Chapter 6
How Important is the Media and Content Sector to the European Economy?

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6.1 Introduction

Many studies have been conducted to investigate the relationship between technology development and economic performance and to demonstrate the increasingly important role of information and communication technology (ICT) sectors. These studies have been carried out at a macrolevel where technology is seen as an important factor in supporting economic growth through capital accumulation and increased productivity (Bresnahan and Trajtenberg 1995; Steindel and Stiroh 2001), and at meso-level where the relationship between technology and the firm efficiency has been recognized (Chacko and Mitchell 1998). More importantly, there have been a substantial number of studies that discuss the role of specific ICT devices, such as telecommunications (Cronin et al. 1991; Madden and Savage 1998; Dutta 2001), and computer technology and the broadband (Jorgenson and Stiroh 1995; Brynjolfsson 1996). In general, these studies indicate that the relationship between technology, in generic forms, and ICT products and services is important to achieve better performance and economic growth.

The European countries, therefore, are also aware of the need to develop the ICT economy in the region. It is denoted by the introduction of the Lisbon Strategy which was set out in 2000 and followed by the Barcelona meeting in 2002. Both initiatives aimed to achieve a significant boost to research and development (R&D) activities in the European region and, ultimately, to obtain the target: "by 2010 the European region would become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion." A particular emphasis of this agenda is the goal of increasing gross expenditure on R and D to 3 % of the EU's gross domestic product (GDP), with the business sectors projected to contribute two-thirds of this financing scheme. Nonetheless, it is generally conceived

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that the agenda has not yet met the target (Creel et al. 2005; Zgajewski and Hajjar 2005; Duncan 2009).[1]

In relation to this, Van Ark et al. (2008), for instance, present the analysis on the productivity gap between the European countries and the United States (US) before and after 2000s. The study reveals that different degrees of technology used in both regions have led to different levels of productivity. The labor productivity (GDP per hour of work) in the US accelerated from 1.2 % in 1973–1995 to 2.3 % in 1995–2006. In contrast, the productivity growth in the 15 European countries decreased from 2.4 % in 1973–1995 to 1.5 % in 1995–2006. The study shows that the slowdown is attributable to a slower emergence of the knowledge economy driven by the lower growth contributions from investment in ICT in Europe, the relatively small share of technology-producing industries, and the slower multi-factor productivity growth that is viewed as a proxy for advances in technology and innovation.

Therefore, to stimulate further economic growth, the role of media and content sector is important to develop as part of the ICT sectors (OECD 2008, 2009). Lamborghini (2006) stated that the digital and on-line content is becoming the real center of the new scenario and the main term of reference to achieve the information society due to two main reasons (1) the positive effects the sector produces for everyday lives, and (2) the fact that the sectors are the main growth driver of the electronic communications sector, with enormous potential in terms of growth and employment. However, while studies on the other ICT devices, for instance, the internet, broadband and mobile phone have been examined extensively, only a few studies are devoted to investigating the role of the media and content sector in the European economy with a precise definition of the sectors. To fill the gap, this study aims to answer three questions:

- How much has the media and content sectors contributed to the output of the European countries' economy during the 1995–2005 period?

The measurement is conducted by calculating the multiplier coefficient that shows how the change in final demand in the media and content sectors contributes to the enlargement of the economic output.

- What are the sources of growth in the media and content sectors in the European economy?

The change in output of a particular sector can be decomposed into four sources: the domestic final demand effect, export effect, import substitution effect, and technology coefficient effect.

- How will the continuous reduction in price in the media and content sectors affect the overall economy?

[1] http://www.euractiv.com/priorities/sweden-admits-lisbon-agenda-failure/article-182797

The price in the media and content sectors has been driven by technological innovation and has declined significantly (e.g., Edquist 2005; Bagchi, Kirs and Lopez 2008; Haacker 2010; Oulton 2010). The scenario analysis is, therefore, performed to forecast the impact of the price reduction on the GDP. The measurement is obtained by calculating the sensitivity of the GDP with respect to the price of the media and content sector.

6.2 ICT Economy in the European Region

The OECD (2009), p. 14 stated that, by nature, ICTs are seen as general purpose of technologies (GPT) that can be used for a broad range of everyday activities. Consequently, new modes of individual behavior have emerged, including new or modified means of personal communication and interaction. In line with this argument, Kramer et al. (2007) also stress that continual reporting on (information) technology has helped raise awareness of the importance of ICT diffusion to overall competitiveness. Thus, they also refer to the role of the ICT sectors in explaining the technology sector.

With regard to the performance of ICT sectors in the European economy, IPTS (2011) delivered an extensive report by first identifying and classifying the ICT sectors into two groups: ICT manufacturing and services.[2] Based on this classification, it is reported that in 2008, the value added by the ICT sectors was as much as 4.7 % of GDP (or equivalent to 574 billion Euros). Besides this, the sectors have also been able to generate 3.6 % of the total employment (8.2 million jobs) with job creation strongly oriented toward ICT services and accounting for 6.2 million jobs. In terms of R and D, the ICT sectors also lead by contributing 25 % of the total business expenditure on R and D.

Nevertheless, if the performance is being compared with that of other countries, it is found that the European region is now lagging behind the US and other emerging countries. With the proportion of relative economic weight of the ICT sectors of GDP, approximately 4.7 % in 2008, the proportion is smaller than that in China (6.6 %), Japan (6.9 %), Korea (7.2 %), and Taiwan (10.5 %). This takes into account that, in general, ICT manufacturing in Asia is greater than that in the EU. The R and D intensity (measured by the ratio of R&D expenditure to value added by the sector) in Europe is also lower than that in the United States and emerging countries. The EU recorded 6.2 %, which is lower than in the United States (11.2 %), Japan (12.8 %), Korea (16.5 %), and Taiwan (12.3 %).

[2] ICT manufacturing consists of IT equipment, IT components, telecom and multimedia equipment, telecom equipment (e.g., network equipment, mobile phones), multimedia equipment (e.g., TVs, DVD players, and video game consoles) and measurement instruments, whereas ICT services consist of telecom services (e.g., fixed line, mobile telecommunications) and computer services and software (e.g., consultancy, software, the internet).

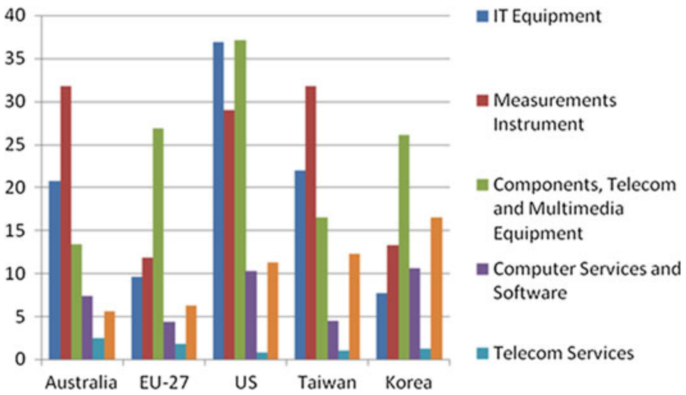

Fig. 6.1 ICT subsector R and D intensities, 2007, as a percentage of the added value *Source* IPTS, EC (2010)

In terms of subsector of ICT, Fig. 6.1 explains the R and D intensities in the ICT sectors, comparing the European region and other leading ICT countries.

The R and D intensities, as shown in Fig. 6.1, vary between the ICT subsectors. Components, telecommunication, and multimedia equipment have the highest percentages of added value in the EU, the United States, and Korea. Telecommunication services, on the other hand, have the lowest percentage of R and D to added value in each country and region. It can be concluded that the intensities of R and D in the EU are generally lower than in the United States, whereas the component, telecommunication, and multimedia equipment recorded the highest contribution in the ICT subsector in terms of R and D intensities in the European countries.

From the end-user and consumption side, the gradual decline in communication consumption also indicates why this recession afflicts most of the ICT industry in the European countries. The annual data on the ratio of expenditure on communication to GDP shows that the ratio has declined gradually. Even though the ratio dropped only slightly from 3 % (2006) to 2.9 % (2008) throughout the EU (15 countries), it has dropped substantially for major and leading ICT countries like Germany, the Netherlands, Italy, Norway, and Finland. For instance, Germany dropped from 2.9 % (2006) to 2.6 % (2008), and the Netherlands has continued to decline from 2.7 % (2006) to 2.4 % (2008). It is not surprising that the investment in this sector is also affected by the recession. From the data, which comprises 33 European countries, the average annual growth in telecommunication investment during 2000–2006 was −6 % compared with 16.2 % during the period 1995–2000. Figure 6.2 shows the decline in telecommunication investment, which began in earnest in 2001.

From industry perspective, the surveys conducted in some European countries on broadcasting media discovered that the largest channels in each country are also suffering a decline in their ratings. Although the aggregate revenue still increases

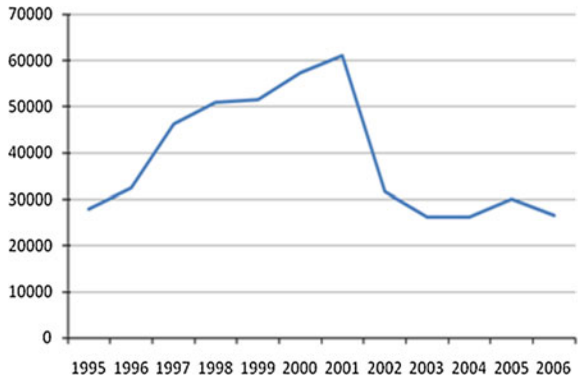

Fig. 6.2 Telecommunication investments in the European countries (MEUR) *Source* Eurostat (2010)

across Europe during 2006–2008, the public broadcasting sector has seen a drop of more than four percentage (4 %) points in its total market share, while the commercial sector (both radio and TV financed by advertising) has grown modestly (Open Society Institute 2009). It is also predicted that the advertising revenues of traditional channels are not likely to grow significantly over the next decade. Using two different econometric models, it is estimated that the gradual decline is around 0.2–0.5 % (OFCOM 2010).

6.3 Methodology

Throughout this analysis, the Input–Output (IO) methodology will serve as the main tool of analysis. The advantage of the IO method is its ability to capture direct and indirect impacts as well as to assess the impacts at both macro- and meso-level (industry level). A close relationship between the firm and industry data is explained in the IO table, as the intermediate transaction in quadrant I consists of the data gathered from an industry survey (Yan 1968: 59–60; United Nations 1999: 3; Miller and Blair 2009: 73). The relationship between IO and the

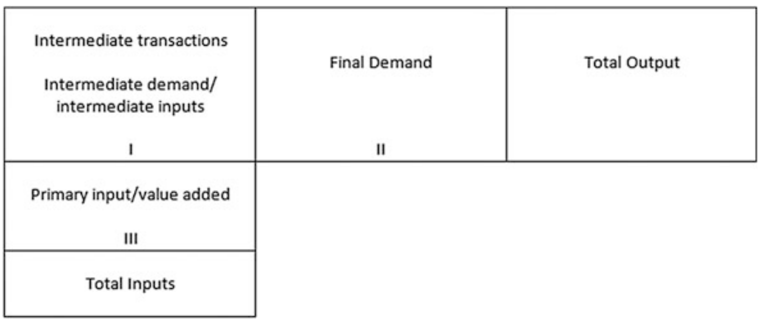

Fig. 6.3 Input–output (IO) table

macro-variable can also be explained that the primary inputs (the summation of wages, salary, and operating surpluses) in quadrant III also reflecting the measurement of GDP from the income approach, whereas, the summation of consumption, investment, government spending, and net export in quadrant II reflecting the GDP calculation from final demand approach. Figure 6.3 presents the IO table and how to operationalize the method.

From Fig. 6.3, the transaction flow in the IO table is explained by system Eq. (6.1) below. Suppose we have four sectors in the economy:

$$x_{11} + x_{12} + x_{13} + x_{14} + c_1 = x_1 \tag{6.1}$$

$$x_{21} + x_{22} + x_{23} + x_{24} + c_2 = x_2$$
$$x_{31} + x_{32} + x_{33} + x_{34} + c_3 = x_3$$
$$x_{41} + x_{42} + x_{43} + x_{44} + c_4 = x_4$$

From Eq. (6.1), x_{ij} denotes the output from sector i used by sector j as an intermediate input (or, in other words, it measures the input from sector i used for further production processes in sector j). In the IO table, these values are located in quadrant I. Moreover, c_i (i = 1…4) refers to the total final demand of sector i, whereas x_i refers to the total output of sector i. Introducing the matrix notation, we can modify Eq. (6.1) to obtain the following matrix column:

$$x = \begin{pmatrix} x_1 \\ \vdots \\ x_4 \end{pmatrix};\ c = \begin{pmatrix} c_1 \\ \vdots \\ c_4 \end{pmatrix} \tag{6.2}$$

From Eq. (6.2), x denotes the column matrix of output and c the column matrix of final demand. The following matrices, I and A, are the identity matrix and technology matrix, respectively, and they are used to further measure the multiplier.

$$I = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix};\ A = \begin{bmatrix} a_{11} & \cdots & a_{14} \\ \vdots & \ddots & \vdots \\ a_{41} & \cdots & a_{44} \end{bmatrix} \tag{6.3}$$

Matrix I is the identity matrix: a diagonal matrix whose off-diagonals are zero, whereas A is the technology matrix, which consists of the ratio of intermediate demand to total output,

$$\frac{x_{\mathrm{ij}}}{x}$$

Hence, a_{14}, for instance, explains the ratio of output from sector 1, which is used to produce the output by sector 4 divided by the total output from sector 1.

The equilibrium of the equation for demand and supply in Eq. (6.1) can be modified as follows:

$$\begin{aligned} Ax + c &= x \\ (\boldsymbol{I} - \boldsymbol{A})\boldsymbol{x} &= \boldsymbol{c} \\ \boldsymbol{x} &= (\boldsymbol{I} - \boldsymbol{A})^{-1}\boldsymbol{c}. \end{aligned} \tag{6.4}$$

The first row of Eq. (6.4) is the general form of Eq. (6.1). The multiplier is defined as the inverse Leontief matrix, $(I - A)^{-1}$, which can also be symbolized as matrix L (consisting of l in the matrix element). Thus, the multiplier measures the change in equilibrium output of the aggregate economy caused by a unit change in the final demand of the industry sector. Throughout this study, the IO table has been transformed into constant terms in order to be appropriate for growth measurement. Therefore, since the IO is calculated on the basis of current prices, the GDP deflator is used to change all the values into constant terms.[3]

6.4 Multiplier Analysis

Referring back to Fig. 6.1, the multiplier measures how total output changes as a result of the change in final demand (quadrant II). The measurement largely depends on the Leontief matrix Eq. (6.4) reflected in quadrant I. This study corresponds to the method of simple multiplier measurement and the domestic transaction model. Hence, in calculating the multiplier, only goods and services produced domestically affect the value of the multiplier. Furthermore, the multiplier uses the open IO instead of the closed one based on the previous study by Grady and Muller (1988). The study shows that the use of a closed IO table usually yields exaggerated estimates of the impact.

6.5 Decomposition Analysis

Skolka (1989) explains that decomposition analysis can be defined as the method of distinguishing major shifts in the economy by means of comparative static changes in key sets of parameters. Blomqvist (1990) cited Fisher (1939) and Clark (1940), among others, who were the first to introduce the concepts of decomposition analysis concerning the classification of primary, secondary, and tertiary

[3] The more thorough estimation on deflating the IO table is explained, for instance, by Celasun (1984) in the case of Turkish structural change of economy. The same method using the sectorial producer price index and import price index can be seen in Zakariah and Ahmad (1999) on the Malaysian economy. This study only uses the GDP deflator to obtain the constant value of IO table. A similar method can be found in Akita (1991).

sectors, which are still widely used today. Nevertheless, Chenery (1960) was the one who employed the method to identify the source of structural change and industrial growth. One of the conclusions of the mentioned study was that differences in factor endowment, especially in the variation of import and domestic production, create the greatest variations between countries in terms of industry output (e.g., machinery, transport equipment, and intermediate goods).

This study uses the decomposition analysis adopted by Roy et al. (2002) and investigates the contribution of the information sectors to the Indian economy. The derivation of the model is explained below.

$$\boldsymbol{x_i} = \boldsymbol{u_i}(\boldsymbol{d_i} + \boldsymbol{w_i}) + \boldsymbol{e_i} \tag{6.5}$$

In Eq. (6.5), x_i denotes the total output of the economy and u_i is the domestic supply ratio defined by $(x_i - e_i)/(d_i + w_i)$. From this equation, d_i and w_i denote the domestic sources affecting change of output, where d_i is the domestic final demand, and w_i is the total intermediate demand. In addition, e_i is the total export and thus plays as an international source affecting the change of output. Thus, from Eq. (6.5), the change of output is affected by domestic factor (d and w) and international source (e).

$$\boldsymbol{x} = \boldsymbol{\hat{u}d} + \boldsymbol{\hat{u}Ax} + \boldsymbol{e} \tag{6.6}$$

Eq. (6.6) substitutes the total intermediate demand (w) for the multiplication of the technical coefficient (A) and total output (x). Then, by introducing identity matrix **I**, Eq. (6.6) can be transformed into Eq. (6.7):

$$\boldsymbol{x} = (\boldsymbol{I} - \boldsymbol{\hat{u}A})^{-1}(\boldsymbol{\hat{u}d} + \boldsymbol{e}) \tag{6.7}$$

Substituting $R = (\boldsymbol{I} - \boldsymbol{\hat{u}A})^{-1}$, the above equation can be represented in Eq. (6.8) below.

$$\boldsymbol{x} = \boldsymbol{R}(\boldsymbol{\hat{u}d} + \boldsymbol{e}) \tag{6.8}$$

Based on Roy et al. (2002), the decomposition of the change in output of the ICT sectors between two periods of time is summarized in Table 6.1 below using Eq. (6.8). A matrix z is introduced showing a diagonal matrix composed of one and zeros. The one appears in the cell of the IO table corresponds to telecommunication and all the other elaments of the matrix are zeros.

Table 6.1 Decomposition of the change on economic output

Factor	Equation
Change in ICT output	$\hat{z}(x_1 - x_0) = \hat{z}[R_1(\hat{u}_1 d_1 + e_1) - R_0(\hat{u}_0 d_0 + e_0)]$
Domestic final demand effect	$\hat{z}R_1\hat{u}_1(d_1 - d_0)$
Export effect	$\hat{z}R_1(e_1 - e_0)$
Import substitution effect	$\hat{z}R_1(\hat{u}_1 - \hat{u}_0)(d_0 + w_0)$
Technology coefficient effect	$\hat{z}R_1\hat{u}_1(A_1 - A_0)x_0$

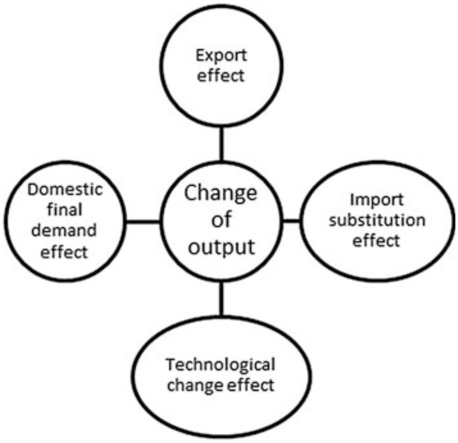

Fig. 6.4 Decomposition analysis

It can be verified, as shown in Table 6.1, that any change in economic output between two periods of time can be decomposed, part by part, from the elements built into the output calculation. Thus, the table allows us to trace the change in output as a result of domestic final demand, export, import substitution and technology coefficient effects. Roy et al. (2002) define the composition factor as follows:

- The domestic final demand effect occurs when the increased economic output is used to fulfill the needs of the domestic market.
- The import substitution effect is calculated from the changes arising in the ratio of imports to total demand. This implicitly assumes that the imports are perfect substitutes for domestic goods, since the source of supply constitutes an integral part of the economic structure.
- The export effect occurs when the growth in output is driven by export-oriented demand (foreign demand).
- The technological effect represents the widening and deepening of the inter-industry relationship over time brought about by changes in production technology as well as substitutions for various inputs.

To explain this analysis more clearly, Fig. 6.4 shows how the decomposition analysis is conducted from its outputs.

The advantage of employing decomposition analysis is explained by Bekhet (2009): the method overcomes many of the static features of IO models and hence is able to examine changes over time in the technical coefficient and sectorial mix.

The data in this study are taken from the IO tables published by Eurostat, comprising the following publications (Table 6.2).

Table 6.2 Selected European country and IO table availability

No	Country	IO publication		
		1995	2000	2005
1	Austria	✔	✔	✔
2	Belgium	✔	✔	NA
3	Denmark	✔	✔	✔
4	Finland	✔	✔	✔
5	France	✔	✔	✔
6	Germany	✔	✔	✔
7	Italy	NA	✔	✔
8	The Netherlands	✔	✔	✔
9	Norway[a]	NA	✔	✔
10	Spain	✔	✔	✔
11	Sweden	✔	✔	✔
12	United Kingdom	✔	NA	NA

Source Eurostat

Given the limited data for the United Kingdom and due to decomposition analysis requiring at least two time periods to enable investigation, the country is excluded from investigation. In terms of the countries investigated, this study continues the coverage by Gould and Ruffin (1993), van Ark, O'Mahony and Timmer (2008), and Eichengreen (2008) of twelve selected European countries that are believed to have been experiencing an advanced level of technological development.

However, given the limited data for some countries in a particular year and due to constraints imposed by decomposition analysis, which requires at least two time periods to for an investigation, the complete analysis could only be done for eight countries that have complete sets of data for 1995, 2000, and 2005.

6.6 The Impact of Price Changes

Heng and Tangavelu (2006) investigate the impact of the information economy on the Singaporean economy. While investigating the impact in terms of the multiplier, they also proposed the following model when determining the magnitude of price changes. Based on the rationale behind the IO calculation, it can be shown that

$$\text{GDP} = \text{Gross Output} - \text{Intermediate Inputs} - \text{Primary Inputs} \tag{6.9}$$

$$\text{GDP} = P_y Y = P_Q Q - P_N N - P_Z Z - P_F F$$

Where Y denotes the quantity of GDP real, P_y is the price of Y, Q denotes the quantity of the output, P_Q is the price of the output, N denotes the quantity of the media and content product, P_N is the price of the media and content products, Z denotes the quantity of non-media and content product, P_Z is the price of non-

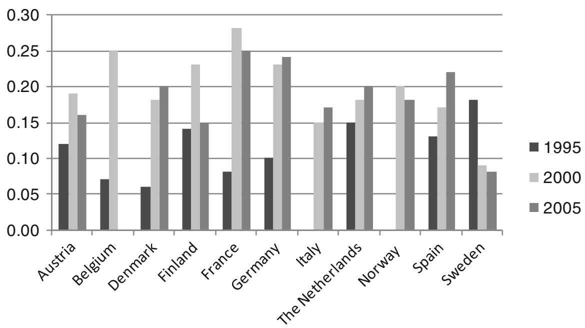

Fig. 6.7 Impact of price reduction on the GDP (percentage)

media and content products, and F denotes the primary inputs, P_F is the price of the primary inputs.

The study makes assumptions that all transactions are carried out in a competitive environment. By definition, firms maximize their profit subject to a given technological constraint, factor endowments, and relative input prices. Following Kohli (1978), it can be derived that the GDP calculation is an optimization of a maximization problem.

$$\mathrm{GDP}(P_Q, P_N, P_Z, F) = \max_{Q,J,Z}\{P_Q Q - P_N N - P_Z Z - P_F F : f(N, Z, F) \geq Q\} \tag{6.10}$$

From Eq. (6.10), it can be inferred that the GDP function is a function of the price of the inputs, output, and the factor endowments. Applying the duality theory, the measurement of profit maximizes the demand for media and the content products can be obtained by the following Sheppard Lemma in Eq. (6.11):

$$\delta \frac{\mathrm{GDP}}{\delta P_N} = N(P_Q, P_Z, P_N, F). \tag{6.11}$$

Multiplying both sides by P_N/GDP, the following formula can be obtained:

$$\delta \frac{\mathrm{GDP}}{\delta P_N} P_N/\mathrm{GDP} = \mathrm{NP}_N/\mathrm{GDP}. \tag{6.12}$$

From Fig. 6.7, it can be concluded that, in general, a reduction in the price of media and content contributes to a higher GDP growth. The average European countries recorded a small elasticity coefficient for each 1 % decrease in media and content products over time. On average, a 1 % reduction in price contributes to an increase in growth of the GDP from approximately 0.17 % during the last three observations. The results vary between countries where France, Germany, Norway, and the Netherlands recorded a higher elasticity compared with other countries.

The left-hand side of Eq. (6.12) reflects the price elasticity of the GDP, which can be calculated as the ratio of the value of the input to the GDP. In other words, $\mathrm{NP}_N/\mathrm{GDP}$ will identify $\times$% change in the GDP as the results of the change in the price of the media and content. The investigation employs the input/output table for the years 1995, 2000, and 2005.

6.7 Data

The *European System of Accounts (ESA 95)* established a compulsory transmission of the tables of the IO framework by the European Member States (European Commission, Eurostat 2010). This obligation applied as of the end of 2002, and it demands that every country construct annual supply and use tables, on the one hand, and five-year symmetric IO tables, symmetric IO tables of domestic production, and symmetric IO tables of imports. It is known as ESA 95, as the collection of data generally covers the period from 1995 onwards. The ESA 95 has 59 sectors that are uniform between the European countries.[4]

This study is motivated by the previous study by Van Ark et al. (2008), which compares the productivity gap between European countries and the United States. In addition, the list of countries below is also a list of the countries that have had a rapid technology transfer, according to Eichengreen (2008: 26, Table 2.6). It is therefore relevant to measure the impact of the ICT sectors in these countries in the sense that the countries are identified as having long histories of R and D activities and technology transfer.

6.8 Sector Definition

When exploring the manual for measuring the Information Economy, the OECD (2008) presented the definition of media and content as part of ICT sectors in the following definition.

> Content corresponds to an organized message intended for human beings published in mass communication media and related media activities. The value of such a product to the consumer does not lie in its tangible qualities but in its information, educational, cultural or entertainment content (OECD 2008).

In accordance with the ISIC category, the definition of media and content products above enclaves the following sector in Table 6.3. Moreover, to enable the impact assessment employing the IO method, the sectors in Table 6.3 are matched with the sectors corresponding to the IO category. The media and content sectors are then found in the following IO sector shown in Table 6.4.

Table 6.4 shows that there are four media and content sectors among the 59 sectors in the European IO table. Thus, the economic impact and contribution of the media and content sectors in this study correspond to these four sectors. As the aggregation level of ISIC categories is more detailed than the IO categories, some media and content products are consequently aggregated in a particular IO sector.

[4] The 59 sectors category on the European Input-Output (IO) table based on ESA 95 is available from the principal author.

Table 6.3 Classification of content and media

No	ISIC	Definition
1	5811	Printed and other text-based content on physical media and related services
2	6010, 6020	Motion picture, video, television and radio content, and related services
3	5911, 5912	Music content and related services
4	5820	Games software
5	5812	On-line content and related services
6	7310, 6391	Other content and related services

Source OECD (2009)

Table 6.4 Classification of the media and content sectors based on the European 59 sectors IO table

Sector	**Sector name**
16	Printed matter and recorded media
43	Post and telecommunications services
49	Computer and related services
51	Other business services

6.9 Results

The following analysis investigates the output multiplier for the media and content sectors and compares the value with the average multiplier of all economic sectors within the European economy. Table 6.5 presents the comparison between the two groups in the investigated European countries.

As explained in the previous section on methodology, the output multiplier measures a change in output as 1 unit value of change in the final demand. For example, based on Table 6.5, for each one euro (1 €) spent in the media and content sectors' final demand increased the economic output by as much as 1.70 euro in 1995, in Sweden. Table 6.5 also indicates that, in general, the output multiplier of the media and content sector is smaller than for the average sectors. Of the European countries, the Scandinavian countries, Sweden, Finland, Denmark, and Norway, recorded continuous performance, with the media and content sectors contributing more than the average economic sectors. Apart from the Scandinavian region, the Netherlands also achieved the same characteristics of a stronger media and content sectors. In the rest of the European region, the sectors contribute to a lower multiplier for the economy.

Figures 6.5,[5] 6.6 explain the decomposition analysis for the media and content sectors.

[5] The original data are all in EUR, except for that of Sweden and Denmark. The transformation to EUR data uses the average exchange rate for 1995–2005. 1 EUR = 7.43 DKK = 8.96 SEK. Data retrieved 28 April 2010, from http://stats.oecd.org/Index.aspx?DataSetCode=CSP2009.

Table 6.5 Multiplier effect of the media and content sector

No	Country	1995		2000		2005	
		Media content	Average sectors	Media content	Average sectors	Media content	Average sectors
1	Sweden	1.70	1.56	1.54	1.54	1.56	1.53
2	Denmark	1.53	1.51	1.39	1.40	1.42	1.43
3	Austria	1.34	1.44	1.53	1.56	1.55	1.56
4	France	1.60	1.71	1.67	1.77	1.68	1.72
5	Belgium	1.48	1.55	1.54	1.59	–	–
6	Spain	1.52	1.62	1.62	1.72	1.67	1.74
7	Norway	–	–	1.80	1.65	1.72	1.62
8	Germany	1.41	1.64	1.55	1.62	1.52	1.56
9	Italy	–	–	1.69	1.74	1.71	1.76
10	Finland	1.66	1.60	1.65	1.62	1.61	1.58
11	The Netherlands	1.44	1.51	1.50	1.50	1.58	1.56

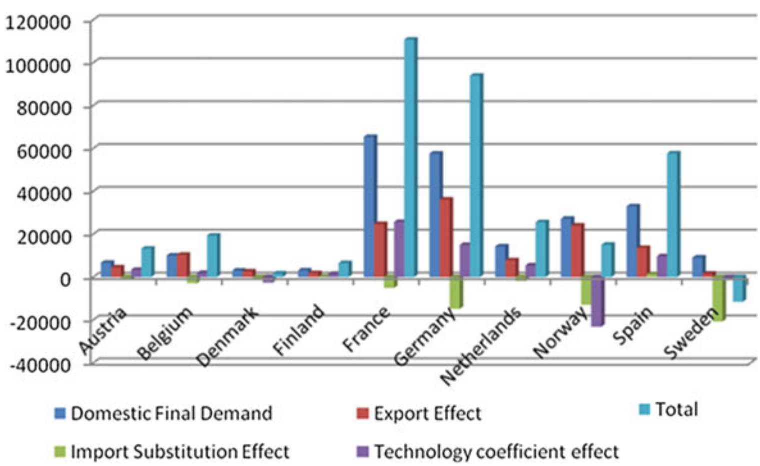

Fig. 6.5 Decomposition of output change in MEUR (1995–2000)

The decomposition in Fig. 6.5 shows that the output of the media and content sectors in 1995–2000 is heavily influenced by the domestic demand and the export effect. Correlated to the size of the economy, the domestic demand and the export effect are associated with the population size and the GDP. Hence, countries like Germany, France, and Spain show a higher domestic final demand effect. The technological change effect is generally positive for the countries, indicating the strong impact of the media and content sectors for the other sectors.

Figure 6.6 presents the characteristics of the media and content sector in the second half of the observation.

During the second half of the observation (2000–2005), the change in the media and content sectors was mainly driven by the technological change effect,

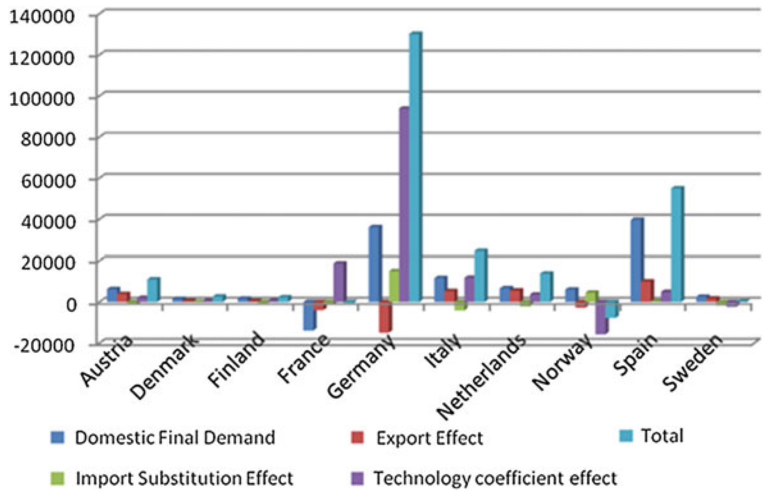

Fig. 6.6 Decomposition of output change in MEUR (2000–2005)

especially in Germany, France, Italy, the Netherlands, and Spain. The most interesting result during this period is the evidence that the export effect decreased, with the media and content sectors in Germany recording substantial negative impacts. This means that, in general, the comparative advantage of media and content products exported to the rest of the world has decreased. Furthermore, most of the countries investigated show a positive import substitution effect, which means that these countries are now playing more passively, letting other countries and regions in the rest of the world penetrate the media and content market. The technological effect remains positive in some countries but with a lower value.

The last section estimates the impact of price reduction from the sector. The price of ICT products tends to fall over time, as concluded by many studies (Bagchi et al. 2008; Haacker 2010; Oulton 2010). It is crucial to investigate the impact of a reduction in the ICT sectors, in particular media and content, on the economy. Figure 6.7 is examined through the elasticity of GDP with respect to price, as stated in Eq. (6.12).

The next question worth addressing is the identification of sectors that enjoy the reduction in media and content price. The impact of the price reduction varies between sectors, depending on the intensity of use on the media and content products as intermediate inputs. The difference in structure of production and input characteristics leads to a different impact. Table 6.6, 6.7, and 6.8 shows the impact of sectorial GDP as a result of a 1 % decrease in the media and content sectors' price.[6]

[6] The dashed sectors correspond to media and content.

Table 6.6 Impact on the rest of the economy as a result of a 1 % reduction in the media and content sector, 1995 (percentage)

Sector	Elasticity
Manufacture of office machinery and computers	0.62
Computer and related activities	0.45
Publishing, printing, and reproduction of recorded media	0.45
Financial intermediation, except insurance, and pension funding	0.35
Other business activities	0.34
Post and telecommunications	0.33
Manufacture of coke, refined petroleum products, and nuclear fuels	0.32
Air transport	0.27
Manufacture of tobacco products	0.25
Activities auxiliary to financial intermediation	0.25
Renting of machinery and equipment without operator and of personal and household goods	0.22

Table 6.7 Impact on the rest of the economy as a result of a 1 % reduction in the media and content sector, 2000 (percentage)

Sector	Elasticity
Publishing, printing, and reproduction of recorded media	0.53
Insurance and pension funding, except compulsory social security	0.51
Mining of coal and lignite; extraction of peat	0.47
Other business activities	0.31
Manufacture of office machinery and computers	0.29
Computer and related activities	0.28
Manufacture of tobacco products	0.28
Post and telecommunications	0.27
Manufacture of radio, television and communication equipment and apparatus	0.26
Manufacture of chemicals and chemical products	0.25

It can be concluded from these tables that the price impact of media and content mainly stimulates the sectors that are manufacturing of ICT products (radio communication equipment and apparatus) and financial sector. It can also be inferred from the tables that the media content themselves are the sectors which enjoy the greatest benefit of price reduction. On average, a 1 % reduction in price contributes to an increase in growth of the media and content from approximately 0.4 % in 1995 and 2000 and 0.5 % in 2005. The results also show the tendency of lack of connection of the media and content sectors having found that during the later period, and these sectors have absorbed the price reduction impact, whereas less impact has been channeled to the other sectors which becomes another reason that during the later investigation from 2000 to 2005, the region also has a lower technological change effect from the media and content sector.

Table 6.8 Impact on the rest of the economy as a result of a 1 % reduction in the media and content sector, 2005 (percentage)

Sector	Elasticity
Publishing, printing, and reproduction of recorded media	0.55
Post and telecommunications	0.47
Manufacture of radio, television, and communication equipment and apparatus	0.42
Other business activities	0.38
Computer and related activities	0.35
Activities auxiliary to financial intermediation	0.27
Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying	0.27
Activities of membership organization	0.26

6.10 Conclusion

This study aims to investigate the economic assessment of the media and content sectors based on the definition by the OECD (2008). Employing the definition and matching up with the ESA 95 consisting 59 sectors of the European IO table, the media and content sectors correspond to printed material, post and telecommunication services, computer services, and business services. The coverage of the study includes the multiplier analysis, decomposition of the source of growth, and the scenario analysis of the price reduction of the media and content sectors on the GDP.

The study found that, in general, the media and content sectors contribute to lower multiplier coefficients; the Scandinavian countries (Sweden, Finland, Denmark, and Norway), together with the Netherlands, recorded a higher multiplier coefficient of the sectors compared with the average economic sectors. The average multiplier of the media and content sectors ranged from 1.3 to 1.8 during 1995–2005. It has also been found from the decomposition analysis that the change in output in the media and content sectors was mainly influenced by the domestic final demand and technological change effect during 1995–2000. Having maintained the domestic final demand effect for most of the countries, the media and content sectors are driven more by the import substitution effect, which describes the lower magnitude of the competitive advantage in the world market. It is also supported by the fact that the other leading ICT countries, for example, Japan, Korea, and Taiwan, have spent a more substantial amount on R and D for ICT, and media and content products in the last couple of years.

Additionally, the price assessment identifies that each 1 % decrease in the media and content price contributes 0.17 % to economic growth. The impact varies between countries, with France, Sweden, and Norway entitled to a higher elasticity coefficient. In terms of sectorial impacts, the study found that the price reduction mainly affects the financial sector, and manufacturing of ICT products beside the media and content sectors themselves. Thus, it is suggested that the link should be even greater, especially to the service sectors, knowing that these sectors generally have a higher multiplier effect in the European region (Leeuwen and Nijkamp 2009).

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