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CHECKING EFFECT OF ICT ON PRODUCTIVITY OF WORK FORCE IN INDUSTRIES IN YAZD

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Abstract

Information and communication technology can be effective on productivity of work force through infrastructure channels. This research wants to check information and communication effect on productivity of work force in industries in Yazd. Hence, using available statistics, it checks information and communication technology effect on productivity of work force. To doing this, it has been assessed by using maximum of available data in 2005 – 2010 for 20 four-digits ISIC codes in industrial businesses in Yazd and by using integrated data of econometrics patterns method and also attraction of information technology is exploited, in Cub Douglas product function instead of independent variable of information and communication technology, 4 substitute variables are used: number of employees of units of industrial businesses in Yazd that use internet, relation of employees of any unit that use computer to its total work force, relation of employees of any unit that use internet to its total work force. Results of assessing pattern shows that information and communication technology have positive and meaningful effect on productivity of work force in two indexes of intended indexes and have no positive effect on both indexes.
Keywords: information technology, productivity.

I. INTRODUCTION

Development of information and communication technology in two recent decades and developing its applications in various scopes such as economic and social, has caused formatting new season of mutual relation between persons, organizations, institutes, firms and governments. Information and communication technology because of its comprehensive presence, rather low access cost, work feasibility, flexibility and attraction is a significant factor in changing traditional ways of business. This technology has caused transformations in product ways, distribution, search and transaction of goods and services and can increase rate of reaction of institutes and businesses to market signs, and offering better service to customers. This flow is

effective in various economic processes and synchronically in two sides of supply and demand of economy causes improvement and growth of economy and productivity. Today, productivity is not selection, but necessity. Undoubtedly, today economic growth and development lies in rate of their productivity growth of various societies. Effort to increase rate of productivity is effort to better life and more welfare for social individuals.

The researches in macro level have addressed positive effect of information and communication technology on productivity of work force. But in industry level, there are little studies. These researches have various results in different countries, That show that developing countries have meaningful differences with developed countries for infrastructures. Also developing countries are different from advanced countries for five ICT variables (landline penetration rate, mobile, computer, internet and internet hosts). (Communication world unit-2007) in spite of these countries, have tried and invested to improve grounds of ICT infrastructures.

This study wants to check ICT effect on productivity of work force in industries in Yazd based on four digits ISIC.

II. DEFINITION OF PROBLEM AND NECESSITY OF APPLYING INVESTIGATION

Today all developed or developing countries highlight importance of matter of productivity as one of necessities of economic development and competitive excellence achievement in international areas. According to this, to promote productivity culture and upgrading it, they invested. Checking function of the countries that have significant economic growth during several decades, suggests that most of these countries gain large share from own growth by increasing productivity.

In modern economy, addition to traditional product factors (physical capital and work force), new product factors have been introduced that are important. Human abilities (often they posed as human capitals), organizing work place (often introduced as organizational capital), information and communication technology (ICT) and science, in most of developed and developing countries are applied to equipping and using these new factors. As matter of productivity and discussion of optimum usage is posed, one cannot ignore its most important part, productivity of human force. Logical using thought and physical sources have helped productivity, and using talent and expert and skillful persons in various areas can lead to better quality and quantity of most of productions. One can say that this thought and mind and body force is human force that made such grand evolutions in using machinery, material, energy and….

Additionally, one of the most important human achievements today is access to electronic technology and then, access to powerful calculation tool and communication devices that called as information and communication technology. Quick development of this technology, caused that various groups of society includes industry owners forced to improve quality and quantity of product and increasing productivity, use information and communication technology.

Using information and communication technology provides possibility of doing calculations and transaction of data by very high rate in wider geographical area and common access and synchronization of information sources, and therefore, made possibility of similar productions by completed lower cost, increasing product level by equal cost, increasing rate in prepare product factors and also offering quickly

productions without need to increasing costs. Alongside above interests, one question which industry owners confront with is weather using information and communication technology is effective on work force? Answer to this question is matter subject of this research. Importance of answering this question results from this fact that work force as one of the most basic factors of product always paled key role in product as far as it is considered as most important kind of productivity of work force and logical using thought and material source of human force that includes thought and physical power, is conceived as making grand evolutions in using machinery, raw material, energy and…. Therefore, identifying effective factors on productivity of work force is very significant. And hence information and communication technology is a variable that today we deal with, identifying effect of information and communication technology has double importance.

In other side, checking effect of human force capital on productivity of work force results from this fact that in current world, governments and families invest very stock to education, while this question raised that weather these invested costs in increasing educations of persons is effective on their productivity of work force, if so, how much this effect and which profile has most effect?

In this study, we assess effect of information and communication technology in human capital on productivity of work force in industrial businesses in Yazd. Intended society includes industrial businesses in Yazd with four digits ISIC, work force productivity function for information and communication technology and human capital has assessed by using composite data of industrial businesses in Yazd during 2005 to 2010.

III. RESEARCH PURPOSES

Main purpose in this research is identifying effect of using information and communication technology on productivity of work force in industries in Yazd and comparison of this effect in this line. Also assessing effect of human capital on productivity of work force is a purpose of this research. Alongside of these two purposes, assessing country capital is a functional goal of this research.

IV. RESEARCH HYPOTHESES

Due to done studies in the world, also some studies already done in Iran or some provinces, one can expect that by using information and communication technology, productivity of work force in industrial businesses will increased, and in another hand, by upgrading human abilities level (increasing human capital) also productivity of work force in industrial businesses will increased. Therefore, research hypotheses are followed as:

1. Indexes of information and communication technology have positive and meaningful effect on productivity of work force in industries in Yazd.
2. Human capital has positive and meaningful effect on productivity of work force in industries of Yazd.

V. RESEARCH METHOD

This research is an empirical research. First theoretical foundations and history of research have collected and offered in form of library and then, results of this research by using calculating capital stock and assessing relation between information and communication technology and also human capital is gained by productivity of work

force by using usual econometric method. In this research, 4 indexes of information and communication technology are used that data related to it, now gained by means of questionnaire by Iran statistics center.

1. Number of employees of units in industries in Yazd that use computer.
2. Number of employees of units in industries in Yazd that use internet.
3. Relation of employees of any unit that use internet to total work force of that unit.
4. Relation of employees of any unit that use internet to total work force of that unit.

Model data is in library method and collected from Iran statistic center. According to resulted information from Iran statistic center data, statistical population in this research which information collected by Iran statistic center. These statistic data is number of whole statistical population that in research, their collection is in four digits ISIC codes. Therefore, instead of sample, statistical population has been used. In this research, to analyze data, econometric software, Eviews, and composite data method are used.

VI. MODEL DESIGN

The model which we use it in this study, is integration of Etrosing model and theoretical model, Menkio, et al that already in this part of history of research, we detail each one, its mathematical form of model followed as:

$$Q = A\, K^{\alpha_1} L^{\alpha_2} H^{\alpha_3}$$

Here, Q is value added, K is available capital, L is work force, H is human capital and A is product technology coefficient that is defined as:

$$A = e^{(\beta_0 + \beta_1 \gamma)}$$

In above relation, γ is Information and communication technology index that in our study, we 4 indexes for it. By dividing sides of relation 1 on L and take nature logarithm, we reach final model that is:

$$ln\left(\frac{Q}{L}\right) = \beta_0 + \beta_1 \gamma + \alpha_1 ln\left(\frac{K}{L}\right) + (\alpha_1 + \alpha_2 + \alpha_3 - 1)\ln(L) + \alpha_3 \ln\left(\frac{H}{L}\right) \quad (۲-۳)$$

Definition of model variables

Dependent variable

As we mention already, dependent variable of our model is productivity of work force. To calculate productivity of work force, we use relation of value added of any business by number of work force of that business that in above relation (3-2) is equal to $\frac{Q}{L}$.

Independent variables

a) Capital stock (K):

First independent variable in this model is capital stock. To calculate capital stock, there are various methods. Various methods of calculating capital stock and the method which we use in this research.

b) Work force

Second independent variable is work force. Number of work force of any business represents work force in this research.

c) Human capital (H):

Human capital is third independent variable in this research which we use it, and as we mention it already, is one aspect of novelty in this research. We in this research have use number of diploma work force of any business as human force index.

d) Information and communication technology Indexes (γ):

In this study, 4 Information and communication technology indexes as technology coefficient of A are used that all of them are real.

Real variables

1. Relation of number of employees of a business that use computer to total number of employees of that business that are shown by CP.
2. Relation of number of employees of a business that use internet to total number of work force of that business that are show by INT.
3. Number of employees of business that use computer.
4. Number of employees of business that use internet.

Dummy variables

In some econometric studies we confront with phenomena that are not measurable quantitably. For example, quality variables such as skillful and half-skillful worker, woman and man bachelor and master students, all are variables that are not measurable quantitably. In this case, one can attribute digit one to owner of intended character, distinguish them from businesses without character. For example, we can specify a variable for a worker and attribute digit one to skillful worker and digit zero to non-skillful worker. The variables that specified so, are dummy variables, dummy variables can appear independently and dependently.

Model data

Model data in this research is integrated or panel data. In this study, Iran statistic center data is used. Statistical population in this research is industrial businesses of country in 2005 to 2010 that are provided by questionnaire and assessed by Iran statistic center. This statistic data is number that includes whole statistic population. In this research, its collection is in four digits ISIC codes.

Therefore, instead of sample, statistical population is used that is more exact. Information related to value added variables, number of work force, human force and Information and communication technology variables are collected from Iran statistic center. But capital stock in industries is calculated and used by acceleration principle that discussed in detail later.

Calculating capital stock

Before stressing various methods of capital stock and calculating capital stock in this study, we must note this point that what is measurement unit K (capital stock)? In response to this issue we necessarily use Rial unit because finding non-physical is impossible and therefore, use capital equipment value as substitute variable. After answering this question, we confront another question that what is calculating Rian value of capital equipment in the year? It is possible that we pose office value but we must note that in fact, office value of most of capital of firm is zero and this is because of depreciatory cost which law has specified. While this system still is in serve of

businesses product. Therefore, researchers have uses various below ways to assess capital equipment value.

a) Kinds of panel data models

Common effects mode (CE)

If y intercept and slope coefficient in various levels and in various times are constant, we call this as common effects model or pooled regression. This model is not different with usual models, so that statistical data overlap and regression had assessed by more numbers of observations. Any variable first rowed timely and rowed sectional. These models will assess by using ordinary least squares (OLS).

b) Fixed effects model

In this model, fixed slope coefficient and y intercept are different, of course, difference of y intercept always is fixed. This model considers heterogeneities and inhomogeneities in variability of y intercept. This kind of model cannot be assessed by sing OLS method, but dummy variables related to sections are added, and in fact, are assessed in form of least square dummy variable.

c) Random effects model

In this model, fixed slope coefficient and y intercept are different and difference between y intercepts are not fixed but accidental.

d) Vary coefficient

In this model, both of y intercept and slope coefficient vary and these changes are accidental.

Recognition between kinds of panel data models

a) Recognition between common effects and fixed effects

To recognize between two models, hypothesis test is used that hypotheses H_0 and H_1 are:

H_0 = limited regression model

H_1 = unlimited regression model

Here, common effects model is limited regression and fixed effects model is unlimited regression. Above statistics test has F distribution with freedom degrees N-1, N.T-N-K that called as F_{leamer} and calculated as:

$$F_{\text{Leamer}} = \frac{\frac{RSS_{CE} - RSS_{FE}}{N-1}}{\frac{RSS_{FE}}{N.T-N-K}}$$

Here, RSS is sum of remains of limited and unlimited regressions, N is number of sections, T is time courses, and K is number of parameters.

As calculated statistics is meaningful, this is in critical region, assumption H_0 is rejected. And therefore, we accept fixed effects model, otherwise, common effects model is accepted.

b) To recognize between two models, always Hausman test is used. Since to doing comparison between these two models, we must test presence of correlation between accidental effects and regressions, hence, in Hausman test, Hypothesis zero is that there is no correlation between accidental effects and regressions, which is:

H_0 = disorder statement and independent variables are not non-correlated

H_1 = disorder statement and independent variables are correlated

Statistic Hausman test has Chi-squared distribution and is calculated as:

$$H=(\beta_{FE}-\beta_{RE})'[Var(\beta_{FE})-Var(\beta_{RE})]^{-1}(\beta_{FE}-\beta_{RE})$$

If statistic test calculated is bigger than amount of table, hypothesis zero is rejected and correlation exists and in result, we must use fixed effects model and if so, hypothesis zero must use accidental effects model.

specifying pattern of model

first model

By using tests related to recognize panel data model, first we specify model then, product function subjected to F test. Hypothesis zero of this test is based on fixed expression (y intercepts) for all units. This is, the model has composited and contrast hypothesis is based on y intercepts for different units, fixed effects.

In this relation, F limer test about Cub-Douglas product function implies that calculated amount F is more than 0.05. Therefore, hypothesis zero that suggests equality of y intercepts, cannot be accepted by 95%. This is economical concept that effective factors except specified factors in the model differently effect on value added and productivity of industrial workshops.

Second test that is used to recognize between fixed effects model and accidental model, is Hausman test. Available hypothesis in fixed effects model is based on lack of correlation between individual fixed effects and description variables. This test specifies being independent of y intercepts from description variables. If y intercepts don't have correlation with description variables, fixed effects method of accidental effects both are compatible but accidental effects model is more effective. While if y intercept has no correlation with description variables, fixed effects model is compatible but accidental effects model is incompatible. Therefore, if first condition (independence of y intercept from description variables) is true, two fixed effect model ad accidental model must have compatible results. In result, their difference must have no systematic difference.

Above statistic test result due to hypothesis zero, the test suggests being bigger than calculating amount than 5 percent that implies rejecting hypothesis zero and lack of presence of relation between description variables and y intercepts that this represents suitability of assessing pattern in form of fixed effect.

Rejecting hypothesis zero in this test means that description variables are correlative and there is a relation between y intercept and regression. This is economic concept that effective factors except specified factors in the model differently, but fixed, effect on value added and productivity of force of industrial workshops.

After using above test, it become clear that this model is kind of fixed effects, we assess model by using OLS method, in result, assessing model is:

$$Ln\left(\frac{Q}{L}\right)=\beta_0+0.147367\gamma+0.626727Ln\left(\frac{K}{L}\right)-0.32259\_Ln(L)+0.725132Ln\left(\frac{H}{L}\right)$$

Table 1: assessing factors of industrial workshops production according t Cub-Douglas product function with real indexes of number of employees that use computer.

Name of variable	Coefficient	Coefficient amount	Standard error	t statistic	Prob
Number of employees	β_1	0.147367	0.045665	3.152667	0.0016

that use computer					
Physical capital	α_1	0.626727	0.022141	22.34456	0.0001
Work force	$\alpha_1+\alpha_2+\alpha_3$=1	0.32259	0.043245	4.478992	0.0001
Human capital	α_3	0.725132	0.332828	2.083363	0.0379
Determination coefficient	R^2	0.765656			

Source: research calculation

Due to statistics related to human force variable, coefficient is meaningful that is, hypothesis H_0 that is equal to $\alpha_1+\alpha_2+\alpha_3$=1 is rejected and since resulted coefficient is negative, decreasing efficiency is accepted related to scale.

The results of assess shows that all assessed coefficients statistically in 5 percent level are meaningful, index of information and communication technology, physical capital and human capital have positive and meaningful effect on value added. As table 4-3-1 shows, assessing Cub-Douglas product function of human capital has most attraction and least attraction belongs to information and communication technology and this matter represents higher role of information and communication non-technology capital related to information and communication technology that has accordance with various studies.

In fact, addition to being high attraction of human capital that represents high power of product of this production factor, error more that human capital also represents high scatter of work force between four digits ISIC codes in industrial in Yazd. Therefore, traditional production factors have higher product power than information and communication technology factor. From fitness of product function in this part, and (attraction) coefficients resulted from assess results, include attraction of information and communication technology index, we find being positive and meaningfulness of effect of information and communication on productivity of work force in industrial in Yazd, and this hypothesis is posed that in beginning of investigation based on this fact that relation of information and communication technology effect on productivity of work force is insignificant, this result is compatible with empirical evidences in most countries. Due to low volume of capital from whole capital and development and penetration of its functional scope among industrial activities, the result is expectable.

second model

In this model, information and communication technology is equal to percentage of employees that use internet. By using tests related to recognition of kind of model that in first model it is descripted, it is clear that this model is kind of fixed effects.

$$Ln\left(\frac{Q}{L}\right) = 4.965139 + 0.147367\gamma + 0.626727Ln\left(\frac{K}{L}\right)\_0.32259Ln(L) + 0.725132Ln(\frac{H}{L})$$

Table 2: assessing product factors of industrial workshops according to Cub-Douglas product function with real indexes of number of employees that use internet.

Name of variable	coefficient	Coefficient amount	Standard error	t statistic	Prob
Number of employees that use computer	β_1	0.014521	0.045665	0.798926	0.4010
Physical capital	α_1	0.586835	0.221420	4.81329	0.0000
Work force	$\alpha_1+\alpha_2+\alpha_3=1$	0.237133	0.047511	5.171222	0.0000
Human capital	$\propto_3$	0.638390	0.009879	2.525623	0.0106
Determination coefficient	R^2	0.862543			

Due to statistics related to human force variable, coefficient is meaningful that is, hypothesis H_0 that is equal to $\alpha_1+\alpha_2+\alpha_3=1$ is rejected and since resulted coefficient is negative, decreasing efficiency is accepted related to scale.
The results of assess shows that all assessed coefficients statistically in 5 percent level are meaningful, index of information and communication technology, physical capital and human capital have positive and meaningful effect on value added. As table 4-3-2 shows, assessing Cub-Douglas product function of human capital has most attraction and least attraction belongs to information and communication technology.
From fitness of product function in this part, and coefficients resulted from assess results, include attraction of information and communication technology index, we find being positive and meaningfulness of effect of information and communication and productivity of work force in industrial in Yazd is positive and meaningful, is rejected.

third model
In this model, information and communication technology index is equal to relation of employees that use computer to total work force of that unit.
By using tests related to recognition of kind of panel data model that in first model it is descripted, it is clear that this model is kind of fixed effects. We assess this model by OLS method, in result, assessed model is:

$$Ln\left(\frac{Q}{L}\right) = 2.171011 + 2.145231ict + 0.576825Ln\left(\frac{K}{L}\right) + 0.227122Ln(L) + 0.688290Ln\left(\frac{H}{L}\right)$$

Table 3: assessing product factors of industrial workshops according to Cub-Douglas product function with real indexes of relation of employees that use computer to total work force of that unit.

Name of variable	coefficient	Coefficient amount	Standard error	t statistic	Prob
Relation of employees that use computer to total work force	β_1	2.145231	0.647732	3.228926	0.0010
Physical capital	α_1	0.576825	0.031570	4.81329	0.0000

Work force	$\alpha_1+\alpha_2+\alpha_3=1$	0.227122	0.049459	4.372222	0.0423
Human capital	$\propto_3$	0.688290	0.0209879	2.729623	0.0016
Determination coefficient	R^2	0.765443			

Due to statistics related to human force variable, coefficient is meaningful that is, hypothesis H_0 that is equal to $\alpha_1+\alpha_2+\alpha_3=1$ is rejected and since resulted coefficient is negative, decreasing efficiency is accepted related to scale.
In another hand, coefficient related to information and communication index is meaningful, it means that one can conclude that relation of employees that use internet to total work force of that unit has meaningful effect on productivity of work force. Also due to meaningfulness of variable coefficient of human capital to work force one can conclude that human capital, this is, the personnel that have educational degree higher than diploma, have positive and meaningful effect on productivity of work force of own businesses. Coefficient of relation of capital to work force also is positive and meaningful, this is, productivity of work force is increased by increase relation of capital to work force.
We find from fitness of product function in this part, and coefficients resulted from assess results, include information and communication technology index to its meaningfulness on productivity of work force in industries in Yazd, and hence, posed hypothesis in beginning of investigation based on this fact that relation of information and communication technology and productivity of work force in industries in Yazd is positive and meaningful, is accepted.

fourth model
In this model, information and communication technology index is equal to percent of employees that use computer, tests related to recognize kind of panel data model in this part also represents this fact that the model is kind of fixed effects and we assess model by using OLS method.
By using tests related to recognition of kind of panel data model that in first model it is descripted, it is clear that this model is kind of fixed effects. We assess this model by OLS method, in result, assessed model is:

$$Ln\left(\frac{Q}{L}\right) = 2.162011 + 0.095231ict + 0.0580825Ln\left(\frac{K}{L}\right) + 0.303532Ln(L) + 0.538280Ln\left(\frac{H}{L}\right)$$

Table 4: assessing product factors of industrial workshops according to Cub-Douglas product function with real indexes of relation of employees that use internet to total work force of that unit.

Name of variable	coefficient	Coefficient amount	Standard error	t statistic	Prob
Relation of employees that use internet to total work force	β_1	0.231426	0.270732	2.095231	0.0010

Physical capital	α_1	4.813292	0.031570	0.580825	0.0000
Work force	$\alpha_1+\alpha_2+\alpha_3=1$	4.372222	0.049459	0.303532	0.0000
Human capital	$\propto_3$	2.459773	0.0209879	0.538280	0.0016
Determination coefficient	R^2	0.864523			

Source: research calculation

Due to statistics related to human force variable, coefficient is meaningful that is, hypothesis H_0 that is equal to $\alpha_1+\alpha_2+\alpha_3=1$ is rejected and since resulted coefficient is negative, decreasing efficiency is accepted related to scale.

In another hand, coefficient related to information and communication index is meaningful in 5 percent level, so one can conclude that relation of employees that use internet to total work force of that unit has meaningful effect on productivity of work force. Also due to meaningfulness of variable coefficient of human capital to work force one can conclude that human capital, this is, the personnel that have educational degree higher than diploma, have positive and meaningful effect on productivity of work force of own businesses. Coefficient of relation of capital to work force also is positive and meaningful, this is, productivity of work force is increased by increase relation of capital to work force.

We find from fitness of product function in this part, and coefficients resulted from assess results, include information and communication technology index to its meaningfulness on productivity of work force in industries in Yazd, and hence, posed hypothesis in beginning of investigation based on this fact that relation of information and communication technology and productivity of work force in industries in Yazd is positive and meaningful, is accepted.

VII. SUMMARY AND CONCLUSION AND SUGGESTIONS

In this chapter, we checked and analyzed information and communication technology on productivity of work force in ISIC codes of industries of Yazd by panel data during 2005 – 2010 and assess product factors by assess production function. Since we have used four information and communication technology indexes in this study. Due to F Limer and Hausman tests, real variables model is kind of fixed effects model. Due to done assess, generally below results are achieved:

1. Relation of capital to work force has positive and meaningful effect on productivity of work force in industries in Yazd.
2. Human capital has positive and meaningful effect on productivity of work force in industries in Yazd.
3. Checking attractions and scale error of product factors suggest lack of institutionalizing information and communication technology on industries in Yazd. Due to role of this technology in increasing productivity of work force, improving quality of work force, deepening capital and improving method and quality of production still application of this technology due to character of quick rate of translating it to consumer countries, are not institutionalized in industry and ground for more application of this technology and improving quality of industries in Yazd is very much.

Checking investigation hypotheses in functional research has special significance, in this part; the results of hypotheses test are descripted. As it stated in chapter one, this research includes two research hypotheses.
First hypothesis: information and communication indexes have positive and meaningful effect on productivity of work force.

As previously mentioned, in two model of assessed model, information and communication indexes have meaningful effect on productivity of work force. So one can concludes that first hypothesis of this investigation is accepted about two cases of information and communication indexes (relation of employees that use internet to total employees of business and business uses computer). From reasons of lack of effect, some the information and communication indexes on productivity of work force are:
1. Lack of education of employees and workers to use this technology.
2. Lack of using available hardware and software to doing works quickly.
3. Lack of manager's attendance to information technology and lack of familiarity with that.
4. Lack of presence of basic constructs of information and communication technology in industrial businesses.
5. Lack of presence of experienced and professional personnel in industries.
Second hypothesis: human capital has positive and meaningful relation with productivity of work force.
Due to assessed models, human capital has positive and meaningful effect on productivity of work force, so one can say the second hypothesis is accepted.
Due to results of investigation, suggestions are delivered as:
1. Information and communication technology effectiveness on productivity of work force needs supplementary factors includes investment in information and communication non-technology and skillful human force. The businesses gain information and communication technology that attend supplementary factors.
2. Attending and need to supplementary policies includes increasing investments except information and communication non-technology and skillful human force.
3. Using optimally information and communication technology needs having skill in using technology. So, educating employees can play important role in increasing productivity of work force and production.
4. Recognizing this fact that information and communication technology in which part of a business is useful, and causes increasing productivity of work force and capital, also one of matters which business owners must attend it specially in selecting information and communication technology. And encourage investor in this part by internal and external sources to improve situation of electronic grounds.
5. Avoiding new monopolies and guarantying safe competitive space in information and communication technology.
6. Character of information and communication technology is that it changes very quickly, in result; used technology in businesses quickly becomes old and retreats. So, for the business that uses information and communication technology, it is very important that accords itself with quick changes of this technology, otherwise using same old hardware and software not only doesn't causes increasing productivity of

work force, but often because of lack of accordance of its possibilities with other available technologies causes decreasing productivity of work force.
7. Advancement of government in using information and communication technology.
8. Institutionalizing using information technology and its services in industrial businesses.
9. Increasing possibilities, capacity and country relational constructs.
10. Upgrading knowledge level and computer general science for employees of industrial businesses firms by using holding continuous meetings.
11. Part of industry and University in field of upgrading individual's skill must interact with each other; University must familiarize students with these skills in field of science (software aspect) and also industry part must step in this ground for hardware, and deepen students' theoretical science with functional and applicable experience, for a country such as Iran in which youths and students, forms major part of its population, it is not proper that its young and scientific society have not sufficient skill in using internet in part of industrial businesses.
12. Using professional individuals in own situations. And there must be accordance between individual business and their education and skills.

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