

# The job creation potential of the Information and Communication Technology sector: The case of Iran

Zahra Zakeri <sup>+</sup>, Mojtaba Esfandiari Kalukan, Vahid Faaliyat and Eiman Cheratian

SME's Research Group, Academic Center for Education, Culture and Research:  
Branch of Tarbiat Modares University (ACECR), Tehran, Iran.

**Abstract.** This article examines the Information and Communication Technology (ICT) job creation in Iran's economy. The results show that this sector has low job creation coefficient among 23 economic sectors. Therefore, considering the importance of ICT, policymakers should make appropriate decisions to increase linkages between ICT and other economic sectors to improve its performance in the economy.

**Keywords:** ICT, Input-output table, Job creation.

## 1. Introduction

Nowadays ICT sector has a special place in economic development. Therefore it is necessary to examine the role of this sector in economic structure. The importance of job creation of production sectors in the economic growth and social welfare has caused that this index to be considered in optimum allocation of resources and arranging the economy of countries. (Jahangard, 2005)

Therefore, this study is allocated to determining ICT sector job creation in Iran's Economy. For this purpose IO analysis is used. The great advantage of this approach is that allow to analysts and policymakers to review and analyze the effects of policy changes or exogenous factors within a system that is related with all economic sectors. Actually increased demand for the output of the ICT sector causes the increased demand for the production inputs such as labor. On the other hand, increased demand for the product in any economic sector, cause increase demand for ICT products and thereby creating a boom in this sector's employment or labor demand increases.

It should be noted that in this study ICT sector is included Manufacture of radio, television and communication equipments, Post and telecommunications.

Finally by using the input-output table for year 2006, published by Iran's Majlis Research Center and by regarding the interaction of ICT with other economic activities, ICT sector demand for labor has been analyzed.

## 2. Data, Model and analysis of results

### 2.1. Statistical basis

In this study, to calculate the coefficients of direct and indirect job creations of ICT sector the 'IO table in 2006' that has been prepared by the Majlis Research Center in 2011 is used.

Employment data on Iran's economic sectors are extracted from the Population and Housing Census in 2006 that is published by the Statistical Center of Iran.

---

<sup>+</sup> E-mail address: zakeri.zahra@gmail.com

## 2.2. Methodology

In this article by using information about employment and input-output table in 2006, Employment of ICT sector and the share of this sector in job creation are examined. Thus the basic relationship in IO is used. (Edmondson, 1998)

$$X=Z+F \quad (1)$$

Relationship (1) shows that, Total output(X) of an economy is divided into intermediate demand (Z) and final demand (F). In the standard model of input-output is assumed that there is a constant ratio between intermediate exchange and total product of each sector, by considering that the IO coefficients can be calculated.

$$A_{ij} = \frac{Z_{ij}}{X_j} \quad (2)$$

And,

$$Z=AX \quad (3)$$

By substituting equation (3) in (1):

$$X=AX+F \quad (4)$$

$$X = (I - A)^{-1}F \quad (5)$$

Relation (5) is a production balance. That can calculate changes in the production sectors of the economy based on changing in final demand and by assuming the stability of the production structure.

The employment coefficient is calculated as follows.

$$l = \frac{L}{X} \Rightarrow L = \hat{l} \cdot X \quad (6)$$

In relation (6) L represents the total employment in different sectors of the economy, (l) is diagonal matrix of employment coefficients and X represents the total output in each sectors. By replacing equation (5) in (6), the new relationship is derived which is shown the relation among final demand, Production structure and employment.

$$L = \hat{l}(I - A)^{-1}F \quad (7)$$

Relation (7) shows, how a unit change of final demand is affected on employment in different sectors directly and indirectly. (Afshari, 2005)

## 2.3. Analysis of results

This section is evaluated the obtained results from calculated job creation coefficients for ICT sector in Iran. The direct and indirect coefficients which are achieved from a unit increase of ICT final demand is shown in table1.

The results are shown in table 1 revealed that, by an increase in final demand (As a unit), ICT employment and other sectors employment will be increased 5.5 and 1.5 units respectively. Besides, the total job creations coefficient of ICT in the economy is 7.02.

The results show that ICT sector has the major effect on Transport, Wholesale, retail, repair of vehicles and goods, Paper and printing, Water, electricity and gas and Bank and insurance sector.

Table 1: Job Creation by ICT in each sectors

Sector	job creation by ICT
Agriculture	0.07
Mine	0.00
Manufacture of food products, beverages, tobacco	0.02
Textiles, clothing and leather	0.03
Manufacture of wood and wood products	0.01
Paper and printing	0.12
Coke, petroleum products, nuclear fuel, materials and chemical products	0.04
Manufacture of rubber and plastic products	0.01
Non-metallic minerals	0.01
Basic metals	0.02
Fabricated metal products, except machinery and equipment	0.03

Manufacture of Machinery	0.01
medical and optical instruments, wrist watches and other time	0.00
Motor vehicles, trailers	0.01
Other industries (furniture - recycling, ...)	0.01
Water, electricity and gas	0.10
Building	0.08
Wholesale, retail, repair of vehicles and goods	0.28
Hotel and Restaurant	0.07
Transport	0.33
<b>ICT</b>	<b>5.50</b>
Bank and insurance	0.10
Other services	0.16
Total Job creation by ICT	7.02
Job creation by ICT in other sectors	1.52

Source: IO2006, Iran.

The job creation coefficient for all sectors is shown in Table 2.

Table 2: Job Creation Coefficient of each sectors

Sector	Job creation coefficient	rank
Agriculture	14.84	3
Mine	0.55	23
Manufacture of food products, beverages, tobacco	13.34	7
Textiles, clothing and leather	26.81	1
Manufacture of wood and wood products	20.48	2
Paper and printing	14.10	4
Coke, petroleum products, nuclear fuel, materials and chemical products	3.14	22
Manufacture of rubber and plastic products	7.81	15
Non-metallic minerals	8.31	14
Basic metals	4.66	19
Fabricated metal products, except machinery and equipment	12.72	8
Manufacture of Machinery	7.47	16
medical and optical instruments, wrist watches and other time	10.00	11
Motor vehicles, trailers	7.11	17
Other industries (furniture - recycling, ...)	14.05	6
Water, electricity and gas	4.62	21
Building	14.05	5
Wholesale, retail, repair of vehicles and goods	8.81	12
Hotel and Restaurant	10.52	10
Transport	10.98	9
<b>ICT</b>	<b>7.02</b>	<b>18</b>
Bank and insurance	4.62	20
Other services	8.48	13

Source: IO2006, Iran.

According to the result of table 2, compared with other sectors, ICT has low job creation coefficient and has 18<sup>th</sup> rank among 23 sectors.

This could be caused by the weak linkages between the ICT sector and other sectors or a limited number of workers in this sector. The number of employees in the ICT sector in 2005 has 15<sup>th</sup> rank in compare with 23 other sectors. So the weak employment in ICT caused a low job creation. Also the rank of ICT in terms of linkages with other sectors is 16<sup>th</sup>. That can be effective in low job creation in ICT sector.

## 2.4. Conclusion

In this study, Input-output model is used to measure ICT sector direct and indirect job creation. The main results can be summarized as follows:

Job creation coefficient of ICT (that shows the direct and indirect effects of a unit increase in final demand for ICT on job creation) in the whole economy is equal to 7.02. So ICT has low job creation coefficient in the Iran economy.

Therefore, considering the importance of ICT, policymakers should make appropriate decisions to increase linkages between ICT and other economic sectors to improve its performance in the economy.

### **3. Acknowledgements**

It is a real pleasure to thank those people who made this assignment possible, Dr A.Banouei and Maedeh Zakeri.

### **4. References**

- [1] Z. Afshari, I. Sheibani and M .Afshari, An Input-Output Model for Assessing the Alternative Growth Strategies in Iran, the 15<sup>th</sup> *International Input-Output Conference*, Beijing, China P.R. (2005)
- [2] W.Edmondson and G.Schluter A Procedure For Determining Food and Fiber Output, Employment, and Value-added by Agricultural Sector, the 12<sup>th</sup> *International Input-Output Conference*, New York, USA. (1998)
- [3] E. Jahangard, The effects of ICT on growth and productivity in manufacturing industries in Iran, *Iranian Journal of Economic*, No, 25. (2005)
- [4] Input-output Table for the year 2006, *Majlis Research Center in* (2011).
- [5] Statistical Center of Iran, (2006).