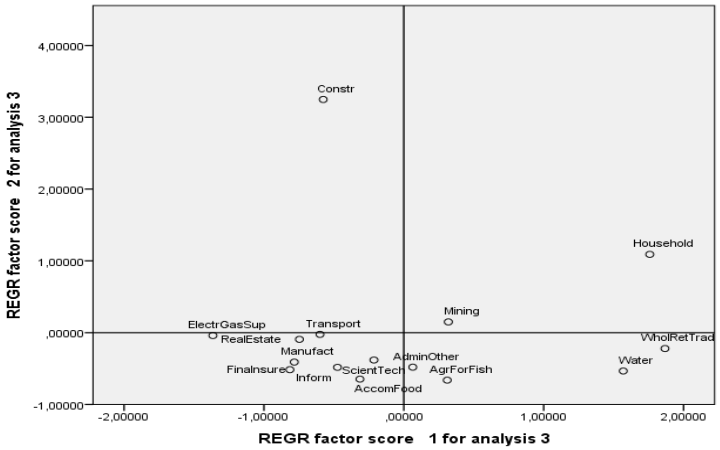

Figure 1: REGR factor score 1 and REGR factor score 2, factor analysis
Source: SPSS system based on the Hungarian Central Statistical Office (2017): Themes - Environment: Tables (STADAT) - Time series of annual data - Environment: Air pollution data. Update: 25.09.2017. *Hungarian Central Statistical Office (HCSO)*, 2017. Available at: http://www.ksh.hu; [Accessed at: 04 September 2018].

Generally in Hungary there were several kinds of different damages caused by economic sectors by their investments, for example fugitive emissions oil: refining/storage energy production and distribution; Distribution of oil products in energy production and distribution, Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other) Energy production and distribution Venting and flaring (oil, gas, combined oil and gas) Energy production and distribution, Other fugitive emissions from energy production Energy production and distribution, Cement production Industrial processes and product use, Lime production Industrial processes and product use, Glass production Industrial processes and product use, Quarrying and mining of minerals other than coal Industrial processes and product use, Construction and demolition Industrial processes and product use, Storage, handling and transport of mineral products Industrial processes and product use, Other mineral products Industrial processes and product use, Ammonia production Industrial processes and product use, Nitric acid production Industrial processes and product use, Adipic acid production Industrial processes and product use, Carbide production Industrial processes and product use, Titanium dioxide production Industrial processes and product use, Soda ash production Industrial processes and product use, Chemical industry: Other Industrial processes and product use, Storage, handling and transport of chemical products Industrial processes and product use [28].

The Figure 2 shows that there are five clusters created by the SPSS system for 15 economic sectors based on their gas and particular material emissions. The Constr sector is alone the fourth cluster, while the Household is alone as fifth cluster, because their gas emission and particular material issue are very special and different from the other sectors' one. The first cluster includes two sectors, namely AgrForFish and Mining, while the third cluster includes Water and WholRetTrad. The second cluster content largest number of sectors as nine one, namely Manufact, ElectrGasSup, Transport, AccomFood, Inform, FinaInsure, RealEstate, ScientTech, AdminOther, which have an important common behaviour, namely these sectors have decreased gas and particular material emissions more than the other sectors' one for the period of 2000 and 2015.

In addition, the five clusters (Figure 2) can be outlined as the followings:

Cluster-1 (2): AgrForFish, Mining

Cluster-2 (9): Manufact, ElectrGasSup, Transport, AccomFood, Inform, FinaInsure, RealEstate, ScientTech, AdminOther

Cluster-3 (2): Water, WholRetTrad

Cluster-4 (1): Constr

Cluster-5 (1): Household

In spite that the Hungarian economy has realised considerable decreasing different gas emission but increasing particular material emission for the latest period of 2000 and 2015 in general. The SO_2 gas emission decreased by 94.4% at the national level, while the Household as economic sector named in our research has increased its share to 8.4% by 67.2% in field of NH_3 gas emission and its share to 86.7% by 47.4% increasing $PM_{2.5}$ emission and its share to 68% by 47.7% increasing PM_{10} emission according to the Table 1. Therefore the Household as family unit remained one of the biggest responsible for the SO_2 gas emission by its share as 47% and also in fields of PM_{10} and $PM_{2.5}$ emissions by the end of 2015 in Hungary.

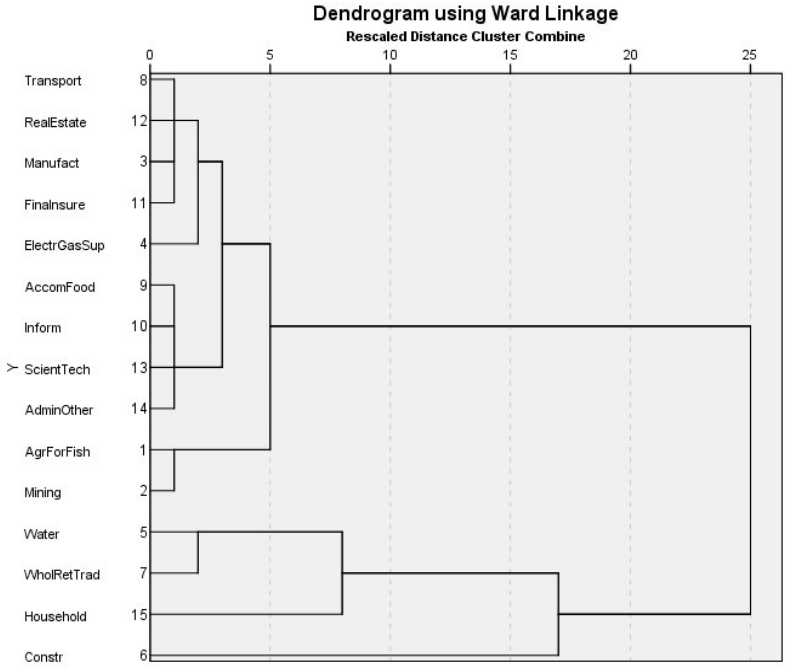

Figure 2: Dendrogram using Ward linkage. Rescaled Distance Cluster Combine
Source: SPSS system based on the Hungarian Central Statistical Office (2017): Themes - Environment: Tables (STADAT) - Time series of annual data - Environment: Air pollution data. Update: 25.09.2017. *Hungarian Central Statistical Office (HCSO)*, 2017. Available at: http://www.ksh.hu; [Accessed at: 04 September 2018].

Finally, as we know that air pollution damage the environment (i.e. acid rain), cause human diseases (i.e. lung and heart disease), and impact on climate (i.e. climate change/global warming) [29]. So, on one hand, the EU has acted at a number of levels to reduce exposure to air

pollution through the EU's legislation and directive [e.g., Air Quality Framework Directive, Daughter Directives, National Emissions Ceilings Directive and the Clean Air for Europe Directive, etc.] using standards, limit values and target values, through policies and strategies, through research, through cooperation with organisations responsible for air pollution, through authorities and non-government organisations at national and regional level [30].

On the other hand, effective actions to control/reduce the effects of air pollution, needs a good understanding of their causes, how pollutants are transported and transformed in the atmosphere, and how they affect humans, ecosystems, society and the economy, as well as formulate and apply strategic policies to control/reduce the emissions of air pollutants, also, up to date knowledge of air quality status and its effect on humans, on environments and on the world's climate [6, 29].

CONCLUSION

Because of the *Household as family unit has remained one of the biggest responsible for the increasing gas and particular material emissions in Hungary,* while the SO_2 gas emission has decreased for the same period at the national level, therefore the new strategy should be followed. The new environmental conservation strategy demands from all sectors to decrease their gas emission in order to follow the sustainable economic growth accompanying with sustainable environment. Naturally the mitigation of gas and particular material emissions is important for all of the nations including the EU, therefore the international cooperation for realising this aim cannot be avoid of this cooperation and force. In spite that the SO_2 gas emission has sharply decreased, but the particular materials, as PM_{10} and $PM_{2.5}$ have increased for the period of 2000 and 2015 in Hungary, which emphasises importance of the considerable force to decrease gas and particular material emissions in order to follow the sustainable economic growth and remaining the natural environment. Also the mining, quarrying and construction have implemented considerable gas emissions for the same period, which needs for introducing new technologies for mitting the gas emissions.

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