Creative Industries in an Economic Point of View – the Use of Input-output Analysis

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Abstract

Creative industries provide services and products that are very important for the present society. Yet these industries, especially art, are often unjustly seen as an unimportant part of the economy. To prove the opposite, this paper uses the input-output analysis on selected sectors of creative industries in the Czech Republic to show their economic importance. The input-output analysis is based on relations between individual industries and can calculate general contribution of individual industry to the whole economy. At first, the paper introduces the term of creative industries, then the concept of input-output analysis and its utilization. After that, the input-output analysis is used on selected sectors of creative industries and the results are compared to other, "uncreative" industries. The results show the potential of creative industries and justifies that they are the integral part of the economy.

Key words: Creative industries, input-output analysis

JEL Classification: R15

1 Introduction

Recently culture and its influence on economic development of regions became a popular topic for many regional economists or specialists from other scientific fields. Topics such as an economy of culture, cultural and creative industries, a creative economy, economic impacts of culture or multipliers of creative industries got into focus of many authors – for example Dostál and Kislingerová (2012), Žáková et al. (2011), Raabová (2010), Florida (2004), Campbell (2011) or Peck (2005) based their works on these topics. The popularity of these subjects can have two reasons. First, these subjects are not as explored as they could be (knowing their history goes back to the half of the 20th century), thus there is still great potential of research. Second reason could be the fact, that culture can play relatively important role in development of regions, therefore it needs scientific attention.

This fact is proven by the EC, who confirms that culture and creative industries employ more than 8 million people and produce almost 4,5% of European GDP (European Commission, 2013). However, it is important to define what activities belong to the category of culture and creative industries and if this impact is really so significant.

For that reason, these terms will be defined at first in this paper. Then the input-output analysis will be explained and used for calculations of output multipliers of selected cultural and creative industries in the Czech Republic. On the basis of the results it will be possible to assess the importance of culture and creative industries which is the main objective of this article.

2 Culture, Cultural and Creative Industries and a Creative Class

To investigate the impact of culture and cultural events it is necessary to define some basic related concepts. The problem is, that individual authors have very often different opinions regarding these terms. Especially, the terms: culture, cultural and creative industries, creativity and a creative class, are not so consistently defined.

Culture is a word that is used in many senses, however, in this paper it will be understood as a general term for art, music and literature (Oxford Advanced Learner's Dictionary of Current English, 2000).

More difficult is to define cultural and creative industries. At first it is interesting to focus on the word "industry", which appears a bit unfortunate. An industry itself is mostly understood as an activity in which tangible products are produced (e.g. the products of a heavy or a light industry), but the term began to be used in a connection with services as well. Even the Oxford Advanced Learner's Dictionary of Current English (2000) allows the definition of the industry as "the people and activities involved in producing a particular thing, or in providing a particular service" (Oxford Advanced Learner's Dictionary of Current English, 2000, p. 663). Thus if the word industry can be understood in this way, it can be used also in a connection with creativity and culture.

Cultural and creative industries can be defined differently. The most widely used definition is the one that has been created for the purpose of mapping the creative industries in the UK in 1998. It says that the creative industries "have their origin in individual creativity, skill and talent and (…) have a potential for wealth and job creation through the generation and exploitation of intellectual property" (DCMS, 2001, p. 5). Other definition can offer Dostál and Kislingerová (2012), who argue that the creative industries are "characterized by the fact that their products are goods, services or experiences that are non-essential in a sense that they are not required to sustain life nor a production of machines or tools" (…) but "are necessary to maintain a civilization in the way we know it. The creative Industries serve to people during their leisure time in many different ways" (Dostál, Kislingerová, 2012, p. 35).

Popularization of creative industries occurred during the 1990s of the 20th century in England, where the local government was dealing with this subject. More specifically they tried to find out how to determine the value of art and culture that had previously been seen only as a marginal part of the economy and mostly dependent on a public support. They believed that these industries had been perceived too narrowly and wanted them to be understood for their real benefits. They have included not only the traditional art forms such as theatre, music and film in the category of creative industries, but also advertising and a retail trade with creative goods (British Council, 2011b). Nowadays, the concept of creative industries contains far more things.

E.g. Žáková et al. (2011), who map the cultural and creative industries in the Czech Republic, classify music, books and magazines, art market, film, video games, radio and a television broadcasting, advertising, design, performing arts, tourism and architecture to the category of cultural and creative industries.

It should be noted that many authors do not use the word "culture" in the title "cultural and creative industries" and entitle this whole area only as the creative industries. Also it is easy to see that there is still no consensus on what to include into those categories. This fact will be proven by the following paragraphs.

The very concept of cultural and creative industries is large, thus many authors divide it into some categories. Žáková et al. (2011) recognize categories of arts, cultural industries, creative industries and related industry sectors. The first category consists of sectors that "produce reproducible goods and services that are "consumed" on the spot (a concert, an art fair, an exhibition)" (Žáková et al., 2011, p. 5). The second category contains the goods and services that can be massively reproduced and distributed, these are for example films, video, music recordings, books, etc. The category of the creative industries authors specify as "an area where culture becomes a creative input in the production of non-cultural goods" (Žáková et al., 2011, p. 5), by this authors mean the products of design, architecture or advertising. The last category is then placed on a special place. Those are goods which need creativity for their development and have a significant importance for the economy, but are not purely cultural goods or services. Examples of this category can be manufacturers of PC, MP3, mobile phones etc. This last category, in some cases, is not even classified as a part of the cultural and creative industries. Another distribution is used in work of Dostál and Kislingerová (2012) who recognise only three basic areas, but the only difference from the previous distribution, is that they sum up the first two categories which Žáková et al. (2011) introduced. Also Herrero et al. (2006) recognize three main categories of cultural economics (thus cultural and creative industries), those are: performing arts, cultural industries and a historic heritage. Content of Performing arts and a historic heritage is relatively clear, but cultural industries need an explanation. According to authors they consist of reproducible goods, such as books, records, films etc.

Therefore it is obvious, that cultural and creative industries represent big area of economy that include a production of many goods and services somehow related to culture and creativity and each author has its own way of defining or designating them. In this paper, arts, cultural industries and creative industries according to Žáková et al. (2011) will form the category of cultural and creative industries. Thus this category will be defined almost as widely as possible, because the analysis will be made on basis of the tables published by the Czech Statistical Office that contain 99 sectors of industries from which only 5 belong to the categories related to culture. Here it is appropriate to also define the concept of creativity, that can be "understood as the use of cultural resources as an intermediate product in the production process of non-cultural sectors, and therefore as a source of innovation" (Žáková et al., 2011, p 5). As stated by Florida (2004), every human being is creative in some way and creativity itself is often not a question of individuals, but requires an extensive social process and teamwork.

The previous paragraphs also show how broad the concept of creative industries can be and why so large numbers of share on GDP are often showed. For example if activities such as IT, manufacturing MP3 players or mobile phones are included in the sector, it is clear that this would

be the sector that contributes significantly to the GDP. For such measurements is always important to define exactly what activities are included in the statistics, which often sadly lacks. British Council report (2011a) also deals with the problem of finding the size of the creative industries, respectively the creative economy. It is clear that while it is relatively easy to identify the extent and value of industries such as the fashion and advertising, in attempt to determine the value of the remaining, there is a problem that applied formulas cannot cover individuals or groups who do creative work in uncreative industries. Therefore, determining the scope of the creative economy is highly problematic and results are rather estimations.

Another important topic, which is connected to the culture and creative industries, is the term "creative class". This topic is very extensively dealt within works of an American author Richard Florida. To the creative class Florida (2004) includes the following: scientists, engineers, artists, musicians, architects, managers and others who, in their work, need to be creative. It is therefore a very broad range of professions and their members do not even need to be employed in companies providing services or goods of the creative industries and can be e.g. managers of manufacturing companies. This wide definition, although theoretically appropriate, is problematic when trying to find a value produced by the creative class. From given examples of professions that belong to the creative class, it is clear, that their members have more freedom at their work and it is possible to agree with Dostál and Kislingerová (2012), that they are expected to work innovatively and of course creatively (for example, they have flexible working hours).

From the theoretical definitions of terms related to culture and creativity, it is clear that there is a little consensus about the use of these certain terms, and each author interprets them in his/hers own way. Therefore it would be useful to finally unite this terminology in some way.

3 Input-output Analysis

Input-output analysis is based on the multiplier effect which was firstly introduced by Kahn (1931) in his work „The Relation of Home Investment to Unemployment“. However, the theory was more developed by John Maynard Keynes in his well-known work “General theory of Employment, Interest and Money” (1936). He explained the multiplier effect on the example of closed economy model, where the economy operates in steady state. If expenses increase (especially the public expenses), expenditures of the whole economy increase more than the original expenditure. They are multiplied by the value of so called multiplier. It is caused by further rounds of consumption: government spends some money on a public project and its realization needs for example additional workforce, some new material or provision of services. These finances are further used when employees spend their salaries and suppliers pay their payables etc. Then other rounds of consumption proceed. Thus the original expenditure is multiplied and the impact on the whole economy is much bigger than the original investment. These multiplier effects does not have to exist only due to the financial “injections” of the government, but can also be caused by the banking system when the money supply is increased. In reality all money that is somehow put in the economy multiplies itself.

In 1930s Wassily Leontief (1936) wrote his „Quantitative Input-Output relations in the economic system of the United States“. He describes the table of economical inputs and outputs, from

which the input-output modelling was subsequently developed. However, he was not the only author who dealt with this topic especially in 1950s. Researchers found out, that this modelling can be appropriate not only for economies of the countries, but also for regions or individual sectors of the economy and it could be used for the development policy and planning. For example Leon Walras set up his model of general equilibrium or Isard (1953) worked with regional and interregional commodity flows and set up his own input-output model. The most significant was the work of Wassily Leontief, who wrote his Input-Output Economics in 1951. In his work (Leontief, 1986), author shows relations among individual sectors using quantification of their inputs and outputs. These sectors are of course mutually linked (an output of one sector is an input of another and otherwise). Using these relations it is possible to calculate how change of demand in one sector affects another sector or the whole economy. To express this change it is necessary to calculate so called sector multipliers - values that express how much the production in whole economy increases if a demand for the production of one sector increases of one unit.

4 The Use of Input-output Analysis

In nowadays the input output analysis is used as a fundamental tool when making an analysis of economic impact and it serves not only to its original purpose (i.e. the analysis of the flows between industrial sectors), but also for justification of economic importance of various economy sectors, assets and also events.

For example Bednaříková (2012) use it for justification of importance of agriculture in the Vysočina region. Authors Llop and Arauzo-Carod (2011) made input-output analysis to prove the economic importance of a new cultural asset (new museum called the Gaudí Centre). Rojíček (2007) provided an extensive analysis of the Czech industry using this tool or Raabová (2010) chose to analyse cultural sectors. The work of Raabová is similar to this one in many ways, but it does not contain the exact methodology of calculation and it obviously uses different (and of course older) data. Also Dunlop et al. (2004) made an analysis of the cultural sector in Scotland and Herrero et al. (2006) use this tool to estimate the economic impact of The European Capital of Culture Salamanca 2002.

Thus from these few examples it is clear, that this analysis could be used not only for the calculation of the economic impact of an industry, but also of assets or an event. Yet, it is important to stress that in these cases, it is necessary to alter the symmetric input-output tables using some existing, but complex methods.

5 Computation of Multipliers

Process of computation of the sector multipliers and assumptions of this method explain among many other authors for example Herrera et al. (2006), Rojíček (2007) or a study prepared by Economic Impact (2011) and naturally it is possible to find it in the original work of Leonfief (1986) as well.

Input-output analysis is based on symmetric input-output tables (hereinafter SIOT). These tables capture all transactions (financial flows) between all sectors in economy, i. e. inputs of individual sectors and their outputs. SIOT are compiled periodically (once in five years) according to the Eurostat methodology (Eurostat Methodologies and working papers, 2008), that is based on the ESA 1995 standard.

Unfortunately by the time of writing this paper, the latest version of these tables (type product x product) was published for the year 2010. Although there could have been some changes in structure of the economy and relations amongst the sectors since 2010, there are no available data that would be more recent, thus these tables will be used.

Using the data from SIOT, direct consumption coefficients (also called the input coefficients) and output multipliers can be calculated. To calculate these multipliers it is first necessary to normalize the data in the SIOT by the row of total resources, i. e. $a_{ij} = z_{ij}/x_j$. This will give us direct consumption matrix (A), which indicates how much one unit of a product consumes intermediates. This intermediate consumption is direct, but it is possible to include the indirect consumption as well, and thus gain the output multipliers. The procedure is as follows: from the identity matrix (I), the matrix of direct consumption coefficients (A) will be subtracted and from the resulting matrix, the inverse matrix will be formed. Generally written:
$(I - A) * x = y$
$x = (I - A)^{-1} * y,$
where $(I - A)^{-1} = L$ is so called Leontief inverse matrix or the matrix of comprehensive consumption coefficients. If the values in each column of the matrix are summed, output multipliers for the entire industry will be obtained. These multipliers indicate how many times the production of the whole economy increases as a result of increased production of one particular (analysed) sector.

5 Multipliers Established From Input-output Table

The very first issue that was encountered when trying to calculate these multipliers was an excessive aggregation of individual sectors in the SIOT table and thus the impossibility of finding all the right sectors. In the Czech SIOT there were only 5 sectors that belong to the category of creative industries. These are: Publishing services (n. 58), Motion picture, video and television programme production services, sound recording and music publishing (59), Programming and broadcasting services (60), Creative, arts and entertainment services (90) and Library, archive, museum and other cultural services (91). The resulting coefficients and multipliers for these sectors are shown in Tab. 1.

Tab. 1 Coefficients of direct consumption and output multipliers for chosen sectors in CZ

number of sector	**06 lowest**	**42 highest**	**58**	**59**	**60**	**90**	**91**
			cultural industries				
coefficients of direct consumption	000,7	0,908	0.455	0.479	0.478	0.413	0.375
output multipliers	1,009	3,381	1.947	1.933	1.910	1.820	1.752

Source: Czech statistical office, 2014, own calculations

The selected cultural industries have average coefficients of direct consumption (a median set out of coefficients has a value of 0.473). For comparison, the greatest value of this coefficient has sector Constructions and construction works for civil engineering (42) with a value of 0.908 (i.e., the sector needs 90.8% of the resources from other sectors and therefore has the greatest potential of multiplier effects). On the other hand the lowest value of direct consumption coefficient (0.007) shows the Crude petroleum and natural gas sector (06), where the most of the resources were imported. These limits correspond to the subsequently calculated output multipliers, where the lowest value is represented by 1.009 (Crude petroleum and natural gas) and the highest value by 3.381 (Constructions and construction works for civil engineering).

Output Multipliers in the Cultural industries have values about 1.9, which means that, when the demand for one of them increases about CZK 1 million, an overall increase of production in the economy will be about CZK 1.9 million, which is not negligible. From these Cultural industries the highest value has the sector of Publishing services and the lowest Library, archive, museum and other cultural services. These high values prove the importance of creative industries in the economy.

For the more precise analysis the attention now will be paid on what inputs (from which sectors) these industries use, but due to the large range of input-output tables, only the largest suppliers will be appointed.

Table 2 Largest suppliers of analysed sectors

58		**59**		**60**		**90**		**91**	
Printing and recording services	0.174	Own production	0.146	Own production	0.222	Own production	0.117	Products of agriculture, hunting and related services	0.054
Own production	0.110	Rental and leasing services sector	0.051	Motion picture, video… (59)	0.183	Specialized construction works	0.060	Specialized construction works	0.047
Wholesale and retail trade	0.062	Printing and recording services	0.033	Telecommu-nications	0.041	Real estate services	0.056	Real estate services	0.047
Postal and courier services	0.023	Computer, electronic and optical products	0.030			Office administrative, office support and other business support services	0.023	Electricity, gas, steam and air conditioning	0.035
Other professional, scientific and technical services	0.011	Real estate services	0.027			Electricity, gas, steam and air conditioning	0.017	Food and beverage serving services	0.017
Paper and paper products	0.010	Programming and broadcastin	0.024			Advertising and market research	0.017	Wholesale and retail trade	0.015

		g services			services			
		Advertising and market research products	0.024		Other professional, scientific and technical services	0.014		
		Wearing apparel products	0.023		Motion picture, video… (59)	0.013		
		Electricity, gas, steam and air conditioning supply	0.019		Programming and broadcasting services	0.013		
		Financial service activities	0.015					
		Telecommu-nications	0.014					
		Sports activities and amusement and recreation activities	0.010					

Source: Czech statistical office, 2014, own calculations

The results are shown in Table 2, which displays those sectors (suppliers), that have the value of direct consumption coefficient higher than 0.010. Except for the last analysed one, all sectors consume their own production. Many of them also consume production of other analysed sectors. The largest number of significant suppliers has the Motion picture, video … sector (n. 59), the lowest, on the other hand, the sector of Programming and broadcasting services (60). Also the closer look at the table reveals very logical supplier-customer relations, for example, it is no surprise, that sector Publishing services needs for its production printing and recording services, paper and paper products or postal and courier services etc. Interesting fact offers the last analysed sector Library, archive, museum and other cultural services, which in addition to having logically very low intermediate consumption has the Products of agriculture, hunting and related services sector as the largest supplier.

It is easy to see, that these "creative" sectors have many suppliers from other sectors that have nothing in common with culture (for example Electricity, gas, steam and air conditioning sector). Thus due to these relations, cultural and creative sectors have potential to affect other parts of the economy.

6 Conclusions

The results of input-output analysis of the five selected sectors that belong to the category of cultural and creative industries showed their importance in the Czech economy. Calculated coefficients of direct consumption which indicate how much one unit of a product consumes intermediates from other sectors had satisfactory values. These values vary around the median of whole statistical set calculated from other sectors. Also output multipliers – which indicate how many times the production of the whole economy increases as a result of increased demand for the production of one particular sector – showed that cultural and creative sectors have an important impact on the economy.

From the values of the biggest suppliers' coefficients of direct consumption, it is clear that, except for the last analysed sector, all consume their own products and often the products of other analysed sectors. Supplier-customer relationships there seem to be very logical and not too surprising. These relationships also show that the increase in demand for one cultural sector will affect the other, "uncreative" industry. Therefore, these sectors should not be underestimated. The objective of this article was fulfilled and it was proven that cultural sectors in general deserve more attention and should be treated as industries that have a potential to increase GDP or affect other economic indicators.

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